

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



**Framework for energy market communications –  
Part 301: Common information model (CIM) extensions for markets**

**Cadre pour les communications pour le marché de l'énergie –  
Partie 301: Extensions du modèle d'information commun (CIM) pour les marchés**



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# INTERNATIONAL ELECTROTECHNICAL COMMISSION

## FRAMEWORK FOR ENERGY MARKET COMMUNICATIONS –

### Part 301: Common information model (CIM) extensions for markets

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International Standard IEC 62325-301 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

The text of this standard is based on the following documents:

|              |                  |
|--------------|------------------|
| FDIS         | Report on voting |
| 57/1438/FDIS | 57/1469/RVD      |

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

Throughout this document, references are made to the UML model. References to specific UML packages and classes are made by citing the name of package or class in single quotes, example, 'IEC 61970' or 'IdentifiedObject'.

A list of all parts of the IEC 62325 series, under the general title: *Framework for energy market communications*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

**IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**

## INTRODUCTION

This International Standard is part of the IEC 62325 series for deregulated energy market data exchanges. This standard was originally based upon the work of the European transmission system operators TF 14 EDI (Electronic data interchange) and the EPRI TR 1009455 and TR 1011431 (CIM extensions to support market operations, phase 1 and phase 2).

The principal objective of the IEC 62325 series of standards is to produce standards which facilitate the integration of market application software developed independently by different vendors into a market management system, between market management systems and market participant systems. This is accomplished by defining message exchanges to enable these applications or systems access to public data and exchange information independent of how such information is represented internally.

The common information model (CIM) specifies the basis for the semantics for this message exchange. The profile specifications, which are contained in other parts of the IEC 62325 standards, specify the content of the messages exchanged. Profile specifications in other parts of the IEC 62325 standard support both European style markets based on the European regulations and the Third Party Access and zonal market concepts and US style markets characterized by day ahead unit commitment by a market operator, intraday and real time balancing through central dispatch, and settlement based on locational marginal prices. These markets are used in the US and in other parts of the world and are not exclusively limited to North America.

The CIM is an abstract model that represents all the major objects in an electric utility enterprise typically needed to model the operational aspects of a utility. This model includes public classes and attributes for these objects, as well as the relationships between them.

The objects represented in the CIM are abstract in nature and may be used in a wide variety of applications. The use of the CIM goes far beyond its application in a market management system. This standard should be understood as a tool to enable integration in any domain where a market system model is needed to facilitate interoperability and plug compatibility between applications and systems independent of any particular implementation.

The IEC 62325 standards are part of a series of standards. IEC 61970 standards define the EMS application programming interfaces and the IEC 61968 standards define System interfaces for distribution management. IEC 62325-301 corresponds to the IEC 61970-301 and the IEC 61968-11 standards that describe parts of the common information model relevant to modeling interfaces for EMS, DMS and MMS systems. While there are multiple IEC standards dealing with different parts of the CIM, there is a single, unified information model comprising the CIM behind all these individual standards documents.

## FRAMEWORK FOR ENERGY MARKET COMMUNICATIONS –

### Part 301: Common information model (CIM) extensions for markets

#### 1 Scope

This part of IEC 62325 specifies the common information model for energy market communications.

The common information model (CIM) is an abstract model that represents all the major objects in an electric utility enterprise typically involved in utility operations and electricity market management. By providing a standard way of representing power system resources as object classes and attributes, along with their relationships, the CIM facilitates the integration of market management system (MMS) applications developed independently by different vendors, between entire MMS systems developed independently, or between an MMS system and other systems concerned with different aspects of market management, such as capacity allocation, day-ahead management, balancing, settlement, etc.

The CIM facilitates integration by defining a common language (i.e. semantics) based on the CIM to enable these applications or systems to access public data and exchange information independent of how such information is represented internally.

The object classes represented in the CIM are abstract in nature and may be used in a wide variety of applications. The use of the CIM goes far beyond its application in a market management system.

Due to the size of the complete CIM, the object classes contained in the CIM are grouped into a number of logical packages, each of which represents a certain part of the overall power system being modeled. Collections of these packages are progressed as separate international standards. This particular international standard specifies a set of packages which provide a logical view of the functional aspects of market management within an electricity market that is shared between all applications. Other standards specify more specific parts of the model that are needed by only certain applications. Subclause 4.2 provides the current grouping of packages into standards documents.

#### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61968-11, *Application integration at electric utilities – System interfaces for distribution management – Part 11: Common information model (CIM) extensions for distribution*

IEC 61970-301, *Energy management system application program interface (EMS-API) – Part 301: Common information model (CIM) base*

IEC 62325-450, *Framework for energy market communications – Part 450: Profile and context modelling rules*

Object management group: *UML 2.0 specification* – available at <<http://www.omg.org>>



### 3 Terms, definitions and abbreviations

For the purposes of this document, the terms and definitions given in IEC 61970-2 as well as the following apply.

#### 3.1 Terms and definitions

##### 3.1.1

##### **Application program interface**

##### **API**

set of public functions provided by an executable application component for use by other executable application components

[SOURCE: IEC 61970-2:2004, 3.4]

##### 3.1.2

##### **CIM model manager**

CIM compliant model manager

##### 3.1.3

##### **Extensible markup language**

##### **XML**

is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable

##### 3.1.4

##### **XML schema description**

##### **XSD**

is an XML-based language used to describe and control XML document contents

##### 3.1.5

##### **intra-day markets**

intra-day scheduling markets which refine the commitment and schedules produced by the day ahead markets

##### 3.1.6

##### **load forecast**

load forecast system which predicts load for the specified time horizon

##### 3.1.7

##### **Market management system**

##### **MMS**

computer system comprising a software platform that provides basic support services and a set of applications with the functionality needed for the effective management of the electricity market

Note 1 to entry: These software systems in an electricity market may include support for capacity allocation, scheduling energy, ancillary or other services, real-time operations and settlements.

##### 3.1.8

##### **scheduler**

scheduling system for resources

##### 3.1.9

##### **third party access**

concept in market management systems which allows third parties to use the transmission system on an equal basis

**3.1.10****Unified modeling language  
UML**

modeling language in the field of object-oriented software engineering that is maintained by the Object Management Group

**3.1.11****RDF schema  
RDFS**

W3C recommendation which provides basic elements for the description of ontologies

**3.1.12****Ontology web language  
OWL**

W3C recommendation which provides a knowledge representation language for authoring ontologies

**3.2 Abbreviations****3.2.1****B and S**

billing and settlement

**3.2.2****CRR**

congestion revenue rights

**3.2.3****DAM**

day ahead market which determines the commitment and schedules of resources

**3.2.4****DMS**

distribution management system

**3.2.5****EMS**

energy management system

**3.2.6****MDMS**

meter data management system

**3.2.7****RTM**

real time markets which finalize dispatch for system resources

**4 CIM specification****4.1 CIM modeling notation**

The CIM is defined using object-oriented modeling techniques. Specifically, the CIM specification uses the unified modeling language (UML) notation, which defines the CIM as a group of packages.

Each package in the CIM contains one or more class diagrams showing graphically all the classes in that package and their relationships. Each class is then defined in text in terms of its attributes and relationships to other classes.

The UML notation is described in Object Management Group (OMG) documents and several published textbooks.

## 4.2 CIM packages

The CIM is partitioned into a set of packages. A package is a general purpose means of grouping related model elements. The packages have been chosen to make the model easier to design, understand and review. The common information model consists of the complete set of packages. Entities may have associations that cross many package boundaries. Each application may use information represented in several packages.

The comprehensive CIM is partitioned into groups of packages for convenience in managing and maintaining them. IEC 62325-301 includes the following packages:

- 'MarketCommon'
- 'MarketManagement'
- 'MarketOperations'

Packages used by the IEC 61970-301 standard and packages used by the IEC 61968-11 standard describe additional parts of the CIM that deal with other logical views of utility operations including wires, topology, generation, load, outages, assets, location, activities, consumers, documentation, work management, and distribution-specific network models.

NOTE The package boundaries do not imply application boundaries. An application may use CIM entities from several packages.

Figure 1 shows package dependencies. The 'IEC 62325' package and its subpackages depend on the 'IEC 61970' and 'IEC 61968' packages. The 'IEC 61970' package is used by the IEC 61970 series of standards as a core model that represents power system resources and their relationships. The 'IEC 61968' package is used by the IEC 61968 series of standards describing logical views of utility operations, including assets, location, activities, customers, documentation, work management and metering models. The dashed line indicates a dependency relationship, with the arrowhead pointing from the dependent package to the package on which it has a dependency.

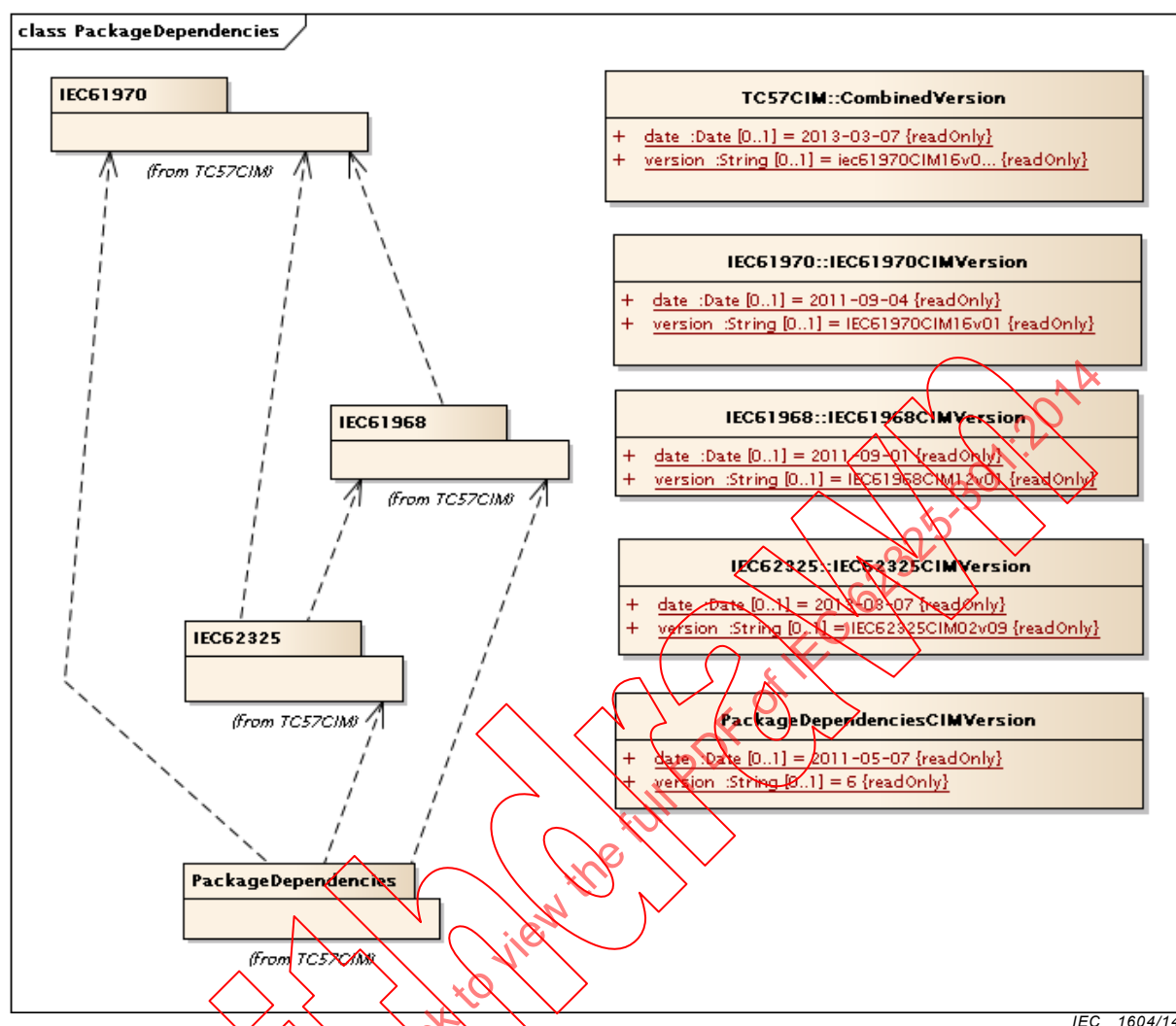


**Figure 1 – 'TC 57CIM' package dependency diagram**

Figure 2 shows the packages defined for IEC 62325-301 and their dependency relationships. The dashed line indicates a dependency relationship, with the arrowhead pointing from the dependent package to the package on which it has a dependency.

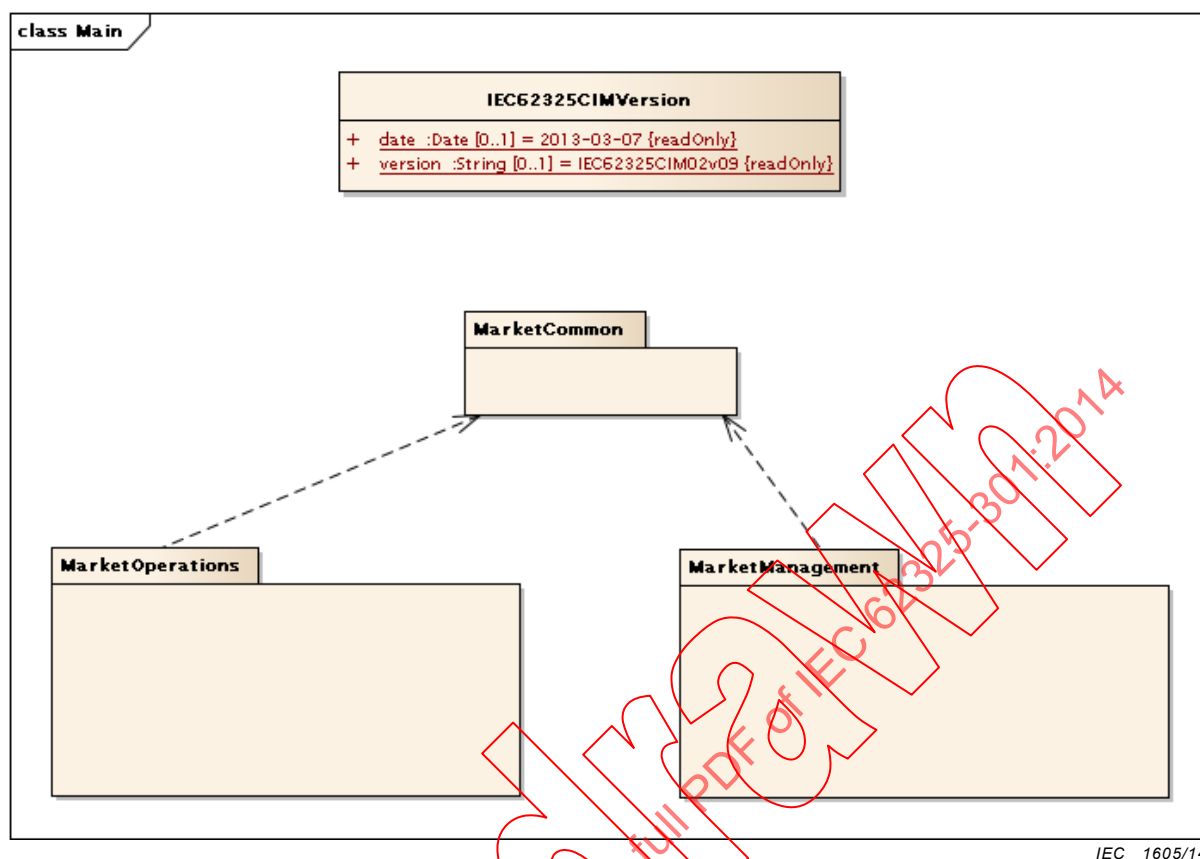


Figure 2 – 'IEC 62325' package dependency diagram

Clause 6 contains the specification for each of the CIM packages.

NOTE The contents of the CIM defined in this specification were auto-generated from the CIM UML electronic model release IEC 62325CIM02v09, which is available through the CIM Users Group.

### 4.3 CIM classes and relationships

#### 4.3.1 Classes

The class diagram(s) for each CIM package shows all the classes in the package and their relationships. Where relationships exist with classes in other packages, those classes are also shown.

Classes and objects model what is in a power system that needs to be represented in a common way to market applications. A class is a description of an object found in the real world, such as a bid, registered resource, or registered load that needs to be represented as part of the overall electricity market in an MMS. Other types of objects include things such as schedules and measurements that MMS applications also need to process, analyze, and store. Such objects need a common representation to achieve the purposes of this standard for plug-compatibility and interoperability. A particular object in a power system with a unique identity is modeled as an instance of the class to which it belongs.

The CIM is defined to facilitate data exchange. As defined in this document, CIM entities have no behavior. IEC 62325-450 *Profile and context modeling rules* defines the modeling principles to generate a profile and the modeling framework principles to define the message payload.

Classes have attributes that describe the characteristics of the objects. Each class in the CIM contains the attributes that describe and identify a specific instance of the class. Only the

attributes that are of public interest to MMS applications are included in the class descriptions.

Each attribute has a type, which identifies what kind of attribute it is. Typical attributes are of type 'Integer', 'Float', 'Boolean', 'String', 'Datetime', 'Date', 'Duration', and 'Decimal', which are called primitive types. However, many additional types are defined as part of the CIM specification. For example, 'RegisteredGenerator' has a "maxDependableCap" attribute of type 'ActivePower'. The definition of many shared types is contained in the 'Domain' package described in Clause 6. The UML stereotypes of 'Primitive', 'Enumeration', 'CIMDatatype', and 'Compound' are added to classes used as types:

- The 'CIMDatatype' stereotype is used with a specific CIM semantics to describe a type that has several attributes {'value', 'unit', 'multiplier', 'denominatorUnit', 'denominatorMultiplier'}, which implies custom mapping to serialization artifacts such as RDFS, OWL, and XSD. Classes with these stereotypes do not participate in generalization or association relationships and are simply used as types for attributes.
- The 'enumeration' stereotype is used to describe the type of an attribute with an enumerated list of choices.
- The 'Compound' stereotype is used to describe sets of related attributes that are commonly reused. 'Compound' classes may consist of attributes whose types are 'Primitive', 'enumeration', 'CIMDatatype' or other 'compound' classes as long as the 'compound' classes do not recurse.

All CIM attributes are implicitly optional in the sense that profiles using the CIM may eliminate any attributes.

Relationships between classes reveal how they are structured in terms of each other. CIM classes are related in a variety of ways, as described in 4.3.2, 4.3.3 and 4.3.4.

#### 4.3.2 Generalization

A generalization is a relationship between a more general and a more specific class. The more specific class can contain only additional information. For example, 'RegisteredGenerator' is a specific subclass of 'RegisteredResource'. Generalization provides for the specific class to inherit attributes and relationships from all the more general classes above it.

Figure 3 is an example of generalization. In this example taken from the 'MarketCommon' package, a 'MarketParticipant' is a more specific type of 'Organisation'. 'Organisation' also inherits from 'IdentifiedObject'.



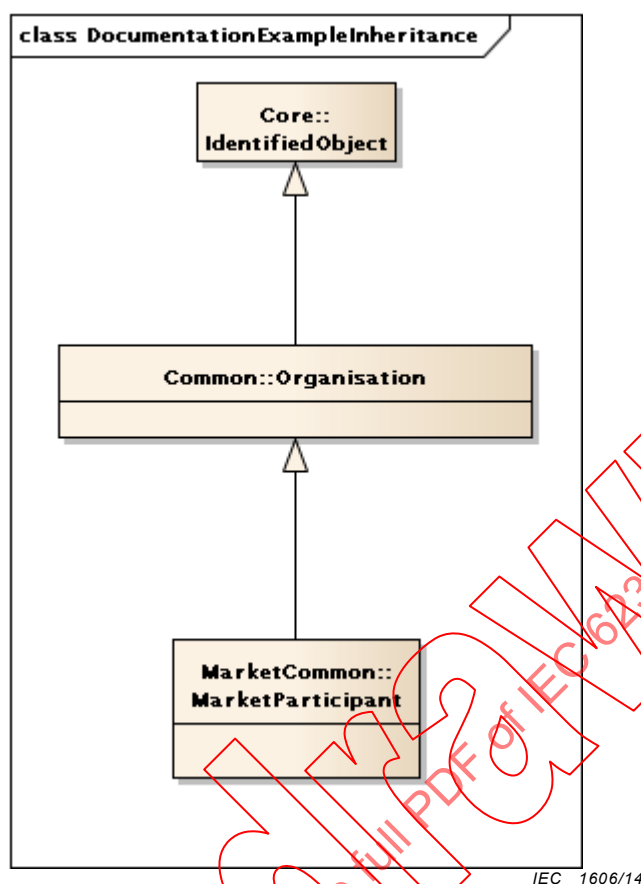


Figure 3 – Example of generalization

#### 4.3.3 Simple association

An association is a conceptual connection between classes. Each association has two “association ends”. The “association ends” were called “roles” prior to the UML 2.0 *specification*. Each association end describes the role the target class (i.e., the class the association end goes to) has in relation to the source class (i.e., the class the association end goes from). Association ends are usually given the name of the target class with or without a qualifier term (verb, noun, adverb) phrase. Each association end also has multiplicity/cardinality, which is an indication of how many objects may participate in the given relationship. In the CIM, associations are not named, only association ends are named. For example, in the CIM there is an association between a ‘MarketParticipant’ and ‘MarketRole’ (See Figure 4 which is taken from the ‘MarketCommon’ package). Multiplicity is shown at both ends of the association. In this example, a ‘MarketParticipant’ object may reference 0 or more ‘MarketRole’ objects and a ‘MarketRole’ may be referenced by 0 or more ‘MarketParticipant’ objects.

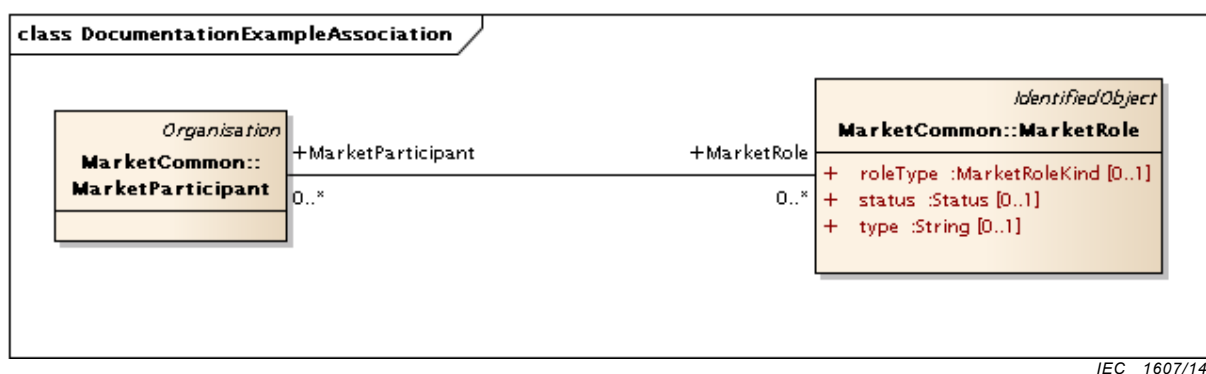


Figure 4 – Example of simple association

#### 4.3.4 Aggregation

Aggregation is a special case of association. Aggregation indicates that the relationship between the classes is some sort of whole-part relationship, where the whole class “consists of” or “contains” the part class, and the part class is “part of” the whole class. The part class does not inherit from the whole class as in generalization. Figure 5 illustrates an aggregation between the ‘EnergyProfile’ class and the ‘EnergyTransaction’ class, which is taken from the ‘ExternalInputs’ package. As shown, an ‘EnergyProfile’ can be a member of one ‘EnergyTransaction’ object, but an ‘EnergyTransaction’ object can contain any one or more of ‘EnergyProfile’ objects. In the context of using CIM as an information model, aggregation does not have a precise or formal interpretation beyond a simple association and is intended to visually assist in representing normal usage.

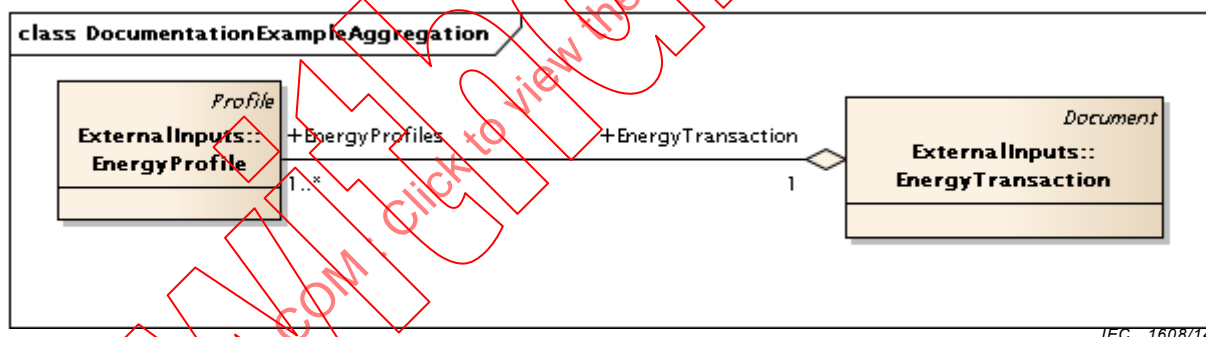


Figure 5 – Example of aggregation

### 4.4 CIM model concepts and examples

#### 4.4.1 ‘MarketCommon’ package

The common market model describes the market participants and the role they are assuming in the market. Defined market roles are supplied by a list (‘MarketRoleKind’). A market participant could play several roles in a market, as shown in Figure 6.

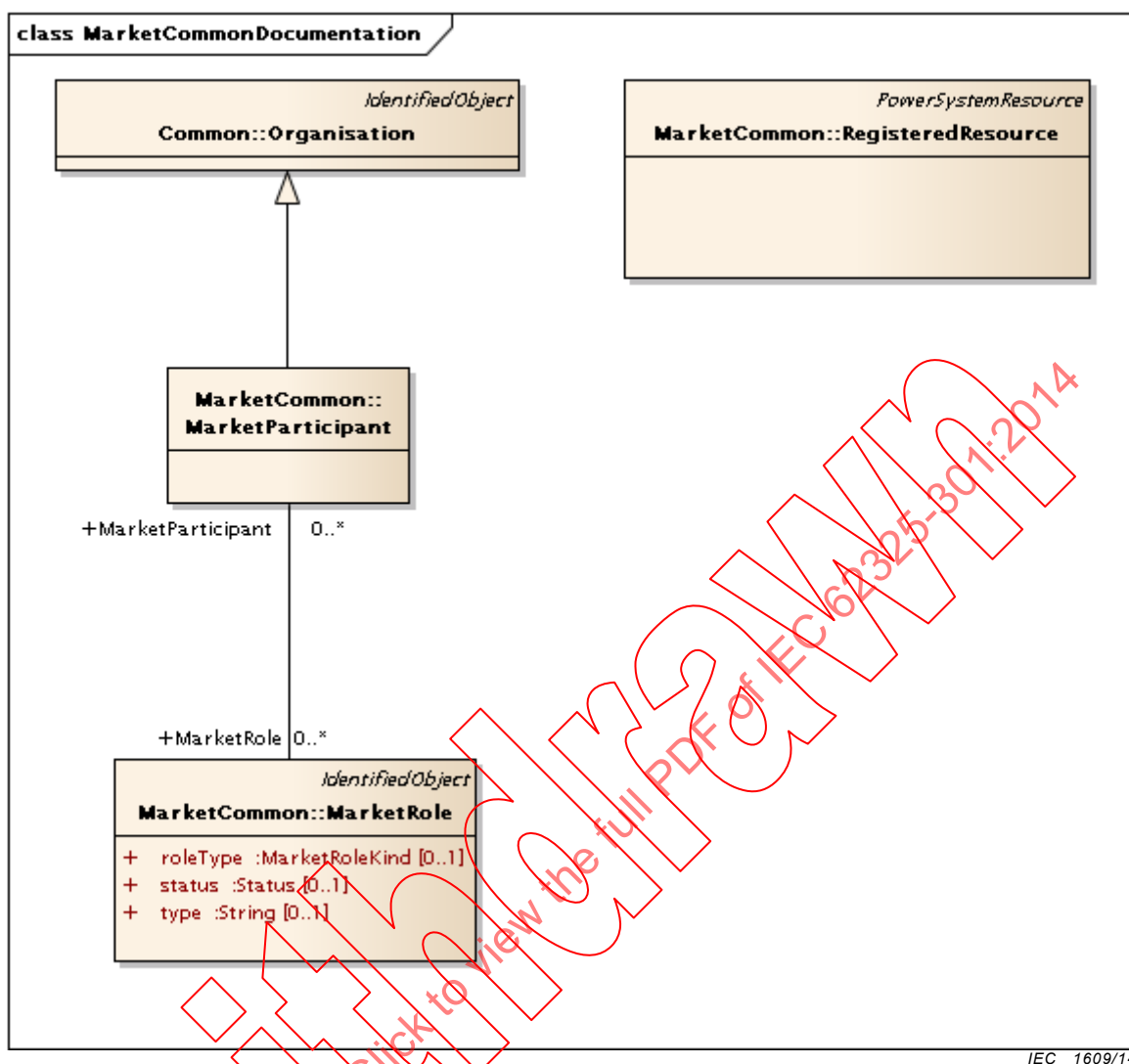


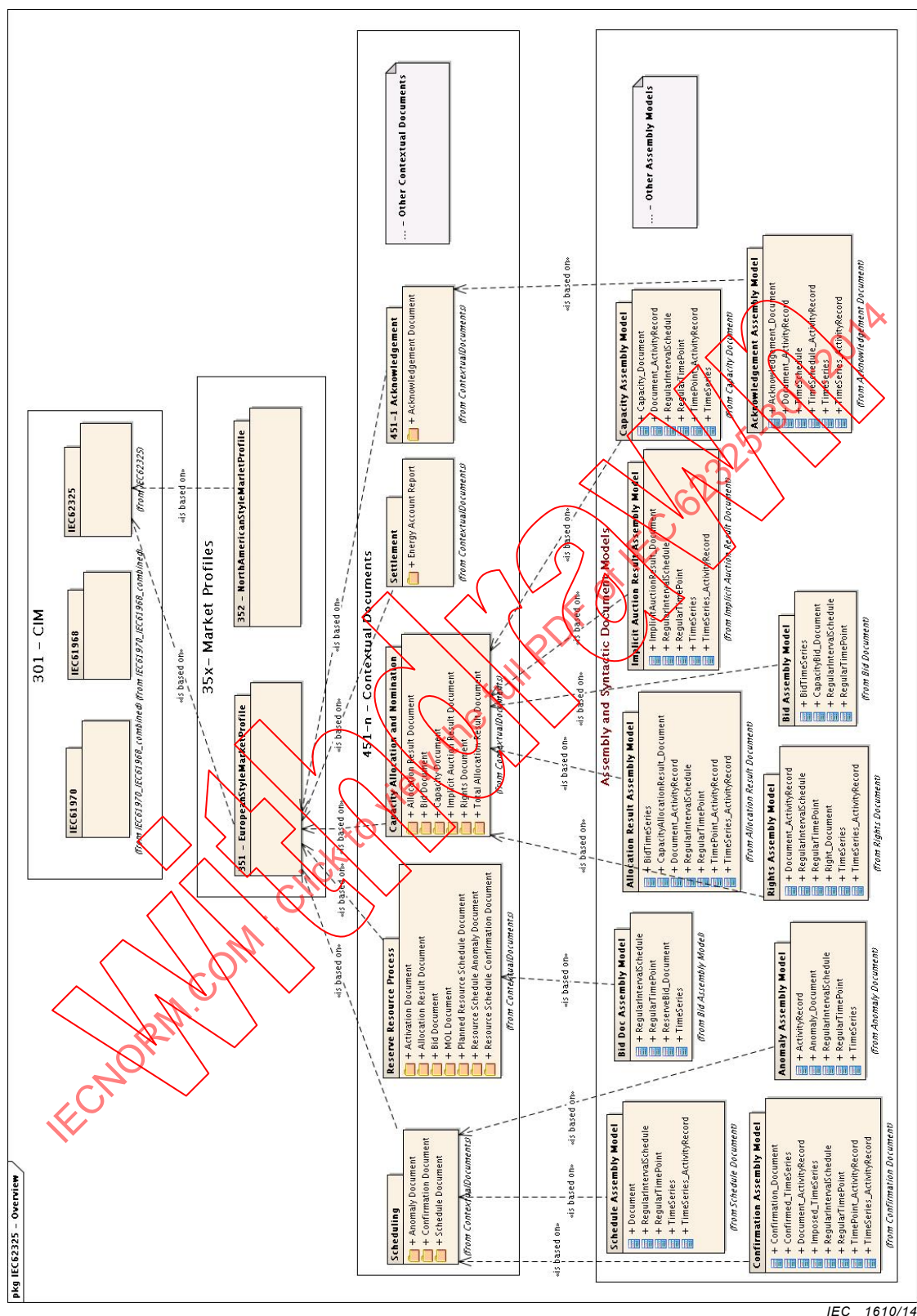
Figure 6 – Common market model

#### 4.4.2 'MarketManagement' package

The market management model describes a consistent set of classes to be used together with the common market model to generate a profile. The profile, in such a case, is to be used when the electricity market is mainly based on regulated Third Party Access, i.e. transmission system operators have to allow any electricity supplier non-discriminatory access to:

- the transmission network to supply customers
- and the wholesale and retail market transactions (bilateral or through a power exchange) being the way to exchange the energy

The 'MarketManagement' package refers to what is later called the European style market. Figure 7 shows an overview of the layered modeling framework to build from the CIM down to the specification of messages. This layered modeling framework defines the way from the CIM concepts of the 'MarketManagement' package through the definition of a market profile to generate the contextualized documents for information exchange.



IEC 1610/14

Figure 7 – Market management model overview

As shown in Figure 7, for each business process necessary to run an electricity market, a dedicated set of contextualized documents is provided. As indicated in Figure 7, the market profiles are specified in IEC 62325-351 and the contextual documents are described in IEC 62325-451-1, IEC 62325-451-2, etc.

Figure 8 shows the classes of the ‘MarketManagement’ package.

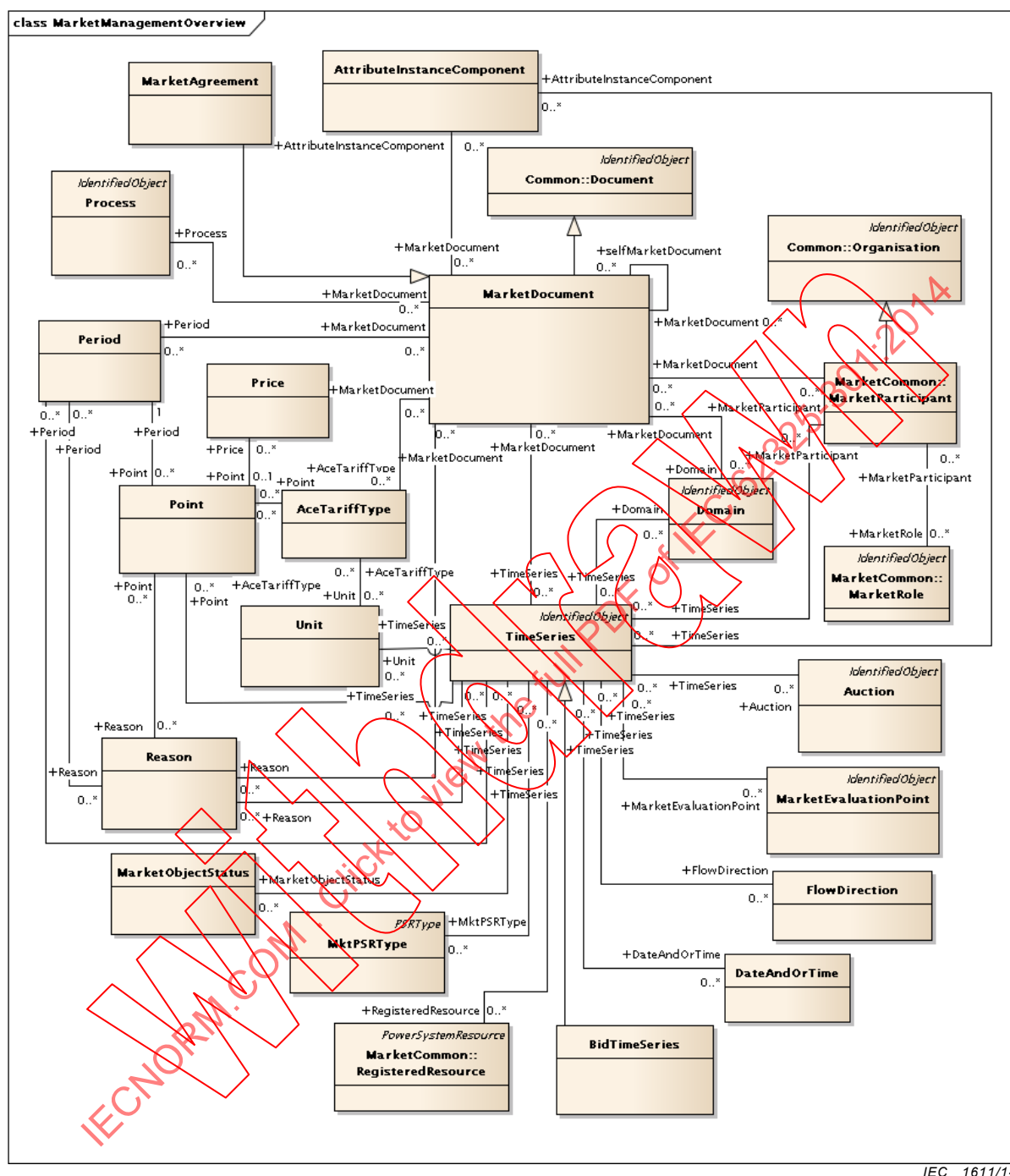


Figure 8 – Market management model

In this market management model a key role is given to the concept of ‘MarketDocument’, i.e. the transactions on the electricity market are based on contractual exchanges of information between market participants through a given set of documents depending upon the business process.

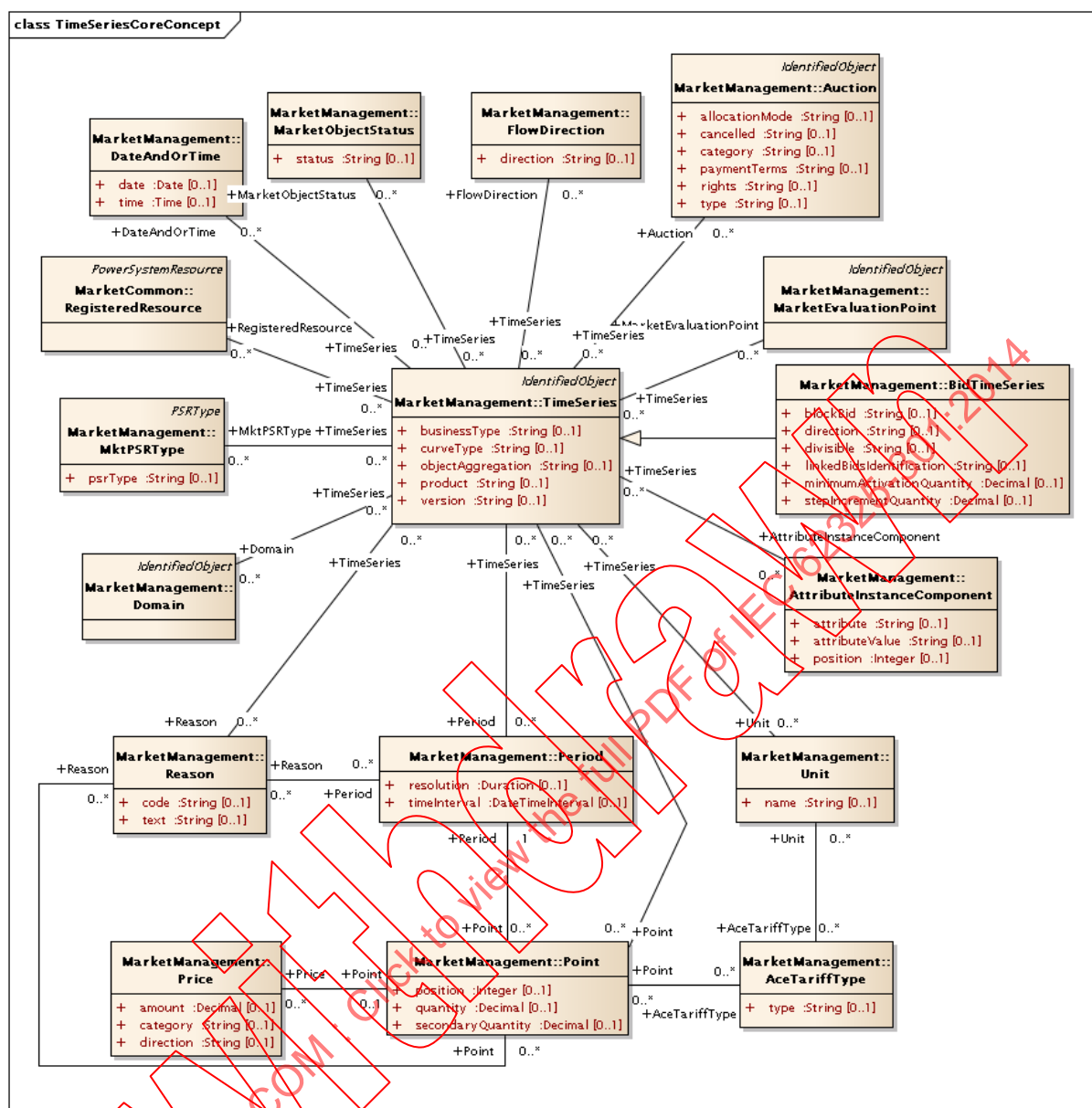
As shown in Figure 7, for each business process necessary to run an electricity market, a dedicated set of contextualized documents is provided. As an example, here is a non-exhaustive list of processes:

- The acknowledgment process: As the information exchange is based on contractual exchanges, it is of matter to have a functional acknowledgment for the exchanged document, and not only a technical acknowledgment;
- The scheduling process: This process describes the way of exchanging information related to schedules, i.e. generation schedules, load schedules, bilateral trade schedules, power exchanges trade schedules, etc;
- The settlement process: This process describes how to exchange the information necessary to settle the electricity market, i.e. the comparison of the scheduled energy and the actual meters;
- The transmission capacity allocation and nomination process: This process describes the explicit and implicit auctions of transmission capacity for cross border trades. It includes also the secondary market of capacity rights, i.e. the resell of capacity rights;
- The reserve resource process: This process describes the way resources, i.e. the generation units and the dispatchable load, are scheduled, and capacity is auctioned and in particular the activation by the system operator of the tertiary reserve for balancing purpose;
- etc.

The 'Process' class (see Figure 8) enables to define for a given document the process to which the information flow is directed. For example, the "schedule document" can be used in different processes such as "forecast", "long term", "day ahead", "intra day" etc.

Within a 'MarketDocument', another important concept is to be underlined, i.e. the 'TimeSeries' concept (see Figure 9) based on which market participants (i.e. 'MarketParticipant' class) playing a role (i.e. 'MarketRole' class) in a market business process (i.e. 'Process' class) can exchange schedules of volume/price related to an energy domain area (i.e. 'Domain' class) for a given business type (such as "internal trade", "cross-border trade", "primary reserve", "secondary reserve", "tertiary reserve", etc.). These documents are the basis on which all exchanges are built in order to manage energy exchanges, bid, capacity allocation, energy reserve resources, and settlement.





IEC 1612/14

Figure 9 – ‘MarketManagement’ ‘TimeSeries’ core concept

To handle quantities and prices in a contractual way for the electricity market, attributes of type ‘Decimal’ have been introduced in the modeling.

#### 4.4.3 ‘MarketOperations’ package

##### 4.4.3.1 Market operations

The ‘MarketOperations’ package describes a consistent set of classes to be used together with the common market model (and other parts of the CIM described in IEC 61970-301 and IEC 61968-11) to generate a profile. The profile, in such a case, is to be used for US style electricity market that is mainly characterized by day ahead unit commitment by a market operator, intraday and real time balancing through central dispatch, and settlement based on locational marginal prices.

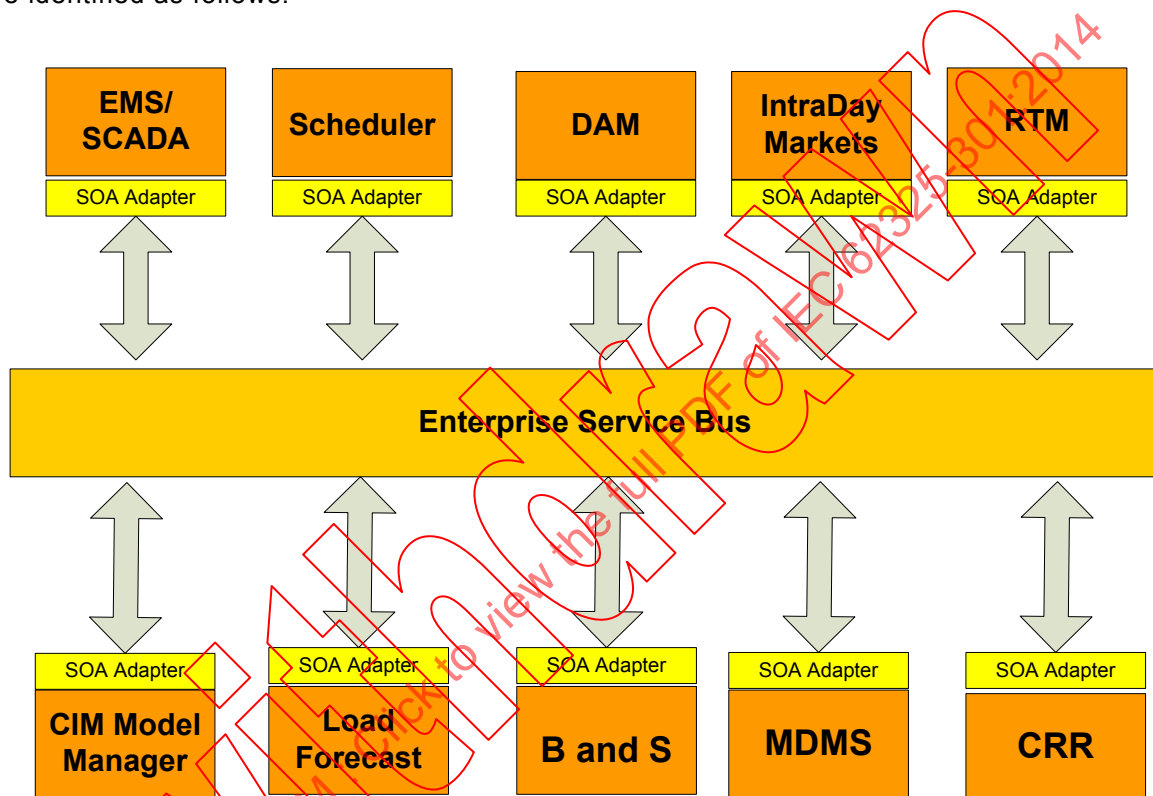
This kind of US style electricity market also includes the auction of congestion revenue rights which are financial instruments that market participants purchase to hedge against congestion

costs. Meter data management and billing and settlement are also included. The 'MarketOperations' package includes models to support these characteristics.

Subclauses 4.4.3.2 through 4.4.3.6 describe major concepts referenced in the 'MarketOperations' package.

#### 4.4.3.2 Market operator software systems

Figure 10 shows the software systems of a typical operator of US style electricity markets that are referenced in the 'MarketOperations' package. The market operator may also be known as a regional transmission operator (RTO) or independent system operator (ISO). The systems are identified as follows:

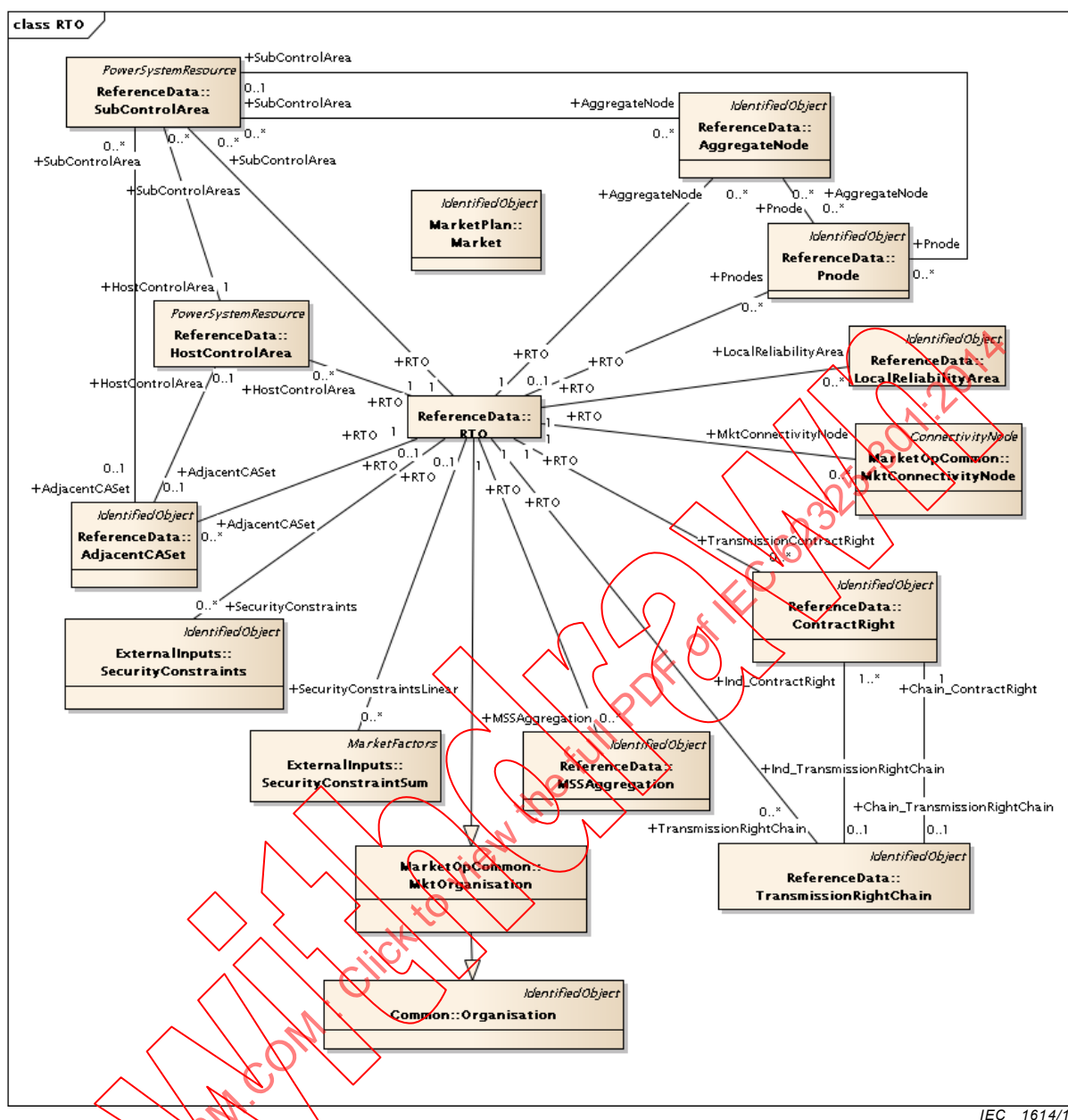


IEC 1613/14

Figure 10 – Market operator software systems for US style electricity markets

#### 4.4.3.3 Regional transmission operator interfaces

Figure 11 illustrates an overview of the UML interface model for a regional transmission operator (RTO) to support the interfaces illustrated in Figure 10. The major classes are briefly summarized: The classes 'AggregateNode' and 'Pnode' are used to model pricing nodes where locational marginal prices are averaged with a weighted average calculation. The class 'LocalReliabilityArea' is used to identify and model load pockets within the RTO. The class 'MktConnectivityNode' is used to extend the IEC 61970 'ConnectivityNode' class with market data. The classes 'TransmissionRightChain', 'ContractRight', and 'MSSAggregation' are used to model legacy contracts for use of the transmission system and to represent grandfathered transmission ownership rights. The classes 'Organisation' and 'MktOrganisation' identify the RTO. The classes 'SecurityConstraints' and 'SecurityConstraintSum' are used to model system constraints such as nomograms that approximate transient stability constraints. The classes 'HostControlArea', 'SubControlArea', and 'AdjacentCAsSet' are used to model data to support control area operations. Resource models and participating transmission owner data are included through associations with their associated classes. More details of the RTO model are included in Clause 6.



IEC 1614/14

Figure 11 – Regional transmission organization for US style electricity market

#### 4.4.3.4 Resource model

Figure 12 illustrates a high level view of the UML model that supports the resource model data for US style electricity market. The class 'RegisteredResource' is a parent class with the following subclasses: 'RegisteredLoad', 'RegisteredInterTie', and 'RegisteredGenerator'. The 'RegisteredResource' class has associations with the classes 'AggregateNode', 'Pnode' and 'MktConnectivityNode' to support aggregated and physical resources. The associations to the 'AggregateNode' and to 'AggregatedPnode' (association is inherited from 'Pnode') support the aggregated resource definition on an aggregated node or aggregated pricing node basis. The associations to 'IndividualPnode' (inherited from 'Pnode') and 'MktConnectivityNode' support the physical resource definition on a pricing or connectivity node basis. Additional associations are also available through the subclasses 'RegisteredLoad', 'RegisteredInterTie' and 'RegisteredGenerator' to support both aggregated and physical resources by a direct tie to the physical resources defined in the power system network model. 'RegisteredLoad' has the association to 'MktEnergyConsumer', 'RegisteredInterTie' has the association to 'Flowgate' and 'RegisteredGenerator' has the association to 'MktGeneratingUnit'

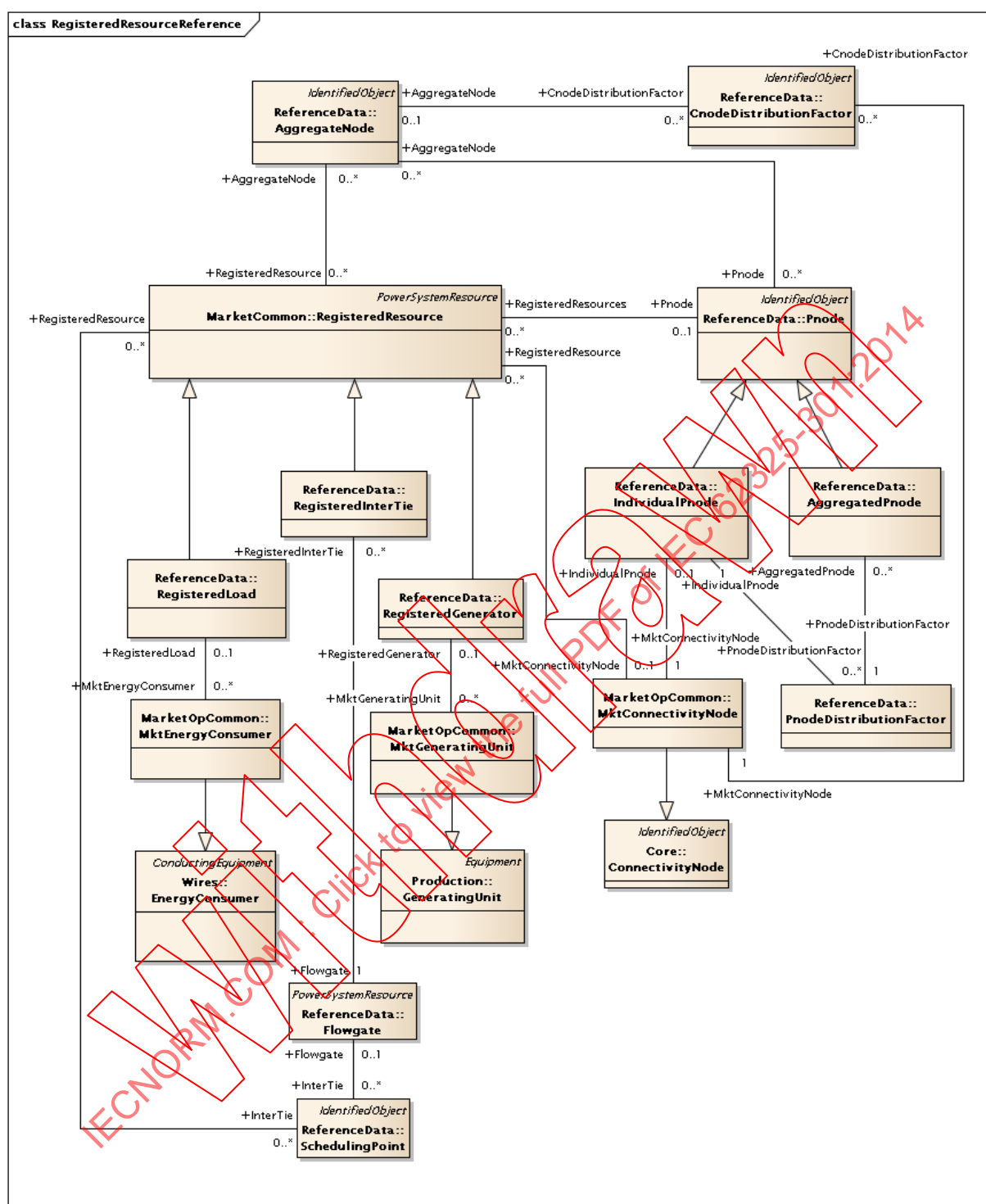


**Figure 12 – Registered resource reference definition for US style electricity market**

#### 4.4.3.5 Bid/Offer model

US style electricity markets are based on offers to sell and bids to buy electricity products that are cleared by a market operator subject to network and resource constraints. Bids and offers include price quantity pairs and technical data related to the ability of the market participant to deliver the quoted products.

Figure 13 shows the overview of the classes and associations that are used to model offers and bids. The term bid is used to include offers to sell and bids to buy one or more electricity

products. The 'Bid' class is a subclass of the 'Document' class from the 'IEC 61968' package. Bids are further classified as 'ResourceBids' or 'TransactionBids'. 'Resource' bids are bids that are based on physical (or virtual) resources that are inside the footprint of the RTO and thus under the direct operational control of the RTO. 'TransactionBids' are bilateral agreements made between market participants that are reported to the RTO for inclusion as constraints in the market clearing. The RTO determines whether the bilateral agreements can be consummated while maintaining system reliability standards.

Bids are associated with scheduling coordinators that submit them on behalf of market participants as shown by the association between the 'Bid' class and the 'SchedulingCoordinator' class. While the association between the 'Bid' class and the 'SchedulingCoordinator' class is optional, it shall be noted that if this association is optional, then the association between the 'Bid' class and the 'MarketParticipant' class shall be required. That is, while both associations to the 'Bid' class are optional in the model, if either one or both are contained in the profile, at least one of the associations between the 'Bid' class and the 'SchedulingCoordinator' or the 'MarketParticipant' is required.

The bid class has a relationship to the 'BidProduct' class and to the 'MarketProduct' classes. These associations are used to model the submittal of bids for energy and ancillary services. A further association between the 'Bid' class and the 'Market' class indicates which market the bid is intended for (day ahead, real time, etc)

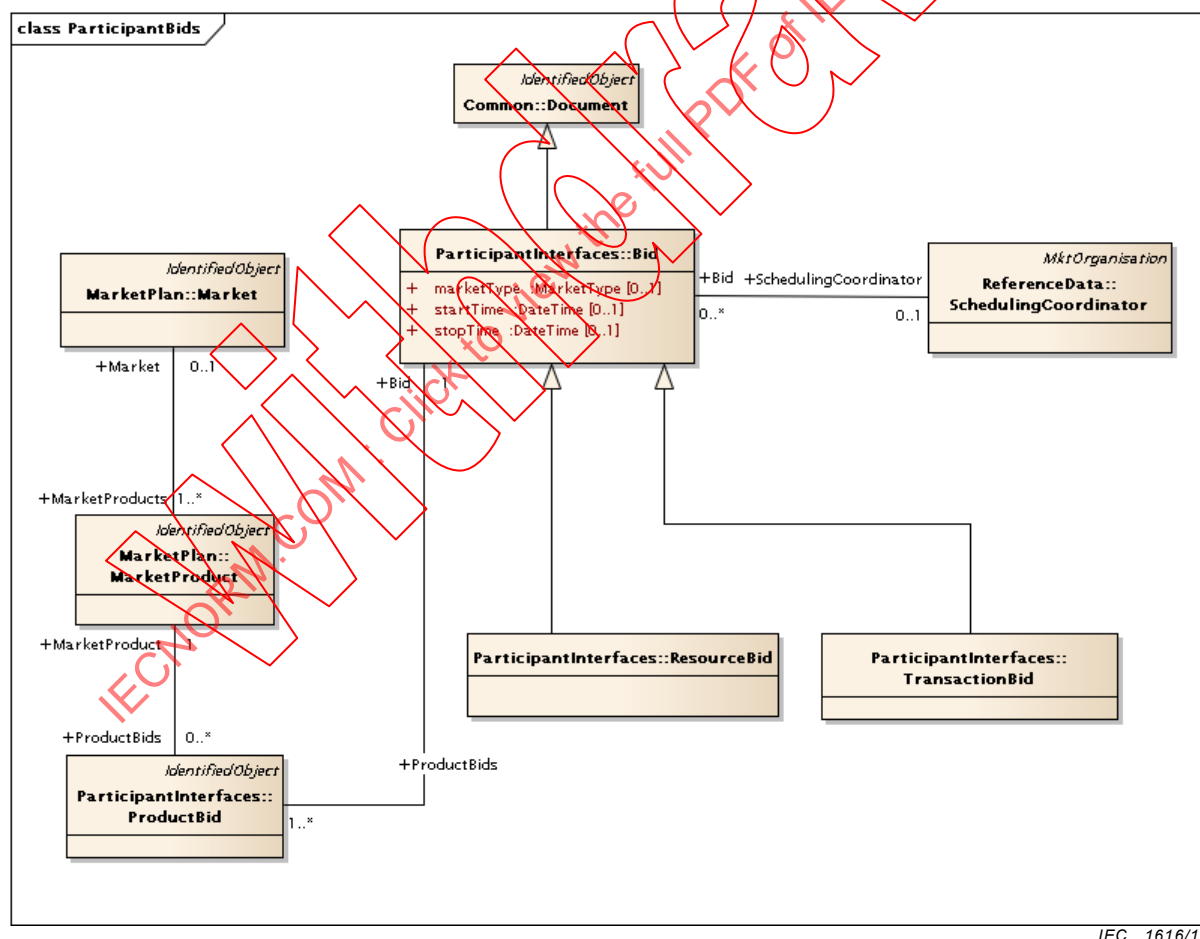


Figure 13 – Bid definition for US style electricity market

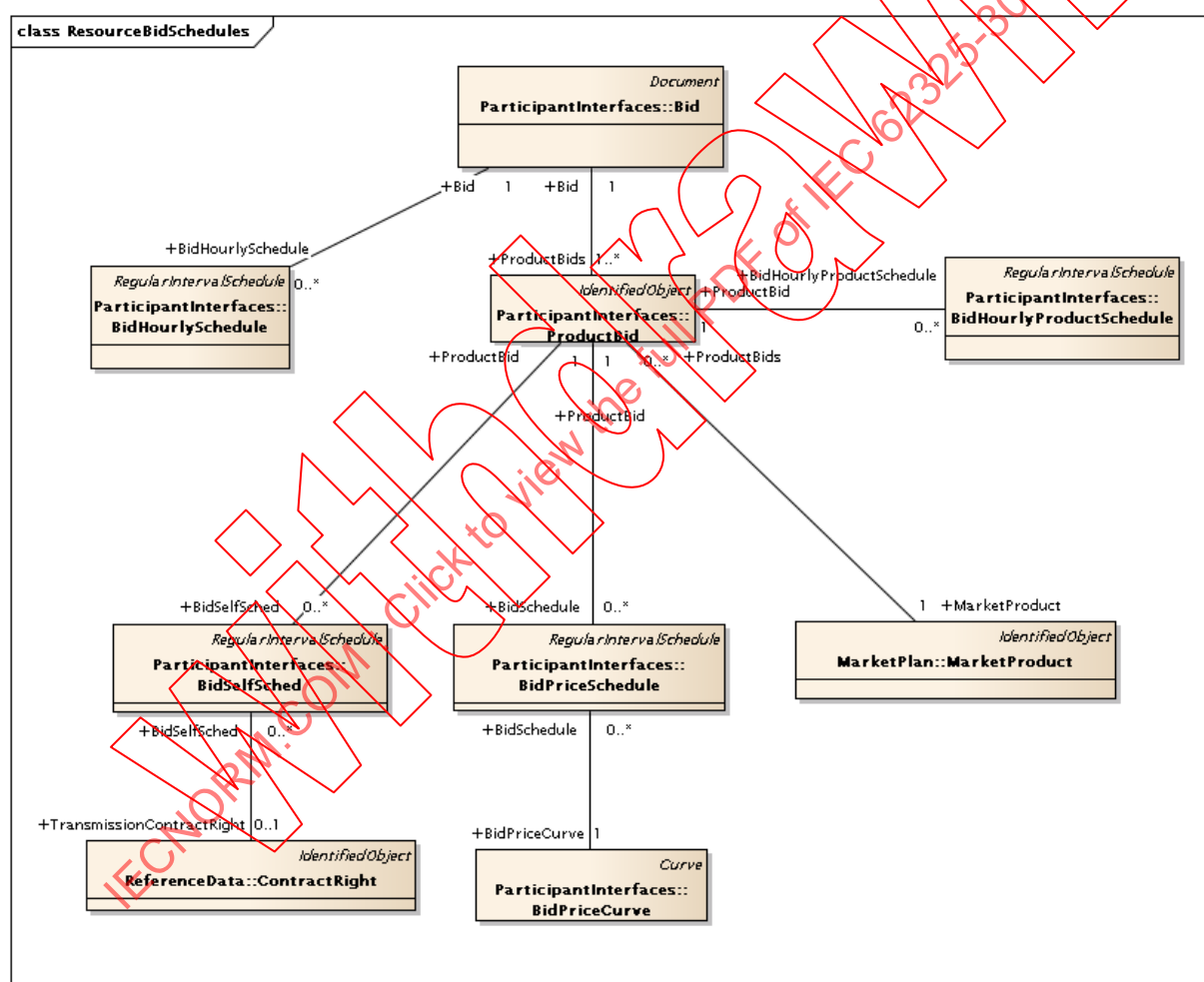
Figure 14 shows further details of bids/offers.

The 'Bid' class is associated with a 'ProductBid' class, which in turn is associated with the 'BidPriceSchedule' class. The class 'BidPriceSchedule' defines bid schedules to allow a

product bid to use specified bid price curves for different time intervals. This simplifies the modeling of bids that are made for multi-interval time horizons. The bid schedule is the set of consecutive intervals for which the bid is valid.

A bid may also be a self schedule, meaning that the market participant would like to operate the resource according to a certain (for example minimum) schedule. The market operator determines whether this resource can run with the submitted self schedule while system reliability criteria are met. These self schedules are settled at the LMPs determined during the market clearing. The class 'Bid' is associated with the class 'ProductBid', which is associated with the class 'BidSelfSchedule' to support the modeling of self schedules. The class 'BidSelfSched' is associated with the class 'ContractRight' which may be used to model the use of legacy contracts to support self schedules

This model also supports bids with part of the range of bid classified as a self schedule and part as regular bid.



IEC 1617/14

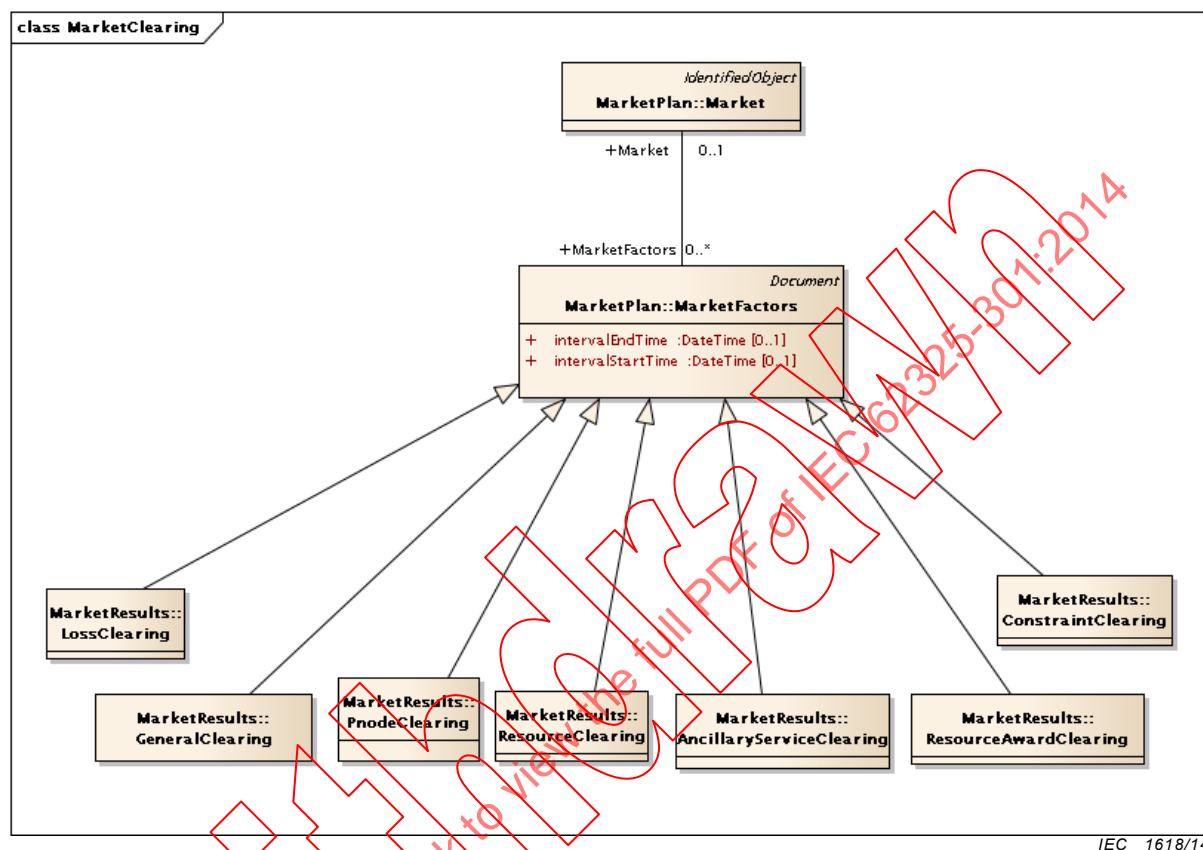
Figure 14 – Resource bid schedule definitions for US style electricity market

#### 4.4.3.6 Market clearing results

Figure 15, illustrates the major classes used to communicate the results of a market clearing run for a US style electricity market. The class 'Market' is used to model the type of market (day ahead, real time, or intraday). The class 'MarketFactors' is used to model the market time horizon. The class 'LossClearing' is used to model electrical losses during the market horizon. The class 'GeneralClearing' is used to model the identity of the market interval. The class 'PnodeClearing' and its associations are used to model the cleared prices (locational



marginal prices) of the run. The class 'ResourceClearing' is used to model market clearing results on a resource basis. The class 'AncillaryServiceClearing' is used to model the clearing results for ancillary services on a market region basis. The class 'ResourceAwardClearing' is used to model further details of the resource clearing. The class 'ConstraintClearing' is used to model the exchange of data on constraints which are binding constraints in the optimal market clearing solution.



IEC 1618/14

Figure 15 – Market clearing for US style electricity market

## 4.5 Modeling guidelines

### 4.5.1 Modeling for change

IEC 62325-301 defines the CIM along with IEC 61970-301 and IEC 61968-11.

### 4.5.2 Process for amendments to the CIM

It may be desirable to amend the CIM to either revise the existing model or to extend the CIM to model additional elements of an electric utility power system. The recommended process for such amendments is as follows.

- Prepare a use case(s) to describe the desired changes. This should include proposed changes to the appropriate class diagrams showing new/revised classes, attributes, and associations.
- The use case(s) is then reviewed by the appropriate working group to decide if the requested changes should be treated as revisions to the current CIM standard, or if they should be treated as private amendments, not requiring a change to the standard itself.
- Proposed amendments accepted by the working group will be added to a list of outstanding issues, and at the appropriate time, a new version of the CIM model will be prepared and an update made to the appropriate IEC CIM specification.

### 4.5.3 Changes to the CIM UML model

From a modeling perspective, when the CIM is extended, the approach is to start with the existing CIM UML model. The extensions may be added in any of several ways that are available in UML, but in all cases the approach is to inspect the current model and determine the best way to build off of the existing class diagrams. The extensions may take the form of any of the following, starting from the simplest to the most complex:

- adding additional attributes to existing classes;
- adding additional associations between two existing classes;
- adding new classes that are specializations of existing classes;
- adding new classes via associations with existing classes.

The main objective is to reuse the existing CIM to the maximum extent possible. From a packaging point of view, extensions should be made to existing packages where possible. If the extensions comprise a new domain of application, then consideration should be given to creating a new package for the additions, but still creating the necessary associations to the existing package, keeping in mind that even though a new package is being created, the CIM is still a single model.

### 4.5.4 Changes to the CIM standards documents

From a documentation perspective, when the CIM is extended, a decision shall be made whether the changes constitute updates to existing CIM standards documents, or whether a new part 3xx specification is required. In either case, the extensions will then become part of the IEC standard CIM.

### 4.5.5 CIM profiles

An implementation of the CIM need not include all classes, attributes, or associations in the standard CIM specification to be compliant with the CIM standard. Profiles may be defined to specify which elements shall be included (i.e., mandatory elements) in a particular use of the CIM, as well as which are optional. These profiles are defined in the Part 35X, and 45x series of standards and shall be based on the modeling rules defined in IEC 62325-450.

In IEC 62325-450, the definition of CIM profiles follows a layered modeling framework to go from the CIM information model down to the specification of messages based on CIM concepts through the definition of different regional contextual models and their subsequent contextualized documents for information exchange.

A full discussion of the rules for IEC 62325 series profiles is presented in the IEC 62325-450 document. Please refer to this document for a complete explanation and a full description of these rules.

## 4.6 Modeling tools

The entire CIM UML model exists as an Enterprise Architect project file and is viewable with that tool, including the class diagrams and descriptions of classes, attributes, types, and relationships. Viewing the CIM in this fashion provides a graphical navigation interface that permits all CIM specification data to be viewed via point-and-click from the class diagram in each package. A free viewer is available through Sparx Systems.

Ideally, the CIM information model is independent of any specific UML tool, though experience has shown that exchanges between different tools are often less than perfect. Until tool interoperability is proven effective, future changes to the CIM specification, resulting in new versions of this standard, will be incorporated first into the Enterprise Architect project description to ensure a single source for the CIM model data.

## 5 Detailed model

### 5.1 Overview

The common information model (CIM) represents a comprehensive logical view of market operations system information. This definition includes the public classes and attributes, as well as the relationships between them. Subclause 5.2 describes how Clause 6 is structured. Clause 6 is automatically generated from the CIM model.

### 5.2 Context

The CIM is partitioned into subpackages. Classes within the packages are listed alphabetically. Native class attributes are listed first, followed by inherited attributes in order of depth of inheritance, then by attribute name. Native associations are listed first for each class, followed by inherited associations in order of depth of inheritance, then alphabetically by class name, then alphabetically by association end name. The associations are described according to the role of each class participating in the association. The association ends are listed under the class at each end of an association.

For each package, the model information for each class is fully described in attribute and association end tables. Attribute and association end information for native and inherited attributes is listed as shown in Table 1 and Table 2. For any inherited attributes or association ends the “description” column will contain text indicating the attributes is inherited from a specific class. The description column for native attributes and association ends contains the actual description.

**Table 1 – Attribute documentation**

| name    | type        | description                                                       |
|---------|-------------|-------------------------------------------------------------------|
| native1 | Float       | A floating point native attribute of the class is described here. |
| native2 | ActivePower | Documentation for another native attribute of type ActivePower.   |
| Name    | Float       | Inherited from class IdentifiedObject                             |

As shown in Table 1, in an attribute table, in some cases, an attribute is a constant, in which case the phrase “(const)” is added in the name column of the attribute table. In such cases, the attribute normally has an initial value also which is preceded by an equal sign and appended to the attribute name.

**Table 2 – Association ends documentation**

| [mult from] | [mult to] name        | type           | description                                                                                       |
|-------------|-----------------------|----------------|---------------------------------------------------------------------------------------------------|
| [0..*]      | [0..1] PSRType        | PSRType        | PSRType (custom classification) for this PowerSystemResource.                                     |
| [0..1]      | [0..*] Measurements   | Measurement    | The Measurements that are included in the naming hierarchy where the PSR is the containing object |
| [1..1]      | [0..*] OperatingShare | OperatingShare | The linkage to any number of operating share objects.                                             |
| [0..*]      | [0..*] PsrLists       | PsrList        |                                                                                                   |
| [1..1]      | [0..1] OutageSchedule | OutageSchedule | A power system resource may have an outage schedule                                               |
| [0..*]      | [0..*] ReportingGroup | ReportingGroup | Reporting groups to which this PSR belongs.                                                       |

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

As shown in Table 2, in an association ends table, the first column describes the multiplicity at the other end of the association (i.e., the multiplicity of the class for which association ends are being described). The multiplicity of the association end itself is included in brackets. The association end name is listed in plain text. The class at the other end of the association is listed in the “type” column. A multiplicity of zero indicates an optional association. A multiplicity of “\*” indicates any number is allowed. For example, a multiplicity of [1..\*] indicates a range from 1 to any larger number is allowed.

In the case that a class is an enumeration, the attributes table is replaced by the enums table as shown in Table 3, since enumeration literals have no type. There are no inherited enumeration literals for an enumeration class.

**Table 3 – Enums documentation**

| literal | description                                                   |
|---------|---------------------------------------------------------------|
| native1 | This is the first native enumeration value.                   |
| native2 | This is the second native enumeration value.                  |
| native3 | There are typically no inherited attributes for enumerations. |

## 6 Top package IEC 62325

### 6.1 General

The IEC 62325 subpackages of the CIM are developed, standardized and maintained by the IEC.

Figure 16 shows class diagram Main.

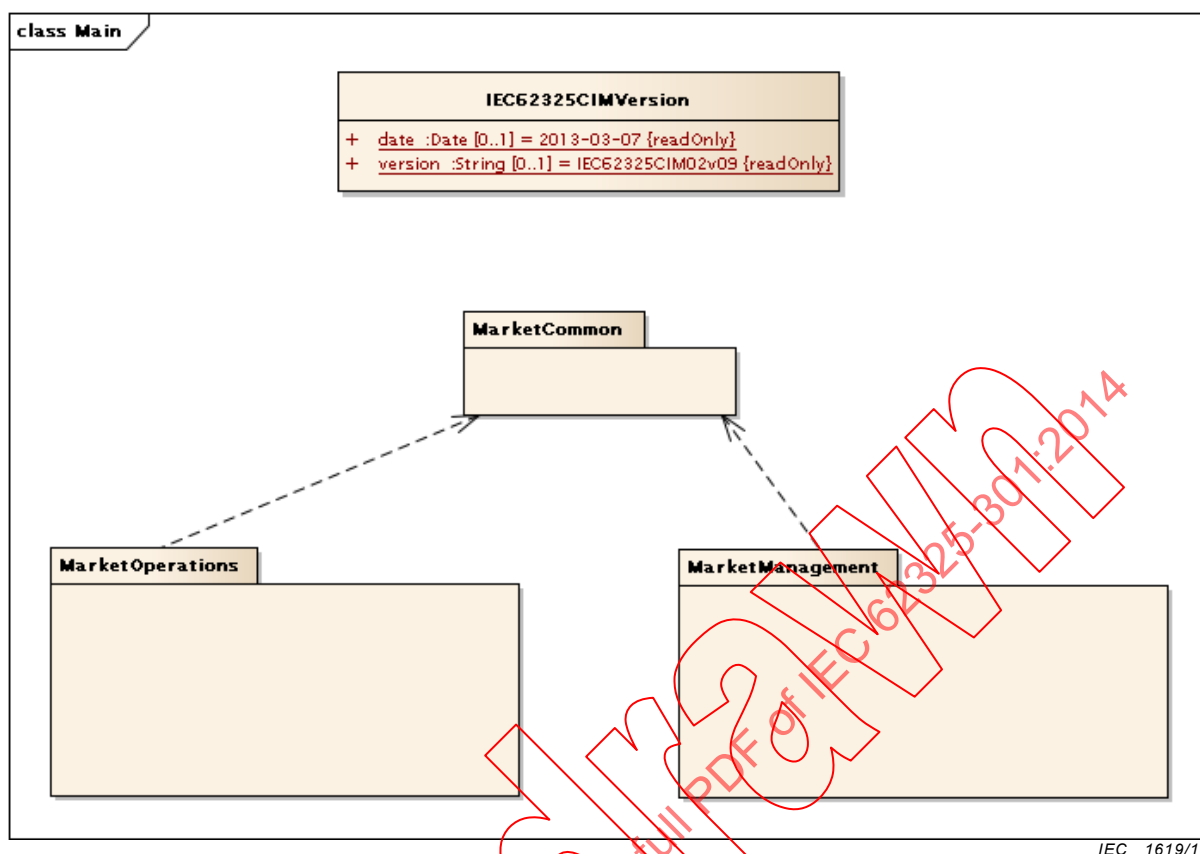


**Figure 16 – Class diagram IEC 62325::Main**

This diagram shows all IEC 62325 packages and their logical dependencies.

## 6.2 IEC 62325CIMVersion root class

IEC 62325 version number assigned to this UML model.

Table 4 shows all attributes of IEC 62325CIMVersion.

**Table 4 – Attributes of IEC 62325::IEC 62325CIMVersion**

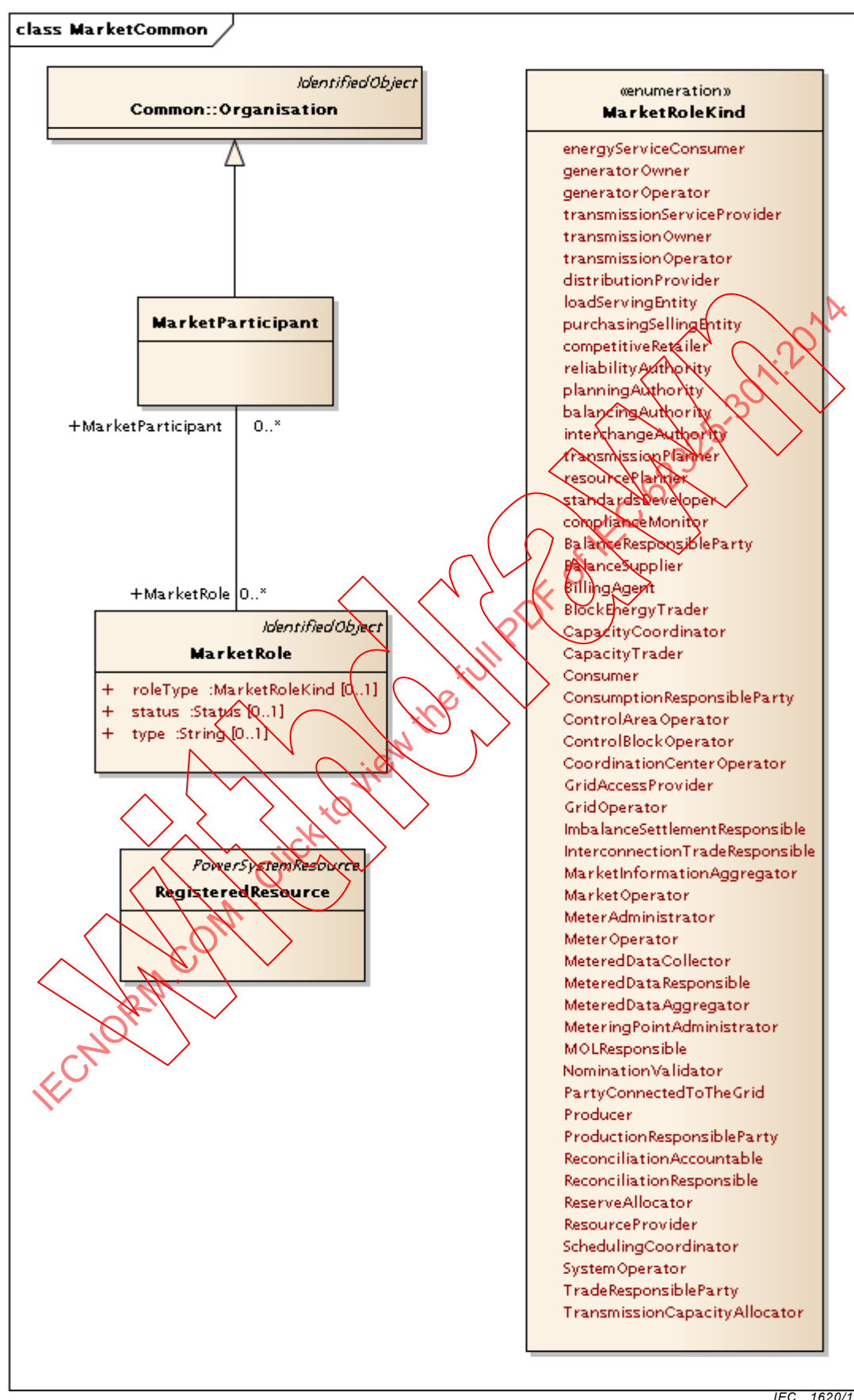
| name                              | type   | description                                                                                                                         |
|-----------------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------------|
| date=2013-03-07 (const)           | Date   | Form is YYYY-MM-DD for example for January 5, 2009 it is 2009-01-05.                                                                |
| version=IEC 62325CIM02v09 (const) | String | Form is IEC 62325CIMXXvYY where XX is the major CIM package version and the YY is the minor version. For example IEC 62325CIM10v03. |

## 6.3 Package MarketCommon

### 6.3.1 General

This package contains the common objects shared by both MarketManagement and MarketOperations packages.

Figure 17 shows class diagram MarketCommon.



IEC 1620/14

Figure 17 – Class diagram MarketCommon::MarketCommon

Common classes used by both MarketManagement and MarketOperations packages.



### 6.3.2 MarketParticipant

An identification of a party acting in a electricity market business process. This class is used to identify organizations that can participate in market management and/or market operations.

Table 5 shows all attributes of MarketParticipant.

**Table 5 – Attributes of MarketCommon::MarketParticipant**

| name              | type              | description                      |
|-------------------|-------------------|----------------------------------|
| streetAddress     | StreetAddress     | inherited from: Organisation     |
| postalAddress     | PostalAddress     | inherited from: Organisation     |
| phone1            | TelephoneNumber   | inherited from: Organisation     |
| phone2            | TelephoneNumber   | inherited from: Organisation     |
| electronicAddress | ElectronicAddress | inherited from: Organisation     |
| aliasName         | String            | inherited from: IdentifiedObject |
| mRID              | String            | inherited from: IdentifiedObject |
| name              | String            | inherited from: IdentifiedObject |

Table 6 shows all association ends of MarketParticipant with other classes.

**Table 6 – Association ends of MarketCommon::MarketParticipant with other classes**

| [mult from] | [mult to] name        | type             | description                      |
|-------------|-----------------------|------------------|----------------------------------|
| [0..*]      | [0..*] MarketDocument | MarketDocument   |                                  |
| [0..*]      | [0..*] MarketRole     | MarketRole       |                                  |
| [0..*]      | [0..*] TimeSeries     | TimeSeries       |                                  |
| [0..1]      | [0..*] Bid            | Bid              |                                  |
| [0..1]      | [0..*] Roles          | OrganisationRole | inherited from: Organisation     |
| [0..1]      | [0..*] DiagramObjects | DiagramObject    | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name             | inherited from: IdentifiedObject |

### 6.3.3 MarketRole

The external intended behaviour played by a party within the electricity market.

Table 7 shows all attributes of MarketRole.

**Table 7 – Attributes of MarketCommon::MarketRole**

| name     | type           | description                                                                                                                                                                       |
|----------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| roleType | MarketRoleKind | Defined using an enumerated list of types of market roles for use when a finite list of types are desired.                                                                        |
| status   | Status         | Status of the market role.                                                                                                                                                        |
| type     | String         | The kind of market roles that can be played by parties for given domains within the electricity market. Types are flexible using dataType of string for free-entry of role types. |

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 8 shows all association ends of MarketRole with other classes.

**Table 8 – Association ends of MarketCommon::MarketRole with other classes**

| [mult from] | [mult to] name           | type              | description                      |
|-------------|--------------------------|-------------------|----------------------------------|
| [0..*]      | [0..*] MarketParticipant | MarketParticipant |                                  |
| [0..1]      | [0..*] DiagramObjects    | DiagramObject     | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names             | Name              | inherited from: IdentifiedObject |

### 6.3.4 MarketRoleKind enumeration

Kind of market role an organisation can have.

Table 9 shows all literals of MarketRoleKind.

**Table 9 – Literals of MarketCommon::MarketRoleKind**

| literal                     | description                                                                                                                                                                                                                                                                                      |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| energyServiceConsumer       | Energy service consumer.                                                                                                                                                                                                                                                                         |
| generatorOwner              | Generator merchant owner.                                                                                                                                                                                                                                                                        |
| generatorOperator           | Generator merchant operator.                                                                                                                                                                                                                                                                     |
| transmissionServiceProvider | Transmission service provider.                                                                                                                                                                                                                                                                   |
| transmissionOwner           | Transmission owner.                                                                                                                                                                                                                                                                              |
| transmissionOperator        | Transmission operator.                                                                                                                                                                                                                                                                           |
| distributionProvider        | Distribution provider.                                                                                                                                                                                                                                                                           |
| loadServingEntity           | Load serving entity.                                                                                                                                                                                                                                                                             |
| purchasingSellingEntity     | Purchasing selling entity.                                                                                                                                                                                                                                                                       |
| competitiveRetailer         | Competitive retailer.                                                                                                                                                                                                                                                                            |
| reliabilityAuthority        | Reliability authority.                                                                                                                                                                                                                                                                           |
| planningAuthority           | Planning authority.                                                                                                                                                                                                                                                                              |
| balancingAuthority          | Balancing authority.                                                                                                                                                                                                                                                                             |
| interchangeAuthority        | Interchange authority.                                                                                                                                                                                                                                                                           |
| transmissionPlanner         | Transmission planner.                                                                                                                                                                                                                                                                            |
| resourcePlanner             | Resource planner.                                                                                                                                                                                                                                                                                |
| standardsDeveloper          | Standards developer.                                                                                                                                                                                                                                                                             |
| complianceMonitor           | Compliance monitor.                                                                                                                                                                                                                                                                              |
| BalanceResponsibleParty     | A party that has a contract proving financial security and identifying balance responsibility with the Imbalance Settlement Responsible of the Market Balance Area entitling the party to operate in the market. This is the only role allowing a party to nominate energy on a wholesale level. |

| literal                     | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             | <p>Additional information:</p> <p>The meaning of the word "balance" in this context signifies that the quantity contracted to provide or to consume shall be equal to the quantity really provided or consumed. Equivalent to "Program responsible party" in the Netherlands. Equivalent to "Balance group manager" in Germany. Equivalent to "market agent" in Spain.</p>                                                                                                                                                         |
| BalanceSupplier             | <p>A party that markets the difference between actual metered energy consumption and the energy bought with firm energy contracts by the Party Connected to the Grid. In addition the Balance Supplier markets any difference with the firm energy contract (of the Party Connected to the Grid) and the metered production.</p> <p>Additional information:</p> <p>There is only one Balance Supplier for each Accounting Point.</p>                                                                                               |
| BillingAgent                | The party responsible for invoicing a concerned party.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| BlockEnergyTrader           | A party that is selling or buying energy on a firm basis (a fixed volume per market time period).                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| CapacityCoordinator         | A party, acting on behalf of the System Operators involved, responsible for establishing a coordinated Offered Capacity and/or Net Transfer Capacity (NTC) and/or Available Transfer Capacity (ATC) between several Market Balance Areas.                                                                                                                                                                                                                                                                                          |
| CapacityTrader              | <p>A party that has a contract to participate in the Capacity Market to acquire capacity through a Transmission Capacity Allocator.</p> <p>The capacity may be acquired on behalf of an Interconnection Trade Responsible or for sale on secondary capacity markets.</p>                                                                                                                                                                                                                                                           |
| Consumer                    | <p>A party that consumes electricity.</p> <p>Additional information:</p> <p>This is a Type of Party Connected to the Grid.</p>                                                                                                                                                                                                                                                                                                                                                                                                     |
| ConsumptionResponsibleParty | <p>A party who can be brought to rights, legally and financially, for any imbalance between energy nominated and consumed for all associated Accounting Points.</p> <p>Additional information:</p> <p>This is a type of Balance Responsible Party.</p>                                                                                                                                                                                                                                                                             |
| ControlAreaOperator         | <p>Responsible for:</p> <ol style="list-style-type: none"> <li>1. The coordination of exchange programs between its related Market Balance Areas and for the exchanges between its associated Control Areas.</li> <li>2. The load frequency control for its own area.</li> <li>3. The coordination of the correction of time deviations.</li> </ol>                                                                                                                                                                                |
| ControlBlockOperator        | <p>Responsible for:</p> <ol style="list-style-type: none"> <li>1. The coordination of exchanges between its associated Control Blocks and the organisation of the coordination of exchange programs between its related Control Areas.</li> <li>2. The load frequency control within its own block and ensuring that its Control Areas respect their obligations in respect to load frequency control and time deviation.</li> <li>3. The organisation of the settlement and/or compensation between its Control Areas.</li> </ol> |

| literal                         | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CoordinationCenterOperator      | Responsible for:<br>1. The coordination of exchange programs between its related Control Blocks and for the exchanges between its associated Coordination Center Zones.<br>2. Ensuring that its Control Blocks respect their obligations in respect to load frequency control.<br>3. Calculating the time deviation in cooperation with the associated coordination centers.<br>4. Carrying out the settlement and/or compensation between its Control Blocks and against the other Coordination Center Zones. |
| GridAccessProvider              | A party responsible for providing access to the grid through an Accounting Point and its use for energy consumption or production to the Party Connected to the Grid.                                                                                                                                                                                                                                                                                                                                          |
| GridOperator                    | A party that operates one or more grids.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| ImbalanceSettlementResponsible  | A party that is responsible for settlement of the difference between the contracted quantities and the realised quantities of energy products for the Balance Responsible Parties in a Market Balance Area.<br>Note:<br>The Imbalance Settlement Responsible has not the responsibility to invoice. The Imbalance Settlement Responsible may delegate the invoicing responsibility to a more generic role such as a Billing Agent.                                                                             |
| InterconnectionTradeResponsible | Is a Balance Responsible Party or depends on one. They are recognized by the Nomination Validator for the nomination of already allocated capacity.<br>Additional information:<br>This is a type of Balance Responsible Party.                                                                                                                                                                                                                                                                                 |
| MarketInformationAggregator     | Market Information Aggregator, A party that provides market related information that has been compiled from the figures supplied by different actors in the market. This information may also be published or distributed for general use.<br>Note:<br>The Market Information Aggregator may receive information from any market participant that is relevant for publication or distribution.                                                                                                                 |
| MarketOperator                  | The unique power exchange of trades for the actual delivery of energy that receives the bids from the Balance Responsible Parties that have a contract to bid. The Market Operator determines the market energy price for the Market Balance Area after applying technical constraints from the System Operator. It may also establish the price for the reconciliation within a Metering Grid Area.                                                                                                           |
| MeterAdministrator              | A party responsible for keeping a database of meters.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| MeterOperator                   | A party responsible for installing, maintaining, testing, certifying and decommissioning physical meters.                                                                                                                                                                                                                                                                                                                                                                                                      |
| MeteredDataCollector            | A party responsible for meter reading and quality control of the reading.                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| MeteredDataResponsible          | A party responsible for the establishment and validation of metered data based on the collected data received from the Metered Data Collector. The party is responsible for the history of metered data for a Metering Point.                                                                                                                                                                                                                                                                                  |
| MeteredDataAggregator           | A party responsible for the establishment and qualification of metered data from the Metered Data Responsible. This data is aggregated according to a                                                                                                                                                                                                                                                                                                                                                          |

| literal                    | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                            | defined set of market rules.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| MeteringPointAdministrator | A party responsible for registering the parties linked to the metering points in a Metering Grid Area. They are also responsible for maintaining the Metering Point technical specifications. They are responsible for creating and terminating metering points.                                                                                                                                                                                                                                                                                                                                          |
| MOLResponsible             | Responsible for the management of the available tenders for all Acquiring System Operators to establish the order of the reserve capacity that can be activated.                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| NominationValidator        | Has the responsibility of ensuring that all capacity nominated is within the allowed limits and confirming all valid nominations to all involved parties. They inform the Interconnection Trade Responsible of the maximum nominated capacity allowed. Depending on market rules for a given interconnection the corresponding System Operators may appoint one Nomination Validator.                                                                                                                                                                                                                     |
| PartyConnectedToTheGrid    | A party that contracts for the right to consume or produce electricity at an Accounting Point.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Producer                   | A party that produces electricity.<br>Additional information:<br>This is a type of Party Connected to the Grid.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| ProductionResponsibleParty | A party who can be brought to rights, legally and financially, for any imbalance between energy nominated and produced for all associated Accounting Points.<br>Additional information:<br>This is a type of Balance Responsible Party.                                                                                                                                                                                                                                                                                                                                                                   |
| ReconciliationAccountable  | A party that is financially accountable for the reconciled volume of energy products for a profiled Accounting Point.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| ReconciliationResponsible  | A party that is responsible for reconciling, within a Metering Grid Area, the volumes used in the imbalance settlement process for profiled Accounting Points and the actual metered quantities.<br>Note:<br>The Reconciliation Responsible may delegate the invoicing responsibility to a more generic role such as a Billing Agent.                                                                                                                                                                                                                                                                     |
| ReserveAllocator           | Informes the market of reserve requirements, receives tenders against the requirements and in compliance with the prequalification criteria, determines what tenders meet requirements and assigns tenders.                                                                                                                                                                                                                                                                                                                                                                                               |
| ResourceProvider           | A role that manages a resource object and provides the schedules for it                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| SchedulingCoordinator      | A party that is responsible for the schedule information and its exchange on behalf of a Balance Responsible Party. For example in the Polish market a Scheduling Coordinator is responsible for information interchange for scheduling and settlement.                                                                                                                                                                                                                                                                                                                                                   |
| SystemOperator             | A party that is responsible for a stable power system operation<br><br>(including the organisation of physical balance) through a transmission grid in a geographical area. The System Operator will also determine and be responsible for cross border capacity and exchanges. If necessary they may reduce allocated capacity to ensure operational stability. Transmission as mentioned above means "the transport of electricity on the extra high or high voltage network with a view to its delivery to final customers or to distributors. Operation of transmission includes as well the tasks of |

| literal                       | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               | <p>system operation concerning its management of energy flows, reliability of the system and availability of all necessary system services." (definition taken from the ENTSO-E RGCE Operation handbook Glossary).</p> <p>Note: additional obligations may be imposed through local market rules.</p>                                                                                                                                                                                                                               |
| TradeResponsibleParty         | <p>A party who can be brought to rights, legally and financially, for any imbalance between energy nominated and consumed for all associated Accounting Points.</p> <p>Note:</p> <p>A power exchange without any privileged responsibilities acts as a Trade Responsible Party.</p> <p>Additional information:</p> <p>This is a type of Balance Responsible Party.</p>                                                                                                                                                              |
| TransmissionCapacityAllocator | <p>Manages the allocation of transmission capacity for an Allocated Capacity Area.</p> <p>For explicit auctions:</p> <p>The Transmission Capacity Allocator manages, on behalf of the System Operators, the allocation of available transmission capacity for an Allocated capacity Area. They offer the available transmission capacity to the market, allocates the available transmission capacity to individual Capacity Traders and calculates the billing amount of already allocated capacities to the Capacity Traders.</p> |

### 6.3.5 RegisteredResource

A resource that is registered through the market participant registration system. Examples include generating unit, load, and non-physical generator or load.

Table 10 shows all attributes of RegisteredResource.

**Table 10 – Attributes of MarketCommon::RegisteredResource**

| name                 | type     | description                                                                                                                                                              |
|----------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACAFlag              | YesNo    | Indication that this resource is associated with an Adjacent Control Area                                                                                                |
| ASSPOptimizationFlag | YesNo    | Indication that the resource participates in the optimization process by default.                                                                                        |
| commercialOpDate     | DateTime | Resource Commercial Operation Date.                                                                                                                                      |
| contingencyAvailFlag | YesNo    | contingent operating reserve availability (Yes/No). Resource is available to participate with capacity in contingency dispatch.                                          |
| dispatchFlag         | YesNo    | <p>Dispatch flag: indicates whether the resource is dispatchable (Y/N)</p> <p>It is move to the RegisteredResource class for the participating load dispatch purpose</p> |
| ECAFlag              | YesNo    | Indication that this resource is associated with an Embedded Control area                                                                                                |
| endEffectiveDate     | DateTime | end effective date                                                                                                                                                       |
| flexibleOfferFlag    | YesNo    | flexible offer flag (Y/N)                                                                                                                                                |
| hourlyPredispatch    | YesNo    | Indicates need to dispatch before the start of the operating hour. Only relevant in Real-Time                                                                            |



| name                    | type                       | description                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         |                            | Market. Applies to generation, inertia and participating load resource. Value (Y/N)                                                                                                                                                                                                                                                                               |
| isAggregatedRes         | YesNo                      | a flag to indicate if a resource is an aggregated resource                                                                                                                                                                                                                                                                                                        |
| lastModified            | DateTime                   | Indication of the last time this item was modified/versioned.                                                                                                                                                                                                                                                                                                     |
| LMPMFlag                | YesNo                      | LMPM flag: indicates whether the resource is subject to the LMPM test (Yes/No)                                                                                                                                                                                                                                                                                    |
| marketParticipationFlag | YesNo                      | Market Participation flag: indicates whether the resource participate in the market (Y/N)                                                                                                                                                                                                                                                                         |
| maxBaseSelfSchedQty     | Float                      | maximum base self schedule quantity                                                                                                                                                                                                                                                                                                                               |
| maxOnTime               | Float                      | maximum on time after start up                                                                                                                                                                                                                                                                                                                                    |
| minDispatchTime         | Hours                      | minimum number of consecutive hours a resource shall be dispatched if bid is accepted                                                                                                                                                                                                                                                                             |
| minOffTime              | Float                      | minimum off time after shut down                                                                                                                                                                                                                                                                                                                                  |
| minOnTime               | Float                      | minimum on time after start up                                                                                                                                                                                                                                                                                                                                    |
| mustOfferFlag           | YesNo                      | Must offer flag: indicates whether the unit is subject to the must offer provisions (Y/N)                                                                                                                                                                                                                                                                         |
| nonMarket               | YesNo                      | Flag to indicate that the Resource is not participating in the Market Operations.                                                                                                                                                                                                                                                                                 |
| pointOfDeliveryFlag     | YesNo                      | Indication that the registered resource is a Point of Delivery (YES) resource which implies there is a POD Loss Factor.                                                                                                                                                                                                                                           |
| priceSetFlagDA          | YesNo                      | Price setting flag: indicates whether a resource is capable of setting the Market Clearing Price (Y) for the DA market, and if not, indicates whether the resource shall submit bids for energy at \$ 0 (S) or not (N)<br><br>Initially in the RegisteredGenerator class. It was move to the RegisteredResource class for the participating load dispatch purpose |
| priceSetFlagRT          | YesNo                      | Price setting flag: indicates whether a resource is capable of setting the Market Clearing Price (Y) for the RT market, and if not, indicates whether the resource shall submit bids for energy at \$ 0 (S) or not (N)<br><br>Initially in the RegisteredGenerator class. It was move to the RegisteredResource class for the participating load dispatch purpose |
| registrationStatus      | ResourceRegistrationStatus | Registration Status of resource – Active, Mothballed, Planned, or Decommissioned.                                                                                                                                                                                                                                                                                 |
| resourceAdequacyFlag    | YesNo                      | Indication that this resource participates in the resource adequacy function.                                                                                                                                                                                                                                                                                     |
| SMPMFlag                | YesNo                      | SMPM flag: indicates whether the resource is subject to the SMPM test (Yes/No)                                                                                                                                                                                                                                                                                    |
| startEffectiveDate      | DateTime                   | start effective date                                                                                                                                                                                                                                                                                                                                              |
| aliasName               | String                     | inherited from: IdentifiedObject                                                                                                                                                                                                                                                                                                                                  |
| mRID                    | String                     | inherited from: IdentifiedObject                                                                                                                                                                                                                                                                                                                                  |
| name                    | String                     | inherited from: IdentifiedObject                                                                                                                                                                                                                                                                                                                                  |

Table 11 shows all association ends of RegisteredResource with other classes.

**Table 11 – Association ends of MarketCommon::RegisteredResource with other classes**

| [mult from] | [mult to] name                               | type                                  | description                                                                                                                                                                                                                  |
|-------------|----------------------------------------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [0..1]      | [0..*] SubstitutionResourceList              | SubstitutionResourceList              |                                                                                                                                                                                                                              |
| [0..*]      | [0..*] SubControlArea                        | SubControlArea                        |                                                                                                                                                                                                                              |
| [1..1]      | [0..*] ResourceAncillaryServiceQualification | ResourceAncillaryServiceQualification | RegisteredResources are qualified for resource ancillary service types (which include market product types as well as other types such as BlackStart) by the association to the class ResourceAncillaryServiceQualification. |
| [0..*]      | [0..*] ResourceCapacity                      | ResourceCapacity                      |                                                                                                                                                                                                                              |
| [0..*]      | [0..*] InterTie                              | SchedulingPoint                       |                                                                                                                                                                                                                              |
| [1..1]      | [0..*] OrgResOwnership                       | OrgResOwnership                       |                                                                                                                                                                                                                              |
| [1..1]      | [0..*] FormerReference                       | FormerReference                       |                                                                                                                                                                                                                              |
| [0..*]      | [0..*] ForbiddenRegion                       | ForbiddenRegion                       |                                                                                                                                                                                                                              |
| [0..1]      | [0..*] ContractDistributionFactor            | ContractDistributionFactor            |                                                                                                                                                                                                                              |
| [0..*]      | [0..*] AggregateNode                         | AggregateNode                         |                                                                                                                                                                                                                              |
| [0..*]      | [0..1] AdjacentCASet                         | AdjacentCASet                         |                                                                                                                                                                                                                              |
| [0..*]      | [0..*] RampRateCurve                         | RampRateCurve                         |                                                                                                                                                                                                                              |
| [1..1]      | [0..*] LoadFollowingInst                     | LoadFollowingInst                     |                                                                                                                                                                                                                              |
| [1..1]      | [0..*] DispatchInstReply                     | DispatchInstReply                     |                                                                                                                                                                                                                              |
| [0..1]      | [0..*] ResourceLoadFollowingInst             | ResourceLoadFollowingInst             |                                                                                                                                                                                                                              |
| [0..1]      | [0..*] ResourceDispatchResults               | ResourceDispatchResults               |                                                                                                                                                                                                                              |
| [0..1]      | [0..*] RUCAwardInstruction                   | RUCAwardInstruction                   |                                                                                                                                                                                                                              |
| [0..1]      | [0..*] RMROperatorInput                      | RMROperatorInput                      |                                                                                                                                                                                                                              |
| [0..1]      | [0..*] MPMResourceStatus                     | MPMResourceStatus                     |                                                                                                                                                                                                                              |
| [0..1]      | [0..*] DopInstruction                        | DopInstruction                        |                                                                                                                                                                                                                              |
| [1..1]      | [0..*] Commitments                           | Commitments                           |                                                                                                                                                                                                                              |
| [1..1]      | [0..*] IntermittentResourceEligibility       | IntermittentResourceEligibility       |                                                                                                                                                                                                                              |
| [0..1]      | [0..*] ExpectedEnergyValues                  | ExpectedEnergyValues                  |                                                                                                                                                                                                                              |
| [0..1]      | [0..*] AllocationResultValues                | AllocationResultValues                |                                                                                                                                                                                                                              |
| [0..*]      | [0..1] MktOrganisation                       | MktOrganisation                       |                                                                                                                                                                                                                              |
| [0..*]      | [0..1] MktConnectivityNode                   | MktConnectivityNode                   |                                                                                                                                                                                                                              |
| [0..*]      | [0..*] TimeSeries                            | TimeSeries                            |                                                                                                                                                                                                                              |
| [1..1]      | [0..1] ResourceVerifiableCosts               | ResourceVerifiableCosts               |                                                                                                                                                                                                                              |
| [0..*]      | [0..1] Pnode                                 | Pnode                                 | A registered resource injects power at one or more connectivity nodes related to a pnode                                                                                                                                     |
| [0..*]      | [0..*] MPMTestThreshold                      | MPMTestThreshold                      |                                                                                                                                                                                                                              |
| [0..*]      | [0..1] HostControlArea                       | HostControlArea                       |                                                                                                                                                                                                                              |
| [0..*]      | [0..*] ControlAreaDesignation                | ControlAreaDesignation                |                                                                                                                                                                                                                              |
| [0..1]      | [0..*] ResourceAwardInstruction              | ResourceAwardInstruction              |                                                                                                                                                                                                                              |
| [0..1]      | [0..*] LoadFollowingOperatorInput            | LoadFollowingOperatorInput            |                                                                                                                                                                                                                              |

| [mult from] | [mult to] name               | type                  | description                         |
|-------------|------------------------------|-----------------------|-------------------------------------|
| [1..1]      | [0..*] Instructions          | Instructions          |                                     |
| [0..1]      | [0..*] ExPostResourceResults | ExPostResourceResults |                                     |
| [0..1]      | [0..*] DotInstruction        | DotInstruction        |                                     |
| [1..1]      | [0..1] DefaultBid            | DefaultBid            |                                     |
| [0..*]      | [0..*] EnergyMarkets         | EnergyMarket          |                                     |
| [0..*]      | [0..1] PSRType               | PSRType               | inherited from: PowerSystemResource |
| [0..1]      | [0..*] Measurements          | Measurement           | inherited from: PowerSystemResource |
| [1..1]      | [0..*] OperatingShare        | OperatingShare        | inherited from: PowerSystemResource |
| [0..*]      | [0..*] PsrLists              | PsrList               | inherited from: PowerSystemResource |
| [1..1]      | [0..1] OutageSchedule        | OutageSchedule        | inherited from: PowerSystemResource |
| [0..*]      | [0..*] ReportingGroup        | ReportingGroup        | inherited from: PowerSystemResource |
| [0..1]      | [0..*] DiagramObjects        | DiagramObject         | inherited from: IdentifiedObject    |
| [1..1]      | [0..*] Names                 | Name                  | inherited from: IdentifiedObject    |

## 6.4 Package MarketManagement

### 6.4.1 General

This package contains all core CIM Market Extensions required for market management systems.

Figure 18 shows package diagram externalDependencies.

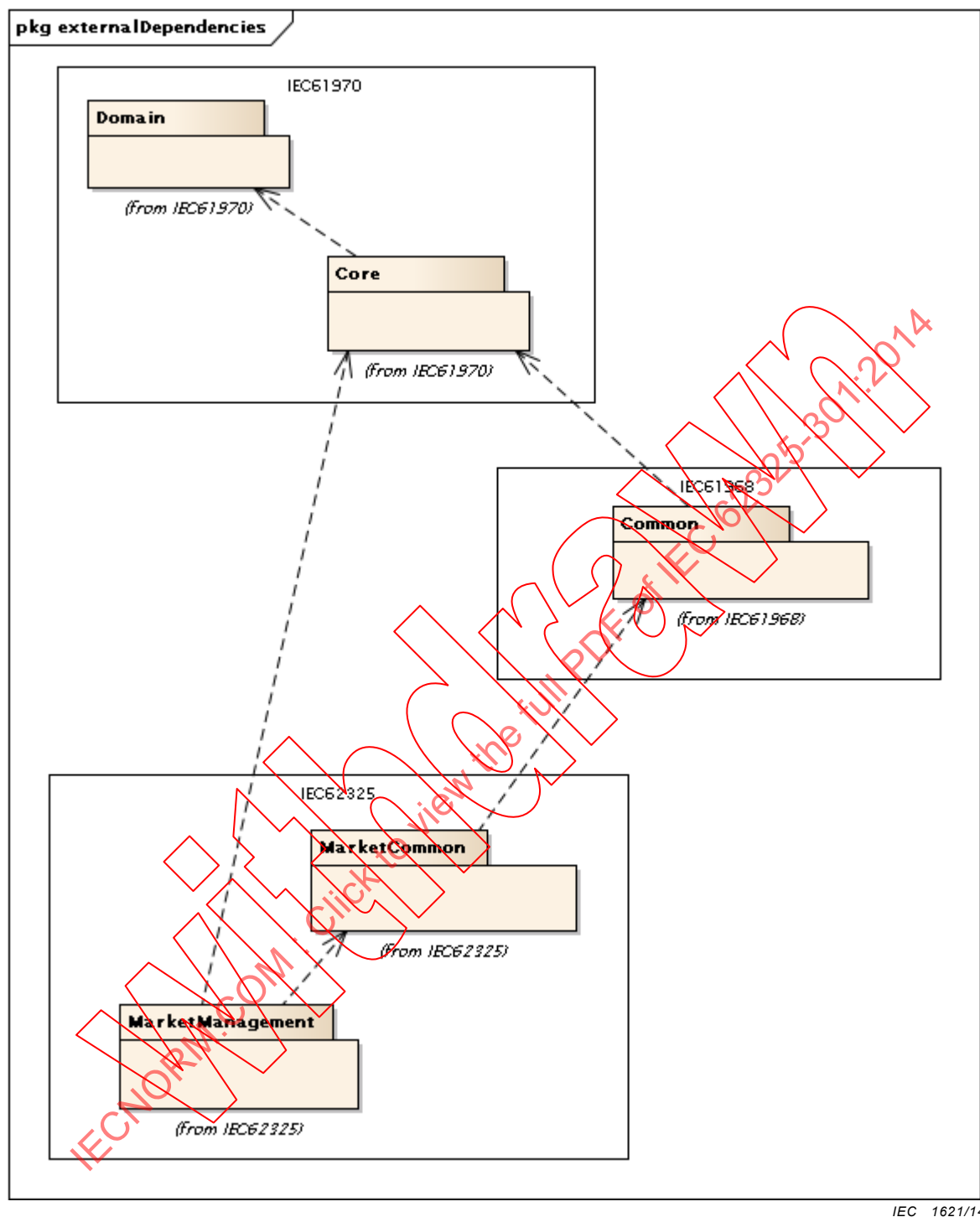
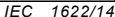


**Figure 18 – Package diagram MarketManagement::externalDependencies**

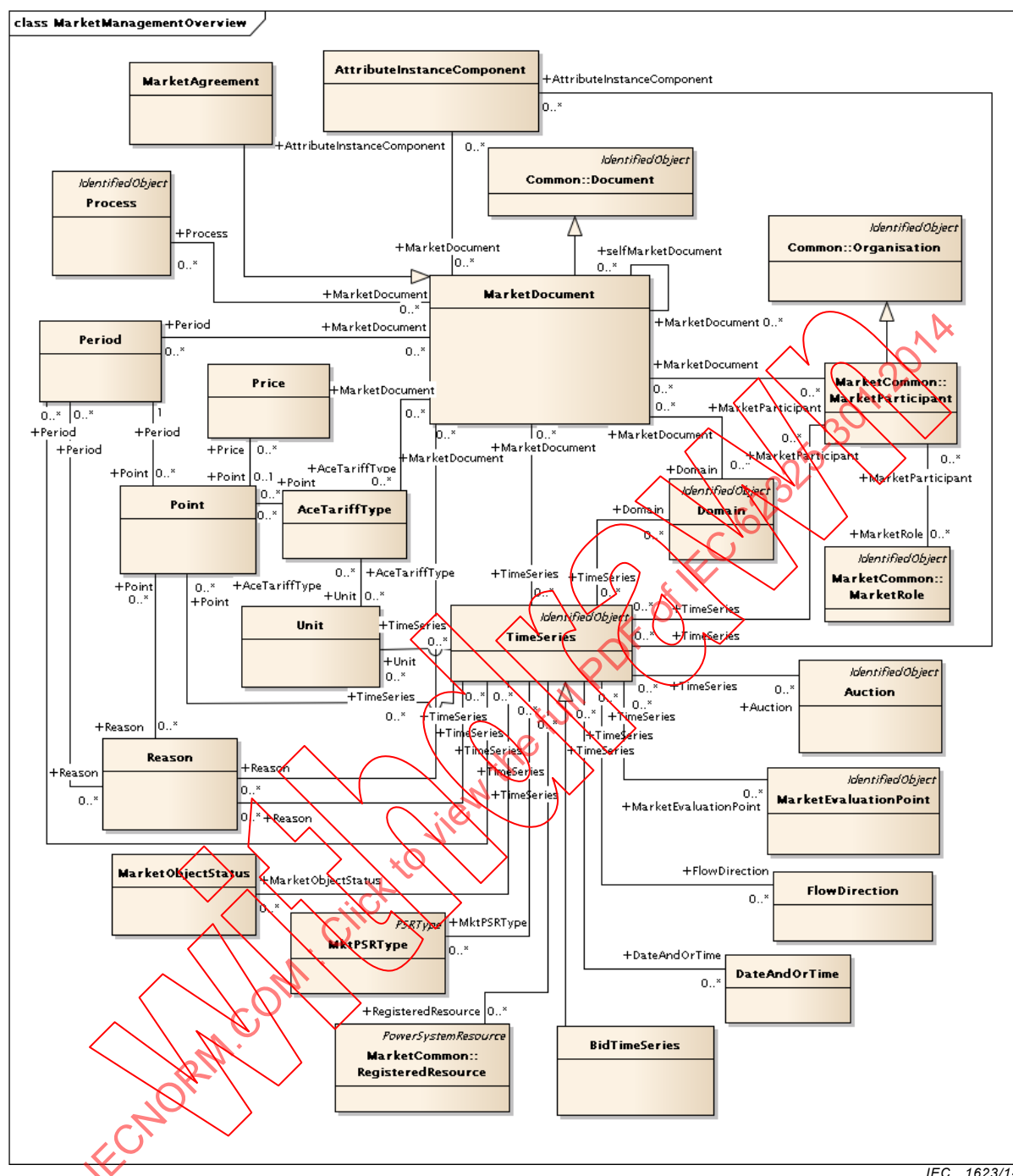
Market Management external dependencies.

Figure 19 shows class diagram Inheritance.



Market Management Inheritance structure.

Figure 20 shows class diagram MarketManagementOverview.



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Figure 20 – Class diagram MarketManagement::MarketManagementOverview

Here are described all used classes for the definition of Market Management Profiles.

It is possible to see all dependencies with other common CIM concepts in Energy Management Systems and Distribution Management Systems.

#### 6.4.2 AceTariffType root class

The Area Control Error tariff type that is applied or used.

Table 12 shows all attributes of AceTariffType.



**Table 12 – Attributes of MarketManagement::AceTariffType**

| name | type   | description                      |
|------|--------|----------------------------------|
| type | String | The coded type of an ACE tariff. |

Table 13 shows all association ends of AceTariffType with other classes.

**Table 13 – Association ends of MarketManagement::AceTariffType with other classes**

| [mult from] | [mult to] name        | type           | description |
|-------------|-----------------------|----------------|-------------|
| [0..*]      | [0..*] Unit           | Unit           |             |
| [0..*]      | [0..*] MarketDocument | MarketDocument |             |
| [0..*]      | [0..*] Point          | Point          |             |

#### 6.4.3 AttributeInstanceComponent root class

A class used to provide information about an attribute.

Table 14 shows all attributes of AttributeInstanceComponent.

**Table 14 – Attributes of MarketManagement::AttributeInstanceComponent**

| name           | type    | description                                                 |
|----------------|---------|-------------------------------------------------------------|
| attribute      | String  | The identification of the formal name of an attribute.      |
| attributeValue | String  | The instance value of the attribute.                        |
| position       | Integer | A sequential value representing a relative sequence number. |

Table 15 shows all association ends of AttributeInstanceComponent with other classes.

**Table 15 – Association ends of MarketManagement::AttributeInstanceComponent with other classes**

| [mult from] | [mult to] name        | type           | description |
|-------------|-----------------------|----------------|-------------|
| [0..*]      | [0..*] TimeSeries     | TimeSeries     |             |
| [0..*]      | [0..*] MarketDocument | MarketDocument |             |

#### 6.4.4 Auction

A class providing the identification and type of an auction.

Table 16 shows all attributes of Auction.

**Table 16 – Attributes of MarketManagement::Auction**

| name           | type   | description                                                         |
|----------------|--------|---------------------------------------------------------------------|
| allocationMode | String | Identification of the method of allocation in an auction.           |
| cancelled      | String | An indicator that signifies that the auction has been cancelled.    |
| category       | String | The product category of an auction.                                 |
| paymentTerms   | String | The terms which dictate the determination of the bid payment price. |
| rights         | String | The rights of use the transmission capacity acquired in an auction. |
| type           | String | The kind of the Auction (e.g. implicit, explicit ...).              |
| aliasName      | String | inherited from: IdentifiedObject                                    |
| mRID           | String | inherited from: IdentifiedObject                                    |
| name           | String | inherited from: IdentifiedObject                                    |

Table 17 shows all association ends of Auction with other classes.

**Table 17 – Association ends of MarketManagement::Auction with other classes**

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [0..*]      | [0..*] TimeSeries     | TimeSeries    |                                  |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

#### 6.4.5 BidTimeSeries

The formal specification of specific characteristics related to a bid.

Table 18 shows all attributes of BidTimeSeries.

**Table 18 – Attributes of MarketManagement::BidTimeSeries**

| name                      | type    | description                                                                                               |
|---------------------------|---------|-----------------------------------------------------------------------------------------------------------|
| blockBid                  | String  | Indication that the values in the period are considered as a whole. They cannot be changed or subdivided. |
| direction                 | String  | The coded identification of the energy flow.                                                              |
| divisible                 | String  | An indication whether or not each element of the bid may be partially accepted or not.                    |
| linkedBidsIdentification  | String  | Unique identification associated with all linked bids.                                                    |
| minimumActivationQuantity | Decimal | The minimum quantity of energy that can be activated at a given time interval.                            |
| stepIncrementQuantity     | Decimal | The minimum increment that can be applied for an increase in an activation request.                       |
| businessType              | String  | inherited from: TimeSeries                                                                                |
| curveType                 | String  | inherited from: TimeSeries                                                                                |
| objectAggregation         | String  | inherited from: TimeSeries                                                                                |

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| product   | String | inherited from: TimeSeries       |
| version   | String | inherited from: TimeSeries       |
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 19 shows all association ends of BidTimeSeries with other classes.

**Table 19 – Association ends of MarketManagement::BidTimeSeries with other classes**

| [mult from] | [mult to] name                    | type                       | description                      |
|-------------|-----------------------------------|----------------------------|----------------------------------|
| [0..*]      | [0..*] MarketParticipant          | MarketParticipant          | inherited from: TimeSeries       |
| [0..*]      | [0..*] DateAndOrTime              | DateAndOrTime              | inherited from: TimeSeries       |
| [0..*]      | [0..*] Domain                     | Domain                     | inherited from: TimeSeries       |
| [0..*]      | [0..*] FlowDirection              | FlowDirection              | inherited from: TimeSeries       |
| [0..*]      | [0..*] MarketDocument             | MarketDocument             | inherited from: TimeSeries       |
| [0..*]      | [0..*] MarketEvaluationPoint      | MarketEvaluationPoint      | inherited from: TimeSeries       |
| [0..*]      | [0..*] Period                     | Period                     | inherited from: TimeSeries       |
| [0..*]      | [0..*] Reason                     | Reason                     | inherited from: TimeSeries       |
| [0..*]      | [0..*] RegisteredResource         | RegisteredResource         | inherited from: TimeSeries       |
| [0..*]      | [0..*] AttributeInstanceComponent | AttributeInstanceComponent | inherited from: TimeSeries       |
| [0..*]      | [0..*] Auction                    | Auction                    | inherited from: TimeSeries       |
| [0..*]      | [0..*] MarketObjectStatus         | MarketObjectStatus         | inherited from: TimeSeries       |
| [0..*]      | [0..*] MktPSRType                 | MktPSRType                 | inherited from: TimeSeries       |
| [0..*]      | [0..*] Point                      | Point                      | inherited from: TimeSeries       |
| [0..*]      | [0..*] Unit                       | Unit                       | inherited from: TimeSeries       |
| [0..1]      | [0..*] DiagramObjects             | DiagramObject              | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                      | Name                       | inherited from: IdentifiedObject |

#### 6.4.6 DateAndOrTime root class

The date and or the time.

Table 20 shows all attributes of DateAndOrTime.

**Table 20 – Attributes of MarketManagement::DateAndOrTime**

| name | type | description                                            |
|------|------|--------------------------------------------------------|
| date | Date | Date as "yyyy-mm-dd", which conforms with ISO 8601     |
| time | Time | Time as "hh:mm:ss.sssZ", which conforms with ISO 8601. |

Table 21 shows all association ends of DateAndOrTime with other classes.

**Table 21 – Association ends of MarketManagement::DateAndOrTime with other classes**

| [mult from] | [mult to] name    | type       | description |
|-------------|-------------------|------------|-------------|
| [0..*]      | [0..*] TimeSeries | TimeSeries |             |

#### 6.4.7 Domain

An area of activity defined within the energy market.

Table 22 shows all attributes of Domain.

**Table 22 – Attributes of MarketManagement::Domain**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 23 shows all association ends of Domain with other classes.

**Table 23 – Association ends of MarketManagement::Domain with other classes**

| [mult from] | [mult to] name        | type           | description                      |
|-------------|-----------------------|----------------|----------------------------------|
| [0..*]      | [0..*] MarketDocument | MarketDocument |                                  |
| [0..*]      | [0..*] TimeSeries     | TimeSeries     |                                  |
| [0..1]      | [0..*] DiagramObjects | DiagramObject  | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name           | inherited from: IdentifiedObject |

#### 6.4.8 FlowDirection root class

The coded identification of the direction of energy flow.

Table 24 shows all attributes of FlowDirection.

**Table 24 – Attributes of MarketManagement::FlowDirection**

| name      | type   | description                                               |
|-----------|--------|-----------------------------------------------------------|
| direction | String | The coded identification of the direction of energy flow. |

Table 25 shows all association ends of FlowDirection with other classes.

**Table 25 – Association ends of MarketManagement::FlowDirection with other classes**

| [mult from] | [mult to] name    | type       | description |
|-------------|-------------------|------------|-------------|
| [0..*]      | [0..*] TimeSeries | TimeSeries |             |

#### 6.4.9 MarketAgreement

An identification or eventually the contents of an agreement between two or more parties.

Table 26 shows all attributes of MarketAgreement.

**Table 26 – Attributes of MarketManagement::MarketAgreement**

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 27 shows all association ends of MarketAgreement with other classes.

**Table 27 – Association ends of MarketManagement::MarketAgreement with other classes**

| [mult from] | [mult to] name                    | type                       | description                      |
|-------------|-----------------------------------|----------------------------|----------------------------------|
| [0..*]      | [0..*] AttributeInstanceComponent | AttributeInstanceComponent | inherited from: MarketDocument   |
| [0..*]      | [0..*] Domain                     | Domain                     | inherited from: MarketDocument   |
| [0..*]      | [0..*] Period                     | Period                     | inherited from: MarketDocument   |
| [0..*]      | [0..*] selfMarketDocument         | MarketDocument             | inherited from: MarketDocument   |
| [0..*]      | [0..*] MarketParticipant          | MarketParticipant          | inherited from: MarketDocument   |
| [0..*]      | [0..1] AceTariffType              | AceTariffType              | inherited from: MarketDocument   |
| [0..*]      | [0..*] Reason                     | Reason                     | inherited from: MarketDocument   |
| [0..*]      | [0..*] TimeSeries                 | TimeSeries                 | inherited from: MarketDocument   |
| [0..*]      | [0..*] Process                    | Process                    | inherited from: MarketDocument   |
| [0..*]      | [0..*] MarketDocument             | MarketDocument             | inherited from: MarketDocument   |
| [0..1]      | [0..*] ConfigurationEvents        | ConfigurationEvent         | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects             | DiagramObject              | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                      | Name                       | inherited from: IdentifiedObject |

#### 6.4.10 MarketDocument

Electronic document containing the information necessary to satisfy a given business process set of requirements.

Table 28 shows all attributes of MarketDocument.

**Table 28 – Attributes of MarketManagement::MarketDocument**

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 29 shows all association ends of MarketDocument with other classes.

**Table 29 – Association ends of MarketManagement::MarketDocument with other classes**

| [mult from] | [mult to] name                    | type                       | description                      |
|-------------|-----------------------------------|----------------------------|----------------------------------|
| [0..*]      | [0..*] AttributeInstanceComponent | AttributeInstanceComponent |                                  |
| [0..*]      | [0..*] Domain                     | Domain                     |                                  |
| [0..*]      | [0..*] Period                     | Period                     |                                  |
| [0..*]      | [0..*] selfMarketDocument         | MarketDocument             |                                  |
| [0..*]      | [0..*] MarketParticipant          | MarketParticipant          |                                  |
| [0..*]      | [0..*] AceTariffType              | AceTariffType              |                                  |
| [0..*]      | [0..*] Reason                     | Reason                     |                                  |
| [0..*]      | [0..*] TimeSeries                 | TimeSeries                 |                                  |
| [0..*]      | [0..*] Process                    | Process                    |                                  |
| [0..*]      | [0..*] MarketDocument             | MarketDocument             |                                  |
| [0..1]      | [0..*] ConfigurationEvents        | ConfigurationEvent         | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects             | DiagramObject              | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                      | Name                       | inherited from: IdentifiedObject |

#### 6.4.11 MarketEvaluationPoint

The identification of an entity where energy products are measured or computed.

Table 30 shows all attributes of MarketEvaluationPoint.

**Table 30 – Attributes of MarketManagement::MarketEvaluationPoint**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 31 shows all association ends of MarketEvaluationPoint with other classes.

**Table 31 – Association ends of MarketManagement::MarketEvaluationPoint with other classes**

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [0..*]      | [0..*] TimeSeries     | TimeSeries    |                                  |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

#### 6.4.12 MarketObjectStatus root class

The condition or position of an object with regard to its standing.

Table 32 shows all attributes of MarketObjectStatus.

**Table 32 – Attributes of MarketManagement::MarketObjectStatus**

| name   | type   | description                                                               |
|--------|--------|---------------------------------------------------------------------------|
| status | String | The coded condition or position of an object with regard to its standing. |

Table 33 shows all association ends of MarketObjectStatus with other classes.

**Table 33 – Association ends of MarketManagement::MarketObjectStatus with other classes**

| [mult from] | [mult to] name    | type       | description |
|-------------|-------------------|------------|-------------|
| [0..*]      | [0..*] TimeSeries | TimeSeries |             |

#### 6.4.13 MktPSRType

The type of a power system resource.

Table 34 shows all attributes of MktPSRType.



**Table 34 – Attributes of MarketManagement::MktPSRType**

| name      | type   | description                                |
|-----------|--------|--------------------------------------------|
| psrType   | String | The coded type of a power system resource. |
| aliasName | String | inherited from: IdentifiedObject           |
| mRID      | String | inherited from: IdentifiedObject           |
| name      | String | inherited from: IdentifiedObject           |

Table 35 shows all association ends of MktPSRType with other classes.

**Table 35 – Association ends of MarketManagement::MktPSRType with other classes**

| [mult from] | [mult to] name              | type                | description                      |
|-------------|-----------------------------|---------------------|----------------------------------|
| [0..*]      | [0..*] TimeSeries           | TimeSeries          |                                  |
| [0..1]      | [0..*] PowerSystemResources | PowerSystemResource | inherited from: PSRType          |
| [0..1]      | [0..*] DiagramObjects       | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                | Name                | inherited from: IdentifiedObject |

#### 6.4.14 Period root class

An identification of a time interval that may have a given resolution.

Table 36 shows all attributes of Period.

**Table 36 – Attributes of MarketManagement::Period**

| name         | type             | description                                                                  |
|--------------|------------------|------------------------------------------------------------------------------|
| resolution   | Duration         | The number of units of time that compose an individual step within a period. |
| timeInterval | DateTimeInterval | The start and end date and time for a given interval.                        |

Table 37 shows all association ends of Period with other classes.

**Table 37 – Association ends of MarketManagement::Period with other classes**

| [mult from] | [mult to] name        | type           | description |
|-------------|-----------------------|----------------|-------------|
| [0..*]      | [0..*] Reason         | Reason         |             |
| [0..*]      | [0..*] MarketDocument | MarketDocument |             |
| [1..1]      | [0..*] Point          | Point          |             |
| [0..*]      | [0..*] TimeSeries     | TimeSeries     |             |

#### 6.4.15 Point root class

An identification of a set of values being addressed within a specific interval of time.

Table 38 shows all attributes of Point.

**Table 38 – Attributes of MarketManagement::Point**

| name              | type    | description                                                                         |
|-------------------|---------|-------------------------------------------------------------------------------------|
| position          | Integer | A sequential value representing the relative position within a given time interval. |
| quantity          | Decimal | Principal quantity identified for a point.                                          |
| secondaryQuantity | Decimal | Secondary quantity identified for a point.                                          |

Table 39 shows all association ends of Point with other classes.

**Table 39 – Association ends of MarketManagement::Point with other classes**

| [mult from] | [mult to] name       | type          | description |
|-------------|----------------------|---------------|-------------|
| [0..*]      | [0..*] AceTariffType | AceTariffType |             |
| [0..*]      | [1..1] Period        | Period        |             |
| [0..*]      | [0..*] TimeSeries    | TimeSeries    |             |
| [0..1]      | [0..*] Price         | Price         |             |
| [0..*]      | [0..*] Reason        | Reason        |             |

#### 6.4.16 Price root class

The cost corresponding to a specific measure and expressed in a currency.

Table 40 shows all attributes of Price.

**Table 40 – Attributes of MarketManagement::Price**

| name      | type    | description                                                                                                                |
|-----------|---------|----------------------------------------------------------------------------------------------------------------------------|
| amount    | Decimal | A number of monetary units specified in a unit of currency.                                                                |
| category  | String  | The category of a price to be used in a price calculation. The price category is mutually agreed between System Operators. |
| direction | String  | The direction indicates whether a System Operator pays the Market Parties or inverse.                                      |

Table 41 shows all association ends of Price with other classes.

**Table 41 – Association ends of MarketManagement::Price with other classes**

| [mult from] | [mult to] name | type  | description |
|-------------|----------------|-------|-------------|
| [0..*]      | [0..1] Point   | Point |             |

### 6.4.17 Process

The formal specification of a set of business transactions having the same business goal.

Table 42 shows all attributes of Process.

**Table 42 – Attributes of MarketManagement::Process**

| name               | type   | description                                                                                                                                            |
|--------------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| classificationType | String | The classification mechanism used to group a set of objects together within a business process. The grouping may be of a detailed or a summary nature. |
| processType        | String | The kind of business process.                                                                                                                          |
| aliasName          | String | inherited from: IdentifiedObject                                                                                                                       |
| mRID               | String | inherited from: IdentifiedObject                                                                                                                       |
| name               | String | inherited from: IdentifiedObject                                                                                                                       |

Table 43 shows all association ends of Process with other classes.

**Table 43 – Association ends of MarketManagement::Process with other classes**

| [mult from] | [mult to] name        | type           | description                      |
|-------------|-----------------------|----------------|----------------------------------|
| [0..*]      | [0..*] MarketDocument | MarketDocument |                                  |
| [0..1]      | [0..*] DiagramObjects | DiagramObject  | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name           | inherited from: IdentifiedObject |

### 6.4.18 Reason root class

The motivation of an act.

Table 44 shows all attributes of Reason.

**Table 44 – Attributes of MarketManagement::Reason**

| name | type   | description                                               |
|------|--------|-----------------------------------------------------------|
| code | String | The motivation of an act in coded form.                   |
| text | String | The textual explanation corresponding to the reason code. |

Table 45 shows all association ends of Reason with other classes.

**Table 45 – Association ends of MarketManagement::Reason with other classes**

| [mult from] | [mult to] name        | type           | description |
|-------------|-----------------------|----------------|-------------|
| [0..*]      | [0..*] MarketDocument | MarketDocument |             |
| [0..*]      | [0..*] Point          | Point          |             |
| [0..*]      | [0..*] Period         | Period         |             |
| [0..*]      | [0..*] TimeSeries     | TimeSeries     |             |

#### 6.4.19 TimeSeries

A set of regular time-ordered measurements or values of quantitative nature of an individual or collective phenomenon taken at successive, in most cases equidistant, periods / points of time.

Table 46 shows all attributes of TimeSeries.

**Table 46 – Attributes of MarketManagement::TimeSeries**

| name              | type   | description                                                                                                               |
|-------------------|--------|---------------------------------------------------------------------------------------------------------------------------|
| businessType      | String | The identification of the nature of the time series.                                                                      |
| curveType         | String | The coded representation of the type of curve being described.                                                            |
| objectAggregation | String | Identification of the object that is the common dominator used to aggregate a time series.                                |
| product           | String | The type of the product such as Power, energy, reactive power, transport capacity that is the subject of the time series. |
| version           | String | Version of the time series.                                                                                               |
| aliasName         | String | inherited from: IdentifiedObject                                                                                          |
| mRID              | String | inherited from: IdentifiedObject                                                                                          |
| name              | String | inherited from: IdentifiedObject                                                                                          |

Table 47 shows all association ends of TimeSeries with other classes.

**Table 47 – Association ends of MarketManagement::TimeSeries with other classes**

| [mult from] | [mult to] name               | type                  | description |
|-------------|------------------------------|-----------------------|-------------|
| [0..*]      | [0..*] MarketParticipant     | MarketParticipant     |             |
| [0..*]      | [0..*] DateAndOrTime         | DateAndOrTime         |             |
| [0..*]      | [0..*] Domain                | Domain                |             |
| [0..*]      | [0..*] FlowDirection         | FlowDirection         |             |
| [0..*]      | [0..*] MarketDocument        | MarketDocument        |             |
| [0..*]      | [0..*] MarketEvaluationPoint | MarketEvaluationPoint |             |
| [0..*]      | [0..*] Period                | Period                |             |
| [0..*]      | [0..*] Reason                | Reason                |             |
| [0..*]      | [0..*] RegisteredResource    | RegisteredResource    |             |

| [mult from] | [mult to] name                    | type                       | description                      |
|-------------|-----------------------------------|----------------------------|----------------------------------|
| [0..*]      | [0..*] AttributeInstanceComponent | AttributeInstanceComponent |                                  |
| [0..*]      | [0..*] Auction                    | Auction                    |                                  |
| [0..*]      | [0..*] MarketObjectStatus         | MarketObjectStatus         |                                  |
| [0..*]      | [0..*] MktPSRType                 | MktPSRType                 |                                  |
| [0..*]      | [0..*] Point                      | Point                      |                                  |
| [0..*]      | [0..*] Unit                       | Unit                       |                                  |
| [0..1]      | [0..*] DiagramObjects             | DiagramObject              | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                      | Name                       | inherited from: IdentifiedObject |

#### 6.4.20 Unit root class

The identification of the unit name for the time series quantities.

Table 48 shows all attributes of Unit.

**Table 48 – Attributes of MarketManagement::Unit**

| name | type   | description                           |
|------|--------|---------------------------------------|
| name | String | The coded representation of the unit. |

Table 49 shows all association ends of Unit with other classes.

**Table 49 – Association ends of MarketManagement::Unit with other classes**

| [mult from] | [mult to] name       | type          | description |
|-------------|----------------------|---------------|-------------|
| [0..*]      | [0..*] TimeSeries    | TimeSeries    |             |
| [0..*]      | [0..*] AceTariffType | AceTariffType |             |

## 6.5 Package MarketOperations

### 6.5.1 General

This package contains all core CIM Market Extensions required for market operations systems.

Figure 21 shows class diagram Main.

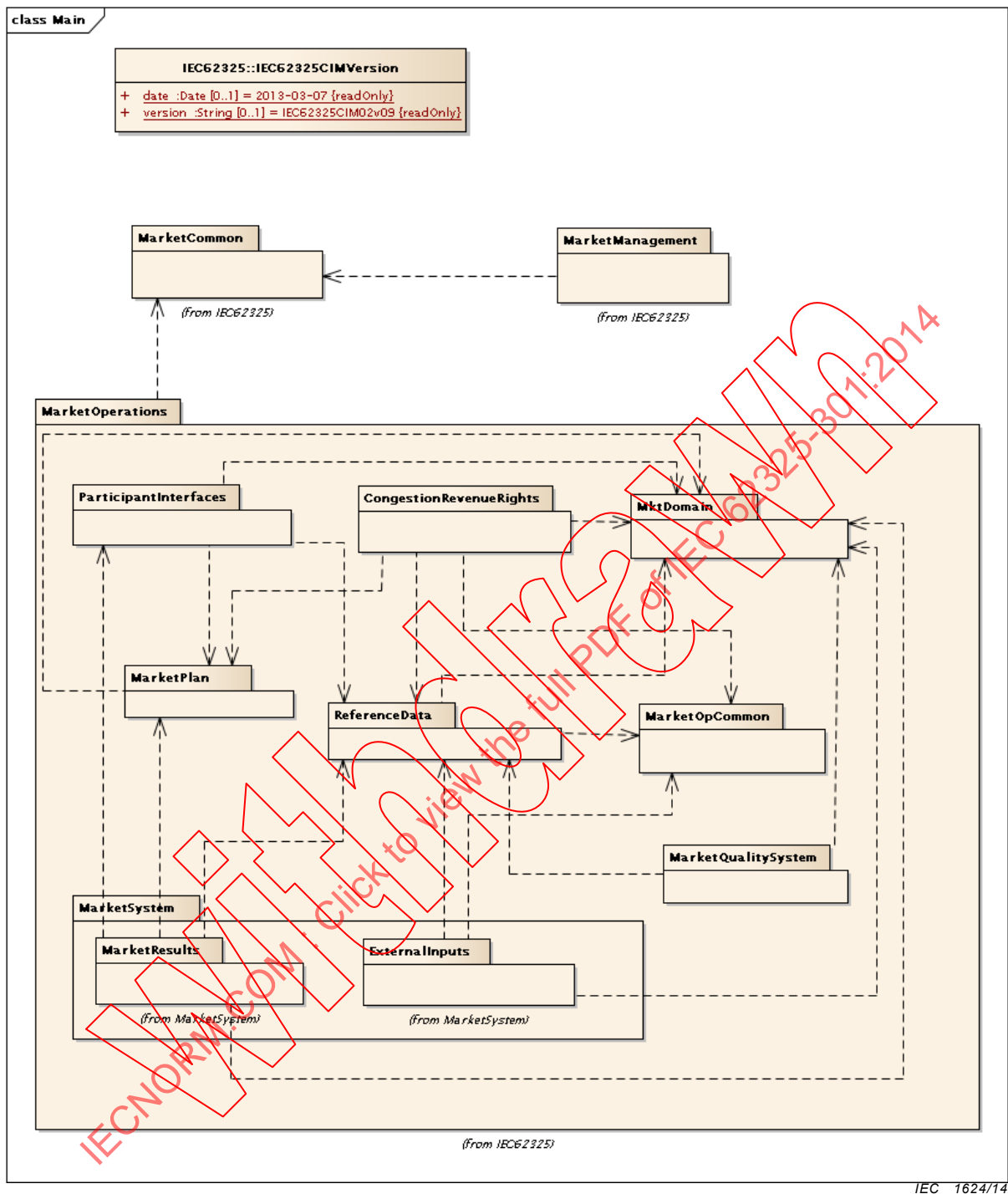


Figure 21 – Class diagram MarketOperations::Main

Figure 22 shows package diagram MarketOperations.



Figure 22 – Package diagram MarketOperations::MarketOperations



This package contains all core CIM Market Extensions required for market operations systems.

## 6.5.2 Package CongestionRevenueRights

### 6.5.2.1 General

Congestion rent is a major, highly volatile charge currently faced by many participants in the LMP-based electrical energy markets. For this reason, the ISOs offer congestion revenue rights (CRR), also known as financial transmission rights or transmission congestion contracts. These are financial instruments that allow market participants to hedge against congestion charges when they schedule their generation, load and bilateral energy transactions.

Figure 23 shows class diagram CongestionRevenueRights.

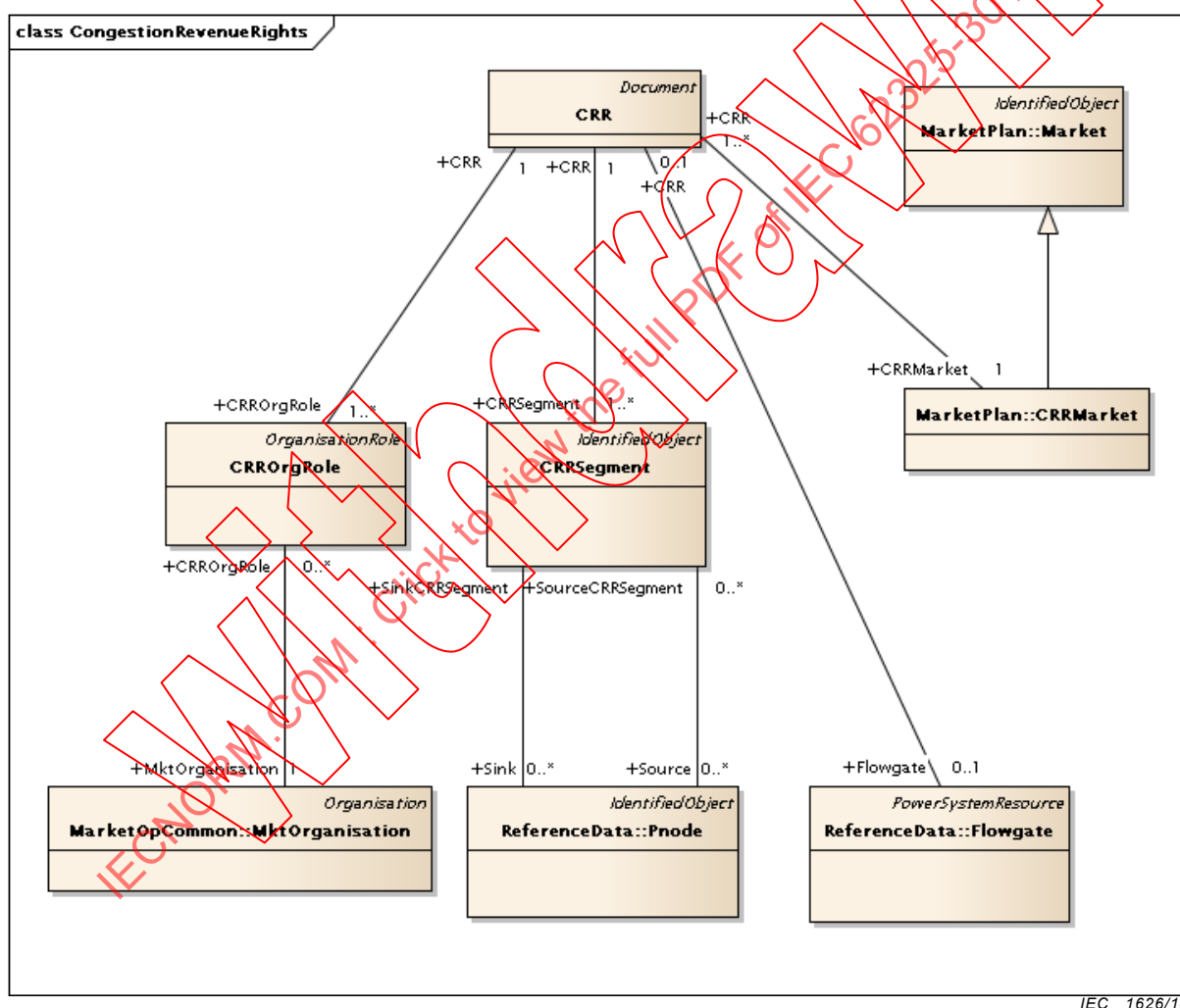


Figure 23 – Class diagram CongestionRevenueRights::CongestionRevenueRights

A congestion revenue right (CRR) is a financial instrument which entitles the holder to a CRR payment when the Congestion is in the direction of the source to CRR source to the CRR sink. The classes shown are used to model the CRR data. The CRRSegment class contains information about CRR segments. The MktOrganization class contains information about the entity that holds the CRR. Associations from CRRSegment to Reference data show the source and sink PNodes.

### 6.5.2.2 CRR

Congestion Revenue Rights (CRR) class that is inherited from a Document class.

A CRR is a financial concept that is used to hedge congestion charges.

The CRR is usually settled based on the Locational Marginal Prices (LMPs) that are calculated in the day-ahead market. These LMPs are determined by the Day-ahead resource schedules/bids. CRRs will not hedge against marginal losses. If the congestion component of LMP at the sink is greater than at the source, then the CRR owner is entitled to receive a portion of congestion revenues. If the congestion component at the sink is less than at the source, then an obligation-type CRR owner will be charged, but an option-type CRR owner will not.

Table 50 shows all attributes of CRR.

**Table 50 – Attributes of CongestionRevenueRights::CRR**

| name                 | type              | description                                                                                                                                                                                                                                                                                                                                                  |
|----------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cRRcategory          | CRRCategoryType   | CRR category represents 'PTP' for a point-to-point CRR, or 'NSR' for a Network Service Right. If CRR category is 'PTP', both Source ID and Sink ID fields are required. If CRR category is 'NSR' only one field, either Source ID or Sink ID, shall be not null and the other shall be null. However, the 'NSR' category will include at least three records |
| cRRtype              | CRRSegmentType    | Type of the CRR, from the possible type definitions in the CRR System (e.g. 'LSE', 'ETC').                                                                                                                                                                                                                                                                   |
| hedgeType            | CRRHedgeType      | hedger type Obligation or Option                                                                                                                                                                                                                                                                                                                             |
| timeOfUse            | TimeOfUse         | Time of Use flag of the CRR – Peak (ON), Offpeak (OFF) or all 24 hours (24HR).                                                                                                                                                                                                                                                                               |
| tradeSliceID         | String            | Segment of the CRR described in the current record                                                                                                                                                                                                                                                                                                           |
| type                 | String            | inherited from: Document                                                                                                                                                                                                                                                                                                                                     |
| createdDateTime      | DateTime          | inherited from: Document                                                                                                                                                                                                                                                                                                                                     |
| lastModifiedDateTime | DateTime          | inherited from: Document                                                                                                                                                                                                                                                                                                                                     |
| revisionNumber       | String            | inherited from: Document                                                                                                                                                                                                                                                                                                                                     |
| electronicAddress    | ElectronicAddress | inherited from: Document                                                                                                                                                                                                                                                                                                                                     |
| subject              | String            | inherited from: Document                                                                                                                                                                                                                                                                                                                                     |
| title                | String            | inherited from: Document                                                                                                                                                                                                                                                                                                                                     |
| docStatus            | Status            | inherited from: Document                                                                                                                                                                                                                                                                                                                                     |
| status               | Status            | inherited from: Document                                                                                                                                                                                                                                                                                                                                     |
| aliasName            | String            | inherited from: IdentifiedObject                                                                                                                                                                                                                                                                                                                             |
| mRID                 | String            | inherited from: IdentifiedObject                                                                                                                                                                                                                                                                                                                             |
| name                 | String            | inherited from: IdentifiedObject                                                                                                                                                                                                                                                                                                                             |

Table 51 shows all association ends of CRR with other classes.

**Table 51 – Association ends of CongestionRevenueRights::CRR with other classes**

| [mult from] | [mult to] name             | type               | description                      |
|-------------|----------------------------|--------------------|----------------------------------|
| [0..1]      | [0..1] Flowgate            | Flowgate           |                                  |
| [1..*]      | [1..1] CRRMarket           | CRRMarket          |                                  |
| [1..1]      | [1..*] CRRSegment          | CRRSegment         |                                  |
| [1..1]      | [1..*] CRROrgRole          | CRROrgRole         |                                  |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name               | inherited from: IdentifiedObject |

### 6.5.2.3 CRROrgRole

Identifies a way in which an organisation may participate with a defined Congestion Revenue Right (CRR).

Table 52 shows all attributes of CRROrgRole.

**Table 52 – Attributes of CongestionRevenueRights::CRROrgRole**

| name      | type        | description                                                                     |
|-----------|-------------|---------------------------------------------------------------------------------|
| kind      | CRRRoleType | Kind of role the organisation is with regards to the congestion revenue rights. |
| status    | Status      | Status of congestion revenue rights organisation role.                          |
| aliasName | String      | inherited from: IdentifiedObject                                                |
| mRID      | String      | inherited from: IdentifiedObject                                                |
| name      | String      | inherited from: IdentifiedObject                                                |

Table 53 shows all association ends of CRROrgRole with other classes.

**Table 53 – Association ends of CongestionRevenueRights::CRROrgRole with other classes**

| [mult from] | [mult to] name             | type               | description                      |
|-------------|----------------------------|--------------------|----------------------------------|
| [1..*]      | [1..1] CRR                 | CRR                |                                  |
| [0..*]      | [1..1] MktOrganisation     | MktOrganisation    |                                  |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent | inherited from: OrganisationRole |
| [0..*]      | [0..1] Organisation        | Organisation       | inherited from: OrganisationRole |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name               | inherited from: IdentifiedObject |

### 6.5.2.4 CRRSegment

CRRSegment represents a segment of a CRR in a particular time frame.

The segment class contains CRR kind, type, quantity, hedger type, time of use flag, and segment period.

Table 54 shows all attributes of CRRSegment.

**Table 54 – Attributes of CongestionRevenueRights::CRRSegment**

| name          | type     | description                              |
|---------------|----------|------------------------------------------|
| amount        | Money    | Dollar amount = quantity x clearingPrice |
| clearingPrice | Money    | Clearing price of a CRR                  |
| endDateTime   | DateTime | segment end date time                    |
| quantity      | Float    | The MW amount associated with the CRR    |
| startDateTime | DateTime | segment start date time                  |
| aliasName     | String   | inherited from: IdentifiedObject         |
| mRID          | String   | inherited from: IdentifiedObject         |
| name          | String   | inherited from: IdentifiedObject         |

Table 55 shows all association ends of CRRSegment with other classes.

**Table 55 – Association ends of CongestionRevenueRights::CRRSegment with other classes**

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [1..*]      | [1..1] CRR            | CRR           |                                  |
| [0..*]      | [0..*] Source         | Pnode         |                                  |
| [0..*]      | [0..*] Sink           | Pnode         |                                  |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

### 6.5.3 Package MarketOpCommon

#### 6.5.3.1 General

This package contains the common objects shared by MarketOperations packages.

#### 6.5.3.2 MarketInvoice root class

A roll up of invoice line items. The whole invoice has a due date and amount to be paid, with information such as customer, banks etc. being obtained through associations. The invoice roll up is based on individual line items that each contain amounts and descriptions for specific services or products.

Table 56 shows all attributes of MarketInvoice.

**Table 56 – Attributes of MarketOpCommon::MarketInvoice**

| name                | type             | description                                                                                                                                                                                                                                                                 |
|---------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| amount              | Money            | Total amount due on this invoice based on line items and applicable adjustments.                                                                                                                                                                                            |
| billMediaKind       | MktBillMediaKind | Kind of media by which the CustomerBillingInfo was delivered.                                                                                                                                                                                                               |
| dueDate             | Date             | Calculated date upon which the Invoice amount is due.                                                                                                                                                                                                                       |
| kind                | MktAccountKind   | Kind of invoice (default is 'sales').                                                                                                                                                                                                                                       |
| mailedDate          | Date             | Date on which the customer billing statement/invoice was printed/mailed.                                                                                                                                                                                                    |
| proForma            | Boolean          | True if payment is to be paid by a Customer to accept a particular ErpQuote (with associated Design) and have work initiated, at which time an associated ErpInvoice should automatically be generated. ErpPayment.subjectStatus satisfies terms specified in the ErpQuote. |
| referenceNumber     | String           | Number of an invoice to be reference by this invoice.                                                                                                                                                                                                                       |
| transactionDateTime | DateTime         | Date and time when the invoice is issued.                                                                                                                                                                                                                                   |
| transferType        | String           | Type of invoice transfer.                                                                                                                                                                                                                                                   |

Table 57 shows all association ends of MarketInvoice with other classes.

**Table 57 – Association ends of MarketOpCommon::MarketInvoice with other classes**

| [mult from] | [mult to] name                | type                  | description |
|-------------|-------------------------------|-----------------------|-------------|
| [0..*]      | [1..*] MajorChargeGroup       | MajorChargeGroup      |             |
| [1..1]      | [0..*] MarketInvoiceLineItems | MarketInvoiceLineItem |             |

### 6.5.3.3 MarketInvoiceLineItem root class

An individual line item on an invoice.

Table 58 shows all attributes of MarketInvoiceLineItem.

**Table 58 – Attributes of MarketOpCommon::MarketInvoiceLineItem**

| name        | type                   | description                                                   |
|-------------|------------------------|---------------------------------------------------------------|
| billPeriod  | DateTimeInterval       | Bill period for the line item.                                |
| glAccount   | String                 | General Ledger account code shall be a valid combination.     |
| glDateTime  | DateTime               | Date and time line item will be posted to the General Ledger. |
| kind        | MktInvoiceLineItemKind | Kind of line item.                                            |
| lineAmount  | Float                  | Amount due for this line item.                                |
| lineNumber  | String                 | Line item number on invoice statement.                        |
| lineVersion | String                 | Version number of the bill run.                               |
| netAmount   | Float                  | Net line item charge amount.                                  |

| name           | type  | description                       |
|----------------|-------|-----------------------------------|
| previousAmount | Float | Previous line item charge amount. |

Table 59 shows all association ends of MarketInvoiceLineItem with other classes.

**Table 59 – Association ends of MarketOpCommon::MarketInvoiceLineItem with other classes**

| [mult from] | [mult to] name                         | type                  | description |
|-------------|----------------------------------------|-----------------------|-------------|
| [0..*]      | [1..1] MarketInvoice                   | MarketInvoice         |             |
| [0..*]      | [0..*] Settlement                      | Settlement            |             |
| [0..*]      | [0..1] ContainerMarketInvoiceLineItem  | MarketInvoiceLineItem |             |
| [0..1]      | [0..*] ComponentMarketInvoiceLineItems | MarketInvoiceLineItem |             |

#### 6.5.3.4 MarketLedger root class

In accounting transactions, a ledger is a book containing accounts to which debits and credits are posted from journals, where transactions are initially recorded. Journal entries are periodically posted to the ledger. Ledger Actual represents actual amounts by account within ledger within company or business area. Actual amounts may be generated in a source application and then loaded to a specific ledger within the enterprise general ledger or budget application.

Table 60 shows all association ends of MarketLedger with other classes.

**Table 60 – Association ends of MarketOpCommon::MarketLedger with other classes**

| [mult from] | [mult to] name             | type              | description |
|-------------|----------------------------|-------------------|-------------|
| [1..1]      | [0..*] MarketLedgerEntries | MarketLedgerEntry |             |

#### 6.5.3.5 MarketLedgerEntry root class

Details of an individual entry in a ledger, which was posted from a journal on the posted date.

Table 61 shows all attributes of MarketLedgerEntry.

**Table 61 – Attributes of MarketOpCommon::MarketLedgerEntry**

| name           | type           | description                                         |
|----------------|----------------|-----------------------------------------------------|
| accountID      | String         | Account identifier for this entry.                  |
| accountKind    | MktAccountKind | Kind of account for this entry.                     |
| amount         | Money          | The amount of the debit or credit for this account. |
| postedDateTime | DateTime       | Date and time this entry was posted to the ledger.  |

| name                | type     | description                               |
|---------------------|----------|-------------------------------------------|
| status              | Status   | Status of ledger entry.                   |
| transactionDateTime | DateTime | Date and time journal entry was recorded. |

Table 62 shows all association ends of MarketLedgerEntry with other classes.

**Table 62 – Association ends of MarketOpCommon::MarketLedgerEntry with other classes**

| [mult from] | [mult to] name      | type         | description |
|-------------|---------------------|--------------|-------------|
| [0..*]      | [0..*] Settlement   | Settlement   |             |
| [0..*]      | [1..1] MarketLedger | MarketLedger |             |

### 6.5.3.6 MktActivityRecord

Subclass of IEC 61968: Common:ActivityRecord

Table 63 shows all attributes of MktActivityRecord.

**Table 63 – Attributes of MarketOpCommon::MktActivityRecord**

| name            | type     | description                      |
|-----------------|----------|----------------------------------|
| createdDateTime | DateTime | inherited from: ActivityRecord   |
| type            | String   | inherited from: ActivityRecord   |
| severity        | String   | inherited from: ActivityRecord   |
| reason          | String   | inherited from: ActivityRecord   |
| status          | Status   | inherited from: ActivityRecord   |
| aliasName       | String   | inherited from: IdentifiedObject |
| mRID            | String   | inherited from: IdentifiedObject |
| name            | String   | inherited from: IdentifiedObject |

Table 64 shows all association ends of MktActivityRecord with other classes.

**Table 64 – Association ends of MarketOpCommon::MktActivityRecord with other classes**

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [0..*]      | [0..*] MarketFactors  | MarketFactors |                                  |
| [0..*]      | [0..*] Assets         | Asset         | inherited from: ActivityRecord   |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

### 6.5.3.7 MktConnectivityNode

Subclass of IEC 61970:Topology:ConnectivityNode



Table 65 shows all attributes of MktConnectivityNode.

**Table 65 – Attributes of MarketOpCommon::MktConnectivityNode**

| name               | type     | description                      |
|--------------------|----------|----------------------------------|
| endEffectiveDate   | DateTime | end effective date               |
| startEffectiveDate | DateTime | start effective date             |
| aliasName          | String   | inherited from: IdentifiedObject |
| mRID               | String   | inherited from: IdentifiedObject |
| name               | String   | inherited from: IdentifiedObject |

Table 66 shows all association ends of MktConnectivityNode with other classes.

**Table 66 – Association ends of MarketOpCommon::MktConnectivityNode with other classes**

| [mult from] | [mult to] name                   | type                      | description                      |
|-------------|----------------------------------|---------------------------|----------------------------------|
| [0..1]      | [0..*] RegisteredResource        | RegisteredResource        |                                  |
| [1..1]      | [0..*] NodeConstraintTerm        | NodeConstraintTerm        |                                  |
| [0..*]      | [1..1] RTO                       | RTO                       |                                  |
| [1..1]      | [0..1] SysLoadDistribuFactor     | SysLoadDistributionFactor |                                  |
| [1..1]      | [0..*] LossPenaltyFactor         | LossSensitivity           |                                  |
| [1..1]      | [0..*] CnodeDistributionFactor   | CnodeDistributionFactor   |                                  |
| [1..1]      | [0..1] IndividualPnode           | IndividualPnode           |                                  |
| [0..*]      | [1..1] ConnectivityNodeContainer | ConnectivityNodeContainer | inherited from: ConnectivityNode |
| [0..*]      | [0..1] TopologicalNode           | TopologicalNode           | inherited from: ConnectivityNode |
| [0..1]      | [0..*] Terminals                 | Terminal                  | inherited from: ConnectivityNode |
| [0..1]      | [0..*] DiagramObjects            | DiagramObject             | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                     | Name                      | inherited from: IdentifiedObject |

### 6.5.3.8 MktEnergyConsumer

Subclass of IEC 61970:Wires:EnergyConsumer

Table 67 shows all attributes of MktEnergyConsumer.

**Table 67 – Attributes of MarketOpCommon::MktEnergyConsumer**

| name            | type                     | description                    |
|-----------------|--------------------------|--------------------------------|
| customerCount   | Integer                  | inherited from: EnergyConsumer |
| grounded        | WindingConnection        | inherited from: EnergyConsumer |
| pfixed          | ActivePower              | inherited from: EnergyConsumer |
| pfixedPct       | PerCent                  | inherited from: EnergyConsumer |
| phaseConnection | PhaseShuntConnectionKind | inherited from: EnergyConsumer |
| qfixed          | ReactivePower            | inherited from: EnergyConsumer |

| name              | type    | description                      |
|-------------------|---------|----------------------------------|
| qfixedPct         | PerCent | inherited from: EnergyConsumer   |
| aggregate         | Boolean | inherited from: Equipment        |
| normallyInService | Boolean | inherited from: Equipment        |
| aliasName         | String  | inherited from: IdentifiedObject |
| mRID              | String  | inherited from: IdentifiedObject |
| name              | String  | inherited from: IdentifiedObject |

Table 68 shows all association ends of MktEnergyConsumer with other classes

**Table 68 – Association ends of MarketOpCommon::  
MktEnergyConsumer with other classes**

| [mult from] | [mult to] name              | type                       | description                         |
|-------------|-----------------------------|----------------------------|-------------------------------------|
| [1..1]      | [0..*] EnergyConsumerData   | EnergyConsumerData         |                                     |
| [0..*]      | [0..1] RegisteredLoad       | RegisteredLoad             |                                     |
| [0..*]      | [0..1] LoadResponse         | LoadResponseCharacteristic | inherited from: EnergyConsumer      |
| [1..1]      | [0..*] EnergyConsumerPhase  | EnergyConsumerPhase        | inherited from: EnergyConsumer      |
| [1..*]      | [0..1] PowerCutZone         | PowerCutZone               | inherited from: EnergyConsumer      |
| [0..*]      | [0..1] BaseVoltage          | BaseVoltage                | inherited from: ConductingEquipment |
| [1..1]      | [0..*] Terminals            | Terminal                   | inherited from: ConductingEquipment |
| [0..*]      | [0..*] ProtectionEquipments | ProtectionEquipment        | inherited from: ConductingEquipment |
| [1..1]      | [0..*] ClearanceTags        | ClearanceTag               | inherited from: ConductingEquipment |
| [1..1]      | [0..1] SvStatus             | SvStatus                   | inherited from: ConductingEquipment |
| [0..*]      | [0..1] EquipmentContainer   | EquipmentContainer         | inherited from: Equipment           |
| [1..1]      | [0..*] ContingencyEquipment | ContingencyEquipment       | inherited from: Equipment           |
| [0..1]      | [0..*] OperationalLimitSet  | OperationalLimitSet        | inherited from: Equipment           |
| [0..*]      | [0..1] PSRType              | PSRType                    | inherited from: PowerSystemResource |
| [0..1]      | [0..*] Measurements         | Measurement                | inherited from: PowerSystemResource |
| [1..1]      | [0..*] OperatingShare       | OperatingShare             | inherited from: PowerSystemResource |
| [0..*]      | [0..*] PsrLists             | PsrList                    | inherited from: PowerSystemResource |
| [1..1]      | [0..1] OutageSchedule       | OutageSchedule             | inherited from: PowerSystemResource |
| [0..*]      | [0..*] ReportingGroup       | ReportingGroup             | inherited from: PowerSystemResource |
| [0..1]      | [0..*] DiagramObjects       | DiagramObject              | inherited from: IdentifiedObject    |
| [1..1]      | [0..*] Names                | Name                       | inherited from: IdentifiedObject    |

### 6.5.3.9 MktGeneratingUnit

Subclass of IEC 61970:Production:GeneratingUnit

Table 69 shows all attributes of MktGeneratingUnit.

**Table 69 – Attributes of MarketOpCommon::MktGeneratingUnit**

| name                            | type                   | description                    |
|---------------------------------|------------------------|--------------------------------|
| allocSpinResP                   | ActivePower            | inherited from: GeneratingUnit |
| autoCntrlMarginP                | ActivePower            | inherited from: GeneratingUnit |
| baseP                           | ActivePower            | inherited from: GeneratingUnit |
| controlDeadband                 | ActivePower            | inherited from: GeneratingUnit |
| controlPulseHigh                | Seconds                | inherited from: GeneratingUnit |
| controlPulseLow                 | Seconds                | inherited from: GeneratingUnit |
| controlResponseRate             | ActivePowerChangeRate  | inherited from: GeneratingUnit |
| dispReserveFlag                 | Boolean                | inherited from: GeneratingUnit |
| efficiency                      | PU                     | inherited from: GeneratingUnit |
| energyMinP                      | HeatRate               | inherited from: GeneratingUnit |
| fastStartFlag                   | Boolean                | inherited from: GeneratingUnit |
| fuelPriority                    | Integer                | inherited from: GeneratingUnit |
| genControlMode                  | GeneratorControlMode   | inherited from: GeneratingUnit |
| genControlSource                | GeneratorControlSource | inherited from: GeneratingUnit |
| genOperatingMode                | GeneratorOperatingMode | inherited from: GeneratingUnit |
| governorMPL                     | PU                     | inherited from: GeneratingUnit |
| governorSCD                     | PerCent                | inherited from: GeneratingUnit |
| highControlLimit                | ActivePower            | inherited from: GeneratingUnit |
| initialIP                       | ActivePower            | inherited from: GeneratingUnit |
| longPF                          | Float                  | inherited from: GeneratingUnit |
| lowControlLimit                 | ActivePower            | inherited from: GeneratingUnit |
| lowerRampRate                   | ActivePowerChangeRate  | inherited from: GeneratingUnit |
| maxEconomicP                    | ActivePower            | inherited from: GeneratingUnit |
| maximumAllowableSpinningReserve | ActivePower            | inherited from: GeneratingUnit |
| maxOperatingP                   | ActivePower            | inherited from: GeneratingUnit |
| minEconomicP                    | ActivePower            | inherited from: GeneratingUnit |
| minimumOffTime                  | Seconds                | inherited from: GeneratingUnit |
| minOperatingP                   | ActivePower            | inherited from: GeneratingUnit |
| modelDetail                     | Classification         | inherited from: GeneratingUnit |
| nominalIP                       | ActivePower            | inherited from: GeneratingUnit |
| normalPF                        | Float                  | inherited from: GeneratingUnit |
| penaltyFactor                   | Float                  | inherited from: GeneratingUnit |
| raiseRampRate                   | ActivePowerChangeRate  | inherited from: GeneratingUnit |
| ratedGrossMaxP                  | ActivePower            | inherited from: GeneratingUnit |
| ratedGrossMinP                  | ActivePower            | inherited from: GeneratingUnit |
| ratedNetMaxP                    | ActivePower            | inherited from: GeneratingUnit |
| shortPF                         | Float                  | inherited from: GeneratingUnit |
| spinReserveRamp                 | ActivePowerChangeRate  | inherited from: GeneratingUnit |
| startupCost                     | Money                  | inherited from: GeneratingUnit |
| startupTime                     | Seconds                | inherited from: GeneratingUnit |
| stepChange                      | ActivePower            | inherited from: GeneratingUnit |
| tieLinePF                       | Float                  | inherited from: GeneratingUnit |

| name              | type    | description                      |
|-------------------|---------|----------------------------------|
| variableCost      | Money   | inherited from: GeneratingUnit   |
| aggregate         | Boolean | inherited from: Equipment        |
| normallyInService | Boolean | inherited from: Equipment        |
| aliasName         | String  | inherited from: IdentifiedObject |
| mRID              | String  | inherited from: IdentifiedObject |
| name              | String  | inherited from: IdentifiedObject |

Table 70 shows all association ends of MktGeneratingUnit with other classes.

**Table 70 – Association ends of MarketOpCommon::  
MktGeneratingUnit with other classes**

| [mult from] | [mult to] name                     | type                        | description                         |
|-------------|------------------------------------|-----------------------------|-------------------------------------|
| [0..*]      | [0..1] RegisteredGenerator         | RegisteredGenerator         |                                     |
| [1..1]      | [0..*] GeneratingUnitDynamicValues | GeneratingUnitDynamicValues |                                     |
| [0..1]      | [1..*] SynchronousMachines         | SynchronousMachine          | inherited from: GeneratingUnit      |
| [1..1]      | [0..1] GenUnitOpSchedule           | GenUnitOpSchedule           | inherited from: GeneratingUnit      |
| [1..1]      | [0..*] GrossToNetActivePowerCurves | GrossToNetActivePowerCurve  | inherited from: GeneratingUnit      |
| [1..1]      | [0..*] GenUnitOpCostCurves         | GenUnitOpCostCurve          | inherited from: GeneratingUnit      |
| [1..1]      | [0..*] ControlAreaGeneratingUnit   | ControlAreaGeneratingUnit   | inherited from: GeneratingUnit      |
| [0..*]      | [0..1] EquipmentContainer          | EquipmentContainer          | inherited from: Equipment           |
| [1..1]      | [0..*] ContingencyEquipment        | ContingencyEquipment        | inherited from: Equipment           |
| [0..1]      | [0..*] OperationalLimitSet         | OperationalLimitSet         | inherited from: Equipment           |
| [0..*]      | [0..1] PSRType                     | PSRType                     | inherited from: PowerSystemResource |
| [0..1]      | [0..*] Measurements                | Measurement                 | inherited from: PowerSystemResource |
| [1..1]      | [0..*] OperatingShare              | OperatingShare              | inherited from: PowerSystemResource |
| [0..*]      | [0..*] PsrLists                    | PsrList                     | inherited from: PowerSystemResource |
| [1..1]      | [0..1] OutageSchedule              | OutageSchedule              | inherited from: PowerSystemResource |
| [0..*]      | [0..*] ReportingGroup              | ReportingGroup              | inherited from: PowerSystemResource |
| [0..1]      | [0..*] DiagramObjects              | DiagramObject               | inherited from: IdentifiedObject    |
| [1..1]      | [0..*] Names                       | Name                        | inherited from: IdentifiedObject    |

#### 6.5.3.10 MktLine

Subclass for IEC 61970:Wires:Line

Table 71 shows all attributes of MktLine.

**Table 71 – Attributes of MarketOpCommon::MktLine**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 72 shows all association ends of MktLine with other classes.

**Table 72 – Association ends of MarketOpCommon::MktLine with other classes**

| [mult from] | [mult to] name           | type                  | description                               |
|-------------|--------------------------|-----------------------|-------------------------------------------|
| [0..*]      | [0..*] Flowgate          | Flowgate              |                                           |
| [0..*]      | [0..1] Region            | SubGeographicalRegion | inherited from: Line                      |
| [0..1]      | [0..*] Equipments        | Equipment             | inherited from: EquipmentContainer        |
| [1..1]      | [0..*] ConnectivityNodes | ConnectivityNode      | inherited from: ConnectivityNodeContainer |
| [0..1]      | [0..*] TopologicalNode   | TopologicalNode       | inherited from: ConnectivityNodeContainer |
| [0..*]      | [0..1] PSRType           | PSRType               | inherited from: PowerSystemResource       |
| [0..1]      | [0..*] Measurements      | Measurement           | inherited from: PowerSystemResource       |
| [1..1]      | [0..*] OperatingShare    | OperatingShare        | inherited from: PowerSystemResource       |
| [0..*]      | [0..*] PsrLists          | PsrList               | inherited from: PowerSystemResource       |
| [1..1]      | [0..1] OutageSchedule    | OutageSchedule        | inherited from: PowerSystemResource       |
| [0..*]      | [0..*] ReportingGroup    | ReportingGroup        | inherited from: PowerSystemResource       |
| [0..1]      | [0..*] DiagramObjects    | DiagramObject         | inherited from: IdentifiedObject          |
| [1..1]      | [0..*] Names             | Name                  | inherited from: IdentifiedObject          |

### 6.5.3.11 MktLoadArea

Subclass of IEC 61970:LoadModel: LoadArea

Table 73 shows all attributes of MktLoadArea.

**Table 73 – Attributes of MarketOpCommon::MktLoadArea**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 74 shows all association ends of MktLoadArea with other classes.

**Table 74 – Association ends of MarketOpCommon::MktLoadArea with other classes**

| [mult from] | [mult to] name        | type           | description                      |
|-------------|-----------------------|----------------|----------------------------------|
| [1..1]      | [0..*] RegisteredLoad | RegisteredLoad |                                  |
| [0..1]      | [0..*] AreaLoadCurve  | AreaLoadCurve  |                                  |
| [1..1]      | [1..*] SubLoadAreas   | SubLoadArea    | inherited from: LoadArea         |
| [0..1]      | [0..1] ControlArea    | ControlArea    | inherited from: EnergyArea       |
| [0..1]      | [0..*] DiagramObjects | DiagramObject  | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name           | inherited from: IdentifiedObject |

**6.5.3.12 MktMeasurement**

Subclass of IEC 61970:Meas:Measurement

Table 75 shows all attributes of MktMeasurement.

**Table 75 – Attributes of MarketOpCommon::MktMeasurement**

| name            | type           | description                      |
|-----------------|----------------|----------------------------------|
| measurementType | String         | inherited from: Measurement      |
| phases          | PhaseCode      | inherited from: Measurement      |
| unitMultiplier  | UnitMultiplier | inherited from: Measurement      |
| unitSymbol      | UnitSymbol     | inherited from: Measurement      |
| aliasName       | String         | inherited from: IdentifiedObject |
| mRID            | String         | inherited from: IdentifiedObject |
| name            | String         | inherited from: IdentifiedObject |

Table 76 shows all association ends of MktMeasurement with other classes.

**Table 76 – Association ends of MarketOpCommon::MktMeasurement with other classes**

| [mult from] | [mult to] name             | type                | description                      |
|-------------|----------------------------|---------------------|----------------------------------|
| [0..*]      | [0..1] Pnode               | Pnode               |                                  |
| [0..*]      | [0..1] Terminal            | Terminal            | inherited from: Measurement      |
| [0..*]      | [0..1] PowerSystemResource | PowerSystemResource | inherited from: Measurement      |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject |

**6.5.3.13 MktOrganisation**

Subclass of IEC 61968:Core2:TopLevel:Organisation

Table 77 shows all attributes of MktOrganisation.

**Table 77 – Attributes of MarketOpCommon::MktOrganisation**

| name                     | type              | description                                                                  |
|--------------------------|-------------------|------------------------------------------------------------------------------|
| creditFlag               | YesNo             | Flag to indicate creditworthiness (Y, N)                                     |
| creditStartEffectiveDate | DateTime          | Date that the organisation becomes creditworthy.                             |
| endEffectiveDate         | DateTime          | end effective date                                                           |
| lastModified             | DateTime          | Indication of the last time this Organization information was modified.      |
| organisationID           | Integer           | Organisation (internal) ID                                                   |
| qualificationStatus      | String            | Organisation qualification status, Qualified, Not Qualified, or Disqualified |
| startEffectiveDate       | DateTime          | start effective date                                                         |
| streetAddress            | StreetAddress     | inherited from: Organisation                                                 |
| postalAddress            | PostalAddress     | inherited from: Organisation                                                 |
| phone1                   | TelephoneNumber   | inherited from: Organisation                                                 |
| phone2                   | TelephoneNumber   | inherited from: Organisation                                                 |
| electronicAddress        | ElectronicAddress | inherited from: Organisation                                                 |
| aliasName                | String            | inherited from: IdentifiedObject                                             |
| mRID                     | String            | inherited from: IdentifiedObject                                             |
| name                     | String            | inherited from: IdentifiedObject                                             |

Table 78 shows all association ends of MktOrganisation with other classes.

**Table 78 – Association ends of MarketOpCommon::MktOrganisation with other classes**

| [mult from] | [mult to] name               | type                  | description                      |
|-------------|------------------------------|-----------------------|----------------------------------|
| [1..1]      | [0..*] CRRORgRole            | CRRORgRole            |                                  |
| [0..*]      | [0..*] MarketPerson          | MarketPerson          |                                  |
| [0..1]      | [0..*] RegisteredResource    | RegisteredResource    |                                  |
| [1..1]      | [0..*] OrgResOwnership       | OrgResOwnership       |                                  |
| [1..1]      | [0..*] OrgPnodeAllocation    | OrgPnodeAllocation    |                                  |
| [1..1]      | [0..*] SchedulingCoordinator | SchedulingCoordinator |                                  |
| [0..1]      | [0..*] Roles                 | OrganisationRole      | inherited from: Organisation     |
| [0..1]      | [0..*] DiagramObjects        | DiagramObject         | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                 | Name                  | inherited from: IdentifiedObject |

#### 6.5.3.14 MktPowerTransformer

Subclass of IEC 61970:Wires:PowerTransformer

Table 79 shows all attributes of MktPowerTransformer.

**Table 79 – Attributes of MarketOpCommon::MktPowerTransformer**

| name        | type    | description                      |
|-------------|---------|----------------------------------|
| vectorGroup | String  | inherited from: PowerTransformer |
| aggregate   | Boolean | inherited from: Equipment        |



| name              | type    | description                      |
|-------------------|---------|----------------------------------|
| normallyInService | Boolean | inherited from: Equipment        |
| aliasName         | String  | inherited from: IdentifiedObject |
| mRID              | String  | inherited from: IdentifiedObject |
| name              | String  | inherited from: IdentifiedObject |

Table 80 shows all association ends of MktPowerTransformer with other classes.

**Table 80 – Association ends of MarketOpCommon::  
MktPowerTransformer with other classes**

| [mult from] | [mult to] name              | type                 | description                         |
|-------------|-----------------------------|----------------------|-------------------------------------|
| [0..*]      | [0..*] Flowgate             | Flowgate             |                                     |
| [0..*]      | [0..1] EndBFlow             | BranchEndFlow        |                                     |
| [0..*]      | [0..1] EndAFlow             | BranchEndFlow        |                                     |
| [0..1]      | [0..*] PowerTransformerEnd  | PowerTransformerEnd  | inherited from: PowerTransformer    |
| [0..1]      | [0..*] TransformerTanks     | TransformerTank      | inherited from: PowerTransformer    |
| [0..*]      | [0..1] BaseVoltage          | BaseVoltage          | inherited from: ConductingEquipment |
| [1..1]      | [0..*] Terminals            | Terminal             | inherited from: ConductingEquipment |
| [0..*]      | [0..*] ProtectionEquipments | ProtectionEquipment  | inherited from: ConductingEquipment |
| [1..1]      | [0..*] ClearanceTags        | ClearanceTag         | inherited from: ConductingEquipment |
| [1..1]      | [0..1] SvStatus             | SvStatus             | inherited from: ConductingEquipment |
| [0..*]      | [0..1] EquipmentContainer   | EquipmentContainer   | inherited from: Equipment           |
| [1..1]      | [0..*] ContingencyEquipment | ContingencyEquipment | inherited from: Equipment           |
| [0..1]      | [0..*] OperationalLimitSet  | OperationalLimitSet  | inherited from: Equipment           |
| [0..*]      | [0..1] PSRType              | PSRType              | inherited from: PowerSystemResource |
| [0..1]      | [0..*] Measurements         | Measurement          | inherited from: PowerSystemResource |
| [1..1]      | [0..*] OperatingShare       | OperatingShare       | inherited from: PowerSystemResource |
| [0..*]      | [0..*] PsrLists             | PsrList              | inherited from: PowerSystemResource |
| [1..1]      | [0..1] OutageSchedule       | OutageSchedule       | inherited from: PowerSystemResource |
| [0..*]      | [0..*] ReportingGroup       | ReportingGroup       | inherited from: PowerSystemResource |
| [0..1]      | [0..*] DiagramObjects       | DiagramObject        | inherited from: IdentifiedObject    |
| [1..1]      | [0..*] Names                | Name                 | inherited from: IdentifiedObject    |

### 6.5.3.15 MktTerminal

Subclass of IEC 61970:Core:Terminal

Table 81 shows all attributes of MktTerminal.

**Table 81 – Attributes of MarketOpCommon::MktTerminal**

| name               | type      | description                                                              |
|--------------------|-----------|--------------------------------------------------------------------------|
| startEffectiveDate | DateTime  | This is the begin date/time of the element eligibility for the flowgate. |
| endEffectiveDate   | DateTime  | This is the end date/time of the element eligibility for the flowgate.   |
| connected          | Boolean   | inherited from: Terminal                                                 |
| phases             | PhaseCode | inherited from: Terminal                                                 |
| sequenceNumber     | Integer   | inherited from: Terminal                                                 |
| aliasName          | String    | inherited from: IdentifiedObject                                         |
| mRID               | String    | inherited from: IdentifiedObject                                         |
| name               | String    | inherited from: IdentifiedObject                                         |

Table 82 shows all association ends of MktTerminal with other classes.

**Table 82 – Association ends of MarketOpCommon::MktTerminal with other classes**

| [mult from] | [mult to] name                  | type                   | description                      |
|-------------|---------------------------------|------------------------|----------------------------------|
| [0..*]      | [0..1] Flowgate                 | Flowgate               |                                  |
| [1..1]      | [0..*] TerminalConstraintTerm   | TerminalConstraintTerm |                                  |
| [0..*]      | [1..1] ConductingEquipment      | ConductingEquipment    | inherited from: Terminal         |
| [0..*]      | [0..1] ConnectivityNode         | ConnectivityNode       | inherited from: Terminal         |
| [0..1]      | [0..*] RegulatingControl        | RegulatingControl      | inherited from: Terminal         |
| [0..*]      | [0..1] TopologicalNode          | TopologicalNode        | inherited from: Terminal         |
| [1..*]      | [0..1] BusNameMarker            | BusNameMarker          | inherited from: Terminal         |
| [1..1]      | [0..*] BranchGroupTerminal      | BranchGroupTerminal    | inherited from: Terminal         |
| [0..1]      | [0..*] Measurements             | Measurement            | inherited from: Terminal         |
| [1..1]      | [0..2] TieFlow                  | TieFlow                | inherited from: Terminal         |
| [0..1]      | [0..*] OperationalLimitSet      | OperationalLimitSet    | inherited from: Terminal         |
| [1..1]      | [0..*] HasSecond_MutualCoupling | MutualCoupling         | inherited from: Terminal         |
| [1..1]      | [0..*] HasFirst_MutualCoupling  | MutualCoupling         | inherited from: Terminal         |
| [1..1]      | [0..1] SvPowerFlow              | SvPowerFlow            | inherited from: Terminal         |
| [1..1]      | [0..*] AuxiliaryEquipment       | AuxiliaryEquipment     | inherited from: Terminal         |
| [0..1]      | [0..*] TransformerEnd           | TransformerEnd         | inherited from: Terminal         |
| [0..1]      | [0..*] DiagramObjects           | DiagramObject          | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                    | Name                   | inherited from: IdentifiedObject |

### 6.5.3.16 MktUserAttribute

Subclass of IEC 61968:Domain2:UserAttribute

Table 83 shows all attributes of MktUserAttribute.

**Table 83 – Attributes of MarketOpCommon::MktUserAttribute**

| name           | type           | description                   |
|----------------|----------------|-------------------------------|
| sequenceNumber | Integer        | inherited from: UserAttribute |
| name           | String         | inherited from: UserAttribute |
| value          | StringQuantity | inherited from: UserAttribute |

Table 84 shows all association ends of MktUserAttribute with other classes.

**Table 84 – Association ends of MarketOpCommon::MktUserAttribute with other classes**

| [mult from] | [mult to] name                 | type                    | description                   |
|-------------|--------------------------------|-------------------------|-------------------------------|
| [0..*]      | [0..*] ChargeType              | ChargeType              |                               |
| [0..*]      | [0..*] MarketStatementLineItem | MarketStatementLineItem |                               |
| [0..*]      | [0..*] PassThroughBill         | PassThroughBill         |                               |
| [0..*]      | [0..*] ChargeGroup             | ChargeGroup             |                               |
| [1..1]      | [0..*] AttributeProperty       | AttributeProperty       |                               |
| [0..*]      | [0..*] BillDeterminant         | BillDeterminant         |                               |
| [0..*]      | [0..1] Transaction             | Transaction             | inherited from: UserAttribute |

## 6.5.4 Package MarketPlan

### 6.5.4.1 General

Market plan definitions for planned markets, planned market events, actual market runs, actual market events.

Figure 24 shows class diagram MarketPlan.

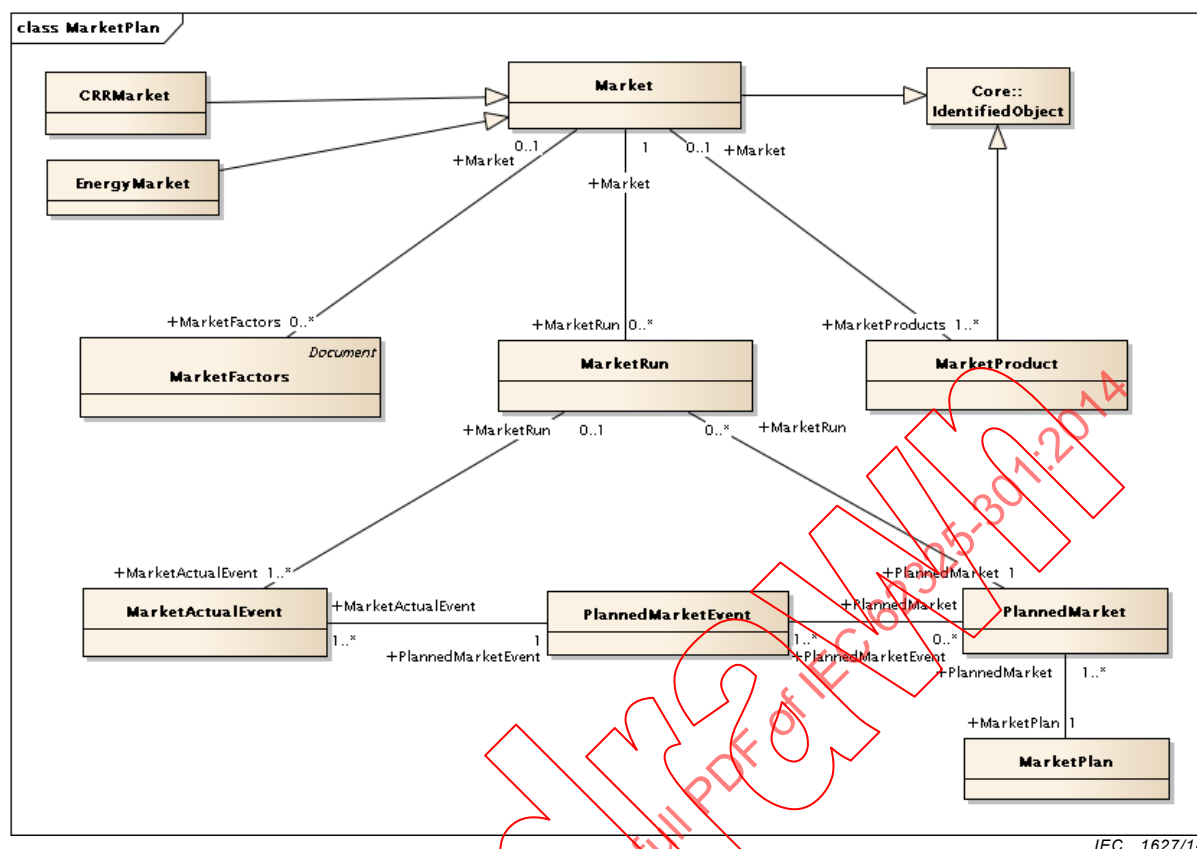


**Figure 24 – Class diagram MarketPlan::MarketPlan**

Shown are the major classes that are used to identify an instance of a market clearing solution. The class Market identifies whether the instance is a Day Ahead, Hour-Ahead (Intraday) or Real Time market. The class MarketFactors describes a market interval as the start and end date/time of the market. The MarketProduct class indicates the market product such as energy or ancillary service. The class PlannedMarket describes the start and end times of the market. Relationships between classes are also shown.

#### 6.5.4.2 CRRMarket

Model that describes the Congestion Revenue Rights Auction Market

Table 85 shows all attributes of CRRMarket.

**Table 85 – Attributes of MarketPlan::CRRMarket**

| name               | type     | description                                                      |
|--------------------|----------|------------------------------------------------------------------|
| labelID            | String   | labelID – an ID for a set of apnodes/pnodes used in a CRR market |
| actualEnd          | DateTime | inherited from: Market                                           |
| actualStart        | DateTime | inherited from: Market                                           |
| dst                | Boolean  | inherited from: Market                                           |
| end                | DateTime | inherited from: Market                                           |
| localTimeZone      | String   | inherited from: Market                                           |
| start              | DateTime | inherited from: Market                                           |
| status             | String   | inherited from: Market                                           |
| timeIntervalLength | Float    | inherited from: Market                                           |

| name          | type     | description                      |
|---------------|----------|----------------------------------|
| tradingDay    | DateTime | inherited from: Market           |
| tradingPeriod | String   | inherited from: Market           |
| aliasName     | String   | inherited from: IdentifiedObject |
| mRID          | String   | inherited from: IdentifiedObject |
| name          | String   | inherited from: IdentifiedObject |

Table 86 shows all association ends of CRRMarket with other classes.

**Table 86 – Association ends of MarketPlan::CRRMarket with other classes**

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [1..1]      | [1..*] CRR            | CRR           |                                  |
| [0..1]      | [0..*] MarketFactors  | MarketFactors | inherited from: Market           |
| [0..1]      | [1..*] MarketProducts | MarketProduct | inherited from: Market           |
| [1..1]      | [0..*] MarketRun      | MarketRun     | inherited from: Market           |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

#### 6.5.4.3 EnergyMarket

Energy and Ancillary Market (e.g. Energy, Spinning Reserve, Non-Spinning Reserve) with a description of the Market operation control parameters.

Table 87 shows all attributes of EnergyMarket.

**Table 87 – Attributes of MarketPlan::EnergyMarket**

| name               | type     | description                      |
|--------------------|----------|----------------------------------|
| actualEnd          | DateTime | inherited from: Market           |
| actualStart        | DateTime | inherited from: Market           |
| dst                | Boolean  | inherited from: Market           |
| end                | DateTime | inherited from: Market           |
| localTimeZone      | String   | inherited from: Market           |
| start              | DateTime | inherited from: Market           |
| status             | String   | inherited from: Market           |
| timeIntervalLength | Float    | inherited from: Market           |
| tradingDay         | DateTime | inherited from: Market           |
| tradingPeriod      | String   | inherited from: Market           |
| aliasName          | String   | inherited from: IdentifiedObject |
| mRID               | String   | inherited from: IdentifiedObject |
| name               | String   | inherited from: IdentifiedObject |

Table 88 shows all association ends of EnergyMarket with other classes.

**Table 88 – Association ends of MarketPlan::EnergyMarket with other classes**

| [mult from] | [mult to] name             | type               | description                      |
|-------------|----------------------------|--------------------|----------------------------------|
| [0..*]      | [0..*] RegisteredResources | RegisteredResource |                                  |
| [0..*]      | [0..1] RTO                 | RTO                |                                  |
| [0..1]      | [0..*] Settlements         | Settlement         |                                  |
| [1..1]      | [0..1] MarketResults       | MarketResults      |                                  |
| [1..1]      | [0..*] Bids                | Bid                |                                  |
| [0..1]      | [0..*] MarketFactors       | MarketFactors      | inherited from: Market           |
| [0..1]      | [1..*] MarketProducts      | MarketProduct      | inherited from: Market           |
| [1..1]      | [0..*] MarketRun           | MarketRun          | inherited from: Market           |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name               | inherited from: IdentifiedObject |

#### 6.5.4.4 Market

Market (e.g. Day Ahead Market, RealTime Market) with a description of the the Market operation control parameters.

Table 89 shows all attributes of Market.

**Table 89 – Attributes of MarketPlan::Market**

| name               | type     | description                                                                                                                                           |
|--------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| actualEnd          | DateTime | Market ending time – actual market end                                                                                                                |
| actualStart        | DateTime | Market starting time – actual market start                                                                                                            |
| dst                | Boolean  | True if daylight savings time (DST) is in effect.                                                                                                     |
| end                | DateTime | Market end time.                                                                                                                                      |
| localTimeZone      | String   | Local time zone.                                                                                                                                      |
| start              | DateTime | Market start time.                                                                                                                                    |
| status             | String   | Market Status<br>'OPEN', 'CLOSED', 'CLEARED', 'BLOCKED'                                                                                               |
| timeIntervalLength | Float    | Trading time interval length.                                                                                                                         |
| tradingDay         | DateTime | Market trading date                                                                                                                                   |
| tradingPeriod      | String   | Trading period that describes the market, possibilities could be for an Energy Market:<br>Day<br>Hour<br>For a CRR Market:<br>Year<br>Month<br>Season |
| aliasName          | String   | inherited from: IdentifiedObject                                                                                                                      |
| mRID               | String   | inherited from: IdentifiedObject                                                                                                                      |
| name               | String   | inherited from: IdentifiedObject                                                                                                                      |

Table 90 shows all association ends of Market with other classes.

**Table 90 – Association ends of MarketPlan::Market with other classes**

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [0..1]      | [0..*] MarketFactors  | MarketFactors |                                  |
| [0..1]      | [1..*] MarketProducts | MarketProduct |                                  |
| [1..1]      | [0..*] MarketRun      | MarketRun     |                                  |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

#### 6.5.4.5 MarketActualEvent root class

This class represent the actual instance of an event.

Table 91 shows all attributes of MarketActualEvent.

**Table 91 – Attributes of MarketPlan::MarketActualEvent**

| name        | type     | description               |
|-------------|----------|---------------------------|
| description | String   | Description of the event. |
| eventID     | String   | Actual event ID.          |
| eventTime   | DateTime | Start time of the event.  |

Table 92 shows all association ends of MarketActualEvent with other classes.

**Table 92 – Association ends of MarketPlan::MarketActualEvent with other classes**

| [mult from] | [mult to] name            | type               | description                                                                                                                                                                      |
|-------------|---------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1..*]      | [0..1] MarketRun          | MarketRun          | Market run triggered by this actual event. For example, the DA run is triggered by the actual open bid submission event and terminated by the actual close bid submission event. |
| [1..*]      | [1..1] PlannedMarketEvent | PlannedMarketEvent | Planned event executed by this actual event.                                                                                                                                     |

#### 6.5.4.6 MarketFactors

Aggregation of market information relative for a specific time interval.

Table 93 shows all attributes of MarketFactors.

**Table 93 – Attributes of MarketPlan::MarketFactors**

| name              | type     | description                                                    |
|-------------------|----------|----------------------------------------------------------------|
| intervalEndTime   | DateTime | The end of the time interval for which requirement is defined. |
| intervalStartTime | DateTime | The start of the time interval for which                       |



| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
|                      |                   | requirement is defined.          |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 94 shows all association ends of MarketFactors with other classes.

**Table 94 – Association ends of MarketPlan::MarketFactors with other classes**

| [mult from] | [mult to] name             | type               | description                      |
|-------------|----------------------------|--------------------|----------------------------------|
| [0..*]      | [0..*] MktActivityRecord   | MktActivityRecord  |                                  |
| [0..*]      | [0..1] Market              | Market             |                                  |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name               | inherited from: IdentifiedObject |

#### 6.5.4.7 MarketPlan root class

This class identifies a set of planned markets. This class is a container of these planned markets

Table 95 shows all attributes of MarketPlan.

**Table 95 – Attributes of MarketPlan::MarketPlan**

| name         | type     | description                        |
|--------------|----------|------------------------------------|
| description  | String   | Description of the planned market. |
| marketPlanID | String   | Planned market identifier.         |
| name         | String   | Name of the planned market.        |
| tradingDay   | DateTime | Planned market trading day.        |

Table 96 shows all association ends of MarketPlan with other classes.

**Table 96 – Association ends of MarketPlan::MarketPlan with other classes**

| [mult from] | [mult to] name       | type          | description                                        |
|-------------|----------------------|---------------|----------------------------------------------------|
| [1..1]      | [1..*] PlannedMarket | PlannedMarket | a market plan has a number of markets (DA, HA, RT) |

#### 6.5.4.8 MarketProduct

A product traded by an RTO (e.g. energy, 10 minute spinning reserve). Ancillary service product examples include: Regulation Up, Regulation Dn, Spinning Reserve, Non-Spinning Reserve, Operating Reserve.

Table 97 shows all attributes of MarketProduct.

**Table 97 – Attributes of MarketPlan::MarketProduct**

| name              | type              | description                                                                                                                                                                                                                                      |
|-------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| marketProductType | MarketProductType | Market product type examples:<br>EN (Energy)<br>RU (Regulation Up)<br>RD (Regulation Dn)<br>SR (Spinning Reserve)<br>NR (Non-Spinning Reserve)<br>RC (RUC)                                                                                       |
| rampInterval      | Float             | Ramping time interval for the specific market product type specified by marketProductType attribute. For example, if marketProductType = EN (from enumeration MarketProductType), then the rampInterval is the ramping time interval for Energy. |
| aliasName         | String            | inherited from: IdentifiedObject                                                                                                                                                                                                                 |
| mRID              | String            | inherited from: IdentifiedObject                                                                                                                                                                                                                 |
| name              | String            | inherited from: IdentifiedObject                                                                                                                                                                                                                 |

Table 98 shows all association ends of MarketProduct with other classes.

**Table 98 – Association ends of MarketPlan::MarketProduct with other classes**

| [mult from] | [mult to] name                  | type                     | description                      |
|-------------|---------------------------------|--------------------------|----------------------------------|
| [1..*]      | [0..1] Market                   | Market                   |                                  |
| [1..1]      | [0..*] ProductBids              | ProductBid               |                                  |
| [1..1]      | [0..*] ResourceAwardInstruction | ResourceAwardInstruction |                                  |
| [0..1]      | [0..*] BidError                 | BidError                 |                                  |
| [0..1]      | [0..*] BidPriceCap              | BidPriceCap              |                                  |
| [0..1]      | [0..1] MarketRegionResults      | MarketRegionResults      |                                  |
| [0..1]      | [0..*] DiagramObjects           | DiagramObject            | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                    | Name                     | inherited from: IdentifiedObject |

#### 6.5.4.9 MarketRun root class

This class represent an actual instance of a planned market. For example, a Day Ahead market opens with the Bid Submission, ends with the closing of the Bid Submission. The market run represent the whole process. MarketRuns can be defined for markets such as Day Ahead Market, Real Time Market, Hour Ahead Market, Week Ahead Market,...

Table 99 shows all attributes of MarketRun.

**Table 99 – Attributes of MarketPlan::MarketRun**

| name                 | type          | description                                                                                                                                                                                                                                                                                                                                            |
|----------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| executionType        | ExecutionType | The execution type; Day Ahead, Intra Day, Real Time Pre-Dispatch, Real Time Dispatch                                                                                                                                                                                                                                                                   |
| marketApprovalTime   | DateTime      | Approved time for case. Identifies the time that the dispatcher approved a specific real time unit dispatch case                                                                                                                                                                                                                                       |
| marketApprovedStatus | Boolean       | Set to true when the plan is approved by authority and becomes the official plan for the day ahead market. Identifies the approved case for the market for the specified time interval.                                                                                                                                                                |
| marketEndTime        | DateTime      | The end time defined as the end of the market, market end time.                                                                                                                                                                                                                                                                                        |
| marketID             | String        | An identification that defines the attributes of the Market. In today's terms: Market Type: DA, RTM, Trade Date: 1/25/04, Trade Hour: 1-25                                                                                                                                                                                                             |
| marketRunID          | String        | A unique identifier that differentiates the different runs of the same Market ID. More specifically, if the market is re-opened and re-closed and rerun completely, the first set of results and the second set of results produced will have the same Market ID but will have different Market Run IDs since the multiple run is for the same market. |
| marketStartTime      | DateTime      | The start time defined as the beginning of the market, market start time.                                                                                                                                                                                                                                                                              |
| marketType           | MarketType    | The market type, Day Ahead Market or Real Time Market.                                                                                                                                                                                                                                                                                                 |
| reportedState        | String        | This is the state of market run activities as reported by market systems to the market definition services.                                                                                                                                                                                                                                            |
| runState             | String        | This is the state controlled by market definition service.<br><br>possible values could be but not limited by: Open, Close.                                                                                                                                                                                                                            |

Table 100 shows all association ends of MarketRun with other classes.

**Table 100 – Association ends of MarketPlan::MarketRun with other classes**

| [mult from] | [mult to] name           | type              | description                                                                                               |
|-------------|--------------------------|-------------------|-----------------------------------------------------------------------------------------------------------|
| [0..*]      | [1..1] Market            | Market            |                                                                                                           |
| [0..1]      | [1..*] MarketActualEvent | MarketActualEvent | All actual events that trigger this market run.                                                           |
| [0..*]      | [1..1] PlannedMarket     | PlannedMarket     | A planned market could have multiple market runs for the reason that a planned market could have a rerun. |

#### 6.5.4.10 PlannedMarket root class

Represent a planned market. For example an planned DA/HA/RT market.

Table 101 shows all attributes of PlannedMarket.

**Table 101 – Attributes of MarketPlan::PlannedMarket**

| name            | type       | description                                                                                                                               |
|-----------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| marketEndTime   | DateTime   | Market end time.                                                                                                                          |
| marketID        | String     | An identification that defines the attributes of the Market. In todays terms: Market Type: DA, RTM, Trade Date: 1/25/04, Trade Hour: 1-25 |
| marketStartTime | DateTime   | Market start time.                                                                                                                        |
| marketType      | MarketType | Market type.                                                                                                                              |

Table 102 shows all association ends of PlannedMarket with other classes.

**Table 102 – Association ends of MarketPlan::PlannedMarket with other classes**

| [mult from] | [mult to] name            | type               | description                                                                                               |
|-------------|---------------------------|--------------------|-----------------------------------------------------------------------------------------------------------|
| [1..1]      | [0..*] MarketRun          | MarketRun          | A planned market could have multiple market runs for the reason that a planned market could have a rerun. |
| [0..*]      | [1..*] PlannedMarketEvent | PlannedMarketEvent | A planned market shall have a set of planned events                                                       |
| [1..*]      | [1..1] MarketPlan         | MarketPlan         | a market plan has a number of markets (DA, HA, RT)                                                        |

#### 6.5.4.11 PlannedMarketEvent root class

This class represents planned events. Used to model the various planned events in a market (closing time, clearing time, etc).

Table 103 shows all attributes of PlannedMarketEvent.

**Table 103 – Attributes of MarketPlan::PlannedMarketEvent**

| name           | type    | description                                                                                                                                |
|----------------|---------|--------------------------------------------------------------------------------------------------------------------------------------------|
| description    | String  | Description of the planned event.                                                                                                          |
| eventType      | String  | Planned event type.                                                                                                                        |
| plannedEventID | String  | Planned event identifier.                                                                                                                  |
| plannedTime    | Integer | This is relative time so that this attribute can be used by more than one planned market. For example the bid submission is 10am everyday. |

Table 104 shows all association ends of PlannedMarketEvent with other classes.

**Table 104 – Association ends of MarketPlan::PlannedMarketEvent with other classes**

| [mult from] | [mult to] name           | type              | description                                         |
|-------------|--------------------------|-------------------|-----------------------------------------------------|
| [1..1]      | [1..*] MarketActualEvent | MarketActualEvent | All actual events that execute this planned event.  |
| [1..*]      | [0..*] PlannedMarket     | PlannedMarket     | A planned market shall have a set of planned events |

## 6.5.5 Package MarketQualitySystem

### 6.5.5.1 General

Post-market accounting, calculation and meter data corrections to reduce invoicing errors and disputes. Reduces manual validation, verification and correction of transactional data that could affect market settlements. Republishing of market results with affected data corrected.

Figure 25 shows class diagram AllocationResults.

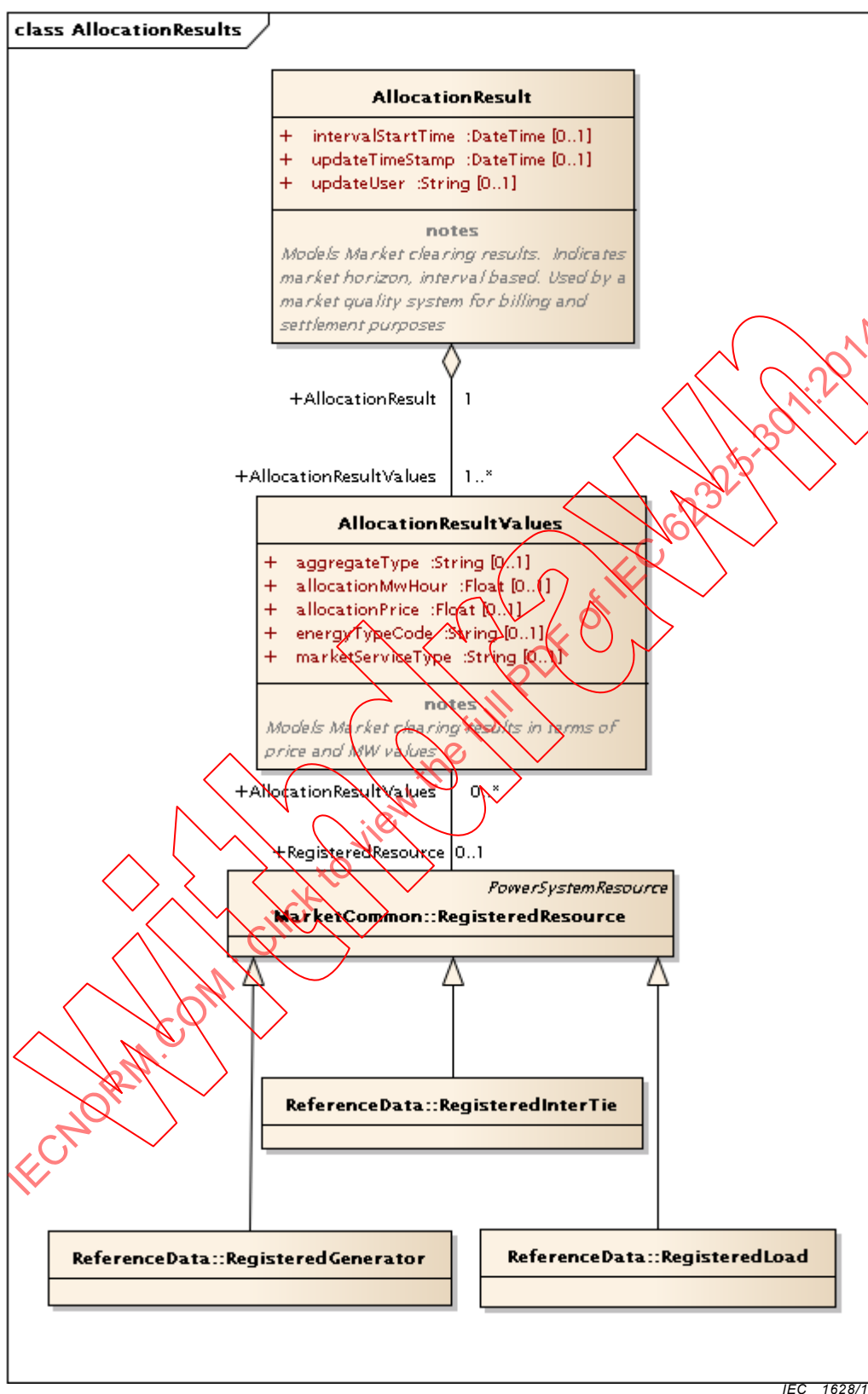


**Figure 25 – Class diagram MarketQualitySystem::AllocationResults**

This figure shows the major classes associated with the Market Quality Systems (MQS) which is typically used to perform analysis prior to Billing and Settlement. It describes the results that are sent to the MQS. Major classes include AllocationResult which define the market horizon. The allocated results are described in the classes AllocationResultsValues and RegisteredResource class and subclasses for Generators, Interties, and Loads.

### 6.5.5.2 AllocationResult root class

Models Market clearing results. Indicates market horizon, interval based. Used by a market quality system for billing and settlement purposes.

Table 105 shows all attributes of AllocationResult.

**Table 105 – Attributes of MarketQualitySystem::AllocationResult**

| name              | type     | description |
|-------------------|----------|-------------|
| intervalStartTime | DateTime |             |
| updateUser        | String   |             |
| updateTimeStamp   | DateTime |             |

Table 106 shows all association ends of AllocationResult with other classes.

**Table 106 – Association ends of MarketQualitySystem::AllocationResult with other classes**

| [mult from] | [mult to] name                | type                   | description |
|-------------|-------------------------------|------------------------|-------------|
| [1..1]      | [1..*] AllocationResultValues | AllocationResultValues |             |

### 6.5.5.3 AllocationResultValues root class

Models Market clearing results in terms of price and MW values

Table 107 shows all attributes of AllocationResultValues.

**Table 107 – Attributes of MarketQualitySystem::AllocationResultValues**

| name              | type   | description                                                                                                                                                                                                                              |
|-------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| aggregateType     | String | "1" -- "Detail",<br>"2" -- "Aggregate by Market service type", in which case, the "AllocationEnergyType" field will not be filled;<br>"3" -- "Aggregate by "AllocationEnergyType", in which case "MarketServiceType" will not be filled. |
| allocationMwHour  | Float  |                                                                                                                                                                                                                                          |
| allocationPrice   | Float  |                                                                                                                                                                                                                                          |
| energyTypeCode    | String |                                                                                                                                                                                                                                          |
| marketServiceType | String | Choices are:<br>ME – Market Energy Capacity;<br>SR – Spinning Reserve Capacity;<br>NR – Non-Spinning Reserve Capacity;<br>DAC – Day Ahead Capacity;<br>DEC – Derate Capacity                                                             |

Table 108 shows all association ends of AllocationResultValues with other classes.



**Table 108 – Association ends of MarketQualitySystem::AllocationResultValues with other classes**

| [mult from] | [mult to] name            | type               | description |
|-------------|---------------------------|--------------------|-------------|
| [0..*]      | [0..1] RegisteredResource | RegisteredResource |             |
| [1..*]      | [1..1] AllocationResult   | AllocationResult   |             |

#### 6.5.5.4 AuxiliaryCost root class

Models Market clearing results for Auxillary costs

Table 109 shows all attributes of AuxiliaryCost.

**Table 109 – Attributes of MarketQualitySystem::AuxiliaryCost**

| name              | type       | description |
|-------------------|------------|-------------|
| intervalStartTime | DateTime   |             |
| marketType        | MarketType |             |
| updateTimeStamp   | DateTime   |             |
| updateUser        | String     |             |

Table 110 shows all association ends of AuxiliaryCost with other classes.

**Table 110 – Association ends of MarketQualitySystem::AuxiliaryCost with other classes**

| [mult from] | [mult to] name         | type            | description |
|-------------|------------------------|-----------------|-------------|
| [1..1]      | [1..*] AuxillaryValues | AuxiliaryValues |             |

#### 6.5.5.5 AuxiliaryObject root class

Models Auxillary Values

Table 111 shows all association ends of AuxiliaryObject with other classes.

**Table 111 – Association ends of MarketQualitySystem::AuxiliaryObject with other classes**

| [mult from] | [mult to] name             | type                | description |
|-------------|----------------------------|---------------------|-------------|
| [0..*]      | [0..1] RegisteredLoad      | RegisteredLoad      |             |
| [0..*]      | [0..1] RegisteredGenerator | RegisteredGenerator |             |

#### 6.5.5.6 AuxiliaryValues

Models Auxillary Values

Table 112 shows all attributes of AuxiliaryValues.

**Table 112 – Attributes of MarketQualitySystem::AuxiliaryValues**

| name                       | type  | description |
|----------------------------|-------|-------------|
| minExpostCapacity          | Float |             |
| maxExpostCapacity          | Float |             |
| availUndispatchedQ         | Float |             |
| incrementalIORAvail        | Float |             |
| startUpCost                | Float |             |
| startUpCostEligibilityFlag | YesNo |             |
| noLoadCost                 | Float |             |
| noLoadCostEligibilityFlag  | YesNo |             |

Table 113 shows all association ends of AuxiliaryValues with other classes.

**Table 113 – Association ends of MarketQualitySystem::AuxiliaryValues with other classes**

| [mult from] | [mult to] name              | type                 | description                     |
|-------------|-----------------------------|----------------------|---------------------------------|
| [1..*]      | [1..1] AuxillaryCost        | AuxiliaryCost        |                                 |
| [1..*]      | [1..1] TenMinAuxillaryData  | TenMinAuxiliaryData  |                                 |
| [1..*]      | [1..1] FiveMinAuxillaryData | FiveMinAuxiliaryData |                                 |
| [0..*]      | [0..1] RegisteredLoad       | RegisteredLoad       | inherited from: AuxiliaryObject |
| [0..*]      | [0..1] RegisteredGenerator  | RegisteredGenerator  | inherited from: AuxiliaryObject |

#### 6.5.5.7 ExpectedEnergy root class

Model Expected Energy from Market Clearing, interval based

Table 114 shows all attributes of ExpectedEnergy.

**Table 114 – Attributes of MarketQualitySystem::ExpectedEnergy**

| name              | type     | description |
|-------------------|----------|-------------|
| intervalStartTime | DateTime |             |
| updateUser        | String   |             |
| updateTimeStamp   | DateTime |             |

Table 115 shows all association ends of ExpectedEnergy with other classes.

**Table 115 – Association ends of MarketQualitySystem::ExpectedEnergy with other classes**

| [mult from] | [mult to] name              | type                 | description |
|-------------|-----------------------------|----------------------|-------------|
| [1..1]      | [1..*] ExpectedEnergyValues | ExpectedEnergyValues |             |

### 6.5.5.8 ExpectedEnergyValues root class

Model Expected Energy from Market Clearing

Table 116 shows all attributes of ExpectedEnergyValues.

**Table 116 – Attributes of MarketQualitySystem::ExpectedEnergyValues**

| name           | type   | description |
|----------------|--------|-------------|
| energyTypeCode | String |             |
| expectedMwh    | Float  |             |

Table 117 shows all association ends of ExpectedEnergyValues with other classes.

**Table 117 – Association ends of MarketQualitySystem::ExpectedEnergyValues with other classes**

| [mult from] | [mult to] name            | type               | description |
|-------------|---------------------------|--------------------|-------------|
| [0..*]      | [0..1] RegisteredResource | RegisteredResource |             |
| [1..*]      | [1..1] ExpectedEnergy     | ExpectedEnergy     |             |

### 6.5.5.9 FiveMinAuxiliaryData root class

Models 5-Minutes Auxillary Data

Table 118 shows all attributes of FiveMinAuxiliaryData.

**Table 118 – Attributes of MarketQualitySystem::FiveMinAuxiliaryData**

| name              | type     | description |
|-------------------|----------|-------------|
| intervalStartTime | DateTime |             |
| updateUser        | String   |             |
| updateTimeStamp   | DateTime |             |

Table 119 shows all association ends of FiveMinAuxiliaryData with other classes.

**Table 119 – Association ends of MarketQualitySystem::FiveMinAuxiliaryData with other classes**

| [mult from] | [mult to] name         | type            | description |
|-------------|------------------------|-----------------|-------------|
| [1..1]      | [1..*] AuxillaryValues | AuxiliaryValues |             |

### 6.5.5.10 TenMinAuxiliaryData root class

Models 10-Minutes Auxillary Data

Table 120 shows all attributes of TenMinAuxiliaryData.

**Table 120 – Attributes of MarketQualitySystem::TenMinAuxiliaryData**

| name              | type     | description |
|-------------------|----------|-------------|
| intervalStartTime | DateTime |             |
| updateUser        | String   |             |
| updateTimeStamp   | DateTime |             |

Table 121 shows all association ends of TenMinAuxiliaryData with other classes.

**Table 121 – Association ends of MarketQualitySystem::TenMinAuxiliaryData with other classes**

| [mult from] | [mult to] name       | type            | description |
|-------------|----------------------|-----------------|-------------|
| [1..1]      | [1..*] AuxillaryData | AuxiliaryValues |             |

#### 6.5.5.11 TradingHubPrice root class

Models prices at Trading Hubs, interval based

Table 122 shows all attributes of TradingHubPrice.

**Table 122 – Attributes of MarketQualitySystem::TradingHubPrice**

| name              | type       | description |
|-------------------|------------|-------------|
| intervalStartTime | DateTime   |             |
| marketType        | MarketType |             |
| updateUser        | String     |             |
| updateTimeStamp   | DateTime   |             |

Table 123 shows all association ends of TradingHubPrice with other classes.

**Table 123 – Association ends of MarketQualitySystem::TradingHubPrice with other classes**

| [mult from] | [mult to] name          | type             | description |
|-------------|-------------------------|------------------|-------------|
| [1..1]      | [1..*] TradingHubValues | TradingHubValues |             |

#### 6.5.5.12 TradingHubValues root class

Models prices at Trading Hubs

Table 124 shows all attributes of TradingHubValues.

**Table 124 – Attributes of MarketQualitySystem::TradingHubValues**

| name  | type  | description                                                                                   |
|-------|-------|-----------------------------------------------------------------------------------------------|
| price | Float | Utilizes the Market type. For DA, the price is hourly. For RTM the price is a 5 minute price. |

Table 125 shows all association ends of TradingHubValues with other classes.

**Table 125 – Association ends of MarketQualitySystem::TradingHubValues with other classes**

| [mult from] | [mult to] name         | type            | description |
|-------------|------------------------|-----------------|-------------|
| [0..*]      | [1..1] AggregatedPnode | AggregatedPnode |             |
| [1..*]      | [1..1] TradingHubPrice | TradingHubPrice |             |

## 6.5.6 Package MarketSystem

### 6.5.6.1 General

Market results and external inputs consumed by markets.

### 6.5.6.2 Package ExternalInputs

#### 6.5.6.2.1 General

Inputs to the market system from external sources.

Figure 26 shows class diagram ASRequirements.

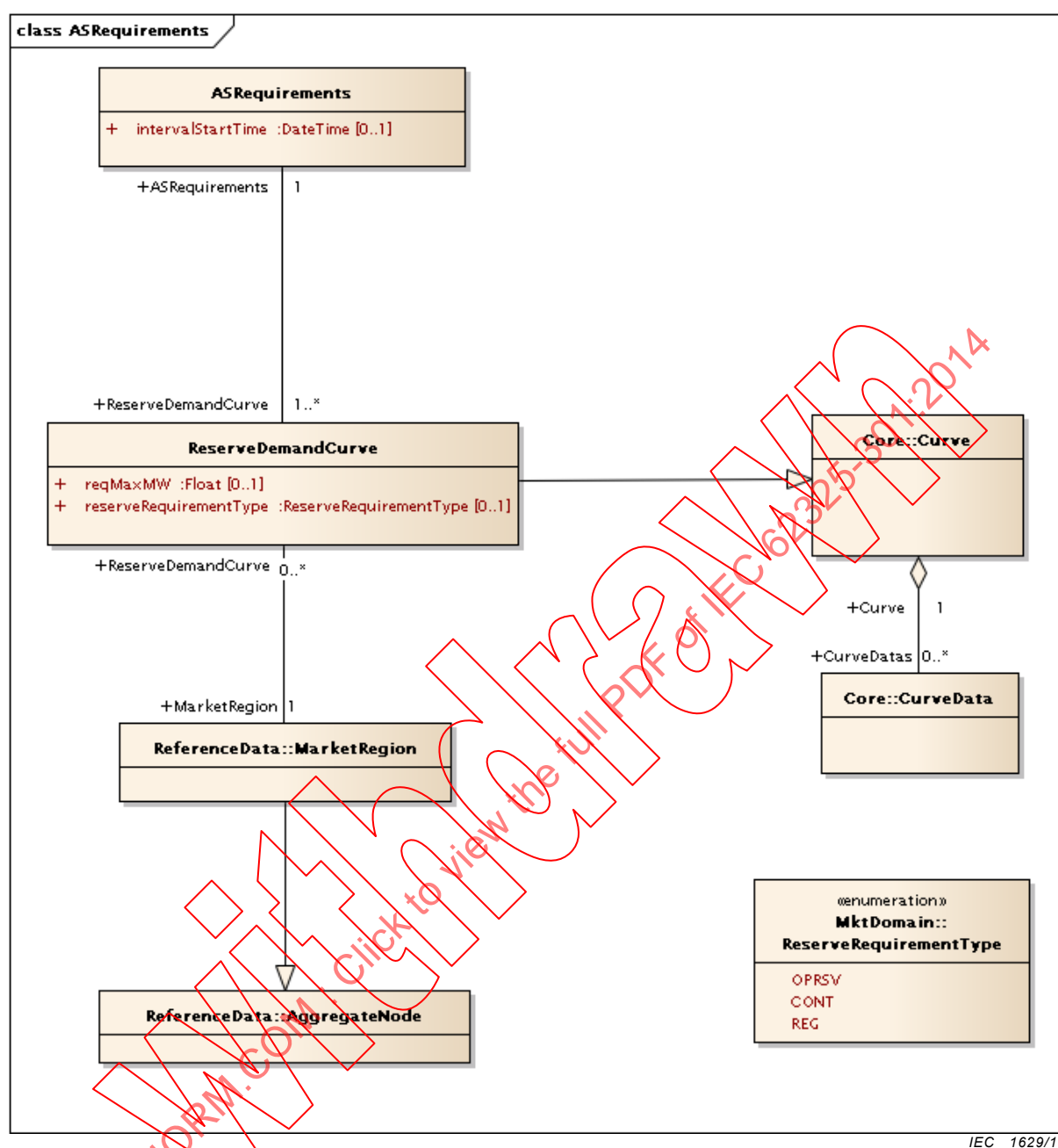


Figure 26 – Class diagram ExternalInputs::ASRequirements

This figure models Ancillary Service requirements. The class ASRequirements is used to describe the interval for which the Ancillary Service is required. The ASRequirement class is used to describe the quantities of required ancillary services. The association to MarketRegion models the regional requirements of ancillary services. The class MarketProduct is used to describe the particular class of ancillary service.

Figure 27 shows class diagram DefaultBids.

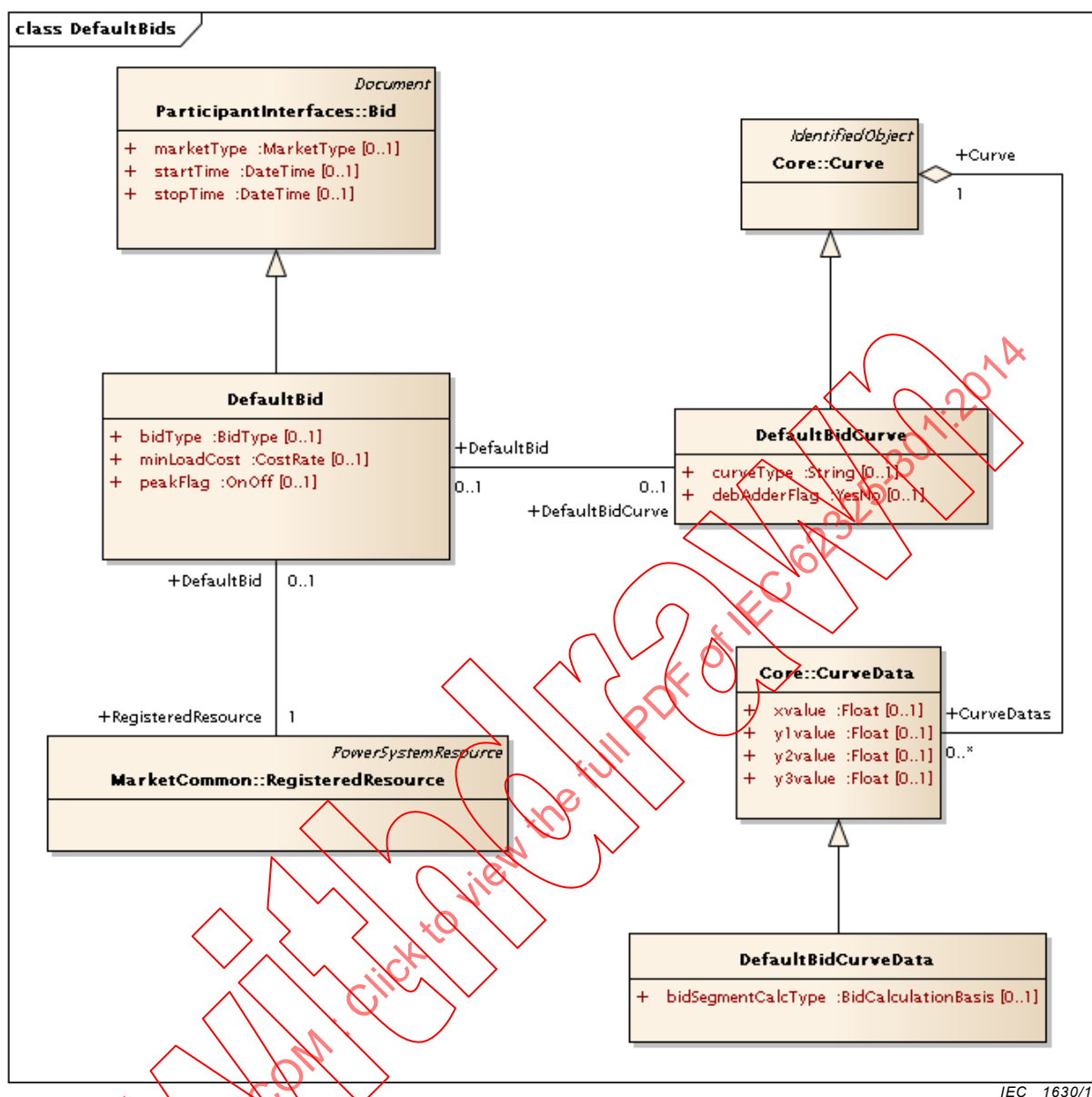


Figure 27 – Class diagram ExternalInputs::DefaultBids

Market Power Mitigation is a process that detects an attempt on the part of a market participant to exercise market power. Detection is followed by remediation. Remediation consist of substitution of a default bid for the original bid. This figure shows the classes used to model a default bid. The classes include a Curve and Curve Data classes (from the 61970 core package), as well the generic class DefaultBid which may be used to further describe the market specific remediation methods. Three typical methods are used: LMP, cost based on gas index, or out-of-market negotiation.

Figure 28 shows class diagram DeratedBranchLimits.



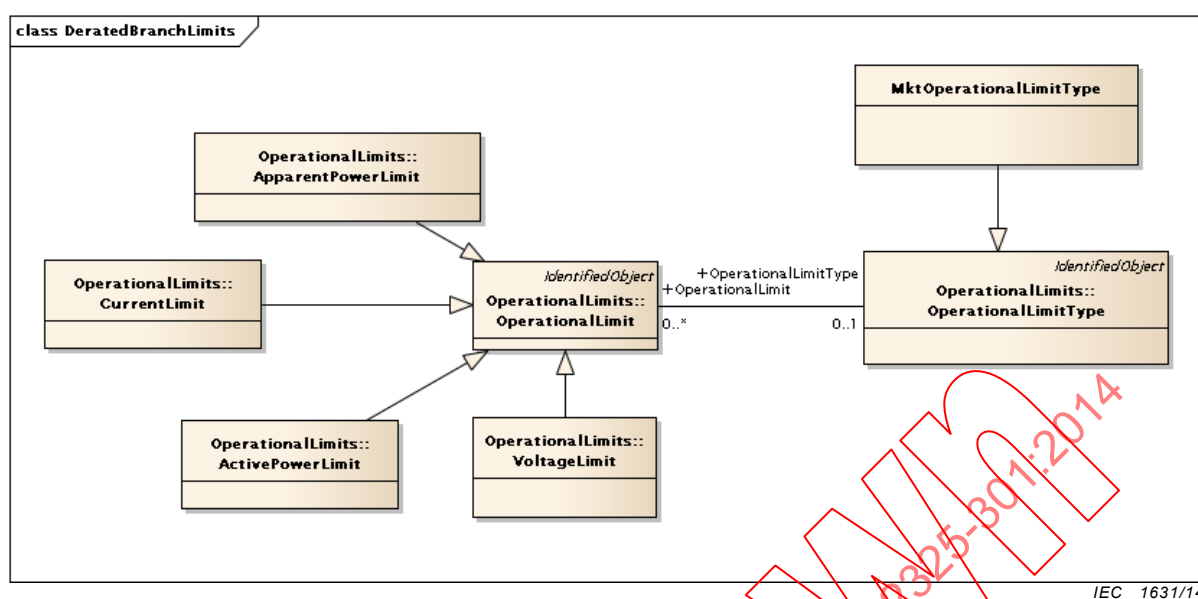
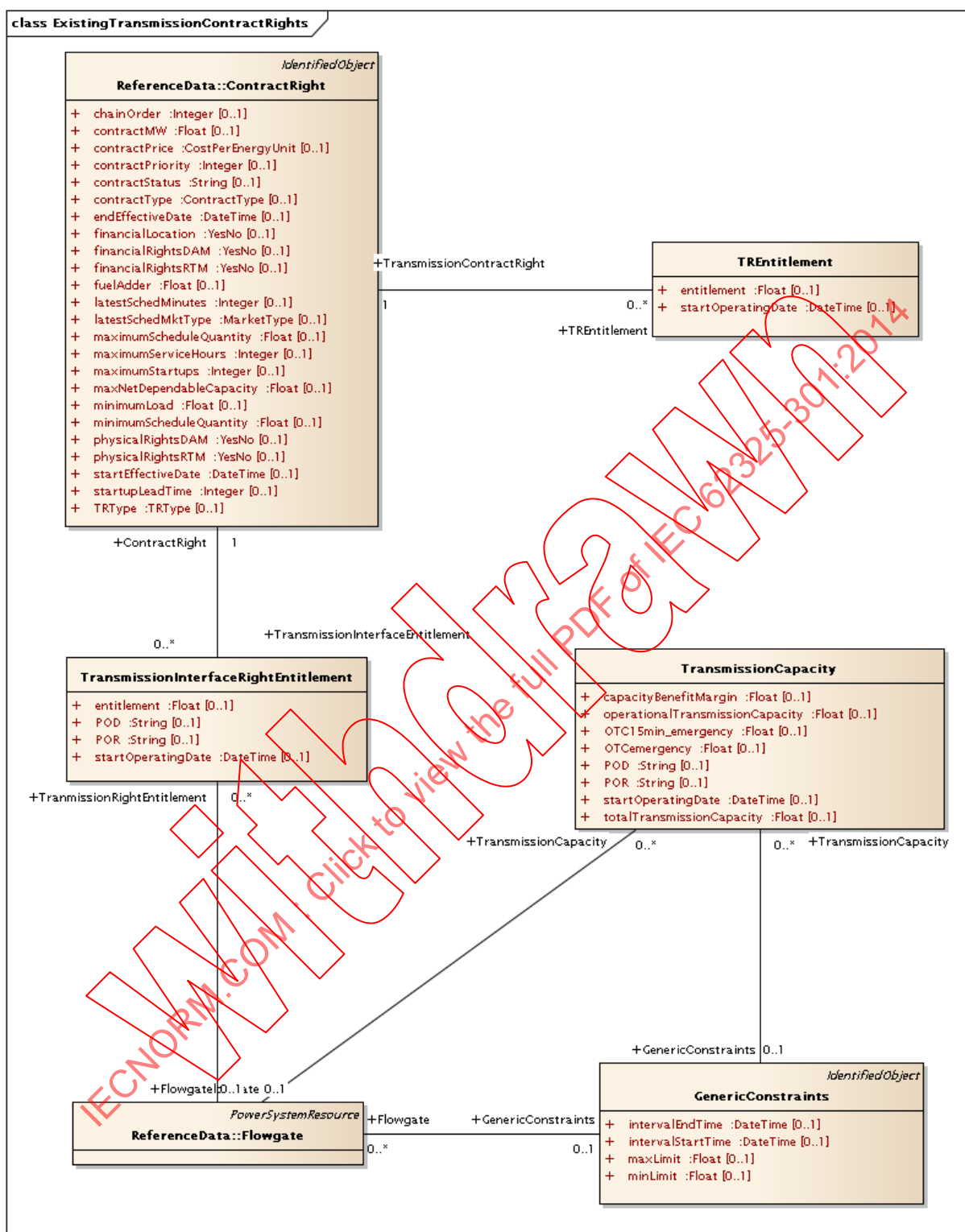


**Figure 28 – Class diagram ExternalInputs::DeratedBranchLimits**

This figure shows the major classes used to model operational limits. The classes are reused from the 61970 OperationalLimits package and include Active Power, Voltage, and Current Limits.

Figure 29 shows class diagram ExistingTransmissionContractRights.



IEC 1632/14

**Figure 29 – Class diagram ExternalInputs::ExistingTransmissionContractRights**

During the startup and evolution of LMP markets, the need arose to accommodate existing transmission rights in the market solution. This figure shows the major classes used to model these legacy rights. The ContractRight class includes information describing the specific rights that are contracted in terms of active power and other contract details. The TransmissionInterfaceRightEntitlement describe the physical aspects of the right in associated point of delivery and point of receipt of active power.

Figure 30 shows class diagram IntermittentResourceSchedules.

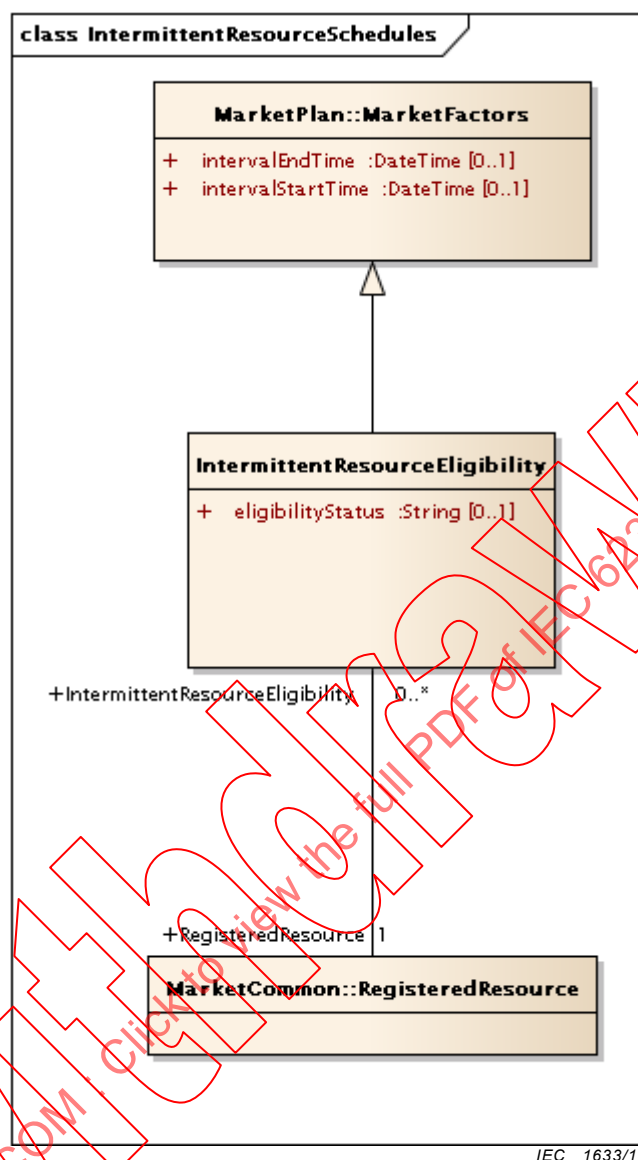


**Figure 30 – Class diagram ExternalInputs::IntermittentResourceSchedules**

This figure shows the major classes used to model intermittent (variable) resources. It is typically used to model renewables such as wind power. The **IntermittentResourceEligibility** class is used to indicate whether the resource is eligible to participate as a renewable resource governed by a generic renewable resource regime.

Figure 31 shows class diagram LoadForecast.

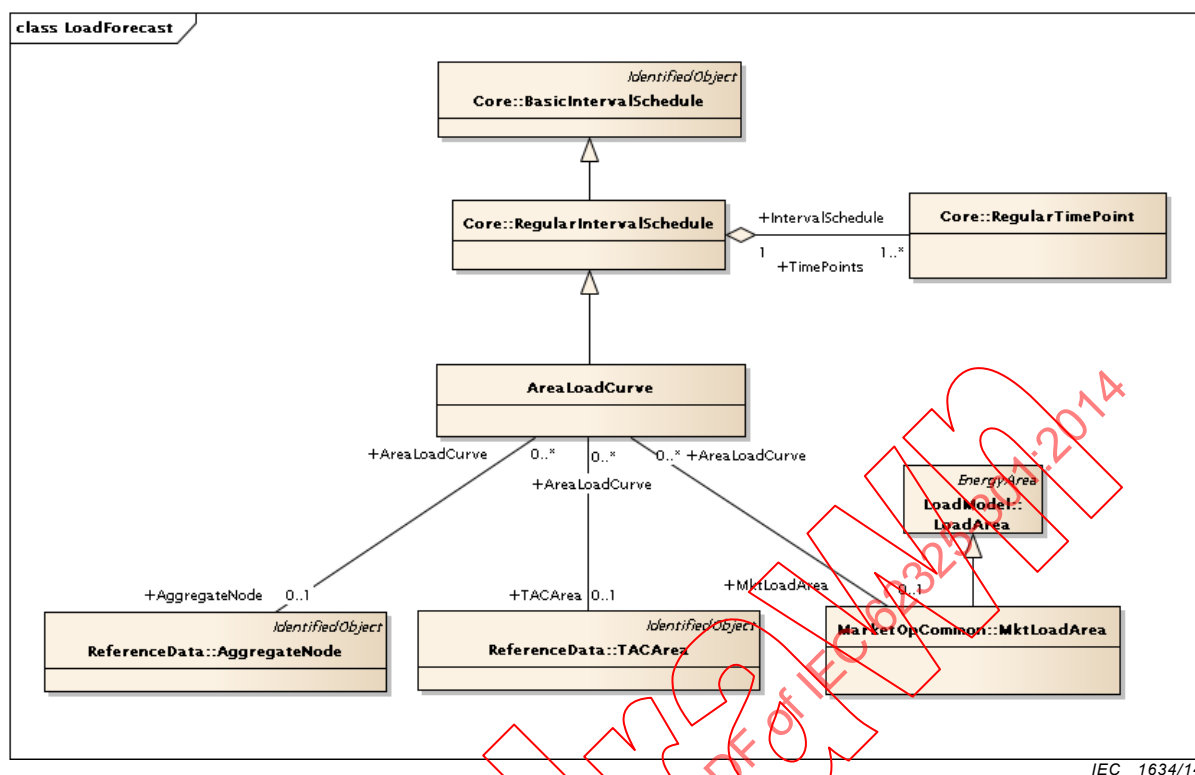


Figure 31 – Class diagram ExternalInputs::LoadForecast

This figure shows the classes used to model the load forecast over the market time horizon. The model reused classes from the 61970 Core package and adds specific models for markets.

Figure 32 shows class diagram OutageOrDeratedEquipment.

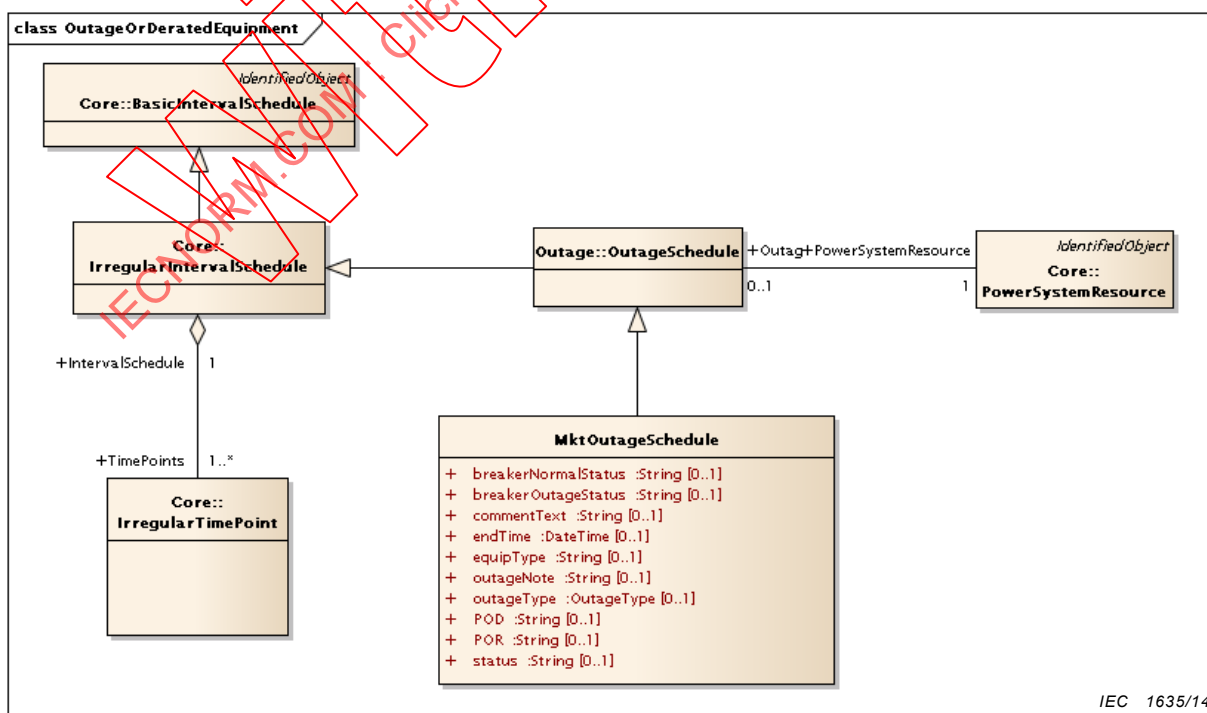


Figure 32 – Class diagram ExternalInputs::OutageOrDeratedEquipment

This figure shows the classes and relationships used to model schedule outages. Several classes are reused from the 61970 packages. The MktOutageSchedule class includes additional attributes to model equipment derations as well as complete outages.

Figure 33 shows class diagram Telemetry.

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Withdawn

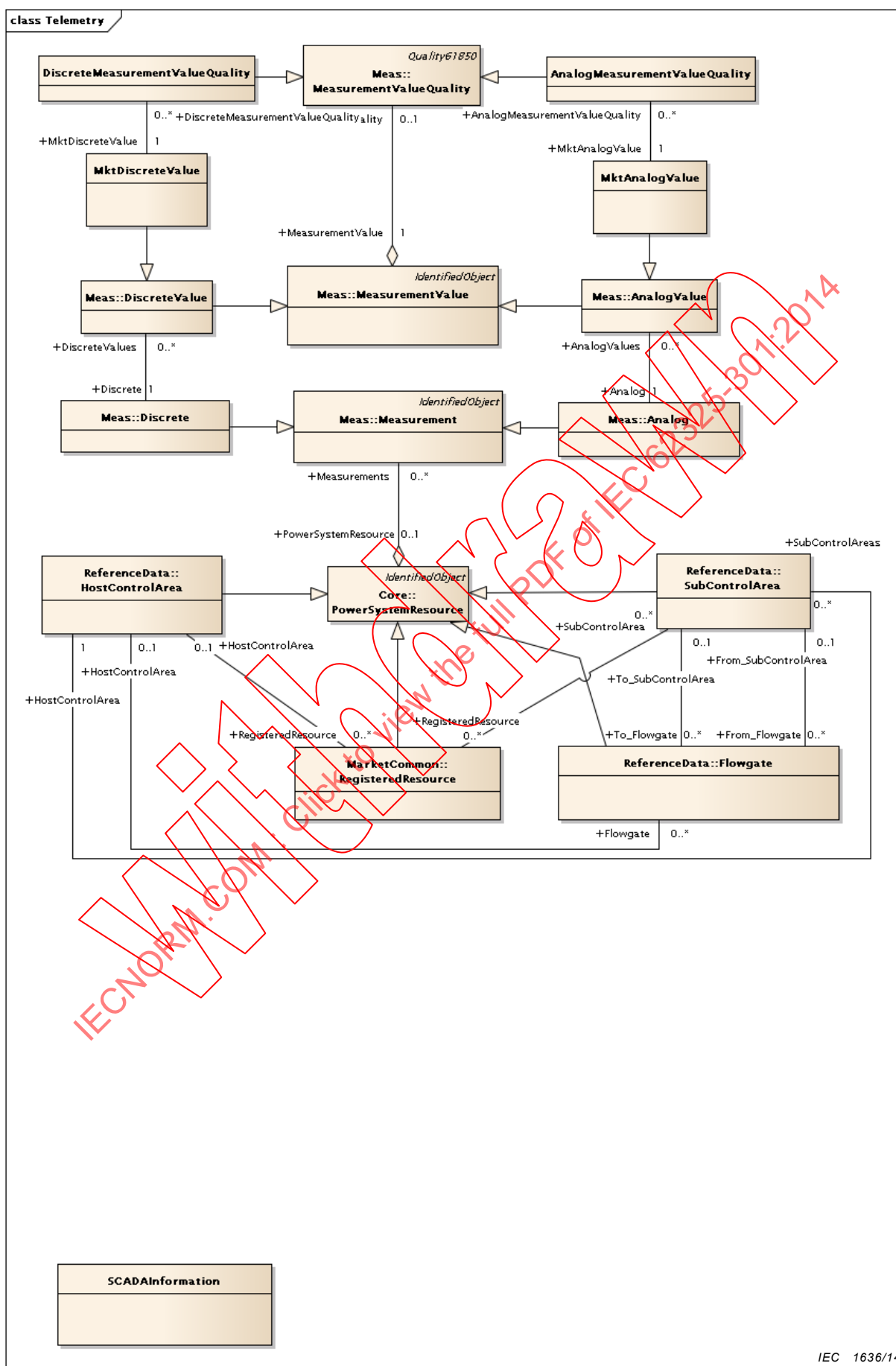


Figure 33 – Class diagram ExternalInputs::Telemetry

This figure shows the classes used to model telemetry that may be used (in the event of failure or non-availability of a state estimator solution) to initialize a real time market run. The figure shows classes from the 61970 package and additional market specific RegisteredResource and Flowgate classes and their relationships to the classes from the 61970 packages.

### 6.5.6.2.2 AnalogMeasurementValueQuality

Measurement quality flags for Analog Values.

Table 126 shows all attributes of AnalogMeasurementValueQuality.

**Table 126 – Attributes of ExternalInputs::AnalogMeasurementValueQuality**

| name              | type     | description                                  |
|-------------------|----------|----------------------------------------------|
| scadaQualityCode  | String   | The quality code for the given Analog Value. |
| badReference      | Boolean  | inherited from: Quality61850                 |
| estimatorReplaced | Boolean  | inherited from: Quality61850                 |
| failure           | Boolean  | inherited from: Quality61850                 |
| oldData           | Boolean  | inherited from: Quality61850                 |
| operatorBlocked   | Boolean  | inherited from: Quality61850                 |
| oscillatory       | Boolean  | inherited from: Quality61850                 |
| outOfRange        | Boolean  | inherited from: Quality61850                 |
| overFlow          | Boolean  | inherited from: Quality61850                 |
| source            | Source   | inherited from: Quality61850                 |
| suspect           | Boolean  | inherited from: Quality61850                 |
| test              | Boolean  | inherited from: Quality61850                 |
| validity          | Validity | inherited from: Quality61850                 |

Table 127 shows all association ends of AnalogMeasurementValueQuality with other classes.

**Table 127 – Association ends of ExternalInputs::AnalogMeasurementValueQuality with other classes**

| [mult from] | [mult to] name          | type             | description                             |
|-------------|-------------------------|------------------|-----------------------------------------|
| [0..*]      | [1..1] MktAnalogValue   | MktAnalogValue   |                                         |
| [0..1]      | [1..1] MeasurementValue | MeasurementValue | inherited from: MeasurementValueQuality |

### 6.5.6.2.3 AreaLoadCurve

Area load curve definition.

Table 128 shows all attributes of AreaLoadCurve.

**Table 128 – Attributes of ExternalInputs::AreaLoadCurve**

| name             | type             | description                             |
|------------------|------------------|-----------------------------------------|
| forecastType     | LoadForecastType | Load forecast area type.                |
| endTime          | DateTime         | inherited from: RegularIntervalSchedule |
| timeStep         | Seconds          | inherited from: RegularIntervalSchedule |
| startTime        | DateTime         | inherited from: BasicIntervalSchedule   |
| value1Unit       | UnitSymbol       | inherited from: BasicIntervalSchedule   |
| value1Multiplier | UnitMultiplier   | inherited from: BasicIntervalSchedule   |
| value2Unit       | UnitSymbol       | inherited from: BasicIntervalSchedule   |
| value2Multiplier | UnitMultiplier   | inherited from: BasicIntervalSchedule   |
| aliasName        | String           | inherited from: IdentifiedObject        |
| mRID             | String           | inherited from: IdentifiedObject        |
| name             | String           | inherited from: IdentifiedObject        |

Table 129 shows all association ends of AreaLoadCurve with other classes.

**Table 129 – Association ends of ExternalInputs::AreaLoadCurve with other classes**

| [mult from] | [mult to] name        | type             | description                             |
|-------------|-----------------------|------------------|-----------------------------------------|
| [0..*]      | [0..1] MktLoadArea    | MktLoadArea      |                                         |
| [0..*]      | [0..1] AggregateNode  | AggregateNode    |                                         |
| [0..*]      | [0..1] TACArea        | TACArea          |                                         |
| [1..1]      | [1..*] TimePoints     | RegularTimePoint | inherited from: RegularIntervalSchedule |
| [0..1]      | [0..*] DiagramObjects | DiagramObject    | inherited from: IdentifiedObject        |
| [1..1]      | [0..*] Names          | Name             | inherited from: IdentifiedObject        |

#### 6.5.6.2.4 ASRequirements root class

Models Ancillary Service Requirements. Describes interval for which the requirement is applicable.

Table 130 shows all attributes of ASRequirements.

**Table 130 – Attributes of ExternalInputs::ASRequirements**

| name              | type     | description                                                      |
|-------------------|----------|------------------------------------------------------------------|
| intervalStartTime | DateTime | The start of the time interval for which requirement is defined. |

Table 131 shows all association ends of ASRequirements with other classes.



**Table 131 – Association ends of ExternalInputs::ASRequirements with other classes**

| [mult from] | [mult to] name            | type               | description |
|-------------|---------------------------|--------------------|-------------|
| [1..1]      | [1..*] ReserveDemandCurve | ReserveDemandCurve |             |

#### 6.5.6.2.5 BaseCaseConstraintLimit

Possibly time-varying max MW or MVA and optionally Min MW limit or MVA limit (Y1 and Y2, respectively) assigned to a contingency analysis base case. Use CurveSchedule XAxisUnits to specify MW or MVA. To be used only if the BaseCaseConstraintLimit differs from the DefaultConstraintLimit.

Table 132 shows all attributes of BaseCaseConstraintLimit.

**Table 132 – Attributes of ExternalInputs::BaseCaseConstraintLimit**

| name         | type           | description                      |
|--------------|----------------|----------------------------------|
| curveStyle   | CurveStyle     | inherited from: Curve            |
| xMultiplier  | UnitMultiplier | inherited from: Curve            |
| xUnit        | UnitSymbol     | inherited from: Curve            |
| y1Multiplier | UnitMultiplier | inherited from: Curve            |
| y1Unit       | UnitSymbol     | inherited from: Curve            |
| y2Multiplier | UnitMultiplier | inherited from: Curve            |
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 133 shows all association ends of BaseCaseConstraintLimit with other classes.

**Table 133 – Association ends of ExternalInputs::BaseCaseConstraintLimit with other classes**

| [mult from] | [mult to] name               | type                  | description                      |
|-------------|------------------------------|-----------------------|----------------------------------|
| [0..1]      | [1..1] SecurityConstraintSum | SecurityConstraintSum |                                  |
| [1..1]      | [0..*] CurveDatas            | CurveData             | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects        | DiagramObject         | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                 | Name                  | inherited from: IdentifiedObject |

#### 6.5.6.2.6 BranchEndFlow root class

Dynamic flows and ratings associated with a branch end.

Table 134 shows all attributes of BranchEndFlow.

**Table 134 – Attributes of ExternalInputs::BranchEndFlow**

| name            | type  | description                                                                                                                       |
|-----------------|-------|-----------------------------------------------------------------------------------------------------------------------------------|
| mwFlow          | Float | The MW flow on the branch<br>Attribute Usage: Active power flow at the series device, transformer, phase shifter, or line end     |
| mVARFlow        | Float | The MVAR flow on the branch<br>Attribute Usage: Reactive power flow at the series device, transformer, phase shifter, or line end |
| normalRating    | Float | The Normal Rating for the branch                                                                                                  |
| longTermRating  | Float | The Long Term Rating for the branch                                                                                               |
| shortTermRating | Float | The Short Term Rating for the branch                                                                                              |
| loadDumpRating  | Float | The Load Dump Rating for the branch                                                                                               |

Table 135 shows all association ends of BranchEndFlow with other classes.

**Table 135 – Association ends of ExternalInputs::BranchEndFlow with other classes**

| [mult from] | [mult to] name                         | type                 | description |
|-------------|----------------------------------------|----------------------|-------------|
| [0..1]      | [0..*]<br>MktPowerTransformerEndBFlow  | MktPowerTransformer  |             |
| [0..1]      | [0..*]<br>MktPowerTransformerEndAFlow  | MktPowerTransformer  |             |
| [0..1]      | [0..*]<br>MktACLineSegmentEndAFlow     | MktACLineSegment     |             |
| [0..1]      | [0..*]<br>MktSeriesCompensatorEndBFlow | MktSeriesCompensator |             |
| [0..1]      | [0..*]<br>MktACLineSegmentEndBFlow     | MktACLineSegment     |             |
| [0..1]      | [0..*]<br>MktSeriesCompensatorEndAFlow | MktSeriesCompensator |             |

#### 6.5.6.2.7 ConstraintTerm

A constraint term is one element of a linear constraint.

Table 136 shows all attributes of ConstraintTerm.

**Table 136 – Attributes of ExternalInputs::ConstraintTerm**

| name      | type   | description                                                                                                 |
|-----------|--------|-------------------------------------------------------------------------------------------------------------|
| factor    | String |                                                                                                             |
| function  | String | The function is an enumerated value that can be 'active', 'reactive', or 'VA' to indicate the type of flow. |
| aliasName | String | inherited from: IdentifiedObject                                                                            |
| mRID      | String | inherited from: IdentifiedObject                                                                            |

| name | type   | description                      |
|------|--------|----------------------------------|
| name | String | inherited from: IdentifiedObject |

Table 137 shows all association ends of ConstraintTerm with other classes.

**Table 137 – Association ends of ExternalInputs::ConstraintTerm with other classes**

| [mult from] | [mult to] name               | type                  | description                      |
|-------------|------------------------------|-----------------------|----------------------------------|
| [0..*]      | [1..1] SecurityConstraintSum | SecurityConstraintSum |                                  |
| [0..1]      | [0..*] DiagramObjects        | DiagramObject         | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                 | Name                  | inherited from: IdentifiedObject |

#### 6.5.6.2.8 ContingencyConstraintLimit

Possibly time-varying max MW or MVA and optionally Min MW limit or MVA limit (Y1 and Y2, respectively) assigned to a constraint for a specific contingency. Use CurveSchedule XAxisUnits to specify MW or MVA.

Table 138 shows all attributes of ContingencyConstraintLimit.

**Table 138 – Attributes of ExternalInputs::ContingencyConstraintLimit**

| name         | type           | description                      |
|--------------|----------------|----------------------------------|
| curveStyle   | CurveStyle     | inherited from: Curve            |
| xMultiplier  | UnitMultiplier | inherited from: Curve            |
| xUnit        | UnitSymbol     | inherited from: Curve            |
| y1Multiplier | UnitMultiplier | inherited from: Curve            |
| y1Unit       | UnitSymbol     | inherited from: Curve            |
| y2Multiplier | UnitMultiplier | inherited from: Curve            |
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 139 shows all association ends of ContingencyConstraintLimit with other classes.

**Table 139 – Association ends of ExternalInputs::ContingencyConstraintLimit with other classes**

| [mult from] | [mult to] name               | type                  | description |
|-------------|------------------------------|-----------------------|-------------|
| [0..*]      | [1..1] SecurityConstraintSum | SecurityConstraintSum |             |
| [1..1]      | [1..1] MWLimitSchedules      | MWLimitSchedule       |             |
| [0..*]      | [1..1] MktContingency        | MktContingency        |             |

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [1..1]      | [0..*] CurveDatas     | CurveData     | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

#### 6.5.6.2.9 ControlAreaSolutionData root class

State Estimator Solution Pool Interchange and Losses

Table 140 shows all attributes of ControlAreaSolutionData.

**Table 140 – Attributes of ExternalInputs::ControlAreaSolutionData**

| name              | type  | description                                                                      |
|-------------------|-------|----------------------------------------------------------------------------------|
| solvedLosses      | Float | Pool Losses MW<br>Attribute Usage: The active power losses of the pool in MW     |
| solvedInterchange | Float | Pool MW Interchange<br>Attribute Usage: The active power interchange of the pool |

Table 141 shows all association ends of ControlAreaSolutionData with other classes.

**Table 141 – Association ends of ExternalInputs::ControlAreaSolutionData with other classes**

| [mult from] | [mult to] name        | type           | description |
|-------------|-----------------------|----------------|-------------|
| [0..*]      | [0..1] MktControlArea | MktControlArea |             |

#### 6.5.6.2.10 DefaultBid

DefaultBid is a generic class to hold Default Energy Bid, Default Startup Bid, and Default Minimum Load Bid:

Default Energy Bid

A Default Energy Bid is a monotonically increasing staircase function consisting at maximum 10 economic bid segments, or 10 (\$/MW, MW) pairs. There are three methods for determining the Default Energy Bid:

- Cost Based: derived from the Heat Rate or Average Cost multiplied by the Gas Price Index plus 10 %.
- LMP Based: a weighted average of LMPs in the preceding 90 days
- Negotiated: an amount negotiated with the designated Independent Entity.

Default Startup Bid

A Default Startup Bid (DSUB) shall be calculated for each RMR unit based on the Startup Cost stored in the Master File and the applicable GPI and EPI

## Default Minimum Load Bid

A Default Minimum Load Bid (DMLB) shall be calculated for each RMR unit based on the Minimum Load Cost stored in the Master File and the applicable GPI.

Table 142 shows all attributes of DefaultBid.

**Table 142 – Attributes of ExternalInputs::DefaultBid**

| name                 | type              | description                                                                                    |
|----------------------|-------------------|------------------------------------------------------------------------------------------------|
| bidType              | BidType           | Default bid type such as Default Energy Bid, Default Minimum Load Bid, and Default Startup Bid |
| minLoadCost          | CostRate          | Minimum load cost in \$/hr                                                                     |
| peakFlag             | OnOff             | on-peak, off-peak, or all                                                                      |
| startTime            | DateTime          | inherited from: Bid                                                                            |
| stopTime             | DateTime          | inherited from: Bid                                                                            |
| marketType           | MarketType        | inherited from: Bid                                                                            |
| type                 | String            | inherited from: Document                                                                       |
| createdDateTime      | DateTime          | inherited from: Document                                                                       |
| lastModifiedDateTime | DateTime          | inherited from: Document                                                                       |
| revisionNumber       | String            | inherited from: Document                                                                       |
| electronicAddress    | ElectronicAddress | inherited from: Document                                                                       |
| subject              | String            | inherited from: Document                                                                       |
| title                | String            | inherited from: Document                                                                       |
| docStatus            | Status            | inherited from: Document                                                                       |
| status               | Status            | inherited from: Document                                                                       |
| aliasName            | String            | inherited from: IdentifiedObject                                                               |
| mRID                 | String            | inherited from: IdentifiedObject                                                               |
| name                 | String            | inherited from: IdentifiedObject                                                               |

Table 143 shows all association ends of DefaultBid with other classes.

**Table 143 – Association ends of ExternalInputs::DefaultBid with other classes**

| [mult from] | [mult to] name               | type                  | description         |
|-------------|------------------------------|-----------------------|---------------------|
| [0..1]      | [1..1] RegisteredResource    | RegisteredResource    |                     |
| [0..1]      | [0..1] DefaultBidCurve       | DefaultBidCurve       |                     |
| [0..*]      | [0..1] MarketParticipant     | MarketParticipant     | inherited from: Bid |
| [0..*]      | [1..1] EnergyMarket          | EnergyMarket          | inherited from: Bid |
| [0..1]      | [0..*] ChargeProfiles        | ChargeProfile         | inherited from: Bid |
| [1..1]      | [0..*] MitigatedBidSegment   | MitigatedBidSegment   | inherited from: Bid |
| [0..*]      | [0..1] SchedulingCoordinator | SchedulingCoordinator | inherited from: Bid |
| [0..1]      | [0..*] MitigatedBid          | MitigatedBid          | inherited from: Bid |
| [0..1]      | [0..*] RMRDetermination      | RMRDetermination      | inherited from: Bid |
| [0..*]      | [1..1] ActionRequest         | ActionRequest         | inherited from: Bid |
| [1..1]      | [1..*] ProductBids           | ProductBid            | inherited from: Bid |

| [mult from] | [mult to] name             | type               | description                      |
|-------------|----------------------------|--------------------|----------------------------------|
| [1..1]      | [0..*] BidHourlySchedule   | BidHourlySchedule  | inherited from: Bid              |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name               | inherited from: IdentifiedObject |

#### 6.5.6.2.11 DefaultBidCurve

Default bid curve for default energy bid curve and default startup curves (cost and time)

Table 144 shows all attributes of DefaultBidCurve.

**Table 144 – Attributes of ExternalInputs::DefaultBidCurve**

| name         | type           | description                                                                                      |
|--------------|----------------|--------------------------------------------------------------------------------------------------|
| curveType    | String         | To indicate a type used for a default energy bid curve, such as LMP, cost or consultative based. |
| debAdderFlag | YesNo          | Default energy bid adder flag                                                                    |
| curveStyle   | CurveStyle     | inherited from: Curve                                                                            |
| xMultiplier  | UnitMultiplier | inherited from: Curve                                                                            |
| xUnit        | UnitSymbol     | inherited from: Curve                                                                            |
| y1Multiplier | UnitMultiplier | inherited from: Curve                                                                            |
| y1Unit       | UnitSymbol     | inherited from: Curve                                                                            |
| y2Multiplier | UnitMultiplier | inherited from: Curve                                                                            |
| y2Unit       | UnitSymbol     | inherited from: Curve                                                                            |
| y3Multiplier | UnitMultiplier | inherited from: Curve                                                                            |
| y3Unit       | UnitSymbol     | inherited from: Curve                                                                            |
| aliasName    | String         | inherited from: IdentifiedObject                                                                 |
| mRID         | String         | inherited from: IdentifiedObject                                                                 |
| name         | String         | inherited from: IdentifiedObject                                                                 |

Table 145 shows all association ends of DefaultBidCurve with other classes.

**Table 145 – Association ends of ExternalInputs::DefaultBidCurve with other classes**

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [0..1]      | [0..1] DefaultBid     | DefaultBid    |                                  |
| [1..1]      | [0..*] CurveDatas     | CurveData     | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

#### 6.5.6.2.12 DefaultBidCurveData

Curve data for default bid curve and startup cost curve.

Table 146 shows all attributes of DefaultBidCurveData.

**Table 146 – Attributes of ExternalInputs::DefaultBidCurveData**

| name               | type                | description                                                             |
|--------------------|---------------------|-------------------------------------------------------------------------|
| bidSegmentCalcType | BidCalculationBasis | Type of calculation basis used to define the default bid segment curve. |
| xvalue             | Float               | inherited from: CurveData                                               |
| y1value            | Float               | inherited from: CurveData                                               |
| y2value            | Float               | inherited from: CurveData                                               |
| y3value            | Float               | inherited from: CurveData                                               |

Table 147 shows all association ends of DefaultBidCurveData with other classes.

**Table 147 – Association ends of ExternalInputs::DefaultBidCurveData with other classes**

| [mult from] | [mult to] name | type  | description               |
|-------------|----------------|-------|---------------------------|
| [0..*]      | [1..1] Curve   | Curve | inherited from: CurveData |

#### 6.5.6.2.13 DefaultConstraintLimit

Possibly time-varying max MW or MVA and optionally Min MW limit or MVA limit (Y1 and Y2, respectively) applied as a default value if no specific constraint limits are specified for a contingency analysis. Use CurveSchedule XAxisUnits to specify MW or MVA.

Table 148 shows all attributes of DefaultConstraintLimit.

**Table 148 – Attributes of ExternalInputs::DefaultConstraintLimit**

| name         | type           | description                      |
|--------------|----------------|----------------------------------|
| curveStyle   | CurveStyle     | inherited from: Curve            |
| xMultiplier  | UnitMultiplier | inherited from: Curve            |
| xUnit        | UnitSymbol     | inherited from: Curve            |
| y1Multiplier | UnitMultiplier | inherited from: Curve            |
| y1Unit       | UnitSymbol     | inherited from: Curve            |
| y2Multiplier | UnitMultiplier | inherited from: Curve            |
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 149 shows all association ends of DefaultConstraintLimit with other classes.

**Table 149 – Association ends of ExternalInputs::  
DefaultConstraintLimit with other classes**

| [mult from] | [mult to] name               | type                  | description                      |
|-------------|------------------------------|-----------------------|----------------------------------|
| [0..1]      | [1..1] SecurityConstraintSum | SecurityConstraintSum |                                  |
| [1..1]      | [0..*] CurveDatas            | CurveData             | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects        | DiagramObject         | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                 | Name                  | inherited from: IdentifiedObject |

#### 6.5.6.2.14 DiscreteMeasurementValueQuality

Measurement quality flags for Discrete Values.

Table 150 shows all attributes of DiscreteMeasurementValueQuality.

**Table 150 – Attributes of ExternalInputs::DiscreteMeasurementValueQuality**

| name                         | type     | description                                                                                  |
|------------------------------|----------|----------------------------------------------------------------------------------------------|
| manualReplaceIndicator       | Boolean  | Switch Manual Replace Indicator. Flag indicating that the switch is manual replace.          |
| removeFromOperationIndicator | Boolean  | Removed From Operation Indicator. Flag indicating that the switch is removed from operation. |
| badReference                 | Boolean  | inherited from: Quality61850                                                                 |
| estimatorReplaced            | Boolean  | inherited from: Quality61850                                                                 |
| failure                      | Boolean  | inherited from: Quality61850                                                                 |
| oldData                      | Boolean  | inherited from: Quality61850                                                                 |
| operatorBlocked              | Boolean  | inherited from: Quality61850                                                                 |
| oscillatory                  | Boolean  | inherited from: Quality61850                                                                 |
| outOfRange                   | Boolean  | inherited from: Quality61850                                                                 |
| overFlow                     | Boolean  | inherited from: Quality61850                                                                 |
| source                       | Source   | inherited from: Quality61850                                                                 |
| suspect                      | Boolean  | inherited from: Quality61850                                                                 |
| test                         | Boolean  | inherited from: Quality61850                                                                 |
| validity                     | Validity | inherited from: Quality61850                                                                 |

Table 151 shows all association ends of DiscreteMeasurementValueQuality with other classes.

**Table 151 – Association ends of ExternalInputs::  
DiscreteMeasurementValueQuality with other classes**

| [mult from] | [mult to] name          | type             | description                             |
|-------------|-------------------------|------------------|-----------------------------------------|
| [0..*]      | [1..1] MktDiscreteValue | MktDiscreteValue |                                         |
| [0..1]      | [1..1] MeasurementValue | MeasurementValue | inherited from: MeasurementValueQuality |



#### 6.5.6.2.15 DistributionFactorSet root class

A containing class that groups all the distribution factors within a market.

This is calculated daily for DA factors and hourly for RT factors.

Table 152 shows all attributes of DistributionFactorSet.

**Table 152 – Attributes of ExternalInputs::DistributionFactorSet**

| name              | type       | description                                                      |
|-------------------|------------|------------------------------------------------------------------|
| intervalStartTime | DateTime   | The start of the time interval for which requirement is defined. |
| intervalEndTime   | DateTime   | The end of the time interval for which requirement is defined.   |
| marketType        | MarketType |                                                                  |

Table 153 shows all association ends of DistributionFactorSet with other classes.

**Table 153 – Association ends of ExternalInputs::DistributionFactorSet with other classes**

| [mult from] | [mult to] name                | type                      | description |
|-------------|-------------------------------|---------------------------|-------------|
| [0..*]      | [0..*] GenDistributionFactor  | GenDistributionFactor     |             |
| [0..*]      | [0..*] SysLoadDistribuFactor  | SysLoadDistributionFactor |             |
| [0..*]      | [0..*] LoadDistributionFactor | LoadDistributionFactor    |             |

#### 6.5.6.2.16 EnergyConsumerData root class

Optimal Power Flow or State Estimator Load Data for OTS. This is used for RealTime, Study and Maintenance Users

Table 154 shows all attributes of EnergyConsumerData.

**Table 154 – Attributes of ExternalInputs::EnergyConsumerData**

| name     | type  | description                                                                        |
|----------|-------|------------------------------------------------------------------------------------|
| loadMVAR | Float | The MVAR load<br>Attribute Usage: The reactive power consumption of the load in MW |
| loadMW   | Float | The active power consumption of the load in MW                                     |

Table 155 shows all association ends of EnergyConsumerData with other classes.

**Table 155 – Association ends of ExternalInputs::EnergyConsumerData with other classes**

| [mult from] | [mult to] name           | type              | description |
|-------------|--------------------------|-------------------|-------------|
| [0..*]      | [1..1] MktEnergyConsumer | MktEnergyConsumer |             |

#### 6.5.6.2.17 EnergyPriceIndex

An Energy Price Index for each Resource is valid for a period (e.g. daily) that is identified by a Valid Period Start Time and a Valid Period End Time. An Energy Price Index is in \$/MWh.

Table 156 shows all attributes of EnergyPriceIndex.

**Table 156 – Attributes of ExternalInputs::EnergyPriceIndex**

| name                 | type                 | description                          |
|----------------------|----------------------|--------------------------------------|
| lastModified         | DateTime             | Time updated                         |
| startEffectiveDate   | DateTime             | Start effective date                 |
| endEffectiveDate     | DateTime             | End effective date                   |
| energyPriceIndex     | Float                | Energy price index                   |
| energyPriceIndexType | EnergyPriceIndexType | EPI type such as wholesale or retail |
| aliasName            | String               | inherited from: IdentifiedObject     |
| mRID                 | String               | inherited from: IdentifiedObject     |
| name                 | String               | inherited from: IdentifiedObject     |

Table 157 shows all association ends of EnergyPriceIndex with other classes.

**Table 157 – Association ends of ExternalInputs::EnergyPriceIndex with other classes**

| [mult from] | [mult to] name             | type                | description                      |
|-------------|----------------------------|---------------------|----------------------------------|
| [1..1]      | [1..1] RegisteredGenerator | RegisteredGenerator |                                  |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject |

#### 6.5.6.2.18 EnergyProfile

Specifies the start time, stop time, level for an EnergyTransaction.

Table 158 shows all attributes of EnergyProfile.

**Table 158 – Attributes of ExternalInputs::EnergyProfile**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 159 shows all association ends of EnergyProfile with other classes.

**Table 159 – Association ends of ExternalInputs::EnergyProfile with other classes**

| [mult from] | [mult to] name           | type              | description                                                 |
|-------------|--------------------------|-------------------|-------------------------------------------------------------|
| [1..*]      | [1..1] TransactionBid    | TransactionBid    |                                                             |
| [1..*]      | [1..1] EnergyTransaction | EnergyTransaction | An EnergyTransaction shall have at least one EnergyProfile. |
| [0..*]      | [0..*] ProfileDatas      | ProfileData       | inherited from: Profile                                     |
| [0..1]      | [0..*] DiagramObjects    | DiagramObject     | inherited from: IdentifiedObject                            |
| [1..1]      | [0..*] Names             | Name              | inherited from: IdentifiedObject                            |

#### 6.5.6.2.19 EnergyTransaction

Specifies the schedule for energy transfers between interchange areas that are necessary to satisfy the associated interchange transaction.

Table 160 shows all attributes of EnergyTransaction.

**Table 160 – Attributes of ExternalInputs::EnergyTransaction**

| name                 | type                  | description                                                                                                                     |
|----------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------|
| capacityBacked       | Boolean               | Interchange capacity flag. When the flag is set to true, it indicates a transaction is capacity backed.                         |
| congestChargeMax     | Money                 | Maximum congestion charges in monetary units.                                                                                   |
| deliveryPointP       | ActivePower           | Delivery point active power.                                                                                                    |
| energyMin            | ActivePower           | Transaction minimum active power if dispatchable.                                                                               |
| firmInterchangeFlag  | Boolean               | Firm interchange flag indicates whether or not this energy transaction can be changed without potential financial consequences. |
| payCongestion        | Boolean               | Willing to Pay congestion flag                                                                                                  |
| reason               | String                | Reason for energy transaction.                                                                                                  |
| receiptPointP        | ActivePower           | Receipt point active power.                                                                                                     |
| state                | EnergyTransactionType | { Approve   Deny   Study }                                                                                                      |
| type                 | String                | inherited from: Document                                                                                                        |
| createdDateTime      | DateTime              | inherited from: Document                                                                                                        |
| lastModifiedDateTime | DateTime              | inherited from: Document                                                                                                        |
| revisionNumber       | String                | inherited from: Document                                                                                                        |
| electronicAddress    | ElectronicAddress     | inherited from: Document                                                                                                        |
| subject              | String                | inherited from: Document                                                                                                        |
| title                | String                | inherited from: Document                                                                                                        |
| docStatus            | Status                | inherited from: Document                                                                                                        |
| status               | Status                | inherited from: Document                                                                                                        |
| aliasName            | String                | inherited from: IdentifiedObject                                                                                                |
| mRID                 | String                | inherited from: IdentifiedObject                                                                                                |
| name                 | String                | inherited from: IdentifiedObject                                                                                                |

Table 161 shows all association ends of EnergyTransaction with other classes.

**Table 161 – Association ends of ExternalInputs::EnergyTransaction with other classes**

| [mult from] | [mult to] name                 | type                    | description                                                 |
|-------------|--------------------------------|-------------------------|-------------------------------------------------------------|
| [0..*]      | [0..*] EnergyPriceCurves       | EnergyPriceCurve        |                                                             |
| [1..1]      | [1..*] EnergyProfiles          | EnergyProfile           | An EnergyTransaction shall have at least one EnergyProfile. |
| [0..*]      | [1..1] Export_SubControlArea   | SubControlArea          | Energy is transferred between interchange areas             |
| [0..1]      | [0..1] TransmissionReservation | TransmissionReservation |                                                             |
| [0..*]      | [1..1] Import_SubControlArea   | SubControlArea          | Energy is transferred between interchange areas             |
| [0..1]      | [0..*] ConfigurationEvents     | ConfigurationEvent      | inherited from: Document                                    |
| [0..1]      | [0..*] DiagramObjects          | DiagramObject           | inherited from: IdentifiedObject                            |
| [1..1]      | [0..*] Names                   | Name                    | inherited from: IdentifiedObject                            |

#### 6.5.6.2.20 GenDistributionFactor root class

This class models the generation distribution factors. This class needs to be used along with the AggregatedPnode and the IndividualPnode to show the distribution of each individual party.

Table 162 shows all attributes of GenDistributionFactor.

**Table 162 – Attributes of ExternalInputs::GenDistributionFactor**

| name   | type  | description                                                                               |
|--------|-------|-------------------------------------------------------------------------------------------|
| factor | Float | Used to calculate generation "participation" of an individual pnode in an AggregatePnode. |

Table 163 shows all association ends of GenDistributionFactor with other classes.

**Table 163 – Association ends of ExternalInputs::GenDistributionFactor with other classes**

| [mult from] | [mult to] name               | type                  | description |
|-------------|------------------------------|-----------------------|-------------|
| [0..*]      | [0..*] DistributionFactorSet | DistributionFactorSet |             |
| [1..*]      | [0..1] AggregatedPnode       | AggregatedPnode       |             |
| [0..1]      | [0..1] IndividualPnode       | IndividualPnode       |             |

#### 6.5.6.2.21 GeneratingUnitDynamicValues root class

Optimal Power Flow or State Estimator Unit Data for Operator Training Simulator. This is used for RealTime, Study and Maintenance Users

Table 164 shows all attributes of GeneratingUnitDynamicValues.

**Table 164 – Attributes of ExternalInputs::GeneratingUnitDynamicValues**

| name        | type  | description                                                           |
|-------------|-------|-----------------------------------------------------------------------|
| lossFactor  | Float | Loss Factor                                                           |
| maximumMW   | Float | The maximum active power generation of the unit in MW                 |
| minimumMW   | Float | The minimum active power generation of the unit in MW                 |
| mVAR        | Float | Unit reactive power generation in MVAR                                |
| mw          | Float | Unit active power generation in MW                                    |
| sensitivity | Float | Unit sensitivity factor. The distribution factors (DFAX) for the unit |

Table 165 shows all association ends of GeneratingUnitDynamicValues with other classes.

**Table 165 – Association ends of ExternalInputs::GeneratingUnitDynamicValues with other classes**

| [mult from] | [mult to] name           | type              | description |
|-------------|--------------------------|-------------------|-------------|
| [0..*]      | [1..1] MktGeneratingUnit | MktGeneratingUnit |             |
| [0..*]      | [0..1] Flowgate          | Flowgate          |             |

#### 6.5.6.2.22 GenericConstraints

Generic constraints can represent secure areas, voltage profile, transient stability and voltage collapse limits.

The generic constraints can be one of the following forms:

- a) Thermal MW limit constraints type
- b) Group line flow constraint type

Table 166 shows all attributes of GenericConstraints.

**Table 166 – Attributes of ExternalInputs::GenericConstraints**

| name              | type     | description                      |
|-------------------|----------|----------------------------------|
| intervalEndTime   | DateTime | Interval End Time                |
| intervalStartTime | DateTime | Interval Start Time              |
| maxLimit          | Float    | Maximum Limit (MW)               |
| minLimit          | Float    | Minimum Limit (MW)               |
| aliasName         | String   | inherited from: IdentifiedObject |
| mRID              | String   | inherited from: IdentifiedObject |
| name              | String   | inherited from: IdentifiedObject |

Table 167 shows all association ends of GenericConstraints with other classes.

**Table 167 – Association ends of ExternalInputs::GenericConstraints with other classes**

| [mult from] | [mult to] name              | type                 | description                      |
|-------------|-----------------------------|----------------------|----------------------------------|
| [0..1]      | [0..*] Flowgate             | Flowgate             |                                  |
| [0..1]      | [0..*] TransmissionCapacity | TransmissionCapacity |                                  |
| [0..1]      | [0..*] DiagramObjects       | DiagramObject        | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                | Name                 | inherited from: IdentifiedObject |

#### 6.5.6.2.23 InterchangeETCData root class

Existing Transmission Contract data for an interchange schedule

Table 168 shows all attributes of InterchangeETCData.

**Table 168 – Attributes of ExternalInputs::InterchangeETCData**

| name           | type   | description                                   |
|----------------|--------|-----------------------------------------------|
| contractNumber | String | Existing transmission contract number         |
| usageMW        | Float  | Existing transmission contract usage MW value |

Table 169 shows all association ends of InterchangeETCData with other classes.

**Table 169 – Association ends of ExternalInputs::InterchangeETCData with other classes**

| [mult from] | [mult to] name             | type                | description |
|-------------|----------------------------|---------------------|-------------|
| [0..*]      | [0..1] InterchangeSchedule | InterchangeSchedule |             |

#### 6.5.6.2.24 InterchangeSchedule

Interchange schedule class to hold information for interchange schedules such as import export type, energy type, and etc.

Table 170 shows all attributes of InterchangeSchedule.

**Table 170 – Attributes of ExternalInputs::InterchangeSchedule**

| name            | type              | description                                                                  |
|-----------------|-------------------|------------------------------------------------------------------------------|
| checkOutType    | CheckOutType      | To indicate a check out type such as adjusted capacity or dispatch capacity. |
| directionType   | InterTieDirection | Import or export.                                                            |
| energyType      | MarketProductType | Energy product type.                                                         |
| intervalLength  | Integer           | Interval length.                                                             |
| marketType      | MarketType        | Market type.                                                                 |
| operatingDate   | DateTime          | Operating date, hour.                                                        |
| outOfMarketType | Boolean           | To indicate an out-of-market (OOM) schedule.                                 |
| scheduleType    | EnergyProductType | Schedule type.                                                               |
| wcrID           | String            | Wheeling Counter-Resource ID (required when                                  |

| name         | type           | description                      |
|--------------|----------------|----------------------------------|
|              |                | Schedule Type=Wheel).            |
| curveStyle   | CurveStyle     | inherited from: Curve            |
| xMultiplier  | UnitMultiplier | inherited from: Curve            |
| xUnit        | UnitSymbol     | inherited from: Curve            |
| y1Multiplier | UnitMultiplier | inherited from: Curve            |
| y1Unit       | UnitSymbol     | inherited from: Curve            |
| y2Multiplier | UnitMultiplier | inherited from: Curve            |
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 171 shows all association ends of InterchangeSchedule with other classes.

**Table 171 – Association ends of ExternalInputs::  
InterchangeSchedule with other classes**

| [mult from] | [mult to] name            | type               | description                      |
|-------------|---------------------------|--------------------|----------------------------------|
| [0..1]      | [0..*] InterchangeETCData | InterchangeETCData |                                  |
| [0..*]      | [0..1] InterTie           | SchedulingPoint    |                                  |
| [0..*]      | [0..1] RegisteredInterTie | RegisteredInterTie |                                  |
| [1..1]      | [0..*] CurveDatas         | CurveData          | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects     | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names              | Name               | inherited from: IdentifiedObject |

#### 6.5.6.2.25 IntermittentResourceEligibility

Indicates whether unit is eligible for treatment as a intermittent variable renewable resource

Table 172 shows all attributes of IntermittentResourceEligibility.

**Table 172 – Attributes of ExternalInputs::IntermittentResourceEligibility**

| name                 | type              | description                                                                |
|----------------------|-------------------|----------------------------------------------------------------------------|
| eligibilityStatus    | String            | Indicates whether a resource is eligible for PIRP program for a given hour |
| intervalEndTime      | DateTime          | inherited from: MarketFactors                                              |
| intervalStartTime    | DateTime          | inherited from: MarketFactors                                              |
| type                 | String            | inherited from: Document                                                   |
| createdDateTime      | DateTime          | inherited from: Document                                                   |
| lastModifiedDateTime | DateTime          | inherited from: Document                                                   |
| revisionNumber       | String            | inherited from: Document                                                   |
| electronicAddress    | ElectronicAddress | inherited from: Document                                                   |

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| subject   | String | inherited from: Document         |
| title     | String | inherited from: Document         |
| docStatus | Status | inherited from: Document         |
| status    | Status | inherited from: Document         |
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 173 shows all association ends of IntermittentResourceEligibility with other classes.

**Table 173 – Association ends of ExternalInputs::IntermittentResourceEligibility with other classes**

| [mult from] | [mult to] name             | type               | description                      |
|-------------|----------------------------|--------------------|----------------------------------|
| [0..*]      | [1..1] RegisteredResource  | RegisteredResource |                                  |
| [0..*]      | [0..*] MktActivityRecord   | MktActivityRecord  | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market              | Market             | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name               | inherited from: IdentifiedObject |

#### 6.5.6.2.26 LoadDistributionFactor root class

This class models the load distribution factors. This class should be used in one of two ways:

Use it along with the AggregatedPnode and the IndividualPnode to show the distribution of each individual party

OR

Use it with Mkt\_EnergyConsumer to represent the current MW/Mvar distribution within its parent load group.

Table 174 shows all attributes of LoadDistributionFactor.

**Table 174 – Attributes of ExternalInputs::LoadDistributionFactor**

| name        | type  | description                                    |
|-------------|-------|------------------------------------------------|
| pDistFactor | Float | Real power (MW) load distribution factor       |
| qDistFactor | Float | Reactive power (MVar) load distribution factor |

Table 175 shows all association ends of LoadDistributionFactor with other classes.



**Table 175 – Association ends of ExternalInputs::LoadDistributionFactor with other classes**

| [mult from] | [mult to] name               | type                  | description |
|-------------|------------------------------|-----------------------|-------------|
| [0..*]      | [0..*] DistributionFactorSet | DistributionFactorSet |             |
| [0..1]      | [0..1] IndividualPnode       | IndividualPnode       |             |
| [1..*]      | [0..1] AggregatedPnode       | AggregatedPnode       |             |

#### 6.5.6.2.27 LossSensitivity

Loss sensitivity applied to a ConnectivityNode for a given time interval.

Table 176 shows all attributes of LossSensitivity.

**Table 176 – Attributes of ExternalInputs::LossSensitivity**

| name                 | type              | description                                                                                                                                                                                                             |
|----------------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| lossFactor           | Float             | Loss penalty factor.<br>Defined as: $1 / (1 - \text{Incremental Transmission Loss})$ ; with the Incremental Transmission Loss expressed as a plus or minus value. The typical range of penalty factors is (0,9 to 1,1). |
| intervalEndTime      | DateTime          | inherited from: MarketFactors                                                                                                                                                                                           |
| intervalStartTime    | DateTime          | inherited from: MarketFactors                                                                                                                                                                                           |
| type                 | String            | inherited from: Document                                                                                                                                                                                                |
| createdDateTime      | DateTime          | inherited from: Document                                                                                                                                                                                                |
| lastModifiedDateTime | DateTime          | inherited from: Document                                                                                                                                                                                                |
| revisionNumber       | String            | inherited from: Document                                                                                                                                                                                                |
| electronicAddress    | ElectronicAddress | inherited from: Document                                                                                                                                                                                                |
| subject              | String            | inherited from: Document                                                                                                                                                                                                |
| title                | String            | inherited from: Document                                                                                                                                                                                                |
| docStatus            | Status            | inherited from: Document                                                                                                                                                                                                |
| status               | Status            | inherited from: Document                                                                                                                                                                                                |
| aliasName            | String            | inherited from: IdentifiedObject                                                                                                                                                                                        |
| mRID                 | String            | inherited from: IdentifiedObject                                                                                                                                                                                        |
| name                 | String            | inherited from: IdentifiedObject                                                                                                                                                                                        |

Table 177 shows all association ends of LossSensitivity with other classes.

**Table 177 – Association ends of ExternalInputs::LossSensitivity with other classes**

| [mult from] | [mult to] name             | type                | description                      |
|-------------|----------------------------|---------------------|----------------------------------|
| [0..*]      | [1..1] MktConnectivityNode | MktConnectivityNode |                                  |
| [0..*]      | [0..*] MktActivityRecord   | MktActivityRecord   | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market              | Market              | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent  | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject |

| [mult from] | [mult to] name | type | description                      |
|-------------|----------------|------|----------------------------------|
| [1..1]      | [0..*] Names   | Name | inherited from: IdentifiedObject |

### 6.5.6.2.28 MktACLineSegment

Subclass of IEC 61970:Wires:ACLineSegment

Table 178 shows all attributes of MktACLineSegment.

**Table 178 – Attributes of ExternalInputs::MktACLineSegment**

| name              | type        | description                      |
|-------------------|-------------|----------------------------------|
| b0ch              | Susceptance | inherited from: ACLineSegment    |
| bch               | Susceptance | inherited from: ACLineSegment    |
| g0ch              | Conductance | inherited from: ACLineSegment    |
| gch               | Conductance | inherited from: ACLineSegment    |
| r                 | Resistance  | inherited from: ACLineSegment    |
| r0                | Resistance  | inherited from: ACLineSegment    |
| x                 | Reactance   | inherited from: ACLineSegment    |
| x0                | Reactance   | inherited from: ACLineSegment    |
| length            | Length      | inherited from: Conductor        |
| aggregate         | Boolean     | inherited from: Equipment        |
| normallyInService | Boolean     | inherited from: Equipment        |
| aliasName         | String      | inherited from: IdentifiedObject |
| mRID              | String      | inherited from: IdentifiedObject |
| name              | String      | inherited from: IdentifiedObject |

Table 179 shows all association ends of MktACLineSegment with other classes.

**Table 179 – Association ends of ExternalInputs::MktACLineSegment with other classes**

| [mult from] | [mult to] name              | type                 | description                         |
|-------------|-----------------------------|----------------------|-------------------------------------|
| [0..*]      | [0..1] EndAFlow             | BranchEndFlow        |                                     |
| [0..*]      | [0..1] EndBFlow             | BranchEndFlow        |                                     |
| [1..1]      | [0..*] Clamp                | Clamp                | inherited from: ACLineSegment       |
| [0..*]      | [0..1] PerLengthImpedance   | PerLengthImpedance   | inherited from: ACLineSegment       |
| [1..1]      | [0..*] Cut                  | Cut                  | inherited from: ACLineSegment       |
| [1..1]      | [0..*] ACLineSegmentPhases  | ACLineSegmentPhase   | inherited from: ACLineSegment       |
| [0..*]      | [0..1] BaseVoltage          | BaseVoltage          | inherited from: ConductingEquipment |
| [1..1]      | [0..*] Terminals            | Terminal             | inherited from: ConductingEquipment |
| [0..*]      | [0..*] ProtectionEquipments | ProtectionEquipment  | inherited from: ConductingEquipment |
| [1..1]      | [0..*] ClearanceTags        | ClearanceTag         | inherited from: ConductingEquipment |
| [1..1]      | [0..1] SvStatus             | SvStatus             | inherited from: ConductingEquipment |
| [0..*]      | [0..1] EquipmentContainer   | EquipmentContainer   | inherited from: Equipment           |
| [1..1]      | [0..*] ContingencyEquipment | ContingencyEquipment | inherited from: Equipment           |

| [mult from] | [mult to] name             | type                | description                         |
|-------------|----------------------------|---------------------|-------------------------------------|
| [0..1]      | [0..*] OperationalLimitSet | OperationalLimitSet | inherited from: Equipment           |
| [0..*]      | [0..1] PSRType             | PSRType             | inherited from: PowerSystemResource |
| [0..1]      | [0..*] Measurements        | Measurement         | inherited from: PowerSystemResource |
| [1..1]      | [0..*] OperatingShare      | OperatingShare      | inherited from: PowerSystemResource |
| [0..*]      | [0..*] PsrLists            | PsrList             | inherited from: PowerSystemResource |
| [1..1]      | [0..1] OutageSchedule      | OutageSchedule      | inherited from: PowerSystemResource |
| [0..*]      | [0..*] ReportingGroup      | ReportingGroup      | inherited from: PowerSystemResource |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject    |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject    |

#### 6.5.6.2.29 MktAnalogLimit

Subclass of IEC 61970:Meas:AnalogLimit

Table 180 shows all attributes of MktAnalogLimit.

**Table 180 – Attributes of ExternalInputs::MktAnalogLimit**

| name          | type            | description                                                                                                                               |
|---------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| exceededLimit | Boolean         | true if limit exceeded                                                                                                                    |
| limitType     | AnalogLimitType | The type of limit the value represents<br>Branch Limit Types:<br>Short Term<br>Medium Term<br>Long Term<br>Voltage Limits:<br>High<br>Low |
| value         | Float           | inherited from: AnalogLimit                                                                                                               |
| aliasName     | String          | inherited from: IdentifiedObject                                                                                                          |
| mRID          | String          | inherited from: IdentifiedObject                                                                                                          |
| name          | String          | inherited from: IdentifiedObject                                                                                                          |

Table 181 shows all association ends of MktAnalogLimit with other classes.

**Table 181 – Association ends of ExternalInputs::MktAnalogLimit with other classes**

| [mult from] | [mult to] name        | type           | description                      |
|-------------|-----------------------|----------------|----------------------------------|
| [0..*]      | [1..1] LimitSet       | AnalogLimitSet | inherited from: AnalogLimit      |
| [0..1]      | [0..*] DiagramObjects | DiagramObject  | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name           | inherited from: IdentifiedObject |

### 6.5.6.2.30 MktAnalogLimitSet

Subclass of IEC 61970:Meas:AnalogLimitSet

Table 182 shows all attributes of MktAnalogLimitSet.

**Table 182 – Attributes of ExternalInputs::MktAnalogLimitSet**

| name               | type    | description                      |
|--------------------|---------|----------------------------------|
| ratingSet          | Integer | Rating set numbers               |
| isPercentageLimits | Boolean | inherited from: LimitSet         |
| aliasName          | String  | inherited from: IdentifiedObject |
| mRID               | String  | inherited from: IdentifiedObject |
| name               | String  | inherited from: IdentifiedObject |

Table 183 shows all association ends of MktAnalogLimitSet with other classes.

**Table 183 – Association ends of ExternalInputs::MktAnalogLimitSet with other classes**

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [1..1]      | [0..*] Limits         | AnalogLimit   | inherited from: AnalogLimitSet   |
| [0..*]      | [0..*] Measurements   | Analog        | inherited from: AnalogLimitSet   |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

### 6.5.6.2.31 MktAnalogValue

Subclass of IEC 61970:Meas:AnalogValue

Table 184 shows all attributes of MktAnalogValue.

**Table 184 – Attributes of ExternalInputs::MktAnalogValue**

| name           | type     | description                      |
|----------------|----------|----------------------------------|
| value          | Float    | inherited from: AnalogValue      |
| timeStamp      | DateTime | inherited from: MeasurementValue |
| sensorAccuracy | PerCent  | inherited from: MeasurementValue |
| aliasName      | String   | inherited from: IdentifiedObject |
| mRID           | String   | inherited from: IdentifiedObject |
| name           | String   | inherited from: IdentifiedObject |

Table 185 shows all association ends of MktAnalogValue with other classes.

**Table 185 – Association ends of ExternalInputs::MktAnalogValue with other classes**

| [mult from] | [mult to] name                       | type                          | description                      |
|-------------|--------------------------------------|-------------------------------|----------------------------------|
| [1..1]      | [0..*] AnalogMeasurementValueQuality | AnalogMeasurementValueQuality |                                  |
| [0..*]      | [1..1] Analog                        | Analog                        | inherited from: AnalogValue      |
| [1..1]      | [0..*] AltGeneratingUnit             | AltGeneratingUnitMeas         | inherited from: AnalogValue      |
| [1..1]      | [0..*] AltTieMeas                    | AltTieMeas                    | inherited from: AnalogValue      |
| [1..1]      | [0..1] RemoteSource                  | RemoteSource                  | inherited from: MeasurementValue |
| [1..1]      | [0..1] MeasurementValueQuality       | MeasurementValueQuality       | inherited from: MeasurementValue |
| [0..*]      | [1..1] MeasurementValueSource        | MeasurementValueSource        | inherited from: MeasurementValue |
| [0..1]      | [0..*] DiagramObjects                | DiagramObject                 | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                         | Name                          | inherited from: IdentifiedObject |

**6.5.6.2.32 MktControlArea**

Market subclass of IEC 61970:ControlArea

Table 186 shows all attributes of MktControlArea.

**Table 186 – Attributes of ExternalInputs::MktControlArea**

| name           | type                | description                      |
|----------------|---------------------|----------------------------------|
| netInterchange | ActivePower         | inherited from: ControlArea      |
| pTolerance     | ActivePower         | inherited from: ControlArea      |
| type           | ControlAreaTypeKind | inherited from: ControlArea      |
| aliasName      | String              | inherited from: IdentifiedObject |
| mRID           | String              | inherited from: IdentifiedObject |
| name           | String              | inherited from: IdentifiedObject |

Table 187 shows all association ends of MktControlArea with other classes.

**Table 187 – Association ends of ExternalInputs::MktControlArea with other classes**

| [mult from] | [mult to] name                   | type                      | description                         |
|-------------|----------------------------------|---------------------------|-------------------------------------|
| [0..1]      | [0..*] ControlAreaSolutionData   | ControlAreaSolutionData   |                                     |
| [0..1]      | [0..1] EnergyArea                | EnergyArea                | inherited from: ControlArea         |
| [1..1]      | [0..*] ControlAreaGeneratingUnit | ControlAreaGeneratingUnit | inherited from: ControlArea         |
| [1..1]      | [0..*] TieFlow                   | TieFlow                   | inherited from: ControlArea         |
| [0..*]      | [0..1] PSRType                   | PSRType                   | inherited from: PowerSystemResource |
| [0..1]      | [0..*] Measurements              | Measurement               | inherited from: PowerSystemResource |
| [1..1]      | [0..*] OperatingShare            | OperatingShare            | inherited from: PowerSystemResource |
| [0..*]      | [0..*] PsrLists                  | PsrList                   | inherited from: PowerSystemResource |

| [mult from] | [mult to] name        | type           | description                         |
|-------------|-----------------------|----------------|-------------------------------------|
| [1..1]      | [0..1] OutageSchedule | OutageSchedule | inherited from: PowerSystemResource |
| [0..*]      | [0..*] ReportingGroup | ReportingGroup | inherited from: PowerSystemResource |
| [0..1]      | [0..*] DiagramObjects | DiagramObject  | inherited from: IdentifiedObject    |
| [1..1]      | [0..*] Names          | Name           | inherited from: IdentifiedObject    |

#### 6.5.6.2.33 MktDiscreteValue

Subclass of IEC 61970:Meas:DiscreteValue

Table 188 shows all attributes of MktDiscreteValue.

**Table 188 – Attributes of ExternalInputs::MktDiscreteValue**

| name           | type     | description                      |
|----------------|----------|----------------------------------|
| value          | Integer  | inherited from: DiscreteValue    |
| timeStamp      | DateTime | inherited from: MeasurementValue |
| sensorAccuracy | PerCent  | inherited from: MeasurementValue |
| aliasName      | String   | inherited from: IdentifiedObject |
| mRID           | String   | inherited from: IdentifiedObject |
| name           | String   | inherited from: IdentifiedObject |

Table 189 shows all association ends of MktDiscreteValue with other classes.

**Table 189 – Association ends of ExternalInputs::MktDiscreteValue with other classes**

| [mult from] | [mult to] name                         | type                            | description                      |
|-------------|----------------------------------------|---------------------------------|----------------------------------|
| [1..1]      | [0..*] DiscreteMeasurementValueQuality | DiscreteMeasurementValueQuality |                                  |
| [0..*]      | [1..1] Discrete                        | Discrete                        | inherited from: DiscreteValue    |
| [1..1]      | [0..1] RemoteSource                    | RemoteSource                    | inherited from: MeasurementValue |
| [1..1]      | [0..1] MeasurementValueQuality         | MeasurementValueQuality         | inherited from: MeasurementValue |
| [0..*]      | [1..1] MeasurementValueSource          | MeasurementValueSource          | inherited from: MeasurementValue |
| [0..1]      | [0..*] DiagramObjects                  | DiagramObject                   | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                           | Name                            | inherited from: IdentifiedObject |

#### 6.5.6.2.34 MktOperationalLimitType

Subclass of IEC 61970:OperationalLimits:OperationalLimitType class

Table 190 shows all attributes of MktOperationalLimitType.

**Table 190 – Attributes of ExternalInputs::MktOperationalLimitType**

| name               | type                           | description                                                               |
|--------------------|--------------------------------|---------------------------------------------------------------------------|
| limitType          | BranchRatingType               | Limit Types: Normal, Emergency, Short Term Emergency, Long Term Emergency |
| acceptableDuration | Seconds                        | inherited from: OperationalLimitType                                      |
| direction          | OperationalLimitDirection Kind | inherited from: OperationalLimitType                                      |
| aliasName          | String                         | inherited from: IdentifiedObject                                          |
| mRID               | String                         | inherited from: IdentifiedObject                                          |
| name               | String                         | inherited from: IdentifiedObject                                          |

Table 191 shows all association ends of MktOperationalLimitType with other classes.

**Table 191 – Association ends of ExternalInputs::MktOperationalLimitType with other classes**

| [mult from] | [mult to] name          | type             | description                          |
|-------------|-------------------------|------------------|--------------------------------------|
| [0..1]      | [0..*] OperationalLimit | OperationalLimit | inherited from: OperationalLimitType |
| [0..1]      | [0..*] DiagramObjects   | DiagramObject    | inherited from: IdentifiedObject     |
| [1..1]      | [0..*] Names            | Name             | inherited from: IdentifiedObject     |

#### 6.5.6.2.35 MktOutageSchedule

Subclass of IEC 61970:Core:Outage:OutageSchedule.

Added additional attributes to represent both equipment outages and equipment rating/derate schedules needed for Market Operations. Attribute outageType is used to help distinguish between the two types.

Table 192 shows all attributes of MktOutageSchedule.

**Table 192 – Attributes of ExternalInputs::MktOutageSchedule**

| name                | type     | description                                                                                         |
|---------------------|----------|-----------------------------------------------------------------------------------------------------|
| breakerNormalStatus | String   | Only applicable for CB/DSC.<br>Possible value are {'O','C'} representing Open/Close breaker status. |
| breakerOutageStatus | String   | Only applicable for CB/DSC.<br>Possible value are {'O','C'} representing Open/Close breaker status. |
| commentText         | String   | Special comments submitted by the reliability engineer on the ticket that can effect Markets.       |
| endTime             | DateTime | Outage End Time.                                                                                    |
| equipType           | String   | Equipment Type<br>- unit<br>- load<br>- Static VAR Compensator<br>- line                            |

| name             | type           | description                                                                                                                                                                                                                                   |
|------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  |                | <ul style="list-style-type: none"> <li>– series device</li> <li>– 2-winding transformer</li> <li>– 3-winding transformer</li> <li>- regulating shunt</li> <li>- fixed shunt (capacitor)</li> <li>- circuit breaker / disconnecter.</li> </ul> |
| outageNote       | String         | Outage note.                                                                                                                                                                                                                                  |
| outageType       | OutageType     | Outage type, IN, OUT, DERATE.                                                                                                                                                                                                                 |
| POD              | String         | Point of delivery.                                                                                                                                                                                                                            |
| POR              | String         | Point of receipt.                                                                                                                                                                                                                             |
| status           | String         | Status<br>'Active' – sysdate between planned start date and planned end date<br>'Apprv' – outage has been approved by Central Market<br>'Accept' – outage has been accepted by Central Market.                                                |
| startTime        | DateTime       | inherited from: BasicIntervalSchedule                                                                                                                                                                                                         |
| value1Unit       | UnitSymbol     | inherited from: BasicIntervalSchedule                                                                                                                                                                                                         |
| value1Multiplier | UnitMultiplier | inherited from: BasicIntervalSchedule                                                                                                                                                                                                         |
| value2Unit       | UnitSymbol     | inherited from: BasicIntervalSchedule                                                                                                                                                                                                         |
| value2Multiplier | UnitMultiplier | inherited from: BasicIntervalSchedule                                                                                                                                                                                                         |
| aliasName        | String         | inherited from: IdentifiedObject                                                                                                                                                                                                              |
| mRID             | String         | inherited from: IdentifiedObject                                                                                                                                                                                                              |
| name             | String         | inherited from: IdentifiedObject                                                                                                                                                                                                              |

Table 193 shows all association ends of MktOutageSchedule with other classes.

**Table 193 – Association ends of ExternalInputs::MktOutageSchedule with other classes**

| [mult from] | [mult to] name             | type                | description                               |
|-------------|----------------------------|---------------------|-------------------------------------------|
| [0..1]      | [1..1] PowerSystemResource | PowerSystemResource | inherited from: OutageSchedule            |
| [0..1]      | [0..1] SwitchingOperations | SwitchingOperation  | inherited from: OutageSchedule            |
| [1..1]      | [1..*] TimePoints          | IrregularTimePoint  | inherited from: IrregularIntervalSchedule |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject          |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject          |

#### 6.5.6.2.36 MktSeriesCompensator

Subclass of IEC 61970:Wires:SeriesCompensator

Table 194 shows all attributes of MktSeriesCompensator.



**Table 194 – Attributes of ExternalInputs::MktSeriesCompensator**

| name              | type       | description                       |
|-------------------|------------|-----------------------------------|
| r                 | Resistance | inherited from: SeriesCompensator |
| r0                | Resistance | inherited from: SeriesCompensator |
| x                 | Reactance  | inherited from: SeriesCompensator |
| x0                | Reactance  | inherited from: SeriesCompensator |
| aggregate         | Boolean    | inherited from: Equipment         |
| normallyInService | Boolean    | inherited from: Equipment         |
| aliasName         | String     | inherited from: IdentifiedObject  |
| mRID              | String     | inherited from: IdentifiedObject  |
| name              | String     | inherited from: IdentifiedObject  |

Table 195 shows all association ends of MktSeriesCompensator with other classes.

**Table 195 – Association ends of ExternalInputs::MktSeriesCompensator with other classes**

| [mult from] | [mult to] name              | type                 | description                         |
|-------------|-----------------------------|----------------------|-------------------------------------|
| [0..*]      | [0..1] EndBFlow             | BranchEndFlow        |                                     |
| [0..*]      | [0..1] EndAFlow             | BranchEndFlow        |                                     |
| [0..*]      | [0..1] BaseVoltage          | BaseVoltage          | inherited from: ConductingEquipment |
| [1..1]      | [0..*] Terminals            | Terminal             | inherited from: ConductingEquipment |
| [0..*]      | [0..*] ProtectionEquipments | ProtectionEquipment  | inherited from: ConductingEquipment |
| [1..1]      | [0..*] ClearanceTags        | ClearanceTag         | inherited from: ConductingEquipment |
| [1..1]      | [0..1] SvStatus             | SvStatus             | inherited from: ConductingEquipment |
| [0..*]      | [0..1] EquipmentContainer   | EquipmentContainer   | inherited from: Equipment           |
| [1..1]      | [0..*] ContingencyEquipment | ContingencyEquipment | inherited from: Equipment           |
| [0..1]      | [0..*] OperationalLimitSet  | OperationalLimitSet  | inherited from: Equipment           |
| [0..*]      | [0..1] PSRType              | PSRType              | inherited from: PowerSystemResource |
| [0..1]      | [0..*] Measurements         | Measurement          | inherited from: PowerSystemResource |
| [1..1]      | [0..*] OperatingShare       | OperatingShare       | inherited from: PowerSystemResource |
| [0..*]      | [0..*] PsrLists             | PsrList              | inherited from: PowerSystemResource |
| [1..1]      | [0..1] OutageSchedule       | OutageSchedule       | inherited from: PowerSystemResource |
| [0..*]      | [0..*] ReportingGroup       | ReportingGroup       | inherited from: PowerSystemResource |
| [0..1]      | [0..*] DiagramObjects       | DiagramObject        | inherited from: IdentifiedObject    |
| [1..1]      | [0..*] Names                | Name                 | inherited from: IdentifiedObject    |

#### 6.5.6.2.37 MktShuntCompensator

Subclass of IEC 61970:Wires:ShuntCompensator

Table 196 shows all attributes of MktShuntCompensator.

**Table 196 – Attributes of ExternalInputs::MktShuntCompensator**

| name               | type                     | description                      |
|--------------------|--------------------------|----------------------------------|
| aVRDelay           | Seconds                  | inherited from: ShuntCompensator |
| b0PerSection       | Susceptance              | inherited from: ShuntCompensator |
| bPerSection        | Susceptance              | inherited from: ShuntCompensator |
| g0PerSection       | Conductance              | inherited from: ShuntCompensator |
| gPerSection        | Conductance              | inherited from: ShuntCompensator |
| grounded           | WindingConnection        | inherited from: ShuntCompensator |
| maximumSections    | Integer                  | inherited from: ShuntCompensator |
| nomU               | Voltage                  | inherited from: ShuntCompensator |
| normalSections     | Integer                  | inherited from: ShuntCompensator |
| phaseConnection    | PhaseShuntConnectionKind | inherited from: ShuntCompensator |
| switchOnCount      | Integer                  | inherited from: ShuntCompensator |
| switchOnDate       | DateTime                 | inherited from: ShuntCompensator |
| voltageSensitivity | VoltagePerReactivePower  | inherited from: ShuntCompensator |
| aggregate          | Boolean                  | inherited from: Equipment        |
| normallyInService  | Boolean                  | inherited from: Equipment        |
| aliasName          | String                   | inherited from: IdentifiedObject |
| mRID               | String                   | inherited from: IdentifiedObject |
| name               | String                   | inherited from: IdentifiedObject |

Table 197 shows all association ends of MktShuntCompensator with other classes.

**Table 197 – Association ends of ExternalInputs::MktShuntCompensator with other classes**

| [mult from] | [mult to] name                     | type                        | description                         |
|-------------|------------------------------------|-----------------------------|-------------------------------------|
| [1..1]      | [0..*] ShuntCompensatorDynamicData | ShuntCompensatorDynamicData |                                     |
| [1..1]      | [0..*] ShuntCompensatorPhase       | ShuntCompensatorPhase       | inherited from: ShuntCompensator    |
| [1..1]      | [0..1] SvShuntCompensatorSections  | SvShuntCompensatorSections  | inherited from: ShuntCompensator    |
| [0..*]      | [0..1] RegulatingControl           | RegulatingControl           | inherited from: RegulatingCondEq    |
| [0..1]      | [1..*] Controls                    | Control                     | inherited from: RegulatingCondEq    |
| [0..*]      | [0..1] BaseVoltage                 | BaseVoltage                 | inherited from: ConductingEquipment |
| [1..1]      | [0..*] Terminals                   | Terminal                    | inherited from: ConductingEquipment |
| [0..*]      | [0..*] ProtectionEquipments        | ProtectionEquipment         | inherited from: ConductingEquipment |
| [1..1]      | [0..*] ClearanceTags               | ClearanceTag                | inherited from: ConductingEquipment |
| [1..1]      | [0..1] SvStatus                    | SvStatus                    | inherited from: ConductingEquipment |
| [0..*]      | [0..1] EquipmentContainer          | EquipmentContainer          | inherited from: Equipment           |
| [1..1]      | [0..*] ContingencyEquipment        | ContingencyEquipment        | inherited from: Equipment           |
| [0..1]      | [0..*] OperationalLimitSet         | OperationalLimitSet         | inherited from: Equipment           |
| [0..*]      | [0..1] PSRType                     | PSRType                     | inherited from: PowerSystemResource |

| [mult from] | [mult to] name        | type           | description                         |
|-------------|-----------------------|----------------|-------------------------------------|
| [0..1]      | [0..*] Measurements   | Measurement    | inherited from: PowerSystemResource |
| [1..1]      | [0..*] OperatingShare | OperatingShare | inherited from: PowerSystemResource |
| [0..*]      | [0..*] PsrLists       | PsrList        | inherited from: PowerSystemResource |
| [1..1]      | [0..1] OutageSchedule | OutageSchedule | inherited from: PowerSystemResource |
| [0..*]      | [0..*] ReportingGroup | ReportingGroup | inherited from: PowerSystemResource |
| [0..1]      | [0..*] DiagramObjects | DiagramObject  | inherited from: IdentifiedObject    |
| [1..1]      | [0..*] Names          | Name           | inherited from: IdentifiedObject    |

### 6.5.6.2.38 MktSwitch

Subclass of IEC 61970:Wires:Switch

Table 198 shows all attributes of MktSwitch.

**Table 198 – Attributes of ExternalInputs::MktSwitch**

| name              | type        | description                      |
|-------------------|-------------|----------------------------------|
| normalOpen        | Boolean     | inherited from: Switch           |
| ratedCurrent      | CurrentFlow | inherited from: Switch           |
| switchOnCount     | Integer     | inherited from: Switch           |
| switchOnDate      | DateTime    | inherited from: Switch           |
| retained          | Boolean     | inherited from: Switch           |
| aggregate         | Boolean     | inherited from: Equipment        |
| normallyInService | Boolean     | inherited from: Equipment        |
| aliasName         | String      | inherited from: IdentifiedObject |
| mRID              | String      | inherited from: IdentifiedObject |
| name              | String      | inherited from: IdentifiedObject |

Table 199 shows all association ends of MktSwitch with other classes.

**Table 199 – Association ends of ExternalInputs::MktSwitch with other classes**

| [mult from] | [mult to] name              | type                | description                         |
|-------------|-----------------------------|---------------------|-------------------------------------|
| [1..1]      | [0..*] SwitchStatus         | SwitchStatus        |                                     |
| [1..1]      | [0..*] SwitchSchedules      | SwitchSchedule      | inherited from: Switch              |
| [1..1]      | [0..*] SwitchPhase          | SwitchPhase         | inherited from: Switch              |
| [0..*]      | [0..1] CompositeSwitch      | CompositeSwitch     | inherited from: Switch              |
| [0..*]      | [0..*] SwitchingOperations  | SwitchingOperation  | inherited from: Switch              |
| [0..*]      | [0..1] BaseVoltage          | BaseVoltage         | inherited from: ConductingEquipment |
| [1..1]      | [0..*] Terminals            | Terminal            | inherited from: ConductingEquipment |
| [0..*]      | [0..*] ProtectionEquipments | ProtectionEquipment | inherited from: ConductingEquipment |
| [1..1]      | [0..*] ClearanceTags        | ClearanceTag        | inherited from: ConductingEquipment |
| [1..1]      | [0..1] SvStatus             | SvStatus            | inherited from: ConductingEquipment |
| [0..*]      | [0..1] EquipmentContainer   | EquipmentContainer  | inherited from: Equipment           |

| [mult from] | [mult to] name              | type                 | description                         |
|-------------|-----------------------------|----------------------|-------------------------------------|
| [1..1]      | [0..*] ContingencyEquipment | ContingencyEquipment | inherited from: Equipment           |
| [0..1]      | [0..*] OperationalLimitSet  | OperationalLimitSet  | inherited from: Equipment           |
| [0..*]      | [0..1] PSRType              | PSRType              | inherited from: PowerSystemResource |
| [0..1]      | [0..*] Measurements         | Measurement          | inherited from: PowerSystemResource |
| [1..1]      | [0..*] OperatingShare       | OperatingShare       | inherited from: PowerSystemResource |
| [0..*]      | [0..*] PsrLists             | PsrList              | inherited from: PowerSystemResource |
| [1..1]      | [0..1] OutageSchedule       | OutageSchedule       | inherited from: PowerSystemResource |
| [0..*]      | [0..*] ReportingGroup       | ReportingGroup       | inherited from: PowerSystemResource |
| [0..1]      | [0..*] DiagramObjects       | DiagramObject        | inherited from: IdentifiedObject    |
| [1..1]      | [0..*] Names                | Name                 | inherited from: IdentifiedObject    |

### 6.5.6.2.39 MktTapChanger

Subclass of IEC 61970:Wires:TapChanger

Table 200 shows all attributes of MktTapChanger.

**Table 200 – Attributes of ExternalInputs::MktTapChanger**

| name             | type    | description                      |
|------------------|---------|----------------------------------|
| highStep         | Integer | inherited from: TapChanger       |
| initialDelay     | Seconds | inherited from: TapChanger       |
| lowStep          | Integer | inherited from: TapChanger       |
| ltcFlag          | Boolean | inherited from: TapChanger       |
| neutralStep      | Integer | inherited from: TapChanger       |
| neutralU         | Voltage | inherited from: TapChanger       |
| normalStep       | Integer | inherited from: TapChanger       |
| regulationStatus | Boolean | inherited from: TapChanger       |
| subsequentDelay  | Seconds | inherited from: TapChanger       |
| aliasName        | String  | inherited from: IdentifiedObject |
| mRID             | String  | inherited from: IdentifiedObject |
| name             | String  | inherited from: IdentifiedObject |

Table 201 shows all association ends of MktTapChanger with other classes.

**Table 201 – Association ends of ExternalInputs::MktTapChanger with other classes**

| [mult from] | [mult to] name               | type                  | description                         |
|-------------|------------------------------|-----------------------|-------------------------------------|
| [1..1]      | [0..*] TapChangerDynamicData | TapChangerDynamicData |                                     |
| [0..*]      | [0..1] TapChangerControl     | TapChangerControl     | inherited from: TapChanger          |
| [1..1]      | [0..1] SvTapStep             | SvTapStep             | inherited from: TapChanger          |
| [1..1]      | [0..*] TapSchedules          | TapSchedule           | inherited from: TapChanger          |
| [0..*]      | [0..1] PSRType               | PSRType               | inherited from: PowerSystemResource |

| [mult from] | [mult to] name        | type           | description                         |
|-------------|-----------------------|----------------|-------------------------------------|
| [0..1]      | [0..*] Measurements   | Measurement    | inherited from: PowerSystemResource |
| [1..1]      | [0..*] OperatingShare | OperatingShare | inherited from: PowerSystemResource |
| [0..*]      | [0..*] PsrLists       | PsrList        | inherited from: PowerSystemResource |
| [1..1]      | [0..1] OutageSchedule | OutageSchedule | inherited from: PowerSystemResource |
| [0..*]      | [0..*] ReportingGroup | ReportingGroup | inherited from: PowerSystemResource |
| [0..1]      | [0..*] DiagramObjects | DiagramObject  | inherited from: IdentifiedObject    |
| [1..1]      | [0..*] Names          | Name           | inherited from: IdentifiedObject    |

#### 6.5.6.2.40 MWLimitSchedule root class

Maximum MW and optionally Minimum MW (Y1 and Y2, respectively)

Table 202 shows all association ends of MWLimitSchedule with other classes.

**Table 202 – Association ends of ExternalInputs::MWLimitSchedule with other classes**

| [mult from] | [mult to] name                 | type                       | description |
|-------------|--------------------------------|----------------------------|-------------|
| [1..1]      | [1..1] SecurityConstraintLimit | ContingencyConstraintLimit |             |

#### 6.5.6.2.41 NodeConstraintTerm

To be used only to constrain a quantity that cannot be associated with a terminal. For example, a registered generating unit that is not electrically connected to the network.

Table 203 shows all attributes of NodeConstraintTerm.

**Table 203 – Attributes of ExternalInputs::NodeConstraintTerm**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| factor    | String | inherited from: ConstraintTerm   |
| function  | String | inherited from: ConstraintTerm   |
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 204 shows all association ends of NodeConstraintTerm with other classes.

**Table 204 – Association ends of ExternalInputs::NodeConstraintTerm with other classes**

| [mult from] | [mult to] name               | type                  | description                      |
|-------------|------------------------------|-----------------------|----------------------------------|
| [0..*]      | [1..1] MktConnectivityNode   | MktConnectivityNode   |                                  |
| [0..*]      | [1..1] SecurityConstraintSum | SecurityConstraintSum | inherited from: ConstraintTerm   |
| [0..1]      | [0..*] DiagramObjects        | DiagramObject         | inherited from: IdentifiedObject |

| [mult from] | [mult to] name | type | description                      |
|-------------|----------------|------|----------------------------------|
| [1..1]      | [0..*] Names   | Name | inherited from: IdentifiedObject |

#### 6.5.6.2.42 Profile

A profile is a simpler curve type.

Table 205 shows all attributes of Profile.

**Table 205 – Attributes of ExternalInputs::Profile**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 206 shows all association ends of Profile with other classes.

**Table 206 – Association ends of ExternalInputs::Profile with other classes**

| [mult from] | [mult to] name        | type          | description                                    |
|-------------|-----------------------|---------------|------------------------------------------------|
| [0..*]      | [0..*] ProfileDatas   | ProfileData   | A profile has profile data associated with it. |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject               |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject               |

#### 6.5.6.2.43 ProfileData root class

Data for profile.

Table 207 shows all attributes of ProfileData.

**Table 207 – Attributes of ExternalInputs::ProfileData**

| name           | type        | description                                                                        |
|----------------|-------------|------------------------------------------------------------------------------------|
| bidPrice       | Float       | Bid price associated with contract                                                 |
| capacityLevel  | ActivePower | Capacity level for the profile, in MW.                                             |
| energyLevel    | RealEnergy  | Energy level for the profile, in MWH.                                              |
| minimumLevel   | Float       | Minimum MW value of contract                                                       |
| sequenceNumber | Integer     | Sequence to provide item numbering for the profile. { greater than or equal to 1 } |
| startDateTime  | DateTime    | Start date/time for this profile.                                                  |
| stopDateTime   | DateTime    | Stop date/time for this profile.                                                   |

Table 208 shows all association ends of ProfileData with other classes.

**Table 208 – Association ends of ExternalInputs::ProfileData with other classes**

| [mult from] | [mult to] name | type    | description                                    |
|-------------|----------------|---------|------------------------------------------------|
| [0..*]      | [0..*] Profile | Profile | A profile has profile data associated with it. |

**6.5.6.2.44 ReserveDemandCurve**

Reserve demand curve. Models maximum quantities of reserve required per Market Region and models a reserve demand curve for the minimum quantities of reserve. The ReserveDemandCurve is a relationship between unit operating reserve price in \$/MWhr (Y-axis) and unit reserves in MW (X-axis).

Table 209 shows all attributes of ReserveDemandCurve.

**Table 209 – Attributes of ExternalInputs::ReserveDemandCurve**

| name                   | type                   | description                                                                                                           |
|------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------|
| reqMaxMW               | Float                  | Region requirement maximum limit                                                                                      |
| reserveRequirementType | ReserveRequirementType | Reserve requirement type that the max and curve apply to. For example, operating reserve, regulation and contingency. |
| curveStyle             | CurveStyle             | inherited from: Curve                                                                                                 |
| xMultiplier            | UnitMultiplier         | inherited from: Curve                                                                                                 |
| xUnit                  | UnitSymbol             | inherited from: Curve                                                                                                 |
| y1Multiplier           | UnitMultiplier         | inherited from: Curve                                                                                                 |
| y1Unit                 | UnitSymbol             | inherited from: Curve                                                                                                 |
| y2Multiplier           | UnitMultiplier         | inherited from: Curve                                                                                                 |
| y2Unit                 | UnitSymbol             | inherited from: Curve                                                                                                 |
| y3Multiplier           | UnitMultiplier         | inherited from: Curve                                                                                                 |
| y3Unit                 | UnitSymbol             | inherited from: Curve                                                                                                 |
| aliasName              | String                 | inherited from: IdentifiedObject                                                                                      |
| mRID                   | String                 | inherited from: IdentifiedObject                                                                                      |
| name                   | String                 | inherited from: IdentifiedObject                                                                                      |

Table 210 shows all association ends of ReserveDemandCurve with other classes.

**Table 210 – Association ends of ExternalInputs::ReserveDemandCurve with other classes**

| [mult from] | [mult to] name        | type           | description                      |
|-------------|-----------------------|----------------|----------------------------------|
| [1..*]      | [1..1] ASRequirements | ASRequirements |                                  |
| [0..*]      | [1..1] MarketRegion   | MarketRegion   |                                  |
| [1..1]      | [0..*] CurveDatas     | CurveData      | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects | DiagramObject  | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name           | inherited from: IdentifiedObject |

#### 6.5.6.2.45 SCADAInformation root class

Contains information about the update from SCADA

Table 211 shows all attributes of SCADAInformation.

**Table 211 – Attributes of ExternalInputs::SCADAInformation**

| name      | type     | description                   |
|-----------|----------|-------------------------------|
| timeStamp | DateTime | time of the update from SCADA |

#### 6.5.6.2.46 SecurityConstraints

Typical for regional transmission operators (RTOs), these constraints include transmission as well as generation group constraints identified in both base case and critical contingency cases.

Table 212 shows all attributes of SecurityConstraints.

**Table 212 – Attributes of ExternalInputs::SecurityConstraints**

| name      | type        | description                                                                    |
|-----------|-------------|--------------------------------------------------------------------------------|
| minMW     | ActivePower | Minimum MW limit (only for transmission constraints).                          |
| maxMW     | ActivePower | Maximum MW limit                                                               |
| actualMW  | ActivePower | Actual branch or group of branches MW flow (only for transmission constraints) |
| aliasName | String      | inherited from: IdentifiedObject                                               |
| mRID      | String      | inherited from: IdentifiedObject                                               |
| name      | String      | inherited from: IdentifiedObject                                               |

Table 213 shows all association ends of SecurityConstraints with other classes.

**Table 213 – Association ends of ExternalInputs::SecurityConstraints with other classes**

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [0..*]      | [0..1] RTO            | RTO           |                                  |
| [0..*]      | [0..1] GeneratingBid  | GeneratingBid |                                  |
| [0..1]      | [0..1] Flowgate       | Flowgate      |                                  |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

#### 6.5.6.2.47 SecurityConstraintSum

Typically provided by RTO systems, constraints identified in both base case and critical contingency cases have to be transferred.

A constraint has N ( $\geq 1$ ) constraint terms. A term is represented by an



instance of TerminalConstraintTerm.

The constraint expression is:

$$\text{minValue} \leq c1 \cdot x1 + c2 \cdot x2 + \dots cn \cdot xn + k \leq \text{maxValue}$$

where:

- $cn$  is ConstraintTerm.factor
- $xn$  is the flow at the terminal

Flow into the associated equipment is positive for the purpose of ConnectivityNode NodeConstraintTerm

$k$  is SecurityConstraintsLinear.resourceMW

The units of  $k$  are assumed to be same as the units of the flows,  $xn$ . The constants,  $cn$ , are dimensionless.

With these conventions,  $cn$  and  $k$  are all positive for a typical constraint such as "weighted sum of generation shall be less than limit". Furthermore,  $cn$  are all 1.0 for a case such as "interface flow shall be less than limit", assuming the terminals are chosen on the importing side of the interface.

Table 214 shows all attributes of SecurityConstraintSum.

**Table 214 – Attributes of ExternalInputs::SecurityConstraintSum**

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| intervalEndTime      | DateTime          | inherited from: MarketFactors    |
| intervalStartTime    | DateTime          | inherited from: MarketFactors    |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 215 shows all association ends of SecurityConstraintSum with other classes.

**Table 215 – Association ends of ExternalInputs::SecurityConstraintSum with other classes**

| [mult from] | [mult to] name                     | type                       | description                      |
|-------------|------------------------------------|----------------------------|----------------------------------|
| [1..1]      | [0..*] ConstraintTerms             | ConstraintTerm             |                                  |
| [0..*]      | [0..1] RTO                         | RTO                        |                                  |
| [1..1]      | [0..1] BaseCaseConstraintLimit     | BaseCaseConstraintLimit    |                                  |
| [1..1]      | [0..*] ContingencyConstraintLimits | ContingencyConstraintLimit |                                  |
| [1..1]      | [0..1] DefaultConstraintLimit      | DefaultConstraintLimit     |                                  |
| [0..*]      | [0..*] MktActivityRecord           | MktActivityRecord          | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market                      | Market                     | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents         | ConfigurationEvent         | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects              | DiagramObject              | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                       | Name                       | inherited from: IdentifiedObject |

#### 6.5.6.2.48 ServicePoint

The defined termination points of a transmission path (down to distribution level or to a customer – generation or consumption or both). Service points are defined from the viewpoint of the transmission service. Each service point is contained within (or on the boundary of) an interchange area. A service point is source or destination of a transaction.

Table 216 shows all attributes of ServicePoint.

**Table 216 – Attributes of ExternalInputs::ServicePoint**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 217 shows all association ends of ServicePoint with other classes.

**Table 217 – Association ends of ExternalInputs::ServicePoint with other classes**

| [mult from] | [mult to] name             | type                    | description                                                 |
|-------------|----------------------------|-------------------------|-------------------------------------------------------------|
| [0..1]      | [0..*] SourceReservation   | TransmissionReservation |                                                             |
| [1..1]      | [0..*] PORTransmissionPath | TransmissionPath        | A transmission path has a "point-of-receipt" service point  |
| [0..1]      | [0..*] SinkReservation     | TransmissionReservation |                                                             |
| [1..1]      | [0..*] PODTransmissionPath | TransmissionPath        | A transmission path has a "point-of-delivery" service point |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject           | inherited from: IdentifiedObject                            |
| [1..1]      | [0..*] Names               | Name                    | inherited from: IdentifiedObject                            |

#### 6.5.6.2.49 ShuntCompensatorDynamicData root class

Optimal Power Flow or State Estimator Filter Bank Data for OTS. This is used for RealTime, Study and Maintenance Users

Table 218 shows all attributes of ShuntCompensatorDynamicData.

**Table 218 – Attributes of ExternalInputs::ShuntCompensatorDynamicData**

| name                    | type    | description                                                                                            |
|-------------------------|---------|--------------------------------------------------------------------------------------------------------|
| mVARInjection           | Float   | The injection of reactive power of the filter bank in the NA solution or VCS reactive power production |
| connectionStatus        | Integer | The current status for the Voltage Control Capacitor 1= Connected 0 = Disconnected                     |
| desiredVoltage          | Float   | The desired voltage for the Voltage Control Capacitor                                                  |
| voltageRegulationStatus | Boolean | Indicator if the voltage control this is regulating<br>True = Yes, False = No                          |
| stepPosition            | Integer | Voltage control capacitor step position                                                                |

Table 219 shows all association ends of ShuntCompensatorDynamicData with other classes.

**Table 219 – Association ends of ExternalInputs::ShuntCompensatorDynamicData with other classes**

| [mult from] | [mult to] name             | type                | description |
|-------------|----------------------------|---------------------|-------------|
| [0..*]      | [1..1] MktShuntCompensator | MktShuntCompensator |             |

#### 6.5.6.2.50 SwitchStatus root class

Optimal Power Flow or State Estimator Circuit Breaker Status.

Table 220 shows all attributes of SwitchStatus.

**Table 220 – Attributes of ExternalInputs::SwitchStatus**

| name         | type             | description                                                                         |
|--------------|------------------|-------------------------------------------------------------------------------------|
| switchStatus | SwitchStatusType | Circuit Breaker Status (closed or open) of the circuit breaker from the power flow. |

Table 221 shows all association ends of SwitchStatus with other classes.

**Table 221 – Association ends of ExternalInputs::SwitchStatus with other classes**

| [mult from] | [mult to] name   | type      | description |
|-------------|------------------|-----------|-------------|
| [0..*]      | [1..1] MktSwitch | MktSwitch |             |

#### 6.5.6.2.51 SysLoadDistributionFactor root class

This class models the system distribution factors. This class needs to be used along with the HostControlArea and the ConnectivityNode to show the distribution of each individual party.

Table 222 shows all attributes of SysLoadDistributionFactor.

**Table 222 – Attributes of ExternalInputs::SysLoadDistributionFactor**

| name   | type  | description                                                                           |
|--------|-------|---------------------------------------------------------------------------------------|
| factor | Float | Used to calculate load "participation" of a connectivity node in an host control area |

Table 223 shows all association ends of SysLoadDistributionFactor with other classes.

**Table 223 – Association ends of ExternalInputs::SysLoadDistributionFactor with other classes**

| [mult from] | [mult to] name               | type                  | description |
|-------------|------------------------------|-----------------------|-------------|
| [0..1]      | [1..1] MktConnectivityNode   | MktConnectivityNode   |             |
| [0..*]      | [0..*] DistributionFactorSet | DistributionFactorSet |             |
| [0..*]      | [1..1] HostControlArea       | HostControlArea       |             |

#### 6.5.6.2.52 TapChangerDynamicData root class

Optimal Power Flow or State Estimator Phase Shifter Data. This is used for RealTime, Study and Maintenance Users. SE Solution Phase Shifter Measurements from the last run of SE

Table 224 shows all attributes of TapChangerDynamicData.

**Table 224 – Attributes of ExternalInputs::TapChangerDynamicData**

| name                    | type    | description                                                                                                               |
|-------------------------|---------|---------------------------------------------------------------------------------------------------------------------------|
| tapPosition             | Float   | Tap position of the phase shifter, high-side tap position of the transformer, or low-side tap position of the transformer |
| desiredVoltage          | Float   | The desired voltage for the LTC                                                                                           |
| voltageRegulationStatus | Boolean | Indicator if the LTC transformer is regulating<br>True = Yes, False = No                                                  |
| angleRegulationStatus   | Boolean | True means the phase shifter is regulating.                                                                               |
| desiredMW               | Float   | Phase Shifter Desired MW. The active power regulation setpoint of the phase shifter                                       |
| solvedAngle             | Float   | Phase Shifter Angle. The solved phase angle shift of the phase shifter                                                    |
| minimumAngle            | Float   | The minimum phase angle shift of the phase shifter                                                                        |
| maximumAngle            | Float   | The maximum phase angle shift of the phase shifter                                                                        |

Table 225 shows all association ends of TapChangerDynamicData with other classes.

**Table 225 – Association ends of ExternalInputs::TapChangerDynamicData with other classes**

| [mult from] | [mult to] name       | type          | description |
|-------------|----------------------|---------------|-------------|
| [0..*]      | [1..1] MktTapChanger | MktTapChanger |             |

#### 6.5.6.2.53 TerminalConstraintTerm

A constraint term associated with a specific terminal on a physical piece of equipment.

Table 226 shows all attributes of TerminalConstraintTerm.

**Table 226 – Attributes of ExternalInputs::TerminalConstraintTerm**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| factor    | String | inherited from: ConstraintTerm   |
| function  | String | inherited from: ConstraintTerm   |
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 227 shows all association ends of TerminalConstraintTerm with other classes.

**Table 227 – Association ends of ExternalInputs::TerminalConstraintTerm with other classes**

| [mult from] | [mult to] name               | type                  | description                      |
|-------------|------------------------------|-----------------------|----------------------------------|
| [0..*]      | [1..1] MktTerminal           | MktTerminal           |                                  |
| [0..*]      | [1..1] SecurityConstraintSum | SecurityConstraintSum | inherited from: ConstraintTerm   |
| [0..1]      | [0..*] DiagramObjects        | DiagramObject         | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                 | Name                  | inherited from: IdentifiedObject |

#### 6.5.6.2.54 TransferInterface

A Transfer Interface is made up of branches such as transmission lines and transformers.

Table 228 shows all attributes of TransferInterface.

**Table 228 – Attributes of ExternalInputs::TransferInterface**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 229 shows all association ends of TransferInterface with other classes.

**Table 229 – Association ends of ExternalInputs::TransferInterface with other classes**

| [mult from] | [mult to] name                   | type                      | description                      |
|-------------|----------------------------------|---------------------------|----------------------------------|
| [1..1]      | [1..1] TransferInterfaceSolution | TransferInterfaceSolution |                                  |
| [0..*]      | [0..1] HostControlArea           | HostControlArea           |                                  |
| [0..1]      | [0..*] DiagramObjects            | DiagramObject             | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                     | Name                      | inherited from: IdentifiedObject |

**6.5.6.2.55 TransferInterfaceSolution root class**

TNA Interface Definitions from OPF for VSA

Table 230 shows all attributes of TransferInterfaceSolution.

**Table 230 – Attributes of ExternalInputs::TransferInterfaceSolution**

| name            | type  | description                                                                                                                             |
|-----------------|-------|-----------------------------------------------------------------------------------------------------------------------------------------|
| interfaceMargin | Float | The margin for the interface                                                                                                            |
| transferLimit   | Float | Transfer Interface + Limit<br>Attribute Usage: The absolute of the maximum flow on the transfer interface. This is a positive MW value. |
| postTransferMW  | Float | Post Transfer MW for step                                                                                                               |

Table 231 shows all association ends of TransferInterfaceSolution with other classes.

**Table 231 – Association ends of ExternalInputs::TransferInterfaceSolution with other classes**

| [mult from] | [mult to] name           | type              | description |
|-------------|--------------------------|-------------------|-------------|
| [1..1]      | [1..1] TransferInterface | TransferInterface |             |
| [0..1]      | [0..1] MktContingencyA   | MktContingency    |             |
| [0..1]      | [0..1] MktContingencyB   | MktContingency    |             |

**6.5.6.2.56 TransmissionCapacity root class**

This class models the transmission (either a transmission interface or a POR/POD pair) capacity including Total Transfer Capacity (TTC), Operating Transfer Capacity (OTC), and Capacity Benefit Margin (CBM)

Table 232 shows all attributes of TransmissionCapacity.

**Table 232 – Attributes of ExternalInputs::TransmissionCapacity**

| name                  | type  | description                                                                                                                                                                       |
|-----------------------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| capacityBenefitMargin | Float | Capacity Benefit Margin (CBM) is used by Markets to calculate the transmission interface limits. This number could be manually or procedurally determined. The CBM is defined per |

| name                            | type     | description                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 |          | transmission interface (branch group).                                                                                                                                                                                                                                                                                                          |
| operationalTransmissionCapacity | Float    | The Operational Transmission Capacity (OTC) is the transmission capacity under the operating condition during a specific time period, incorporating the effects of derates and current settings of operation controls. The OTCs for all transmission interface (branch group) are always provided regardless of outage or switching conditions. |
| OTC15min_emergency              | Float    | The Operational Transmission Capacity (OTC) 15 minute Emergency Limit                                                                                                                                                                                                                                                                           |
| OTCEmergency                    | Float    | The Operational Transmission Capacity (OTC) Emergency Limit.                                                                                                                                                                                                                                                                                    |
| POD                             | String   | point of delivery                                                                                                                                                                                                                                                                                                                               |
| POR                             | String   | point of receipt                                                                                                                                                                                                                                                                                                                                |
| startOperatingDate              | DateTime | Operating date & hour when the entitlement applies                                                                                                                                                                                                                                                                                              |
| totalTransmissionCapacity       | Float    | Total Transmission Capacity                                                                                                                                                                                                                                                                                                                     |

Table 233 shows all association ends of TransmissionCapacity with other classes.

**Table 233 – Association ends of ExternalInputs::TransmissionCapacity with other classes**

| [mult from] | [mult to] name            | type               | description |
|-------------|---------------------------|--------------------|-------------|
| [0..*]      | [0..1] GenericConstraints | GenericConstraints |             |
| [0..*]      | [0..1] Flowgate           | Flowgate           |             |

#### 6.5.6.2.57 TransmissionInterfaceRightEntitlement root class

This is formally called the branch group ETC/TOR entitlement with the inclusion of CVR as ETC. Is used to represent the entitlements. This could be also used to represent the TR entitlement on a POR/POD.

Table 234 shows all attributes of TransmissionInterfaceRightEntitlement.

**Table 234 – Attributes of ExternalInputs::TransmissionInterfaceRightEntitlement**

| name               | type     | description                                          |
|--------------------|----------|------------------------------------------------------|
| entitlement        | Float    | the entitlement                                      |
| POD                | String   | point of delivery                                    |
| POR                | String   | point of receipt                                     |
| startOperatingDate | DateTime | Operating date and hour when the entitlement applies |

Table 235 shows all association ends of TransmissionInterfaceRightEntitlement with other classes.

**Table 235 – Association ends of ExternalInputs::TransmissionInterfaceRightEntitlement with other classes**

| [mult from] | [mult to] name       | type          | description |
|-------------|----------------------|---------------|-------------|
| [0..*]      | [1..1] ContractRight | ContractRight |             |
| [0..*]      | [0..1] Flowgate      | Flowgate      |             |

#### 6.5.6.2.58 TransmissionPath

An electrical connection, link, or line consisting of one or more parallel transmission elements between two areas of the interconnected electric systems, or portions thereof. TransmissionCorridor and TransmissionRightOfWay refer to legal aspects. The TransmissionPath refers to the segments between a TransmissionProvider's ServicePoints.

Table 236 shows all attributes of TransmissionPath.

**Table 236 – Attributes of ExternalInputs::TransmissionPath**

| name                    | type        | description                                                                                         |
|-------------------------|-------------|-----------------------------------------------------------------------------------------------------|
| availTransferCapability | ActivePower | The available transmission capability of a transmission path for the reference direction.           |
| parallelPathFlag        | Boolean     | Flag which indicates if the transmission path is also a designated interconnection "parallel path". |
| totalTransferCapability | ActivePower | The total transmission capability of a transmission path in the reference direction.                |
| aliasName               | String      | inherited from: IdentifiedObject                                                                    |
| mRID                    | String      | inherited from: IdentifiedObject                                                                    |
| name                    | String      | inherited from: IdentifiedObject                                                                    |

Table 237 shows all association ends of TransmissionPath with other classes.

**Table 237 – Association ends of ExternalInputs::TransmissionPath with other classes**

| [mult from] | [mult to] name                 | type                    | description                                                 |
|-------------|--------------------------------|-------------------------|-------------------------------------------------------------|
| [1..1]      | [0..*] TransmissionReservation | TransmissionReservation |                                                             |
| [0..*]      | [1..1] PointOfReceipt          | ServicePoint            | A transmission path has a "point-of-receipt" service point  |
| [0..*]      | [1..1] DeliveryPoint           | ServicePoint            | A transmission path has a "point-of-delivery" service point |
| [0..1]      | [0..*] DiagramObjects          | DiagramObject           | inherited from: IdentifiedObject                            |
| [1..1]      | [0..*] Names                   | Name                    | inherited from: IdentifiedObject                            |

#### 6.5.6.2.59 TransmissionReservation root class

A transmission reservation is obtained from the OASIS system to reserve transmission for a specified time period, transmission path and transmission product.

Table 238 shows all association ends of TransmissionReservation with other classes.



**Table 238 – Association ends of ExternalInputs::TransmissionReservation with other classes**

| [mult from] | [mult to] name           | type              | description |
|-------------|--------------------------|-------------------|-------------|
| [0..1]      | [0..1] EnergyTransaction | EnergyTransaction |             |
| [0..1]      | [0..1] TransactionBid    | TransactionBid    |             |
| [0..*]      | [0..1] Source            | ServicePoint      |             |
| [0..*]      | [0..1] Sink              | ServicePoint      |             |
| [0..*]      | [1..1] TransmissionPath  | TransmissionPath  |             |

#### 6.5.6.2.60 TREntitlement root class

A Transmission Right(TR) can be a chain of TR's or on individual.

When a transmission right is not a chain, this is formally the ETC/TOR Entitlement for each ETC/TOR contract with the inclusion of CVR(Converted Rights) as an ETC. This is the sum of all entitlements on all related transmission interfaces for the same TR.

When TR is a chain, its entitlement is the minimum of all entitlements for the individual TRs in the chain.

Table 239 shows all attributes of TREntitlement.

**Table 239 – Attributes of ExternalInputs::TREntitlement**

| name               | type     | description                                          |
|--------------------|----------|------------------------------------------------------|
| entitlement        | Float    | The entitlement                                      |
| startOperatingDate | DateTime | Operating date and hour when the entitlement applies |

Table 240 shows all association ends of TREntitlement with other classes.

**Table 240 – Association ends of ExternalInputs::TREntitlement with other classes**

| [mult from] | [mult to] name                   | type          | description |
|-------------|----------------------------------|---------------|-------------|
| [0..*]      | [1..1] TransmissionContractRight | ContractRight |             |

#### 6.5.6.2.61 UnitInitialConditions

Resource status at the end of a given clearing period.

Table 241 shows all attributes of UnitInitialConditions.

**Table 241 – Attributes of ExternalInputs::UnitInitialConditions**

| name             | type        | description                                                                                                                                            |
|------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| cumEnergy        | RealEnergy  | Cumulative energy production over trading period.                                                                                                      |
| cumStatusChanges | Integer     | Cumulative number of status changes of the resource.                                                                                                   |
| numberOfStartups | Integer     | Number of start ups in the Operating Day until the end of previous hour.                                                                               |
| onlineStatus     | Boolean     | 'true' if the GeneratingUnit is currently On-Line                                                                                                      |
| resourceMW       | ActivePower | Resource MW output at the end of previous clearing period.                                                                                             |
| resourceStatus   | Integer     | Resource status at the end of previous clearing period:<br>0 – off-line<br>1 – on-line production<br>2 – in shutdown process<br>3 – in startup process |
| statusDate       | DateTime    | Time and date for resourceStatus                                                                                                                       |
| timeInStatus     | Float       | Time in market trading intervals the resource is in the state as of the end of the previous clearing period.                                           |
| timeInterval     | DateTime    | Time interval                                                                                                                                          |
| aliasName        | String      | inherited from: IdentifiedObject                                                                                                                       |
| mRID             | String      | inherited from: IdentifiedObject                                                                                                                       |
| name             | String      | inherited from: IdentifiedObject                                                                                                                       |

Table 242 shows all association ends of UnitInitialConditions with other classes.

**Table 242 – Association ends of ExternalInputs::UnitInitialConditions with other classes**

| [mult from] | [mult to] name        | type                | description                      |
|-------------|-----------------------|---------------------|----------------------------------|
| [0..*]      | [0..1] GeneratingUnit | RegisteredGenerator |                                  |
| [0..1]      | [0..*] DiagramObjects | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name                | inherited from: IdentifiedObject |

### 6.5.6.3 Package MarketResults

#### 6.5.6.3.1 General

Results from the execution of a market.

Figure 34 shows class diagram Instructions.

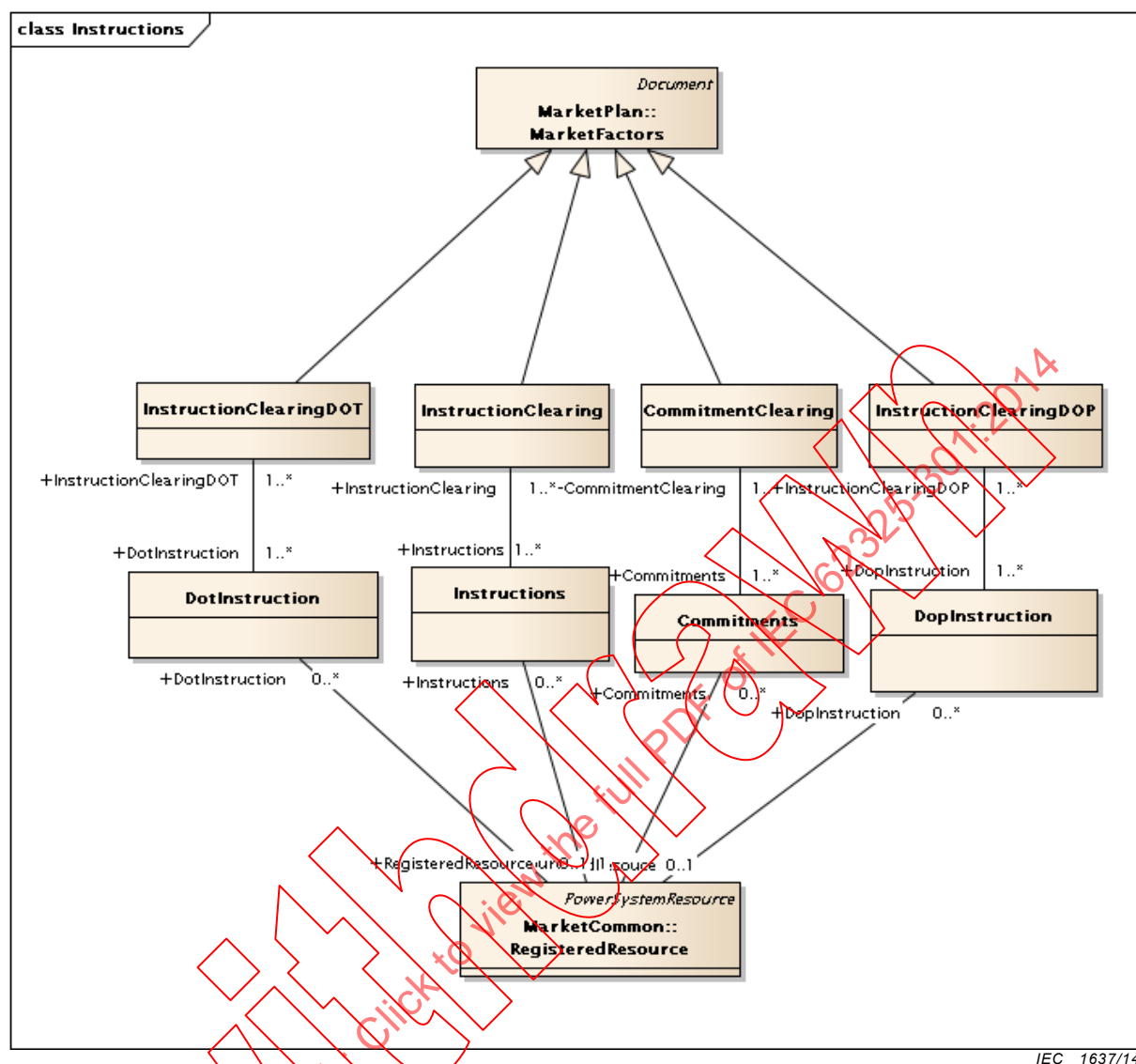


Figure 34 – Class diagram MarketResults::Instructions

This figure shows the classes used to model the instructions sent to market participants following a market clearing. The major classes and relationships include the RegisteredResource class that models the participating resource, the Commitment and CommitmentClearing classes which model results which calls for commitment of resource. The DotInstruction and DopInstruction allow the modeling of the results of a dynamic (or lookahead) dispatch that may be used in the real time market.

Figure 35 shows class diagram MarketClearing.

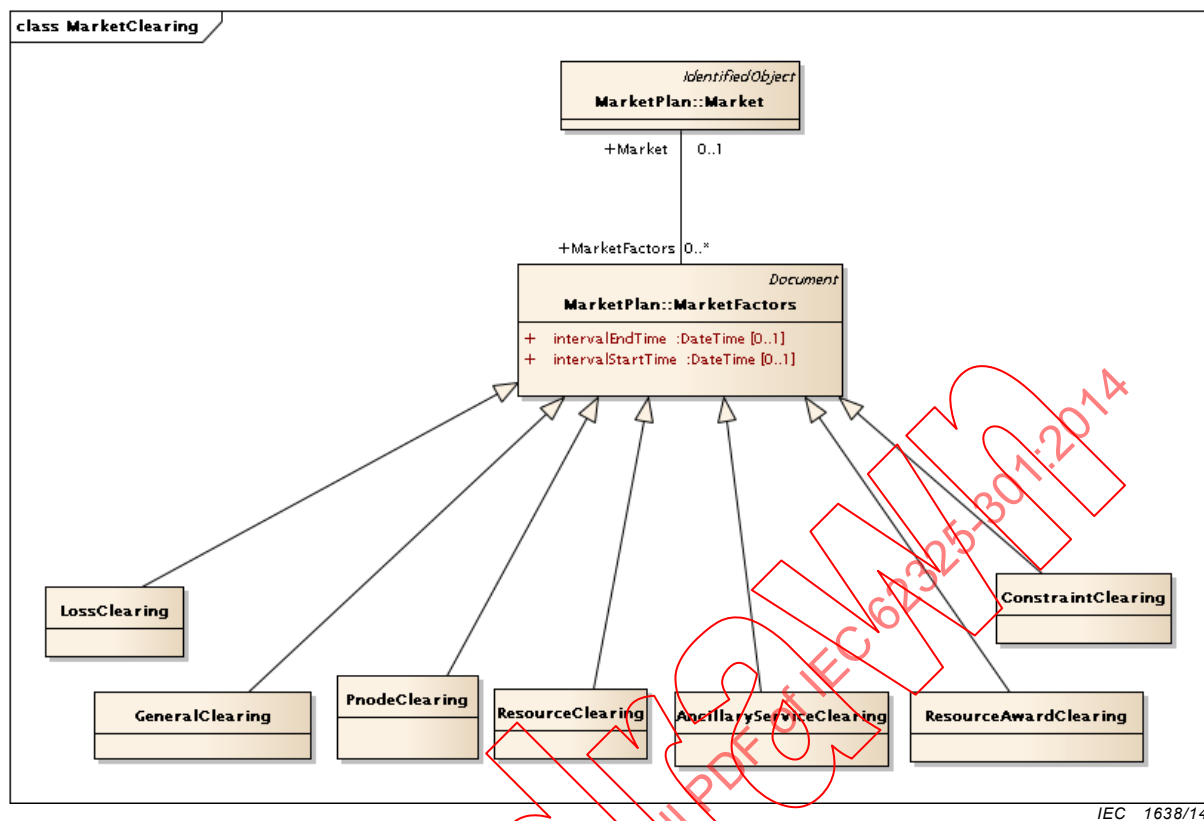
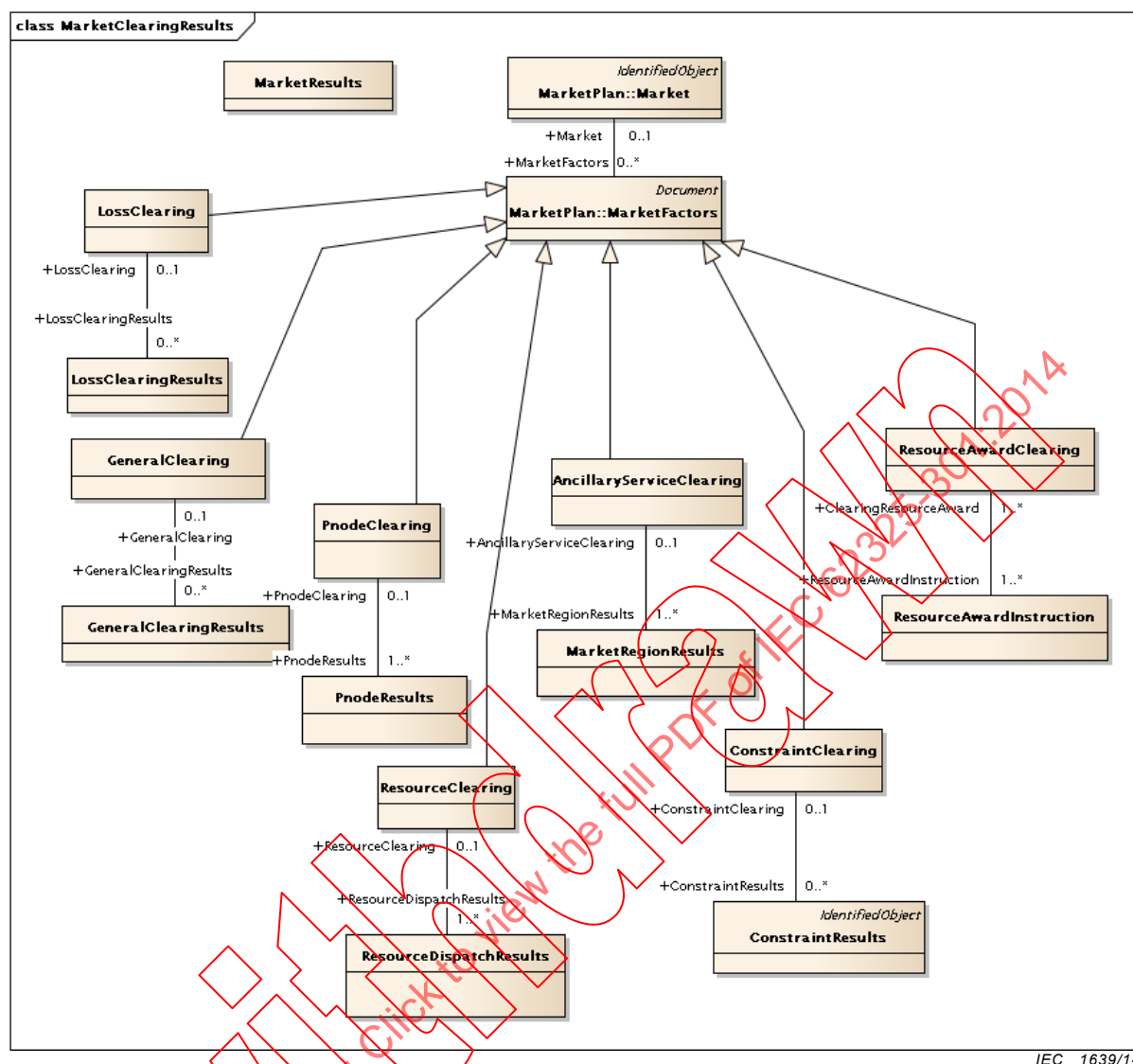


**Figure 35 – Class diagram MarketResults::MarketClearing**

Each of the defined market clearing classes inherit from the MarketFactors class to allow definition of the market time intervals and the execution type within the market.

Figure 36 shows class diagram MarketClearingResults.

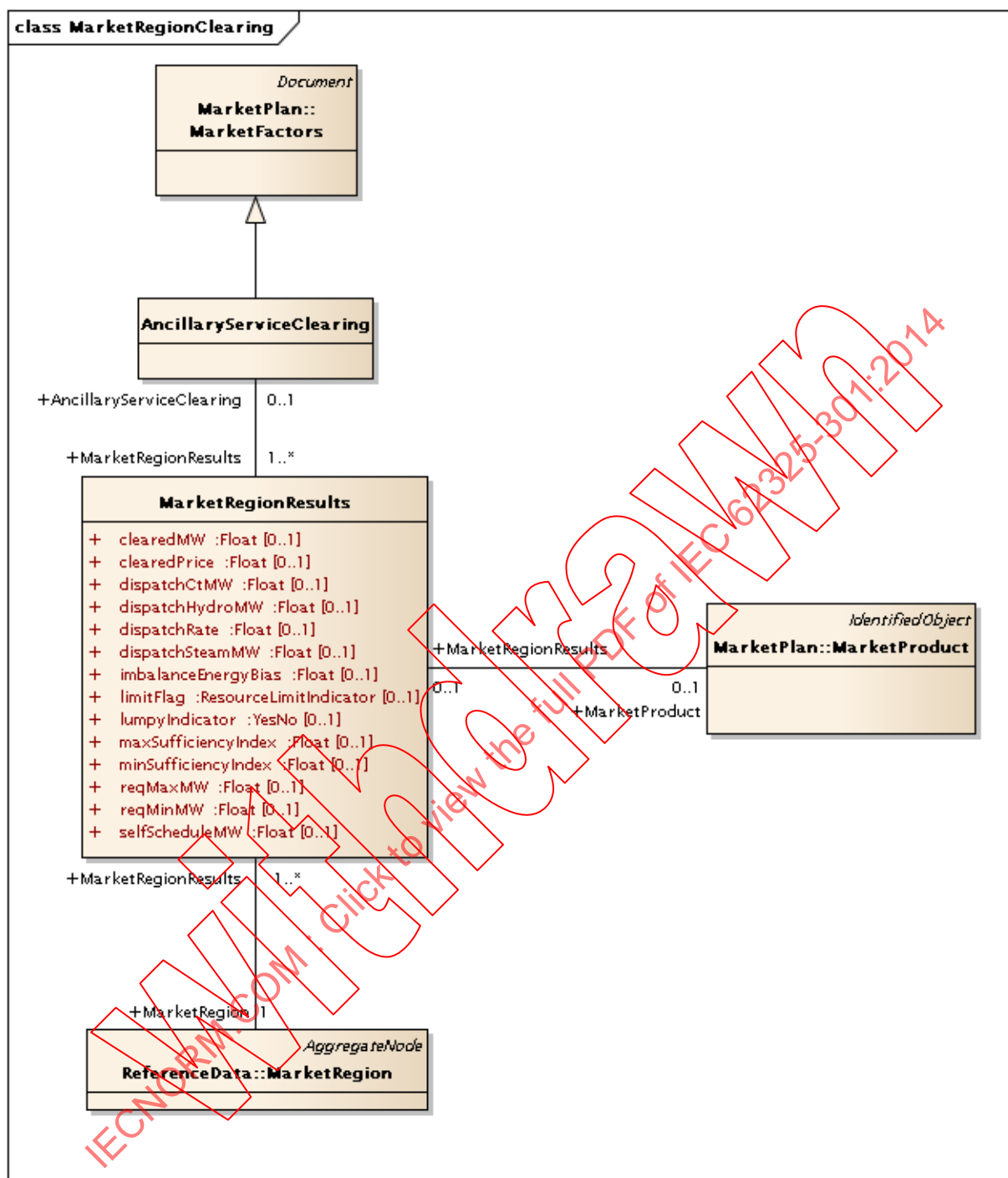


IEC 1639/14

**Figure 36 – Class diagram MarketResults::MarketClearingResults**

This figure shows the classes and relationships used to model the results of the market clearing at an overview level. The Market Results class summarizes the market run. The LossClearingResults Class summarizes losses. The GeneralClearingResults is used to model the cleared load on a load zone basis. The PnodeClearing and PnodeClearingResults classes are used to model the locational marginal prices (LMPs) at the level of individual pricing nodes. The ResourceClearing and ResourceDispatchInstruction classes includes the dispatch instructions and indicator of a normal case or contingency case dispatch. The AncillaryServiceClearing class includes information on ancillary services. The ConstraintResults class contains the constraints that are binding and their associated shadow costs. The ResourceAwardInstruction includes Active Power awards and LMP information.

Figure 37 shows class diagram MarketRegionClearing.

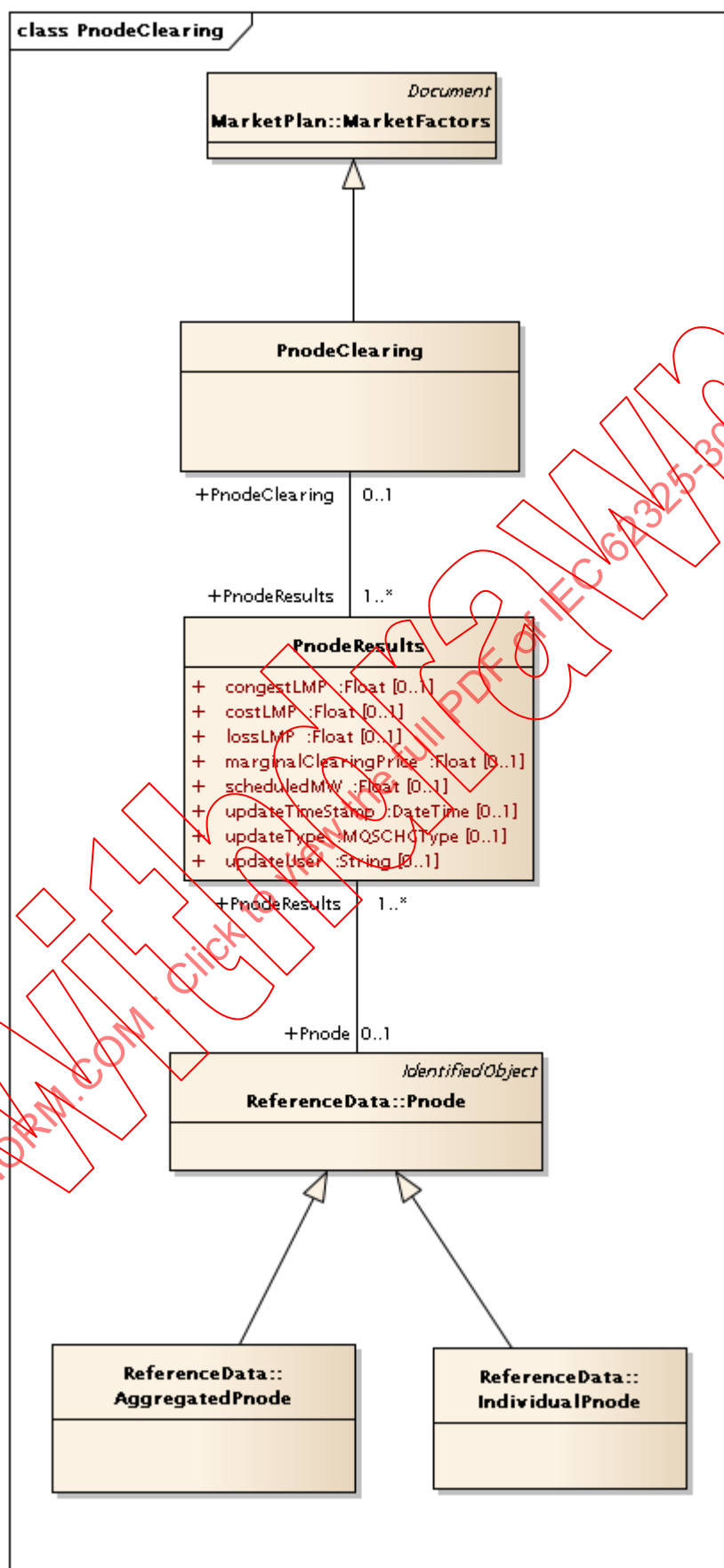


IEC 1640/14

**Figure 37 – Class diagram MarketResults::MarketRegionClearing**

This figure shows the classes and relationships used to model the results of the market clearing of ancillary services at the level of a region of the market. The model includes results at the level of specific ancillary service products by means of the class MarketProduct and association to MarketRegionResults.

Figure 38 shows class diagram PnodeClearing.



IEC 1641/14

Figure 38 – Class diagram MarketResults::PnodeClearing

This figure shows the classes and relationships used to model the results of the market clearing at the level of the pricing nodes. The locational marginal prices (LMPs) and their components: energy, congestion and losses are shown for each pricing node. Modeling of results at the levels of aggregated Pnodes and Individual Pnodes is supported by the classes AggregatedPnode and IndividualPnode.

Figure 39 shows class diagram ResourceAwardsClearing.

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Withdrawing



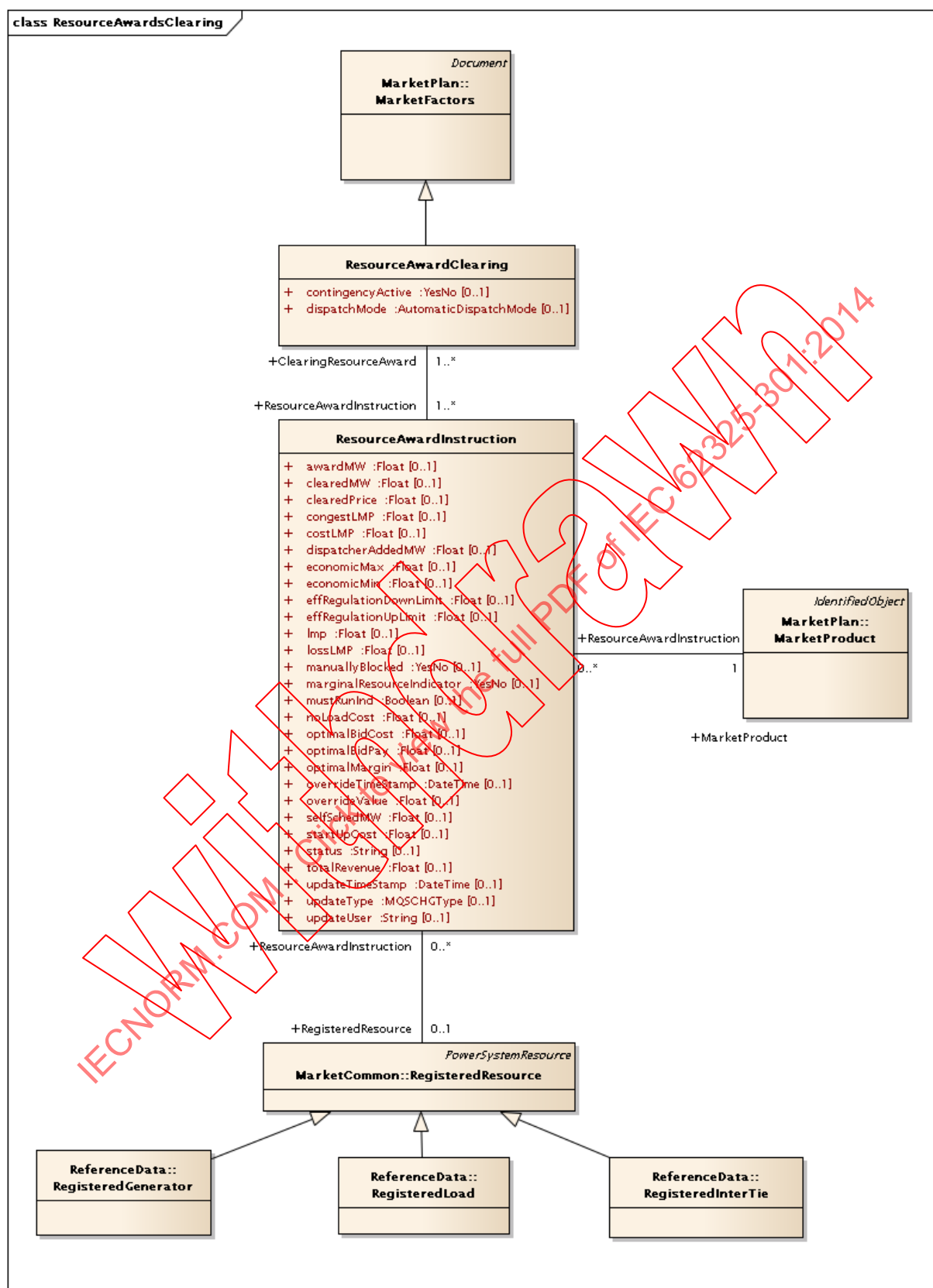


Figure 39 – Class diagram MarketResults::ResourceAwardsClearing

This figure shows the classes and relationships used to model the results of the market clearing with more emphasis on the ResourceAwardInstruction. The main class of this diagram is the ResourceAwardInstruction which models the details of the award to the

resource including the active power, the locational marginal price (LMP) and along with its energy, congestion and cost components. the resource model includes RegisteredGenerator, RegisteredLoad and RegisteredInterTie as subclasses.

Figure 40 shows class diagram TransactionBidClearing.

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Withdrawing

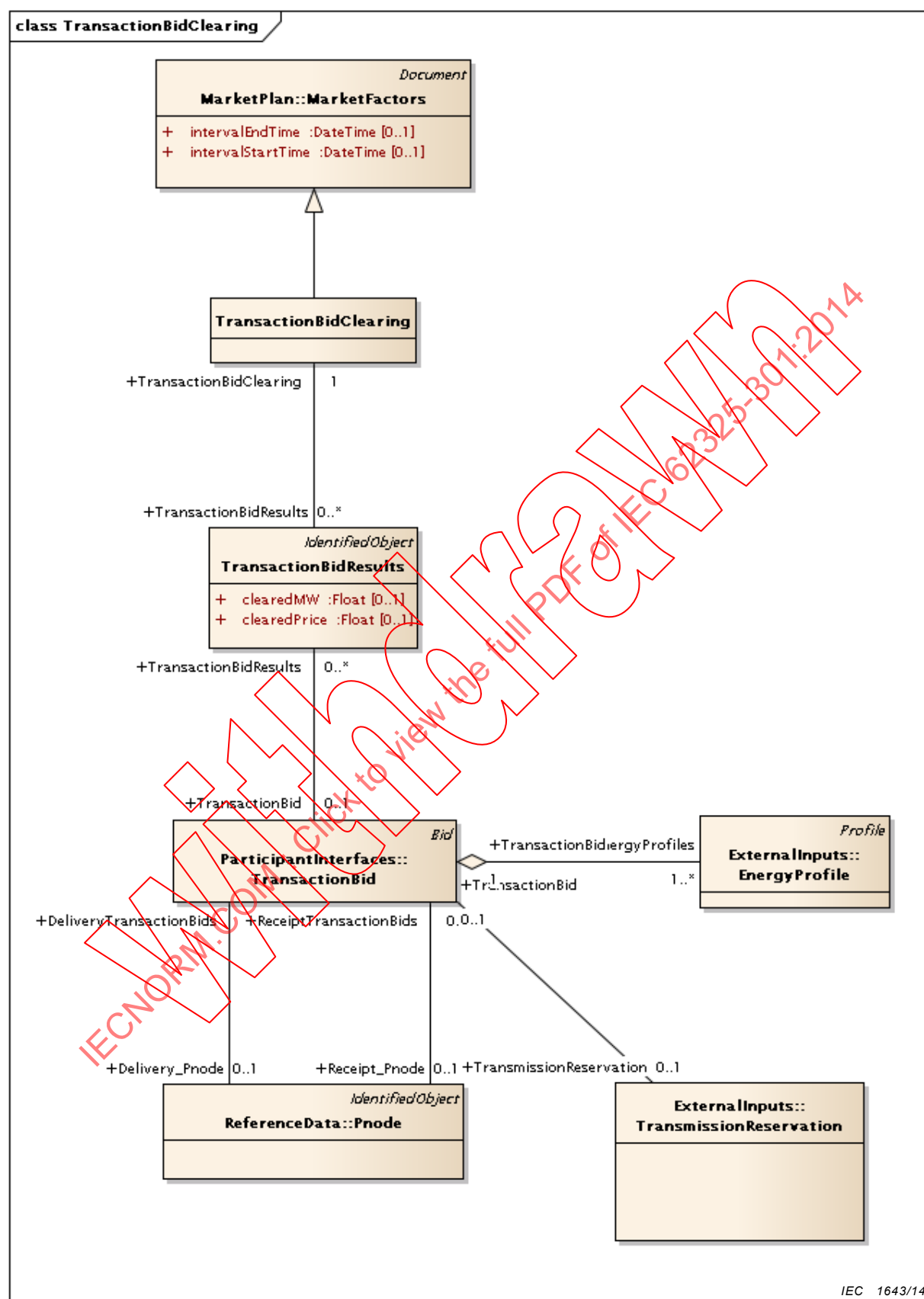


**Figure 40 – Class diagram MarketResults::TransactionBidClearing**

This figure shows the classes and relationships used to model the results of the market clearing with more emphasis on Transaction Results. The model includes TransactionBid class and its relationship to Point of Delivery and Point of Receipt Pnodes.

### 6.5.6.3.2 AncillaryServiceClearing

Model of results of market clearing with respect to Ancillary Service products

Table 243 shows all attributes of AncillaryServiceClearing.

**Table 243 – Attributes of MarketResults::AncillaryServiceClearing**

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| intervalEndTime      | DateTime          | inherited from: MarketFactors    |
| intervalStartTime    | DateTime          | inherited from: MarketFactors    |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 244 shows all association ends of AncillaryServiceClearing with other classes.

**Table 244 – Association ends of MarketResults::AncillaryServiceClearing with other classes**

| [mult from] | [mult to] name             | type                | description                      |
|-------------|----------------------------|---------------------|----------------------------------|
| [0..1]      | [1..*] MarketRegionResults | MarketRegionResults |                                  |
| [0..*]      | [0..*] MktActivityRecord   | MktActivityRecord   | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market              | Market              | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent  | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject |

### 6.5.6.3.3 BillDeterminant

Model various charges to support billing and settlement of

Table 245 shows all attributes of BillDeterminant.

**Table 245 – Attributes of MarketResults::BillDeterminant**

| name                 | type              | description                                                                             |
|----------------------|-------------------|-----------------------------------------------------------------------------------------|
| calculationLevel     | String            | Level in charge calculation order.                                                      |
| configVersion        | String            | The version of configuration of calculation logic in the settlement.                    |
| deleteStatus         | String            |                                                                                         |
| effectiveDate        | DateTime          |                                                                                         |
| exception            | String            |                                                                                         |
| factor               | String            |                                                                                         |
| frequency            | String            |                                                                                         |
| numberInterval       | Integer           | Number of intervals of bill determinant in trade day, eg 300 for five minute intervals. |
| offset               | String            |                                                                                         |
| precisionLevel       | String            | The level of precision in the current value.                                            |
| primaryYN            | String            |                                                                                         |
| referenceFlag        | String            |                                                                                         |
| reportable           | String            |                                                                                         |
| roundOff             | String            |                                                                                         |
| source               | String            |                                                                                         |
| terminationDate      | DateTime          |                                                                                         |
| unitOfMeasure        | String            | The UOM for the current value of the Bill Determinant.                                  |
| type                 | String            | inherited from: Document                                                                |
| createdDateTime      | DateTime          | inherited from: Document                                                                |
| lastModifiedDateTime | DateTime          | inherited from: Document                                                                |
| revisionNumber       | String            | inherited from: Document                                                                |
| electronicAddress    | ElectronicAddress | inherited from: Document                                                                |
| subject              | String            | inherited from: Document                                                                |
| title                | String            | inherited from: Document                                                                |
| docStatus            | Status            | inherited from: Document                                                                |
| status               | Status            | inherited from: Document                                                                |
| aliasName            | String            | inherited from: IdentifiedObject                                                        |
| mRID                 | String            | inherited from: IdentifiedObject                                                        |
| name                 | String            | inherited from: IdentifiedObject                                                        |

Table 246 shows all association ends of BillDeterminant with other classes.

**Table 246 – Association ends of MarketResults::BillDeterminant with other classes**

| [mult from] | [mult to] name           | type              | description                                                                                                |
|-------------|--------------------------|-------------------|------------------------------------------------------------------------------------------------------------|
| [0..*]      | [0..*] MktUserAttribute  | MktUserAttribute  |                                                                                                            |
| [0..1]      | [0..*] ChargeProfileData | ChargeProfileData |                                                                                                            |
| [0..*]      | [0..*] ChargeComponents  | ChargeComponent   | A BillDeterminant can have 0-n ChargeComponent and a ChargeComponent can associate to 0-n BillDeterminant. |

| [mult from] | [mult to] name             | type               | description                      |
|-------------|----------------------------|--------------------|----------------------------------|
| [0..1]      | [0..1] ChargeProfile       | ChargeProfile      |                                  |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name               | inherited from: IdentifiedObject |

#### 6.5.6.3.4 ChargeProfile

A type of profile for financial charges

Table 247 shows all attributes of ChargeProfile.

**Table 247 – Attributes of MarketResults::ChargeProfile**

| name           | type    | description                                                             |
|----------------|---------|-------------------------------------------------------------------------|
| type           | String  | The type of profile. It could be amount, price, or quantity.            |
| frequency      | String  | The calculation frequency, daily or monthly.                            |
| numberInterval | Integer | The number of intervals in the profile data.                            |
| unitOfMeasure  | String  | The unit of measure applied to the value attribute of the profile data. |
| aliasName      | String  | inherited from: IdentifiedObject                                        |
| mRID           | String  | inherited from: IdentifiedObject                                        |
| name           | String  | inherited from: IdentifiedObject                                        |

Table 248 shows all association ends of ChargeProfile with other classes.

**Table 248 – Association ends of MarketResults::ChargeProfile with other classes**

| [mult from] | [mult to] name           | type              | description                      |
|-------------|--------------------------|-------------------|----------------------------------|
| [0..1]      | [0..1] BillDeterminant   | BillDeterminant   |                                  |
| [0..1]      | [0..*] ChargeProfileData | ChargeProfileData |                                  |
| [0..*]      | [0..1] PassThroughBill   | PassThroughBill   |                                  |
| [0..*]      | [0..1] Bid               | Bid               |                                  |
| [0..*]      | [0..*] ProfileDatas      | ProfileData       | inherited from: Profile          |
| [0..1]      | [0..*] DiagramObjects    | DiagramObject     | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names             | Name              | inherited from: IdentifiedObject |

#### 6.5.6.3.5 ChargeProfileData root class

Model of various charges associated with an energy profile to support billing and settlement

Table 249 shows all attributes of ChargeProfileData.

**Table 249 – Attributes of MarketResults::ChargeProfileData**

| name      | type     | description                                                                                     |
|-----------|----------|-------------------------------------------------------------------------------------------------|
| sequence  | Integer  | The sequence number of the profile.                                                             |
| timeStamp | DateTime | The date and time of an interval.                                                               |
| value     | Float    | The value of an interval given a profile type (amount, price, or quantity), subject to the UOM. |

Table 250 shows all association ends of ChargeProfileData with other classes.

**Table 250 – Association ends of MarketResults::ChargeProfileData with other classes**

| [mult from] | [mult to] name         | type            | description |
|-------------|------------------------|-----------------|-------------|
| [0..*]      | [0..1] BillDeterminant | BillDeterminant |             |
| [0..*]      | [0..1] ChargeProfile   | ChargeProfile   |             |

#### 6.5.6.3.6 CommitmentClearing

Models results of market clearing which call for commitment of units.

Table 251 shows all attributes of CommitmentClearing.

**Table 251 – Attributes of MarketResults::CommitmentClearing**

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| intervalEndTime      | DateTime          | inherited from: MarketFactors    |
| intervalStartTime    | DateTime          | inherited from: MarketFactors    |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 252 shows all association ends of CommitmentClearing with other classes.

**Table 252 – Association ends of MarketResults::CommitmentClearing with other classes**

| [mult from] | [mult to] name             | type               | description                      |
|-------------|----------------------------|--------------------|----------------------------------|
| [1..*]      | [1..*] Commitments         | Commitments        |                                  |
| [0..*]      | [0..*] MktActivityRecord   | MktActivityRecord  | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market              | Market             | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name               | inherited from: IdentifiedObject |

#### 6.5.6.3.7 Commitments root class

Provides the necessary information (on a resource basis) to capture the Startup/Shutdown commitment results. This information is relevant to all markets.

Table 253 shows all attributes of Commitments.

**Table 253 – Attributes of MarketResults::Commitments**

| name                | type                                | description                                                                                                                                                                                                         |
|---------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| commitmentType      | CommitmentType                      | the type of UC status (self commitment, ISO commitment, or SCUC commitment)                                                                                                                                         |
| instructionCost     | Float                               | Total cost associated with changing the status of the resource.                                                                                                                                                     |
| instructionType     | AutomaticDisplnstTypeCo<br>mmitment | Indicator of either a Start-Up or a Shut-Down.                                                                                                                                                                      |
| intervalEndTime     | DateTime                            | End time for the commitment period. This will be on an interval boundary.                                                                                                                                           |
| intervalStartTime   | DateTime                            | Start time for the commitment period. This will be on an interval boundary.                                                                                                                                         |
| minStatusChangeTime | Integer                             | SCUC commitment period start-up time.<br>Calculated start up time based on the StartUpTimeCurve provided with the Bid.<br><br>This is a combination of StartUp time bid and Unit down time.<br><br>Units is minutes |
| noLoadCost          | Float                               | Unit no load cost in case of energy commodity                                                                                                                                                                       |
| updateTimeStamp     | DateTime                            |                                                                                                                                                                                                                     |
| updateType          | MQSCHGType                          |                                                                                                                                                                                                                     |
| updateUser          | String                              |                                                                                                                                                                                                                     |

Table 254 shows all association ends of Commitments with other classes.

**Table 254 – Association ends of MarketResults::Commitments with other classes**

| [mult from] | [mult to] name            | type               | description |
|-------------|---------------------------|--------------------|-------------|
| [0..*]      | [1..1] RegisteredResource | RegisteredResource |             |
| [1..*]      | [1..*] CommitmentClearing | CommitmentClearing |             |



### 6.5.6.3.8 ConstraintClearing

Groups all items associated with Binding Constraints and Constraint Violations per interval and market.

Table 255 shows all attributes of ConstraintClearing.

**Table 255 – Attributes of MarketResults::ConstraintClearing**

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| intervalEndTime      | DateTime          | inherited from: MarketFactors    |
| intervalStartTime    | DateTime          | inherited from: MarketFactors    |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 256 shows all association ends of ConstraintClearing with other classes.

**Table 256 – Association ends of MarketResults::ConstraintClearing with other classes**

| [mult from] | [mult to] name             | type               | description                      |
|-------------|----------------------------|--------------------|----------------------------------|
| [0..1]      | [0..*] ConstraintResults   | ConstraintResults  |                                  |
| [0..*]      | [0..*] MktActivityRecord   | MktActivityRecord  | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market              | Market             | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name               | inherited from: IdentifiedObject |

### 6.5.6.3.9 ConstraintResults

Provides the Market results for the constraint processing for either the DAM or RTM. The data includes the constraint type (binding or violated), the solved value for the constraint, and the associated shadow price.

Table 257 shows all attributes of ConstraintResults.

**Table 257 – Attributes of MarketResults::ConstraintResults**

| name                      | type                  | description                                                                                                                                                           |
|---------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| baseFlow                  | Float                 | Branch base Power Flow.                                                                                                                                               |
| BGLimit                   | Float                 | This value is determined in DA and RTM. The SCUC optimization ensures that the MW flow on the Branch Group will not exceed this limit in the relevant direction.      |
| BGTRResCap                | Float                 | Branch Group TR Reservation Capacity – This value is determined in DA and RTM. It is the amount of spare transmission capacity that is left for the TR holder to use. |
| bindingLimit              | Float                 | MW Limit.                                                                                                                                                             |
| clearedValue              | Float                 | Cleared MW.                                                                                                                                                           |
| competitivePathConstraint | YesNo                 | Non-competitive path constraint Flag" (Y/N) indicating whether the shadow price on a non-competitive path was non-zero.                                               |
| constraintType            | ResultsConstraintType | Type of constraint.                                                                                                                                                   |
| limitFlag                 | ConstraintLimitType   | Limit flag ('Maximum', 'Minimum').                                                                                                                                    |
| optimizationFlag          | YesNo                 | Included in optimization Y/N.                                                                                                                                         |
| overloadMW                | Float                 | Transmission overload MW.                                                                                                                                             |
| percentMW                 | Float                 | Actual MW flow as percent of limit.                                                                                                                                   |
| shadowPrice               | Float                 | Shadow Price (\$/MW) for the commodity. Shadow price for the corresponding constraint.                                                                                |
| updateTimeStamp           | DateTime              | Update time stamp.                                                                                                                                                    |
| updateType                | MQSCHGType            | MQS change type.                                                                                                                                                      |
| updateUser                | String                | Updated user.                                                                                                                                                         |
| aliasName                 | String                | inherited from: IdentifiedObject                                                                                                                                      |
| mRID                      | String                | inherited from: IdentifiedObject                                                                                                                                      |
| name                      | String                | inherited from: IdentifiedObject                                                                                                                                      |

Table 258 shows all association ends of ConstraintResults with other classes.

**Table 258 – Association ends of MarketResults::ConstraintResults with other classes**

| [mult from] | [mult to] name            | type               | description                      |
|-------------|---------------------------|--------------------|----------------------------------|
| [0..*]      | [1..1] MktContingency     | MktContingency     |                                  |
| [0..*]      | [0..1] ConstraintClearing | ConstraintClearing |                                  |
| [1..*]      | [1..1] Flowgate           | Flowgate           |                                  |
| [0..1]      | [0..*] DiagramObjects     | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names              | Name               | inherited from: IdentifiedObject |

#### 6.5.6.3.10 DopInstruction root class

Provides the necessary information (on a resource basis) to capture the Dispatch Operating Point (DOP) results on a Dispatch interval. This information is only relevant to the RT interval market.

Table 259 shows all attributes of DopInstruction.

**Table 259 – Attributes of MarketResults::DopInstruction**

| name            | type        | description                                                                                                                                                                                                                                              |
|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| mwDOP           | ActivePower | Dispatched Operating Point (MW)                                                                                                                                                                                                                          |
| timestampDOP    | DateTime    | DOP time stamp                                                                                                                                                                                                                                           |
| plotPriority    | Integer     | A value used to establish priority of the DOP when plotting. This is only applicable when two DOPs exist for the same time, but with different MW values. E.g. when indicating a step in the curve. Its used to determine if the curve steps up or down. |
| runIndicatorDOP | YesNo       | Indication of DOP validity.<br><br>Shows the DOP is calculated from the latest run (YES). A NO indicator shows that the DOP is copied from a previous execution.<br><br>Up to 2 intervals can be missed.                                                 |
| updateUser      | String      |                                                                                                                                                                                                                                                          |
| updateTimeStamp | DateTime    |                                                                                                                                                                                                                                                          |
| updateType      | MQSCHGType  |                                                                                                                                                                                                                                                          |

Table 260 shows all association ends of DopInstruction with other classes.

**Table 260 – Association ends of MarketResults::DopInstruction with other classes**

| [mult from] | [mult to] name                | type                   | description |
|-------------|-------------------------------|------------------------|-------------|
| [0..*]      | [0..1] RegisteredResource     | RegisteredResource     |             |
| [1..*]      | [1..*] InstructionClearingDOP | InstructionClearingDOP |             |

#### 6.5.6.3.11 DotInstruction root class

Provides the necessary information (on a resource basis) to capture the Dispatch Operating Target (DOT) results on a Dispatch interval. This information is only relevant to the RT interval market.

Table 261 shows all attributes of DotInstruction.

**Table 261 – Attributes of MarketResults::DotInstruction**

| name                | type  | description                                                                                                                                                                         |
|---------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| actualRampRate      | Float | Actual ramp rate.                                                                                                                                                                   |
| compliantIndicator  | YesNo | Flag indicating whether or not the resource was in compliance with the instruction (plus/minus 10%).<br><br>Directs if a unit is allowed to set the price (ex-post pricing).        |
| DOT                 | Float | Dispatch operating target value.                                                                                                                                                    |
| economicMaxOverride | Float | Economic Max Limit override for unit, this value is null, if it is not, this value overrides the Energy column value.<br><br>Allows dispatcher to override the unit's energy value. |
| expectedEnergy      | Float | Expected energy.                                                                                                                                                                    |

| name                       | type     | description                                                                                                                                              |
|----------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| generatorPerformanceDegree | Float    | The Degree of Generator Performance (DGP) used for the unit. Measure of how a generator responds to raise /lower signals. Calculated every five minutes. |
| hourAheadSchedEnergy       | Float    | HASP results.                                                                                                                                            |
| hourlySchedule             | Float    | Hourly Schedule (DA Energy Schedule).                                                                                                                    |
| instructionTime            | DateTime | The date/time for the instruction.                                                                                                                       |
| maximumEmergencyInd        | Boolean  | True if maximum emergency limit activated; false otherwise. If unit is requested to move up to its max emergency limit., this flag is set to true.       |
| meterLoadFollowing         | Float    | Meter Sub System Load Following.                                                                                                                         |
| nonRampRestrictedMW        | Float    | Desired MW that is not ramp restricted. If no ramp rate limit existed for the unit, this is the MW value that the unit was requested to move to.         |
| nonSpinReserve             | Float    | Non Spin Reserve used to procure energy.                                                                                                                 |
| previousDOTTimeStamp       | DateTime | Timestamp when the previous DOT value was issued.                                                                                                        |
| rampRateLimit              | Float    | The ramp rate limit for the unit in MWs per minute. Participant bidding data.                                                                            |
| regulationStatus           | YesNo    | Regulation Status (Yes/No).                                                                                                                              |
| spinReserve                | Float    | Spin Reserve used to procure energy.                                                                                                                     |
| standardRampEnergy         | Float    | Standard ramping energy (MWH).                                                                                                                           |
| supplementalEnergy         | Float    | Supplemental Energy procure by Real Time Dispatch.                                                                                                       |
| unitStatus                 | Integer  | Output results from the case identifying the reason the unit was committed by the software.                                                              |

Table 262 shows all association ends of DotInstruction with other classes.

**Table 262 – Association ends of MarketResults::DotInstruction with other classes**

| [mult from] | [mult to] name                | type                   | description |
|-------------|-------------------------------|------------------------|-------------|
| [0..*]      | [0..1] RegisteredResource     | RegisteredResource     |             |
| [1..*]      | [1..*] InstructionClearingDOT | InstructionClearingDOT |             |

#### 6.5.6.3.12 ExPostLoss

Model of ex-post calculation of MW losses.

Table 263 shows all attributes of ExPostLoss.

**Table 263 – Attributes of MarketResults::ExPostLoss**

| name              | type     | description                   |
|-------------------|----------|-------------------------------|
| intervalEndTime   | DateTime | inherited from: MarketFactors |
| intervalStartTime | DateTime | inherited from: MarketFactors |
| type              | String   | inherited from: Document      |
| createdDateTime   | DateTime | inherited from: Document      |

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 264 shows all association ends of ExPostLoss with other classes.

**Table 264 – Association ends of MarketResults::ExPostLoss with other classes**

| [mult from] | [mult to] name             | type               | description                      |
|-------------|----------------------------|--------------------|----------------------------------|
| [1..1]      | [0..*] ExPostLossResults   | ExPostLossResults  |                                  |
| [0..*]      | [0..*] MktActivityRecord   | MktActivityRecord  | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market              | Market             | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name               | inherited from: IdentifiedObject |

#### 6.5.6.3.13 ExPostLossResults root class

Model results of ex-post calculation of MW losses. Summarizes loss in two categories losses on the the extra high voltage transmission and total losses. Calculated for each subcontrol area.

Table 265 shows all attributes of ExPostLossResults.

**Table 265 – Attributes of MarketResults::ExPostLossResults**

| name        | type  | description                                                                                     |
|-------------|-------|-------------------------------------------------------------------------------------------------|
| totalLossMW | Float | Total MW losses in the company<br>Attribute Usage: Information purposes – Output of LPA engine. |
| ehvLossMW   | Float | EHV MW losses in the company<br>Attribute Usage: Information purposes – Output of LPA engine.   |

Table 266 shows all association ends of ExPostLossResults with other classes.

**Table 266 – Association ends of MarketResults::ExPostLossResults with other classes**

| [mult from] | [mult to] name        | type           | description |
|-------------|-----------------------|----------------|-------------|
| [0..*]      | [1..1] ExPostLoss     | ExPostLoss     |             |
| [0..*]      | [0..1] SubControlArea | SubControlArea |             |

**6.5.6.3.14 ExPostMarketRegion**

Model of ex-post calculation of cleared MW on a regional basis

Table 267 shows all attributes of ExPostMarketRegion.

**Table 267 – Attributes of MarketResults::ExPostMarketRegion**

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| intervalEndTime      | DateTime          | inherited from: MarketFactors    |
| intervalStartTime    | DateTime          | inherited from: MarketFactors    |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 268 shows all association ends of ExPostMarketRegion with other classes.

**Table 268 – Association ends of MarketResults::ExPostMarketRegion with other classes**

| [mult from] | [mult to] name                   | type                      | description                      |
|-------------|----------------------------------|---------------------------|----------------------------------|
| [1..1]      | [0..1] ExPostMarketRegionResults | ExPostMarketRegionResults |                                  |
| [0..*]      | [0..*] MktActivityRecord         | MktActivityRecord         | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market                    | Market                    | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents       | ConfigurationEvent        | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects            | DiagramObject             | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                     | Name                      | inherited from: IdentifiedObject |

### 6.5.6.3.15 ExPostMarketRegionResults root class

Model of expost calculation of cleared MW on a region basis. Includes cleared price

Table 269 shows all attributes of ExPostMarketRegionResults.

**Table 269 – Attributes of MarketResults::ExPostMarketRegionResults**

| name               | type  | description |
|--------------------|-------|-------------|
| exPostClearedPrice | Float |             |

Table 270 shows all association ends of ExPostMarketRegionResults with other classes.

**Table 270 – Association ends of MarketResults::ExPostMarketRegionResults with other classes**

| [mult from] | [mult to] name            | type               | description |
|-------------|---------------------------|--------------------|-------------|
| [0..1]      | [1..1] ExPostMarketRegion | ExPostMarketRegion |             |
| [0..*]      | [1..1] MarketRegion       | MarketRegion       |             |

### 6.5.6.3.16 ExPostPricing

Model of ex-post pricing of nodes

Table 271 shows all attributes of ExPostPricing.

**Table 271 – Attributes of MarketResults::ExPostPricing**

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| energyPrice          | Float             | market energy price              |
| intervalEndTime      | DateTime          | inherited from: MarketFactors    |
| intervalStartTime    | DateTime          | inherited from: MarketFactors    |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 272 shows all association ends of ExPostPricing with other classes.

**Table 272 – Association ends of MarketResults::ExPostPricing with other classes**

| [mult from] | [mult to] name             | type                 | description                      |
|-------------|----------------------------|----------------------|----------------------------------|
| [1..1]      | [0..*] ExPostResults       | ExPostPricingResults |                                  |
| [0..*]      | [0..*] MktActivityRecord   | MktActivityRecord    | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market              | Market               | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent   | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject        | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name                 | inherited from: IdentifiedObject |

### 6.5.6.3.17 ExPostPricingResults root class

Model of ex-post pricing of nodes. Includes LMP information, pnode based.

Table 273 shows all attributes of ExPostPricingResults.

**Table 273 – Attributes of MarketResults::ExPostPricingResults**

| name       | type  | description                                                                                                                                                                                                                                                                                                                                          |
|------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| congestLMP | Float | Congestion component of Location Marginal Price (LMP) in monetary units per MW; congestion component of the hourly LMP at a specific pricing node<br><br>Attribute Usage: Result of the Security, Pricing, and Dispatch (SPD)/Simultaneous Feasibility Test (SFT) software and denotes the hourly congestion component of LMP for each pricing node. |
| Imp        | Float | 5 min weighted average LMP; the Location Marginal Price of the Pnode for which price calculation is carried out.<br><br>Attribute Usage: 5 min weighted average LMP to be displayed on UI                                                                                                                                                            |
| lossLMP    | Float | Loss component of Location Marginal Price (LMP) in monetary units per MW; loss component of the hourly LMP at a specific pricing node<br><br>Attribute Usage: Result of the Security, Pricing, and Dispatch (SPD)/Simultaneous Feasibility Test (SFT) software and denotes the hourly loss component of LMP for each pricing node.                   |

Table 274 shows all association ends of ExPostPricingResults with other classes.

**Table 274 – Association ends of MarketResults::ExPostPricingResults with other classes**

| [mult from] | [mult to] name       | type          | description |
|-------------|----------------------|---------------|-------------|
| [0..*]      | [1..1] ExPostPricing | ExPostPricing |             |
| [0..*]      | [1..1] Pnode         | Pnode         |             |



### 6.5.6.3.18 ExPostResource

Model of ex-post pricing of resources.

Table 275 shows all attributes of ExPostResource.

**Table 275 – Attributes of MarketResults::ExPostResource**

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| intervalEndTime      | DateTime          | inherited from: MarketFactors    |
| intervalStartTime    | DateTime          | inherited from: MarketFactors    |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 276 shows all association ends of ExPostResource with other classes.

**Table 276 – Association ends of MarketResults::ExPostResource with other classes**

| [mult from] | [mult to] name               | type                  | description                      |
|-------------|------------------------------|-----------------------|----------------------------------|
| [1..1]      | [0..*] ExPostResourceResults | ExPostResourceResults |                                  |
| [0..*]      | [0..*] MktActivityRecord     | MktActivityRecord     | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market                | Market                | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents   | ConfigurationEvent    | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects        | DiagramObject         | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                 | Name                  | inherited from: IdentifiedObject |

### 6.5.6.3.19 ExPostResourceResults root class

Model of ex-post pricing of resources contains components of LMPs: energy, congestion, loss. Resource based.

Table 277 shows all attributes of ExPostResourceResults.

**Table 277 – Attributes of MarketResults::ExPostResourceResults**

| name          | type                | description                                                                                                                   |
|---------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------|
| congestionLMP | Float               | LMP component in USD (deprecated)                                                                                             |
| desiredMW     | Float               | Desired output of unit                                                                                                        |
| dispatchRate  | Float               | Unit Dispatch rate from real time unit dispatch.                                                                              |
| Imp           | Float               | LMP (Local Marginal Price) in USD at the equipment (deprecated)                                                               |
| lossLMP       | Float               | loss Imp (deprecated)                                                                                                         |
| maxEconomicMW | Float               | Economic Maximum MW                                                                                                           |
| minEconomicMW | Float               | Economic Minimum MW                                                                                                           |
| resourceMW    | Float               | Current MW output of the equipment<br>Attribute Usage: Information purposes –<br>Information purposes – Output of LPA engine. |
| status        | EquipmentStatusType | Status of equipment                                                                                                           |

Table 278 shows all association ends of ExPostResourceResults with other classes.

**Table 278 – Association ends of MarketResults::ExPostResourceResults with other classes**

| [mult from] | [mult to] name            | type               | description |
|-------------|---------------------------|--------------------|-------------|
| [0..*]      | [0..1] RegisteredResource | RegisteredResource |             |
| [0..*]      | [1..1] ExPostResource     | ExPostResource     |             |

#### 6.5.6.3.20 GeneralClearing

Model of clearing result of the market run at the market level. Identifies interval

Table 279 shows all attributes of GeneralClearing.

**Table 279 – Attributes of MarketResults::GeneralClearing**

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| intervalEndTime      | DateTime          | inherited from: MarketFactors    |
| intervalStartTime    | DateTime          | inherited from: MarketFactors    |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |

| name | type   | description                      |
|------|--------|----------------------------------|
| name | String | inherited from: IdentifiedObject |

Table 280 shows all association ends of GeneralClearing with other classes.

**Table 280 – Association ends of MarketResults::GeneralClearing with other classes**

| [mult from] | [mult to] name                | type                   | description                      |
|-------------|-------------------------------|------------------------|----------------------------------|
| [0..1]      | [0..*] GeneralClearingResults | GeneralClearingResults |                                  |
| [0..*]      | [0..*] MktActivityRecord      | MktActivityRecord      | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market                 | Market                 | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents    | ConfigurationEvent     | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects         | DiagramObject          | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                  | Name                   | inherited from: IdentifiedObject |

#### 6.5.6.3.21 GeneralClearingResults root class

Provides the adjusted load forecast value on a load forecast zone basis.

Table 281 shows all attributes of GeneralClearingResults.

**Table 281 – Attributes of MarketResults::GeneralClearingResults**

| name                | type        | description                                                                                                   |
|---------------------|-------------|---------------------------------------------------------------------------------------------------------------|
| loadForecast        | ActivePower | Load Prediction/Forecast (MW), by Time Period (5', 10', 15')                                                  |
| totalLoad           | Float       | Amount of load in the control zone<br>Attribute Usage: hourly load value for the specific area                |
| totalNetInterchange | Float       | Amount of interchange for the control zone<br>Attribute Usage: hourly interchange value for the specific area |

Table 282 shows all association ends of GeneralClearingResults with other classes.

**Table 282 – Association ends of MarketResults::GeneralClearingResults with other classes**

| [mult from] | [mult to] name         | type            | description |
|-------------|------------------------|-----------------|-------------|
| [0..*]      | [0..1] GeneralClearing | GeneralClearing |             |
| [0..*]      | [0..1] SubControlArea  | SubControlArea  |             |

#### 6.5.6.3.22 InstructionClearing

Model of market clearing, relating to commitment instructions. Identifies interval

Table 283 shows all attributes of InstructionClearing.

**Table 283 – Attributes of MarketResults::InstructionClearing**

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| intervalEndTime      | DateTime          | inherited from: MarketFactors    |
| intervalStartTime    | DateTime          | inherited from: MarketFactors    |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 284 shows all association ends of InstructionClearing with other classes.

**Table 284 – Association ends of MarketResults::InstructionClearing with other classes**

| [mult from] | [mult to] name             | type               | description                      |
|-------------|----------------------------|--------------------|----------------------------------|
| [1..*]      | [1..*] Instructions        | Instructions       |                                  |
| [0..*]      | [0..*] MktActivityRecord   | MktActivityRecord  | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market              | Market             | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name               | inherited from: IdentifiedObject |

#### 6.5.6.3.23 InstructionClearingDOP

Model of market clearing, related to Dispatch Operating Point. Identifies interval

Table 285 shows all attributes of InstructionClearingDOP.

**Table 285 – Attributes of MarketResults::InstructionClearingDOP**

| name                 | type     | description                   |
|----------------------|----------|-------------------------------|
| intervalEndTime      | DateTime | inherited from: MarketFactors |
| intervalStartTime    | DateTime | inherited from: MarketFactors |
| type                 | String   | inherited from: Document      |
| createdDateTime      | DateTime | inherited from: Document      |
| lastModifiedDateTime | DateTime | inherited from: Document      |

| name              | type              | description                      |
|-------------------|-------------------|----------------------------------|
| revisionNumber    | String            | inherited from: Document         |
| electronicAddress | ElectronicAddress | inherited from: Document         |
| subject           | String            | inherited from: Document         |
| title             | String            | inherited from: Document         |
| docStatus         | Status            | inherited from: Document         |
| status            | Status            | inherited from: Document         |
| aliasName         | String            | inherited from: IdentifiedObject |
| mRID              | String            | inherited from: IdentifiedObject |
| name              | String            | inherited from: IdentifiedObject |

Table 286 shows all association ends of InstructionClearingDOP with other classes.

**Table 286 – Association ends of MarketResults::InstructionClearingDOP with other classes**

| [mult from] | [mult to] name             | type               | description                      |
|-------------|----------------------------|--------------------|----------------------------------|
| [1..*]      | [1..*] DopInstruction      | DopInstruction     |                                  |
| [0..*]      | [0..*] MktActivityRecord   | MktActivityRecord  | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market              | Market             | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name               | inherited from: IdentifiedObject |

#### 6.5.6.3.24 InstructionClearingDOT

Model of market clearing, related to Dispatch Operating Target (model of anticipatory dispatch). Identifies interval

Table 287 shows all attributes of InstructionClearingDOT.

**Table 287 – Attributes of MarketResults::InstructionClearingDOT**

| name                 | type                  | description                                                              |
|----------------------|-----------------------|--------------------------------------------------------------------------|
| contingencyActive    | YesNo                 | Indication that the system is currently operating in a contingency mode. |
| dispatchMode         | AutomaticDispatchMode |                                                                          |
| intervalEndTime      | DateTime              | inherited from: MarketFactors                                            |
| intervalStartTime    | DateTime              | inherited from: MarketFactors                                            |
| type                 | String                | inherited from: Document                                                 |
| createdDateTime      | DateTime              | inherited from: Document                                                 |
| lastModifiedDateTime | DateTime              | inherited from: Document                                                 |
| revisionNumber       | String                | inherited from: Document                                                 |
| electronicAddress    | ElectronicAddress     | inherited from: Document                                                 |
| subject              | String                | inherited from: Document                                                 |
| title                | String                | inherited from: Document                                                 |

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| docStatus | Status | inherited from: Document         |
| status    | Status | inherited from: Document         |
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 288 shows all association ends of InstructionClearingDOT with other classes.

**Table 288 – Association ends of MarketResults::InstructionClearingDOT with other classes**

| [mult from] | [mult to] name             | type               | description                      |
|-------------|----------------------------|--------------------|----------------------------------|
| [1..*]      | [1..*] DotInstruction      | DotInstruction     |                                  |
| [0..*]      | [0..*] MktActivityRecord   | MktActivityRecord  | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market              | Market             | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name               | inherited from: IdentifiedObject |

#### 6.5.6.3.25 Instructions root class

Provides the necessary information (on a resource basis) to capture the Startup/Shutdown instruction results. This information is relevant to the DA Market (RUC only) as well as the RT Market (HASP, Pre-dispatch, and Interval).

Table 289 shows all attributes of Instructions.

**Table 289 – Attributes of MarketResults::Instructions**

| name                 | type                            | description                                                                                                                                                                                                                                   |
|----------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| bindingDOT           | Float                           |                                                                                                                                                                                                                                               |
| bindingInstruction   | YesNo                           |                                                                                                                                                                                                                                               |
| instructionCost      | Float                           | Total cost associated with changing the status of the resource.                                                                                                                                                                               |
| instructionSource    | MQSInstructionSource            | instruction source for market quality results (INS, ACT)                                                                                                                                                                                      |
| instructionStartTime | DateTime                        | Time the resource should be at Pmin (for start ups).<br>Time the resource is off line.                                                                                                                                                        |
| instructionType      | AutomaticDisplnstTypeCommitment | Indicator of either a Start-Up or a Shut-Down.                                                                                                                                                                                                |
| manuallyBlocked      | YesNo                           | Manually Blocked Indicator (Yes/No). The instruction has been blocked by an Operator.                                                                                                                                                         |
| minStatusChangeTime  | Integer                         | Minimum start up time required to bring the unit online (minutes).<br>SCUC commitment period start-up time.<br>Calculated start up time based on the StartUpTimeCurve provided with the Bid.<br>This is a combination of StartUp time bid and |

| name            | type       | description                         |
|-----------------|------------|-------------------------------------|
|                 |            | Unit down time.<br>Units is minutes |
| updateTimeStamp | DateTime   |                                     |
| updateType      | MQSCHGType |                                     |
| updateUser      | String     |                                     |

Table 290 shows all association ends of Instructions with other classes.

**Table 290 – Association ends of MarketResults::Instructions with other classes**

| [mult from] | [mult to] name             | type                | description |
|-------------|----------------------------|---------------------|-------------|
| [0..*]      | [1..1] RegisteredResource  | RegisteredResource  |             |
| [1..*]      | [1..*] InstructionClearing | InstructionClearing |             |

#### 6.5.6.3.26 LoadFollowingOperatorInput root class

Model of load following capabilities that are entered by operators on a temporary basis. Related to Registered Resources in Metered Subsystems

Table 291 shows all attributes of LoadFollowingOperatorInput.

**Table 291 – Attributes of MarketResults::LoadFollowingOperatorInput**

| name                           | type       | description                                |
|--------------------------------|------------|--------------------------------------------|
| dataEntryTimeStamp             | DateTime   | Time the data entry was performed          |
| tempLoadFollowingUpManualCap   | Float      | temporarily manually entered LFU capacity. |
| tempLoadFollowingDownManualCap | Float      | temporarily manually entered LFD capacity  |
| updateUser                     | String     |                                            |
| updateTimeStamp                | DateTime   |                                            |
| updateType                     | MQSCHGType |                                            |

Table 292 shows all association ends of LoadFollowingOperatorInput with other classes.

**Table 292 – Association ends of MarketResults::LoadFollowingOperatorInput with other classes**

| [mult from] | [mult to] name            | type               | description |
|-------------|---------------------------|--------------------|-------------|
| [0..*]      | [0..1] RegisteredResource | RegisteredResource |             |

#### 6.5.6.3.27 LossClearing

RT only and is published on 5 minute intervals for the previous RT time interval results.

Table 293 shows all attributes of LossClearing.

**Table 293 – Attributes of MarketResults::LossClearing**

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| intervalEndTime      | DateTime          | inherited from: MarketFactors    |
| intervalStartTime    | DateTime          | inherited from: MarketFactors    |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 294 shows all association ends of LossClearing with other classes.

**Table 294 – Association ends of MarketResults::LossClearing with other classes**

| [mult from] | [mult to] name             | type                | description                      |
|-------------|----------------------------|---------------------|----------------------------------|
| [0..1]      | [0..*] LossClearingResults | LossClearingResults |                                  |
| [0..*]      | [0..*] MktActivityRecord   | MktActivityRecord   | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market              | Market              | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent  | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject |

#### 6.5.6.3.28 LossClearingResults root class

Provides the MW loss for RUC Zones, subcontrol areas, and the total loss.

Table 295 shows all attributes of LossClearingResults.

**Table 295 – Attributes of MarketResults::LossClearingResults**

| name   | type  | description |
|--------|-------|-------------|
| lossMW | Float |             |

Table 296 shows all association ends of LossClearingResults with other classes.



**Table 296 – Association ends of MarketResults::LossClearingResults with other classes**

| [mult from] | [mult to] name         | type            | description |
|-------------|------------------------|-----------------|-------------|
| [1..*]      | [0..1] SubControlArea  | SubControlArea  |             |
| [0..*]      | [0..1] LossClearing    | LossClearing    |             |
| [0..*]      | [0..1] HostControlArea | HostControlArea |             |
| [0..*]      | [0..1] RUCZone         | RUCZone         |             |

**6.5.6.3.29 MarketRegionResults root class**

Provides all Region Ancillary Service results for the DA and RT markets. The specific data is commodity type (Regulation Up, Regulation Down, Spinning Reserve, Non-spinning Reserve, or Total Up reserves) based for the cleared MW, cleared price, and total capacity required for the region.

Table 297 shows all attributes of MarketRegionResults.

**Table 297 – Attributes of MarketResults::MarketRegionResults**

| name                | type                   | description                                                                                                                                                              |
|---------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| clearedMW           | Float                  | Cleared generation Value in MW. For AS, this value is clearedMW = AS Total. For AS, clearedMW – selfScheduleMW = AS Procured                                             |
| clearedPrice        | Float                  | Marginal Price (\$/MW) for the commodity (Energy, Regulation Up, Regulation Down, Spinning Reserve, or Non-spinning reserve) based on the pricing run.                   |
| dispatchCtMW        | Float                  | Dispatchable MW for Combustion units.                                                                                                                                    |
| dispatchHydroMW     | Float                  | Dispatchable MW for Hydro units.                                                                                                                                         |
| dispatchRate        | Float                  | Dispatch rate in MW/minutes.                                                                                                                                             |
| dispatchSteamMW     | Float                  | Dispatchable MW for Steam units.                                                                                                                                         |
| imbalanceEnergyBias | Float                  | Imbalance Energy Bias (MW) by Time Period (5' only)                                                                                                                      |
| limitFlag           | ResourceLimitIndicator | Locational AS Flags indicating whether the Upper or Lower Bound limit of the AS regional procurement is binding                                                          |
| lumpyIndicator      | YesNo                  | The "Lumpy Flag"(Y/N) indicates whether the resource that sets the price is a lumpy generator by hour over the time horizon.<br>Only applicable for the Day Ahead Market |
| maxSufficiencyIndex | Float                  | Region requirement maximum limit                                                                                                                                         |
| minSufficiencyIndex | Float                  | Region requirement minimum limit                                                                                                                                         |
| reqMaxMW            | Float                  | Region requirement maximum limit                                                                                                                                         |
| reqMinMW            | Float                  | Region requirement minimum limit                                                                                                                                         |
| selfScheduleMW      | Float                  | Aof AS, selfScheduleMW = AS Self-Provided                                                                                                                                |

Table 298 shows all association ends of MarketRegionResults with other classes.

**Table 298 – Association ends of MarketResults::MarketRegionResults with other classes**

| [mult from] | [mult to] name                  | type                     | description |
|-------------|---------------------------------|--------------------------|-------------|
| [0..1]      | [0..1] MarketProduct            | MarketProduct            |             |
| [1..*]      | [0..1] AncillaryServiceClearing | AncillaryServiceClearing |             |
| [1..*]      | [1..1] MarketRegion             | MarketRegion             |             |

### 6.5.6.3.30 MarketResults root class

This class holds elements that are single values for the entire market time horizon. That is, for the Day Ahead market, there is 1 value for each element, not hourly based. Is a summary of the market run

Table 299 shows all attributes of MarketResults.

**Table 299 – Attributes of MarketResults::MarketResults**

| name                        | type  | description                                                         |
|-----------------------------|-------|---------------------------------------------------------------------|
| startUpCost                 | Float | Total Start-up Cost (\$) over the time horizon                      |
| minimumLoadCost             | Float | Total Minimum Load Cost (\$) over the time horizon                  |
| contingentOperatingResAvail | YesNo | Global Contingent Operating Reserve Availability Indicator (Yes/No) |
| energyCost                  | Float | Total Energy Cost (\$) over the time horizon                        |
| totalCost                   | Float | Total Cost (Energy + AS) cost (\$) by over the time horizon         |
| ancillarySvcCost            | Float | Total AS Cost (i.e., payment) (\$) over the time horizon            |
| totalRucCost                | Float | The total RUC capacity cost for this interval                       |

Table 300 shows all association ends of MarketResults with other classes.

**Table 300 – Association ends of MarketResults::MarketResults with other classes**

| [mult from] | [mult to] name      | type         | description |
|-------------|---------------------|--------------|-------------|
| [0..1]      | [1..1] EnergyMarket | EnergyMarket |             |

### 6.5.6.3.31 MarketStatement

A statement is a roll up of statement line items. Each statement along with its line items provide the details of specific charges at any given time. Used by Billing and Settlement

Table 301 shows all attributes of MarketStatement.

**Table 301 – Attributes of MarketResults::MarketStatement**

| name                 | type              | description                                                        |
|----------------------|-------------------|--------------------------------------------------------------------|
| tradeDate            | DateTime          | The date of which Settlement is run.                               |
| referenceNumber      | String            | The version number of previous statement (in the case of true up). |
| start                | DateTime          | The start of a bill period.                                        |
| end                  | DateTime          | The end of a bill period.                                          |
| transactionDate      | DateTime          | The date of which this statement is issued.                        |
| type                 | String            | inherited from: Document                                           |
| createdDateTime      | DateTime          | inherited from: Document                                           |
| lastModifiedDateTime | DateTime          | inherited from: Document                                           |
| revisionNumber       | String            | inherited from: Document                                           |
| electronicAddress    | ElectronicAddress | inherited from: Document                                           |
| subject              | String            | inherited from: Document                                           |
| title                | String            | inherited from: Document                                           |
| docStatus            | Status            | inherited from: Document                                           |
| status               | Status            | inherited from: Document                                           |
| aliasName            | String            | inherited from: IdentifiedObject                                   |
| mRID                 | String            | inherited from: IdentifiedObject                                   |
| name                 | String            | inherited from: IdentifiedObject                                   |

Table 302 shows all association ends of MarketStatement with other classes.

**Table 302 – Association ends of MarketResults::MarketStatement with other classes**

| [mult from] | [mult to] name                 | type                    | description                      |
|-------------|--------------------------------|-------------------------|----------------------------------|
| [1..1]      | [0..*] MarketStatementLineItem | MarketStatementLineItem |                                  |
| [0..1]      | [0..*] ConfigurationEvents     | ConfigurationEvent      | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects          | DiagramObject           | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                   | Name                    | inherited from: IdentifiedObject |

#### 6.5.6.3.32 MarketStatementLineItem

An individual line item on a statement.

Table 303 shows all attributes of MarketStatementLineItem.

**Table 303 – Attributes of MarketResults::MarketStatementLineItem**

| name           | type     | description                                                    |
|----------------|----------|----------------------------------------------------------------|
| intervalNumber | String   | The number of intervals.                                       |
| intervalDate   | DateTime | The date of which the settlement is run.                       |
| quantityUOM    | String   | The unit of measure for the quantity element of the line item. |
| previousAmount | Float    | Previous settlement amount.                                    |

| name                | type   | description                                       |
|---------------------|--------|---------------------------------------------------|
| currentAmount       | Float  | Current settlement amount.                        |
| netAmount           | Float  | Net settlement amount.                            |
| previousQuantity    | Float  | Previous settlement quantity, subject to the UOM. |
| currentQuantity     | Float  | Current settlement quantity, subject to the UOM.  |
| netQuantity         | Float  | Net settlement quantity, subject to the UOM.      |
| previousPrice       | Float  | Previous settlement price.                        |
| currentPrice        | Float  | Current settlement price.                         |
| netPrice            | Float  | Net settlement price.                             |
| previousISOAmount   | Float  | Previous ISO settlement amount.                   |
| currentISOAmount    | Float  | Current ISO settlement amount.                    |
| netISOAmount        | Float  | Net ISO settlement amount.                        |
| previousISOQuantity | Float  | Previous ISO settlement quantity.                 |
| currentISOQuantity  | Float  | Current ISO settlement quantity.                  |
| netISOQuantity      | Float  | Net ISO settlement quantity.                      |
| aliasName           | String | inherited from: IdentifiedObject                  |
| mRID                | String | inherited from: IdentifiedObject                  |
| name                | String | inherited from: IdentifiedObject                  |

Table 304 shows all association ends of MarketStatementLineItem with other classes.

**Table 304 – Association ends of MarketResults::  
MarketStatementLineItem with other classes**

| [mult from] | [mult to] name                          | type                    | description                      |
|-------------|-----------------------------------------|-------------------------|----------------------------------|
| [0..*]      | [0..*] MktUserAttribute                 | MktUserAttribute        |                                  |
| [0..*]      | [1..1] MarketStatement                  | MarketStatement         |                                  |
| [0..*]      | [0..1] ContainerMarketStatementLineItem | MarketStatementLineItem |                                  |
| [0..1]      | [0..1] PassThroughBill                  | PassThroughBill         |                                  |
| [0..1]      | [0..*] ComponentMarketStatementLineItem | MarketStatementLineItem |                                  |
| [0..1]      | [0..*] DiagramObjects                   | DiagramObject           | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                            | Name                    | inherited from: IdentifiedObject |

#### 6.5.6.3.33 MitigatedBid

Mitigated bid results posted for a given settlement period.

Table 305 shows all attributes of MitigatedBid.

**Table 305 – Attributes of MarketResults::MitigatedBid**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 306 shows all association ends of MitigatedBid with other classes.

**Table 306 – Association ends of MarketResults::MitigatedBid with other classes**

| [mult from] | [mult to] name              | type                 | description                      |
|-------------|-----------------------------|----------------------|----------------------------------|
| [0..*]      | [1..*] MitigatedBidClearing | MitigatedBidClearing |                                  |
| [0..*]      | [0..1] Bid                  | Bid                  |                                  |
| [0..1]      | [0..*] DiagramObjects       | DiagramObject        | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                | Name                 | inherited from: IdentifiedObject |

#### 6.5.6.3.34 MitigatedBidClearing

Model of market power mitigation through reference or mitigated bids. Interval based.

Table 307 shows all attributes of MitigatedBidClearing.

**Table 307 – Attributes of MarketResults::MitigatedBidClearing**

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| intervalEndTime      | DateTime          | inherited from: MarketFactors    |
| intervalStartTime    | DateTime          | inherited from: MarketFactors    |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 308 shows all association ends of MitigatedBidClearing with other classes.

**Table 308 – Association ends of MarketResults::MitigatedBidClearing with other classes**

| [mult from] | [mult to] name             | type               | description                      |
|-------------|----------------------------|--------------------|----------------------------------|
| [1..*]      | [0..*] MPMResourceStatus   | MPMResourceStatus  |                                  |
| [1..*]      | [0..*] MitigatedBid        | MitigatedBid       |                                  |
| [1..*]      | [0..*] RMRDetermination    | RMRDetermination   |                                  |
| [0..*]      | [0..*] MktActivityRecord   | MktActivityRecord  | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market              | Market             | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name               | inherited from: IdentifiedObject |

#### 6.5.6.3.35 MitigatedBidSegment root class

Model of mitigated bid. Indicates segment of piece-wise linear bid, that has been mitigated

Table 309 shows all attributes of MitigatedBidSegment.

**Table 309 – Attributes of MarketResults::MitigatedBidSegment**

| name              | type     | description                    |
|-------------------|----------|--------------------------------|
| intervalStartTime | DateTime |                                |
| thresholdType     | String   |                                |
| segmentNumber     | Integer  | Mitigated Bid Segment Number   |
| segmentMW         | Float    | Mitigated bid segment MW value |

Table 310 shows all association ends of MitigatedBidSegment with other classes.

**Table 310 – Association ends of MarketResults::MitigatedBidSegment with other classes**

| [mult from] | [mult to] name | type | description |
|-------------|----------------|------|-------------|
| [0..*]      | [1..1] Bid     | Bid  |             |

#### 6.5.6.3.36 MPMClearing

Model of results of Market Power tests, and possible mitigation. Interval based

Table 311 shows all attributes of MPMClearing.

**Table 311 – Attributes of MarketResults::MPMClearing**

| name                  | type  | description |
|-----------------------|-------|-------------|
| LMPMFinalFlag         | YesNo |             |
| SMPMFinalFlag         | YesNo |             |
| mitigationOccuredFlag | YesNo |             |

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| intervalEndTime      | DateTime          | inherited from: MarketFactors    |
| intervalStartTime    | DateTime          | inherited from: MarketFactors    |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 312 shows all association ends of MPMClearing with other classes.

**Table 312 – Association ends of MarketResults::MPMClearing with other classes**

| [mult from] | [mult to] name             | type               | description                      |
|-------------|----------------------------|--------------------|----------------------------------|
| [0..1]      | [0..*] MPMTestResults      | MPMTestResults     |                                  |
| [0..*]      | [0..*] MktActivityRecord   | MktActivityRecord  | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market              | Market             | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name               | inherited from: IdentifiedObject |

#### 6.5.6.3.37 MPMResourceStatus root class

Model of results of Market Power tests, gives status of resource for the associated interval

Table 313 shows all attributes of MPMResourceStatus.

**Table 313 – Attributes of MarketResults::MPMResourceStatus**

| name           | type   | description                                  |
|----------------|--------|----------------------------------------------|
| resourceStatus | String | Interval Test Status<br>'N' – not applicable |

Table 314 shows all association ends of MPMResourceStatus with other classes.

**Table 314 – Association ends of MarketResults::MPMResourceStatus with other classes**

| [mult from] | [mult to] name              | type                 | description |
|-------------|-----------------------------|----------------------|-------------|
| [0..*]      | [0..1] RegisteredResource   | RegisteredResource   |             |
| [0..*]      | [1..*] MitigatedBidClearing | MitigatedBidClearing |             |
| [0..*]      | [1..1] MPMTTestCategory     | MPMTTestCategory     |             |

#### 6.5.6.3.38 MPMTTestResults root class

Provides the outcome and margin percent (as appropriate) result data for the MPM tests. There are relationships to Zone for Designated Congestion Area Tests, CurveSchedData for bid segment tests, to the SubControlArea for the system wide level tests, and Rnodes for the LMPM impact tests.

Table 315 shows all attributes of MPMTTestResults.

**Table 315 – Attributes of MarketResults::MPMTTestResults**

| name          | type            | description                                                                                                             |
|---------------|-----------------|-------------------------------------------------------------------------------------------------------------------------|
| outcome       | MPMTTestOutcome | The results of the test. For the Price, Impact, and Conduct tests, typical values are NA, Pass, Fail, Disable, or Skip. |
| marginPercent | PerCent         | Used to show the Margin % result of the Impact test                                                                     |

Table 316 shows all association ends of MPMTTestResults with other classes.

**Table 316 – Association ends of MarketResults::MPMTTestResults with other classes**

| [mult from] | [mult to] name          | type             | description |
|-------------|-------------------------|------------------|-------------|
| [0..*]      | [0..1] MPMClearing      | MPMClearing      |             |
| [1..*]      | [1..1] AggregatedRnode  | AggregatedRnode  |             |
| [0..*]      | [1..1] MPMTTestCategory | MPMTTestCategory |             |

#### 6.5.6.3.39 PassThroughBill

Pass Through Bill is used for:

- 1) Two sided charge transactions with or without ISO involvement (hence the ?pass thru?)
- 2) Specific direct charges or payments that are calculated outside or provided directly to settlements
- 3) Specific charge bill determinants that are externally supplied and used in charge calculations

Table 317 shows all attributes of PassThroughBill.



**Table 317 – Attributes of MarketResults::PassThroughBill**

| name                 | type              | description                                                                                               |
|----------------------|-------------------|-----------------------------------------------------------------------------------------------------------|
| adjustedAmount       | Money             |                                                                                                           |
| amount               | Money             | The charge amount of the product/service.                                                                 |
| billedTo             | String            | The company to which the PTB transaction is billed.                                                       |
| billEnd              | DateTime          | Bill period end date                                                                                      |
| billRunType          | String            | The settlement run type, for example: prelim, final, and rerun.                                           |
| billStart            | DateTime          | Bill period start date                                                                                    |
| effectiveDate        | DateTime          | The effective date of the transaction                                                                     |
| isDisputed           | Boolean           | Disputed transaction indicator                                                                            |
| isProfiled           | Boolean           | A flag indicating whether there is a profile data associated with the PTB.                                |
| paidTo               | String            | The company to which the PTB transaction is paid.                                                         |
| previousEnd          | DateTime          | The previous bill period end date                                                                         |
| previousStart        | DateTime          | The previous bill period start date                                                                       |
| price                | Money             | The price of product/service.                                                                             |
| productCode          | String            | The product identifier for determining the charge type of the transaction.                                |
| providedBy           | String            | The company by which the PTB transaction service is provided.                                             |
| quantity             | FloatQuantity     | The product quantity.                                                                                     |
| serviceEnd           | DateTime          | The end date of service provided, if periodic.                                                            |
| serviceStart         | DateTime          | The start date of service provided, if periodic.                                                          |
| soldTo               | String            | The company to which the PTB transaction is sold.                                                         |
| taxAmount            | Money             | The tax on services taken.                                                                                |
| timeZone             | String            | The time zone code                                                                                        |
| tradeDate            | DateTime          | The trade date                                                                                            |
| transactionDate      | DateTime          | The date the transaction occurs.                                                                          |
| transactionType      | String            | The type of transaction. For example, charge customer, bill customer, matching AR/AP, or bill determinant |
| type                 | String            | inherited from: Document                                                                                  |
| createdDateTime      | DateTime          | inherited from: Document                                                                                  |
| lastModifiedDateTime | DateTime          | inherited from: Document                                                                                  |
| revisionNumber       | String            | inherited from: Document                                                                                  |
| electronicAddress    | ElectronicAddress | inherited from: Document                                                                                  |
| subject              | String            | inherited from: Document                                                                                  |
| title                | String            | inherited from: Document                                                                                  |
| docStatus            | Status            | inherited from: Document                                                                                  |
| status               | Status            | inherited from: Document                                                                                  |
| aliasName            | String            | inherited from: IdentifiedObject                                                                          |
| mRID                 | String            | inherited from: IdentifiedObject                                                                          |
| name                 | String            | inherited from: IdentifiedObject                                                                          |

Table 318 shows all association ends of PassThroughBill with other classes.

**Table 318 – Association ends of MarketResults::PassThroughBill with other classes**

| [mult from] | [mult to] name                 | type                    | description                      |
|-------------|--------------------------------|-------------------------|----------------------------------|
| [0..*]      | [0..*] MktUserAttribute        | MktUserAttribute        |                                  |
| [0..1]      | [0..1] MarketStatementLineItem | MarketStatementLineItem |                                  |
| [0..1]      | [0..*] ChargeProfiles          | ChargeProfile           |                                  |
| [0..1]      | [0..*] ConfigurationEvents     | ConfigurationEvent      | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects          | DiagramObject           | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                   | Name                    | inherited from: IdentifiedObject |

#### 6.5.6.3.40 PnodeClearing

Pricing node clearing results posted for a given settlement period.

Table 319 shows all attributes of PnodeClearing.

**Table 319 – Attributes of MarketResults::PnodeClearing**

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| intervalEndTime      | DateTime          | inherited from: MarketFactors    |
| intervalStartTime    | DateTime          | inherited from: MarketFactors    |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 320 shows all association ends of PnodeClearing with other classes.

**Table 320 – Association ends of MarketResults::PnodeClearing with other classes**

| [mult from] | [mult to] name             | type               | description                   |
|-------------|----------------------------|--------------------|-------------------------------|
| [0..1]      | [1..*] PnodeResults        | PnodeResults       |                               |
| [0..*]      | [0..*] MktActivityRecord   | MktActivityRecord  | inherited from: MarketFactors |
| [0..*]      | [0..1] Market              | Market             | inherited from: MarketFactors |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent | inherited from: Document      |

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

#### 6.5.6.3.41 PnodeResults root class

Provides the total price, the cost component, the loss component, and the congestion component for Pnodes for the forward and real time markets. There are several prices produced based on the run type (MPM, RUC, Pricing, or Scheduling/Dispatch).

Table 321 shows all attributes of PnodeResults.

**Table 321 – Attributes of MarketResults::PnodeResults**

| name                  | type       | description                                                                     |
|-----------------------|------------|---------------------------------------------------------------------------------|
| marginalClearingPrice | Float      | Locational Marginal Price (LMP) (\$/MWh)                                        |
| costLMP               | Float      | Cost component of Locational Marginal Pricing (LMP) in monetary units per MW.   |
| lossLMP               | Float      | Loss component of Location Marginal Price (LMP) in monetary units per MW.       |
| congestLMP            | Float      | Congestion component of Location Marginal Price (LMP) in monetary units per MW. |
| scheduledMW           | Float      | total MW schedule at the pnode                                                  |
| updateUser            | String     |                                                                                 |
| updateTimeStamp       | DateTime   |                                                                                 |
| updateType            | MQSCHGType |                                                                                 |

Table 322 shows all association ends of PnodeResults with other classes.

**Table 322 – Association ends of MarketResults::PnodeResults with other classes**

| [mult from] | [mult to] name       | type          | description |
|-------------|----------------------|---------------|-------------|
| [1..*]      | [0..1] PnodeClearing | PnodeClearing |             |
| [1..*]      | [0..1] Pnode         | Pnode         |             |

#### 6.5.6.3.42 ResourceAwardClearing

Models details of bid and offer market clearing. Class indicates whether a contingency is active and whether the automatic dispatching system is active for this interval of the market solution

Table 323 shows all attributes of ResourceAwardClearing.

**Table 323 – Attributes of MarketResults::ResourceAwardClearing**

| name              | type                  | description                                       |
|-------------------|-----------------------|---------------------------------------------------|
| dispatchMode      | AutomaticDispatchMode |                                                   |
| contingencyActive | YesNo                 | Indication that the system is currently operating |

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
|                      |                   | in a contingency mode.           |
| intervalEndTime      | DateTime          | inherited from: MarketFactors    |
| intervalStartTime    | DateTime          | inherited from: MarketFactors    |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 324 shows all association ends of ResourceAwardClearing with other classes.

**Table 324 – Association ends of MarketResults::ResourceAwardClearing with other classes**

| [mult from] | [mult to] name                  | type                     | description                      |
|-------------|---------------------------------|--------------------------|----------------------------------|
| [1..*]      | [1..*] ResourceAwardInstruction | ResourceAwardInstruction |                                  |
| [1..*]      | [1..*] RUCAwardInstruction      | RUCAwardInstruction      |                                  |
| [0..*]      | [0..*] MktActivityRecord        | MktActivityRecord        | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market                   | Market                   | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents      | ConfigurationEvent       | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects           | DiagramObject            | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                    | Name                     | inherited from: IdentifiedObject |

#### 6.5.6.3.43 ResourceAwardInstruction root class

Model of market results, instruction for resource. Contains details of award as attributes

Table 325 shows all attributes of ResourceAwardInstruction.

**Table 325 – Attributes of MarketResults::ResourceAwardInstruction**

| name      | type  | description                                                                                                                                                                           |
|-----------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| awardMW   | Float | For DA Energy: Not Applicable;<br>For DA AS: DA AS market award;<br>For RT Energy: Not Applicable;<br>For RT AS: RT AS market award (excluding DA AS market or self-proviison awards) |
| clearedMW | Float | For DA Energy: Total Schedule = DA market                                                                                                                                             |

| name                      | type     | description                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           |          | <p>schedule + DA self-schedule award;</p> <p>For DA AS: DA Ancillary Service Awards = DA AS market award + DA AS self-provision award;</p> <p>For RT Energy: Total Schedule = RT market schedule + RT self-schedule award;</p> <p>For RT AS: RT Ancillary Service Awards = RT AS self-provision award + RT AS market award + DA AS market award + DA AS self-provision award;</p> |
| clearedPrice              | Float    | Marginal Price (\$/MW) for the commodity (Regulation Up, Regulation Down, Spinning Reserve, or Non-spinning reserve) for pricing run.                                                                                                                                                                                                                                             |
| congestLMP                | Float    | Congestion component of Location Marginal Price (LMP) in monetary units per MW.                                                                                                                                                                                                                                                                                                   |
| costLMP                   | Float    | Cost component of Locational Marginal Pricing (LMP) in monetary units per MW.                                                                                                                                                                                                                                                                                                     |
| dispatcherAddedMW         | Float    | The tier2 mw added by dispatcher action<br>Market results of the synchronized reserve market                                                                                                                                                                                                                                                                                      |
| economicMax               | Float    | Unit max output for dispatch; bid in economic maximum                                                                                                                                                                                                                                                                                                                             |
| economicMin               | Float    | Unit min output for dispatch; bid in economic minimum                                                                                                                                                                                                                                                                                                                             |
| effRegulationDownLimit    | Float    | Effective Regulation Down Limit (MW)                                                                                                                                                                                                                                                                                                                                              |
| effRegulationUpLimit      | Float    | Effective Regulation Up Limit                                                                                                                                                                                                                                                                                                                                                     |
| Imp                       | Float    | Locational marginal price value                                                                                                                                                                                                                                                                                                                                                   |
| lossLMP                   | Float    | Loss component of Location Marginal Price (LMP) in monetary units per MW.                                                                                                                                                                                                                                                                                                         |
| manuallyBlocked           | YesNo    | Indicates if an award was manually blocked (Y/N). Valid for Spinning and Non-spinning.                                                                                                                                                                                                                                                                                            |
| marginalResourceIndicator | YesNo    | Indicator (Yes / No) that this resource set the price for this dispatch / schedule.                                                                                                                                                                                                                                                                                               |
| mustRunInd                | Boolean  | Identifies if the unit was set to must run by the market participant responsible for bidding in the unit                                                                                                                                                                                                                                                                          |
| noLoadCost                | Float    | Unit no-load cost in case of energy commodity                                                                                                                                                                                                                                                                                                                                     |
| optimalBidCost            | Float    | Optimal Bid cost                                                                                                                                                                                                                                                                                                                                                                  |
| optimalBidPay             | Float    | Optimal Bid production payment based on LMP                                                                                                                                                                                                                                                                                                                                       |
| optimalMargin             | Float    | Optimal Bid production margin                                                                                                                                                                                                                                                                                                                                                     |
| overrideTimeStamp         | DateTime | Time the manual data entry occurred.                                                                                                                                                                                                                                                                                                                                              |
| overrideValue             | Float    | Provides the ability for the grid operator to override items, such as spin capacity requirements, prior to running the algorithm. This value is market product based (spin, non-spin, reg up, reg down, or RUC).                                                                                                                                                                  |
| selfSchedMW               | Float    | <p>For DA Energy: DA total self-schedule award;</p> <p>For DA AS: DA AS self-provision award;</p> <p>For RT Energy: RT total self-schedule award;</p> <p>For RT AS: RT AS self-provision award (excluding DA AS market or self-provision awards)</p>                                                                                                                              |
| startUpCost               | Float    | Unit start up cost in case of energy commodity                                                                                                                                                                                                                                                                                                                                    |
| status                    | String   | In or out status of resource                                                                                                                                                                                                                                                                                                                                                      |

| name            | type       | description                                               |
|-----------------|------------|-----------------------------------------------------------|
| totalRevenue    | Float      | Total bid revenue (startup_cost + no_load_cost + bid_pay) |
| updateTimeStamp | DateTime   |                                                           |
| updateType      | MQSCHGType |                                                           |
| updateUser      | String     |                                                           |

Table 326 shows all association ends of ResourceAwardInstruction with other classes.

**Table 326 – Association ends of MarketResults::ResourceAwardInstruction with other classes**

| [mult from] | [mult to] name               | type                  | description |
|-------------|------------------------------|-----------------------|-------------|
| [0..*]      | [0..1] RegisteredResource    | RegisteredResource    |             |
| [1..1]      | [0..*] SelfScheduleBreakdown | SelfScheduleBreakdown |             |
| [0..*]      | [1..1] MarketProduct         | MarketProduct         |             |
| [1..*]      | [1..*] ClearingResourceAward | ResourceAwardClearing |             |

#### 6.5.6.3.44 ResourceClearing

Model of market results, including clearing result of resources. Associated with ResourceDispatchResults.

Table 327 shows all attributes of ResourceClearing.

**Table 327 – Attributes of MarketResults::ResourceClearing**

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| intervalEndTime      | DateTime          | inherited from: MarketFactors    |
| intervalStartTime    | DateTime          | inherited from: MarketFactors    |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 328 shows all association ends of ResourceClearing with other classes.

**Table 328 – Association ends of MarketResults::ResourceClearing with other classes**

| [mult from] | [mult to] name                   | type                      | description                      |
|-------------|----------------------------------|---------------------------|----------------------------------|
| [0..1]      | [0..*] ResourceLoadFollowingInst | ResourceLoadFollowingInst |                                  |
| [0..1]      | [1..*] ResourceDispatchResults   | ResourceDispatchResults   |                                  |
| [0..*]      | [0..*] MktActivityRecord         | MktActivityRecord         | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market                    | Market                    | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents       | ConfigurationEvent        | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects            | DiagramObject             | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                     | Name                      | inherited from: IdentifiedObject |

**6.5.6.3.45 ResourceDispatchResults root class**

The ResourceDispatchResults class provides market results that can be provided to a SC. The specific data provided consists of several indicators such as contingency flags, blocked start up, and RMR dispatch. It also provides the projected overall and the regulating status of the resource.

Table 329 shows all attributes of ResourceDispatchResults.

**Table 329 – Attributes of MarketResults::ResourceDispatchResults**

| name                     | type       | description                                                                                                       |
|--------------------------|------------|-------------------------------------------------------------------------------------------------------------------|
| blockedDispatch          | String     | Blocked Dispatch Indicator (Yes/No)                                                                               |
| blockedPublishDOP        | String     | Block sending DOP to ADS (Y/N)                                                                                    |
| contingencyFlag          | YesNo      | Contingent Operating Reserve Indicator (Yes/No). Resource participating with AS capacity in contingency dispatch. |
| limitIndicator           | String     | indicate which limit is the constraints                                                                           |
| lowerLimit               | Float      | resource energy ramping lower limit                                                                               |
| maxRampRate              | Float      | maximum ramp rate                                                                                                 |
| operatingLimitHigh       | Float      | The upper operating limit incorporating any derate used by the RTD for the Binding Interval.                      |
| operatingLimitLow        | Float      | The lower operating limit incorporating any derate used by the RTD for the Binding Interval.                      |
| penaltyDispatchIndicator | YesNo      | Penalty Dispatch Indicator (Yes / No) indicating an un-economic adjustment.                                       |
| regulatingLimitHigh      | Float      | The upper regulating limit incorporating any derate used by the RTD for the Binding Interval.                     |
| regulatingLimitLow       | Float      | The lower regulating limit incorporating any derate used by the RTD for the Binding Interval.                     |
| resourceStatus           | String     | Unit Commitment Status (On/Off/Starting)                                                                          |
| totalSchedule            | Float      | Resource total upward schedule. total schedule = En + all AS per resource per interval                            |
| updateTimeStamp          | DateTime   |                                                                                                                   |
| updateType               | MQSCHGType |                                                                                                                   |
| updateUser               | String     |                                                                                                                   |
| upperLimit               | Float      | resource energy ramping upper limit                                                                               |

Table 330 shows all association ends of ResourceDispatchResults with other classes.

**Table 330 – Association ends of MarketResults::ResourceDispatchResults with other classes**

| [mult from] | [mult to] name            | type               | description |
|-------------|---------------------------|--------------------|-------------|
| [0..*]      | [0..1] RegisteredResource | RegisteredResource |             |
| [1..*]      | [0..1] ResourceClearing   | ResourceClearing   |             |

#### 6.5.6.3.46 ResourceLoadFollowingInst root class

Model of market clearing results for resources that bid to follow load

Table 331 shows all attributes of ResourceLoadFollowingInst.

**Table 331 – Attributes of MarketResults::ResourceLoadFollowingInst**

| name                | type     | description                                                                                       |
|---------------------|----------|---------------------------------------------------------------------------------------------------|
| instructionID       | String   | Unique instruction id per instruction, assigned by the SC and provided to ADS. ADS passes through |
| intervalStartTime   | DateTime | The start of the time interval for which requirement is defined.                                  |
| calcLoadFollowingMW | Float    | Weighted average for RTPD and RTCD and same for RTID                                              |
| dispWindowLowLimt   | Float    |                                                                                                   |
| dispWindowHighLimt  | Float    |                                                                                                   |

Table 332 shows all association ends of ResourceLoadFollowingInst with other classes.

**Table 332 – Association ends of MarketResults::ResourceLoadFollowingInst with other classes**

| [mult from] | [mult to] name            | type               | description |
|-------------|---------------------------|--------------------|-------------|
| [0..*]      | [0..1] RegisteredResource | RegisteredResource |             |
| [0..*]      | [0..1] ResourceClearing   | ResourceClearing   |             |

#### 6.5.6.3.47 RMRDetermination root class

Indicates whether unit is a reliability must run unit: required to be on to satisfy Grid Code Reliability criteria, load demand, or voltage support.

Table 333 shows all association ends of RMRDetermination with other classes.



**Table 333 – Association ends of MarketResults::RMRDetermination with other classes**

| [mult from] | [mult to] name              | type                 | description |
|-------------|-----------------------------|----------------------|-------------|
| [0..*]      | [1..*] MitigatedBidClearing | MitigatedBidClearing |             |
| [0..*]      | [0..1] Bid                  | Bid                  |             |

**6.5.6.3.48 RMROperatorInput**

RMR Operator's entry of the RMR requirement per market interval.

Table 334 shows all attributes of RMROperatorInput.

**Table 334 – Attributes of MarketResults::RMROperatorInput**

| name                 | type              | description                                                                                                                       |
|----------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| manuallySchedRMRMw   | Float             | The lower of the original pre-dispatch or the AC run schedule (Also known as the RMR Requirement) becomes the pre-dispatch value. |
| updateUser           | String            |                                                                                                                                   |
| updateTimeStamp      | DateTime          |                                                                                                                                   |
| updateType           | MQSCHGType        |                                                                                                                                   |
| intervalEndTime      | DateTime          | inherited from: MarketFactors                                                                                                     |
| intervalStartTime    | DateTime          | inherited from: MarketFactors                                                                                                     |
| type                 | String            | inherited from: Document                                                                                                          |
| createdDateTime      | DateTime          | inherited from: Document                                                                                                          |
| lastModifiedDateTime | DateTime          | inherited from: Document                                                                                                          |
| revisionNumber       | String            | inherited from: Document                                                                                                          |
| electronicAddress    | ElectronicAddress | inherited from: Document                                                                                                          |
| subject              | String            | inherited from: Document                                                                                                          |
| title                | String            | inherited from: Document                                                                                                          |
| docStatus            | Status            | inherited from: Document                                                                                                          |
| status               | Status            | inherited from: Document                                                                                                          |
| aliasName            | String            | inherited from: IdentifiedObject                                                                                                  |
| mRID                 | String            | inherited from: IdentifiedObject                                                                                                  |
| name                 | String            | inherited from: IdentifiedObject                                                                                                  |

Table 335 shows all association ends of RMROperatorInput with other classes.

**Table 335 – Association ends of MarketResults::RMROperatorInput with other classes**

| [mult from] | [mult to] name             | type               | description                      |
|-------------|----------------------------|--------------------|----------------------------------|
| [0..*]      | [0..1] RegisteredResource  | RegisteredResource |                                  |
| [0..*]      | [0..*] MktActivityRecord   | MktActivityRecord  | inherited from: MarketFactors    |
| [0..*]      | [0..1] Market              | Market             | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject      | inherited from: IdentifiedObject |

| [mult from] | [mult to] name | type | description                      |
|-------------|----------------|------|----------------------------------|
| [1..1]      | [0..*] Names   | Name | inherited from: IdentifiedObject |

#### 6.5.6.3.49 RUCAwardInstruction root class

This class models the information about the RUC awards

Table 336 shows all attributes of RUCAwardInstruction.

**Table 336 – Attributes of MarketResults::RUCAwardInstruction**

| name              | type              | description                                                                                                                                                                                                         |
|-------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| clearedPrice      | Float             | Marginal Price (\$/MW) for the commodity (Regulation Up, Regulation Down, Spinning Reserve, or Non-spinning reserve) for pricing run.                                                                               |
| marketProductType | MarketProductType | major product type may include the following but not limited to:<br>Energy<br>Regulation Up<br>Regulation Dn<br>Spinning Reserve<br>Non-Spinning Reserve<br>Operating Reserve                                       |
| RUCAward          | Float             | The RUC Award of a resource is the portion of the RUC Capacity that is not under RA or RMR contracts. The RUC Award of a resource is the portion of the RUC Capacity that is eligible for RUC Availability payment. |
| RUCCapacity       | Float             | The RUC Capacity of a resource is the difference between (i) the RUC Schedule and (ii) the higher of the DA Schedule and the Minimum Load.                                                                          |
| RUCSchedule       | Float             | The RUC Schedule of a resource is its output level that balances the load forecast used in RUC. The RUC Schedule in RUC is similar to the DA Schedule in DAM.                                                       |
| updateTimeStamp   | DateTime          |                                                                                                                                                                                                                     |
| updateType        | MQSCHGType        |                                                                                                                                                                                                                     |
| updateUser        | String            |                                                                                                                                                                                                                     |

Table 337 shows all association ends of RUCAwardInstruction with other classes.

**Table 337 – Association ends of MarketResults::RUCAwardInstruction with other classes**

| [mult from] | [mult to] name               | type                  | description |
|-------------|------------------------------|-----------------------|-------------|
| [0..*]      | [0..1] RegisteredResource    | RegisteredResource    |             |
| [1..*]      | [1..*] ClearingResourceAward | ResourceAwardClearing |             |

### 6.5.6.3.50 SelfScheduleBreakdown root class

Model of Self Schedules Results. Includes self schedule MW, and type of self schedule for each self schedule type included in total self schedule MW value found in ResourceAwardInstruction.

Table 338 shows all attributes of SelfScheduleBreakdown.

**Table 338 – Attributes of MarketResults::SelfScheduleBreakdown**

| name          | type                      | description                                               |
|---------------|---------------------------|-----------------------------------------------------------|
| selfSchedMW   | Float                     | Cleared value for the specific self schedule type listed. |
| selfSchedType | SelfScheduleBreakdownType | Self schedule breakdown type.                             |

Table 339 shows all association ends of SelfScheduleBreakdown with other classes.

**Table 339 – Association ends of MarketResults::SelfScheduleBreakdown with other classes**

| [mult from] | [mult to] name                  | type                     | description |
|-------------|---------------------------------|--------------------------|-------------|
| [0..*]      | [1..1] ResourceAwardInstruction | ResourceAwardInstruction |             |

### 6.5.6.3.51 Settlement

Specifies a settlement run.

Table 340 shows all attributes of Settlement.

**Table 340 – Attributes of MarketResults::Settlement**

| name                 | type              | description                                    |
|----------------------|-------------------|------------------------------------------------|
| tradeDate            | DateTime          | The trade date on which the settlement is run. |
| type                 | String            | inherited from: Document                       |
| createdDateTime      | DateTime          | inherited from: Document                       |
| lastModifiedDateTime | DateTime          | inherited from: Document                       |
| revisionNumber       | String            | inherited from: Document                       |
| electronicAddress    | ElectronicAddress | inherited from: Document                       |
| subject              | String            | inherited from: Document                       |
| title                | String            | inherited from: Document                       |
| docStatus            | Status            | inherited from: Document                       |
| status               | Status            | inherited from: Document                       |
| aliasName            | String            | inherited from: IdentifiedObject               |
| mRID                 | String            | inherited from: IdentifiedObject               |
| name                 | String            | inherited from: IdentifiedObject               |

Table 341 shows all association ends of Settlement with other classes.

**Table 341 – Association ends of MarketResults::Settlement with other classes**

| [mult from] | [mult to] name               | type                  | description                      |
|-------------|------------------------------|-----------------------|----------------------------------|
| [0..*]      | [0..*] MarketInvoiceLineItem | MarketInvoiceLineItem |                                  |
| [0..*]      | [0..*] MarketLedgerEntry     | MarketLedgerEntry     |                                  |
| [0..*]      | [0..1] EnergyMarket          | EnergyMarket          |                                  |
| [0..*]      | [1..*] MajorChargeGroup      | MajorChargeGroup      |                                  |
| [0..1]      | [0..*] ConfigurationEvents   | ConfigurationEvent    | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects        | DiagramObject         | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                 | Name                  | inherited from: IdentifiedObject |

#### 6.5.6.3.52 TransactionBidClearing

Contains the intervals relevant for the associated TransactionBidResults. For example, Day Ahead cleared results for the transaction bids for each interval of the market day.

Table 342 shows all attributes of TransactionBidClearing.

**Table 342 – Attributes of MarketResults::TransactionBidClearing**

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| intervalEndTime      | DateTime          | inherited from: MarketFactors    |
| intervalStartTime    | DateTime          | inherited from: MarketFactors    |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 343 shows all association ends of TransactionBidClearing with other classes.

**Table 343 – Association ends of MarketResults::TransactionBidClearing with other classes**

| [mult from] | [mult to] name               | type                  | description                   |
|-------------|------------------------------|-----------------------|-------------------------------|
| [1..1]      | [0..*] TransactionBidResults | TransactionBidResults |                               |
| [0..*]      | [0..*] MktActivityRecord     | MktActivityRecord     | inherited from: MarketFactors |

| [mult from] | [mult to] name             | type               | description                      |
|-------------|----------------------------|--------------------|----------------------------------|
| [0..*]      | [0..1] Market              | Market             | inherited from: MarketFactors    |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name               | inherited from: IdentifiedObject |

### 6.5.6.3.53 TransactionBidResults

Contains the cleared results for each TransactionBid submitted to and accepted by the market.

Table 344 shows all attributes of TransactionBidResults.

**Table 344 – Attributes of MarketResults::TransactionBidResults**

| name         | type   | description                         |
|--------------|--------|-------------------------------------|
| clearedMW    | Float  | The market transaction megawatt     |
| clearedPrice | Float  | The price of the market transaction |
| aliasName    | String | inherited from: IdentifiedObject    |
| mRID         | String | inherited from: IdentifiedObject    |
| name         | String | inherited from: IdentifiedObject    |

Table 345 shows all association ends of TransactionBidResults with other classes.

**Table 345 – Association ends of MarketResults::TransactionBidResults with other classes**

| [mult from] | [mult to] name                | type                   | description                      |
|-------------|-------------------------------|------------------------|----------------------------------|
| [0..*]      | [1..1] TransactionBidClearing | TransactionBidClearing |                                  |
| [0..*]      | [0..1] TransactionBid         | TransactionBid         |                                  |
| [0..1]      | [0..*] DiagramObjects         | DiagramObject          | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                  | Name                   | inherited from: IdentifiedObject |

## 6.5.7 Package MktDomain

### 6.5.7.1 General

The MktDomain package is a data dictionary of quantities and units that define datatypes for attributes (properties) that may be used by any class in any other package within MarketOperations.

### 6.5.7.2 ActionType enumeration

Action type associated with an ActionRequest against a ParticipantInterfaces::Trade.

Table 346 shows all literals of ActionType.

**Table 346 – Literals of MktDomain::ActionType**

| literal | description     |
|---------|-----------------|
| CANCEL  | Cancel a trade. |

**6.5.7.3 AnalogLimitType enumeration**

Limit type specified for AnalogLimits.

Table 347 shows all literals of AnalogLimitType.

**Table 347 – Literals of MktDomain::AnalogLimitType**

| literal          | description              |
|------------------|--------------------------|
| BranchMediumTerm | Branch Medium Term Limit |
| BranchLongTerm   | Branch Long Term Limit   |
| BranchShortTerm  | Branch Short Term Limit  |
| VoltageHigh      | Voltage High Limit       |
| VoltageLow       | Voltage Low Limit        |

**6.5.7.4 AnodeType enumeration**

Aggregated Nodes Types for example:

SYS – System Zone/Region;

RUC – RUC Zone;

LFZ – Load Forecast Zone;

REG – Market Energy/Ancillary Service Region;

AGR – Aggregate Generation Resource;

POD – Point of Delivery;

ALR – Aggregate Load Resource;

LTAC – Load Transmission Access Charge (TAC) Group;

ACA – Adjacent Control Area

ASR – Aggregated System Resource

ECA – Embedded Control Area

Table 348 shows all literals of AnodeType.

**Table 348 – Literals of MktDomain::AnodeType**

| literal | description                             |
|---------|-----------------------------------------|
| SYS     | System Zone/Region;                     |
| RUC     | RUC Zone                                |
| LFZ     | Load Forecast Zone                      |
| REG     | Market Energy/Ancillary Service Region; |
| AGR     | Aggregate Generation Resource;          |
| POD     | Point of Delivery;                      |
| ALR     | Aggregate Load Resource;                |

| literal | description                                |
|---------|--------------------------------------------|
| LTAC    | Load TransmissionAccessCharge (TAC) Group; |
| ACA     | Adjacent Control Area                      |
| ASR     | Aggregated System Resource                 |
| ECA     | Embedded Control Area                      |

#### 6.5.7.5 ApnodeType enumeration

Aggregate Node Types for example:

AG – Aggregated Generation

CPZ – Custom Price Zone

DPZ – Default Price Zone

LAP – Load Aggregation Point

TH – Trading Hub

SYS – System Zone

CA – Control Area

GA – generic aggregation

EHV – 500 kV

GH – generic hub

ZN – zone

INT – Interface

BUS – Bus

Table 349 shows all literals of ApnodeType.

**Table 349 – Literals of MktDomain::ApnodeType**

| literal | description                                       |
|---------|---------------------------------------------------|
| AG      | Aggregated Generation                             |
| CPZ     | Custom Price Zone                                 |
| DPZ     | Default Price Zone                                |
| TH      | Trading Hub                                       |
| SYS     | System Zone                                       |
| CA      | Control Area                                      |
| DCA     | Designated Congestion Area                        |
| GA      | generic aggregation                               |
| GH      | generic hub                                       |
| EHV     | 500 kV – Extra High Voltage aggregate price nodes |
| ZN      | Zone                                              |
| INT     | Interface                                         |
| BUS     | Bus                                               |

#### 6.5.7.6 AreaControlMode enumeration

Area's present control mode

Table 350 shows all literals of AreaControlMode.

**Table 350 – Literals of MktDomain::AreaControlMode**

| literal | description             |
|---------|-------------------------|
| CF      | CF = Constant Frequency |
| CTL     | Constant Tie-Line       |
| TLB     | Tie-Line Bias           |
| OFF     | Off control             |

#### 6.5.7.7 AutomaticDispatchMode enumeration

Automatic Dispatch mode

Table 351 shows all literals of AutomaticDispatchMode.

**Table 351 – Literals of MktDomain::AutomaticDispatchMode**

| literal     | description                                                |
|-------------|------------------------------------------------------------|
| INTERVAL    |                                                            |
| CONTINGENCY | Contingency occurrence, redispatch of contingency reserves |
| MANUAL      | Operator override                                          |

#### 6.5.7.8 AutomaticDisplnstTypeCommitment enumeration

Commitment instruction types.

Table 352 shows all literals of AutomaticDisplnstTypeCommitment.

**Table 352 – Literals of MktDomain::AutomaticDisplnstTypeCommitment**

| literal   | description                |
|-----------|----------------------------|
| START_UP  | Start up instruction type  |
| SHUT_DOWN | Shut down instruction type |

#### 6.5.7.9 BidCalculationBasis enumeration

The basis used to calculate the bid price curve for an energy default bid.

Table 353 shows all literals of BidCalculationBasis.

**Table 353 – Literals of MktDomain::BidCalculationBasis**

| literal    | description                                                  |
|------------|--------------------------------------------------------------|
| LMP_BASED  | Based on prices paid at particular pricing location.         |
| COST_BASED | Based on unit generation characteristics and a cost of fuel. |
| NEGOTIATED | An amount negotiated with the designated Independent Entity. |



#### 6.5.7.10 BidMitigationStatus enumeration

For example:

'S' – Mitigated by SMPM because of "misconduct"

'L' – Mitigated by LMPM because of "misconduct"

'R' – Modified by LMPM because of RMR rules

'M' – Mitigated because of "misconduct" both by SMPM and LMPM

'B' – Mitigated because of "misconduct" both by SMPM and modified by LMLM because of RMR rules

'O' – original

Table 354 shows all literals of BidMitigationStatus.

**Table 354 – Literals of MktDomain::BidMitigationStatus**

| literal | description |
|---------|-------------|
| S       |             |
| L       |             |
| R       |             |
| M       |             |
| B       |             |
| O       |             |

#### 6.5.7.11 BidMitigationType enumeration

For example:

Initial

Final

Table 355 shows all literals of BidMitigationType.

**Table 355 – Literals of MktDomain::BidMitigationType**

| literal | description |
|---------|-------------|
| I       |             |
| F       |             |

#### 6.5.7.12 BidType enumeration

For example:

DEFAULT\_ENERGY\_BID

DEFAULT\_STARTUP\_BID

DEFAULT\_MINIMUM\_LOAD\_BID

Table 356 shows all literals of BidType.

**Table 356 – Literals of MktDomain::BidType**

| literal                  | description |
|--------------------------|-------------|
| DEFAULT_ENERGY_BID       |             |
| DEFAULT_STARTUP_BID      |             |
| DEFAULT_MINIMUM_LOAD_BID |             |

**6.5.7.13 BidTypeRMR enumeration**

Bid self schedule type has two types as the required output of requirements and qualified pre-dispatch.

Table 357 shows all literals of BidTypeRMR.

**Table 357 – Literals of MktDomain::BidTypeRMR**

| literal               | description                                    |
|-----------------------|------------------------------------------------|
| REQUIREMENTS          | Qualified pre-dispatch bid self schedule type. |
| QUALIFIED_PREDISPATCH | Output of requirements bid self schedule type. |

**6.5.7.14 BranchRatingType enumeration**

Operational limit types for branch derates

Table 358 shows all literals of BranchRatingType.

**Table 358 – Literals of MktDomain::BranchRatingType**

| literal   | description          |
|-----------|----------------------|
| Normal    |                      |
| Emergency |                      |
| ShortTerm | Short Term Emergency |
| LongTerm  | Long Term Emergency  |

**6.5.7.15 CheckOutType enumeration**

To indicate a check out type such as adjusted capacity or dispatch capacity

Table 359 shows all literals of CheckOutType.

**Table 359 – Literals of MktDomain::CheckOutType**

| literal        | description |
|----------------|-------------|
| PRE_HOUR       |             |
| PRE_SCHEDULE   |             |
| AFTER_THE_FACT |             |

**6.5.7.16 CommitmentType enumeration**

For example:

SELF – Self commitment

ISO – New commitment for this market period

UC – Existing commitment that was a hold over from a previous market.

Table 360 shows all literals of CommitmentType.

**Table 360 – Literals of MktDomain::CommitmentType**

| literal | description |
|---------|-------------|
| SELF    |             |
| ISO     |             |
| UC      |             |

**6.5.7.17 ConstraintLimitType enumeration**

Binding constraint results limit type, For example:

MAXIMUM

MINIMUM

Table 361 shows all literals of ConstraintLimitType.

**Table 361 – Literals of MktDomain::ConstraintLimitType**

| literal | description |
|---------|-------------|
| MAXIMUM |             |
| MINIMUM |             |

**6.5.7.18 ConstraintRampType enumeration**

Constraint Ramp type

Table 362 shows all literals of ConstraintRampType.

**Table 362 – Literals of MktDomain::ConstraintRampType**

| literal | description |
|---------|-------------|
| FAST    |             |
| SLOW    |             |

**6.5.7.19 ContractType enumeration**

Transmission Contract Type, For example:

O – Other

TE – Transmission Export

TI – Transmission Import

ETC – Existing Transmission Contract

RMT – RMT Contract

TOR – Transmission Ownership Right

RMR – Reliability Must Run Contract

CVR – Converted contract.

Table 363 shows all literals of ContractType.

**Table 363 – Literals of MktDomain::ContractType**

| literal | description                          |
|---------|--------------------------------------|
| ETC     | ETC – Existing Transmission Contract |
| TOR     | TOR – Transmission Ownership Right   |
| RMR     | RMR – Reliability Must Run Contract  |
| RMT     | RMT – RMT Contract                   |
| O       | O – Other                            |
| TE      | TE – Transmission Export             |
| TI      | TI – Transmission Import             |
| CVR     | CVR – Converted contract.            |

#### 6.5.7.20 CostBasis enumeration

For example:

Bid Cost

Proxy Cost

Registered Cost

Table 364 shows all literals of CostBasis.

**Table 364 – Literals of MktDomain::CostBasis**

| literal | description |
|---------|-------------|
| BIDC    |             |
| PRXC    |             |
| REGC    |             |

#### 6.5.7.21 CRRCategoryType enumeration

Congestion Revenue Rights category types

Table 365 shows all literals of CRRCategoryType.

**Table 365 – Literals of MktDomain::CRRCategoryType**

| literal | description     |
|---------|-----------------|
| NSR     | Network Service |
| PTP     | Point to Point  |

**6.5.7.22 CRRHedgeType enumeration**

Congestion Revenue Right hedge type

Table 366 shows all literals of CRRHedgeType.

**Table 366 – Literals of MktDomain::CRRHedgeType**

| literal    | description |
|------------|-------------|
| OBLIGATION |             |
| OPTION     |             |

**6.5.7.23 CRRRoleType enumeration**

Role types an organisation can play with respect to a congestion revenue right.

Table 367 shows all literals of CRRRoleType.

**Table 367 – Literals of MktDomain::CRRRoleType**

| literal | description |
|---------|-------------|
| SELLER  |             |
| BUYER   |             |
| OWNER   |             |

**6.5.7.24 CRRSegmentType enumeration**

Type of the CRR, from the possible type definitions in the CRR System (e.g. 'LSE', 'ETC').

Table 368 shows all literals of CRRSegmentType.

**Table 368 – Literals of MktDomain::CRRSegmentType**

| literal | description                     |
|---------|---------------------------------|
| AUC     |                                 |
| CAP     |                                 |
| CF      |                                 |
| CVR     | Converted rights.               |
| ETC     | Existing Transmission Contract. |
| LSE     | Load Serving Entity.            |
| MT      | Merchant transmission.          |
| TOR     | Transmission Ownership Rights.  |

**6.5.7.25 DispatchResponseType enumeration**

For example:

NON\_RESPONSE

ACCEPT

DECLINE

PARTIAL.

Table 369 shows all literals of DispatchResponseType.

**Table 369 – Literals of MktDomain::DispatchResponseType**

| literal      | description |
|--------------|-------------|
| NON_RESPONSE |             |
| ACCEPT       |             |
| DECLINE      |             |
| PARTIAL      |             |

#### 6.5.7.26 EnergyPriceIndexType enumeration

For example:

WHOLESALE

RETAIL

BOTH

Table 370 shows all literals of EnergyPriceIndexType.

**Table 370 – Literals of MktDomain::EnergyPriceIndexType**

| literal   | description |
|-----------|-------------|
| WHOLESALE |             |
| RETAIL    |             |
| BOTH      |             |

#### 6.5.7.27 EnergyProductType enumeration

Energy product type

Table 371 shows all literals of EnergyProductType.

**Table 371 – Literals of MktDomain::EnergyProductType**

| literal | description |
|---------|-------------|
| FIRM    | Firm        |
| NFRM    | Non Firm    |
| DYN     | Dynamic     |
| WHL     | Wheeling    |

#### 6.5.7.28 EnergyTransactionType enumeration

Defines the state of a transaction.

Table 372 shows all literals of EnergyTransactionType.

**Table 372 – Literals of MktDomain::EnergyTransactionType**

| literal | description |
|---------|-------------|
| approve | Approve     |
| deny    | Deny        |
| study   | Study       |

**6.5.7.29 EquipmentStatusType enumeration**

Status of equipment

Table 373 shows all literals of EquipmentStatusType.

**Table 373 – Literals of MktDomain::EquipmentStatusType**

| literal | description       |
|---------|-------------------|
| In      | Equipment is in.  |
| Out     | Equipment is out. |

**6.5.7.30 ExecutionType enumeration**

Execution types of Market Runs

Table 374 shows all literals of ExecutionType.

**Table 374 – Literals of MktDomain::ExecutionType**

| literal | description                    |
|---------|--------------------------------|
| DA      | Day Ahead                      |
| HASP    | Real Time Hour Ahead Execution |
| RTPD    | Real Time Pre-dispatch         |
| RTD     | Real Time Dispatch             |

**6.5.7.31 FlagTypeRMR enumeration**

Indicates whether the unit is RMR and it's condition type, for example:

N' – not an RMR unit

'1' – RMR Condition 1 unit

'2' – RMR Condition 2 unit

Table 375 shows all literals of FlagTypeRMR.

**Table 375 – Literals of MktDomain::FlagTypeRMR**

| literal | description                |
|---------|----------------------------|
| N       | 'N' – not an RMR unit      |
| 1       | '1' – RMR Condition 1 unit |
| 2       | '2' – RMR Condition 2 unit |

### 6.5.7.32 FlowDirectionType enumeration

Specifies the direction of energy flow in the flowgate.

Table 376 shows all literals of FlowDirectionType.

**Table 376 – Literals of MktDomain::FlowDirectionType**

| literal | description        |
|---------|--------------------|
| Forward | Forward direction. |
| Reverse | Reverse direction. |

### 6.5.7.33 FuelSource enumeration

For example:

Bio Gas (Landfill, Sewage, Digester, etc.)

Biomass

Coal

DIST

Natural Gas

Geothermal

HRCV

None

Nuclear

Oil

Other

Solar

Waste to Energy

Water

Wind

Table 377 shows all literals of FuelSource.

**Table 377 – Literals of MktDomain::FuelSource**

| literal | description                                |
|---------|--------------------------------------------|
| NG      | Natural Gas                                |
| NNG     | Non-Natural Gas                            |
| BGAS    | Bio Gas (Landfill, Sewage, Digester, etc.) |
| BIOM    | Biomass                                    |
| COAL    | Coal                                       |
| DIST    |                                            |
| GAS     |                                            |
| GEOT    | GeoThermal                                 |
| HRCV    |                                            |
| NONE    |                                            |
| NUCL    | Nuclear                                    |



| literal | description     |
|---------|-----------------|
| OIL     |                 |
| OTHR    | Other           |
| SOLR    | Solar           |
| WAST    | Waste to Energy |
| WATR    | Water           |
| WIND    | Wind            |

#### 6.5.7.34 InterTieDirection enumeration

Direction of an intertie.

Table 378 shows all literals of InterTieDirection.

**Table 378 – Literals of MktDomain::InterTieDirection**

| literal | description |
|---------|-------------|
| E       | Export.     |
| I       | Import.     |

#### 6.5.7.35 LoadForecastType enumeration

Load forecast zone types

Table 379 shows all literals of LoadForecastType.

**Table 379 – Literals of MktDomain::LoadForecastType**

| literal | description              |
|---------|--------------------------|
| LFZ     | Load forecast zone.      |
| LZMS    | Metered sub system zone. |

#### 6.5.7.36 MarketProductSelfSchedType enumeration

Market product self schedule bid types.

Table 380 shows all literals of MarketProductSelfSchedType.

**Table 380 – Literals of MktDomain::MarketProductSelfSchedType**

| literal | description                     |
|---------|---------------------------------|
| ETC     | Existing Transmission Contract. |
| TOR     | Transmission Ownership Right.   |
| RMR     | Reliability Must Run.           |
| RGMR    | Regulatory must run.            |
| RMT     | Reliability must take.          |
| PT      | Price taker.                    |
| LPT     | Low price taker.                |

| literal | description        |
|---------|--------------------|
| SP      | Self provision.    |
| RA      | Resource adequacy. |

#### 6.5.7.37 MarketProductType enumeration

For example:

Energy, Reg Up, Reg Down, Spin Reserve, Nonspin Reserve, RUC, Load Following Up, and Load Following Down.

Table 381 shows all literals of MarketProductType.

**Table 381 – Literals of MktDomain::MarketProductType**

| literal | description              |
|---------|--------------------------|
| EN      | energy type              |
| RU      | regulation up            |
| RD      | regulation down          |
| SR      | spinning reserve         |
| NR      | non spinning reserve     |
| RC      | Residual Unit Commitment |
| LFU     | Load following up        |
| LFD     | Load following down      |
| REG     | Regulation               |

#### 6.5.7.38 MarketType enumeration

Market type.

Table 382 shows all literals of MarketType.

**Table 382 – Literals of MktDomain::MarketType**

| literal | description               |
|---------|---------------------------|
| DAM     | Day ahead market.         |
| RTM     | Real time market.         |
| HAM     | Hour Ahead Market.        |
| RUC     | Residual Unit Commitment. |

#### 6.5.7.39 MktAccountKind enumeration

Kind of Market account.

Table 383 shows all literals of MktAccountKind.

**Table 383 – Literals of MktDomain::MktAccountKind**

| literal     | description |
|-------------|-------------|
| normal      |             |
| reversal    |             |
| statistical |             |
| estimate    |             |

**6.5.7.40 MktBillMediaKind enumeration**

Kind of bill media.

Table 384 shows all literals of MktBillMediaKind.

**Table 384 – Literals of MktDomain::MktBillMediaKind**

| literal    | description |
|------------|-------------|
| paper      |             |
| electronic |             |
| other      |             |

**6.5.7.41 MktInvoiceLineItemKind enumeration**

Kind of invoice line item.

Table 385 shows all literals of MktInvoiceLineItemKind.

**Table 385 – Literals of MktDomain::MktInvoiceLineItemKind**

| literal       | description |
|---------------|-------------|
| initial       |             |
| recalculation |             |
| other         |             |

**6.5.7.42 MPMTIdentifierType enumeration**

Market power mitigation test identifier type, for example:

- 1 ? Global Price Test
- 2 ? Global Conduct Test
- 3 ? Global Impact Test
- 4 ? Local Price Test
- 5 ? Local Conduct Test
- 6 ? Local Impact Test

Table 386 shows all literals of MPMTIdentifierType.

**Table 386 – Literals of MktDomain::MPMTestIdentifierType**

| literal | description              |
|---------|--------------------------|
| 1       | 1 – Global Price Test.   |
| 2       | 2 – Global Conduct Test. |
| 3       | 3 – Global Impact Test.  |
| 4       | 4 – Local Price Test.    |
| 5       | 5 – Local Conduct Test.  |
| 6       | 6 – Local Impact Test.   |

**6.5.7.43 MPMTestMethodType enumeration**

Market power mitigation test method type.

Tests with the normal (default) thresholds or tests with the alternate thresholds.

Table 387 shows all literals of MPMTestMethodType.

**Table 387 – Literals of MktDomain::MPMTestMethodType**

| literal   | description |
|-----------|-------------|
| NORMAL    | Normal.     |
| ALTERNATE | Alternate.  |

**6.5.7.44 MPMTestOutcome enumeration**

For example:

Passed

Failed

Disabled

Skipped

Table 388 shows all literals of MPMTestOutcome.

**Table 388 – Literals of MktDomain::MPMTestOutcome**

| literal | description |
|---------|-------------|
| P       | Passed      |
| F       | Failed      |
| D       | Disabled    |
| S       | Skipped     |

**6.5.7.45 MQSCHGType enumeration**

For example:

ADD – add

CHG – change

Table 389 shows all literals of MQSCHGType.

**Table 389 – Literals of MktDomain::MQSCHGType**

| literal | description |
|---------|-------------|
| ADD     |             |
| CHG     |             |

#### 6.5.7.46 MQSInstructionSource enumeration

Valid values, for example:

INS – Instruction from RTM

ACT – Actual instruction after the fact

Table 390 shows all literals of MQSInstructionSource.

**Table 390 – Literals of MktDomain::MQSInstructionSource**

| literal | description |
|---------|-------------|
| INS     |             |
| ACT     |             |

#### 6.5.7.47 OnOff enumeration

ON

OFF

Table 391 shows all literals of OnOff.

**Table 391 – Literals of MktDomain::OnOff**

| literal | description |
|---------|-------------|
| ON      |             |
| OFF     |             |

#### 6.5.7.48 OutageType enumeration

Outage type, IN, OUT, DERATE.

Table 392 shows all literals of OutageType.

**Table 392 – Literals of MktDomain::OutageType**

| literal | description                                                 |
|---------|-------------------------------------------------------------|
| OUT     | Equipment status is outaged.                                |
| IN      | Equipment status is reinstated.                             |
| DERATE  | Equipment has a derated limit set by the derateP attribute. |

#### 6.5.7.49 ParticipationCategoryMPM enumeration

For example:

'Y' – Participates in both LMPM and SMPM

'N' – Not included in LMP price measures

'S' – Participates in SMPM price measures

'L' – Participates in LMPM price measures

Table 393 shows all literals of ParticipationCategoryMPM.

**Table 393 – Literals of MktDomain::ParticipationCategoryMPM**

| literal | description |
|---------|-------------|
| Y       |             |
| N       |             |
| S       |             |
| L       |             |

#### 6.5.7.50 PassIndicatorType enumeration

Defines the individual passes that produce results per execution type/market type

Table 394 shows all literals of PassIndicatorType.

**Table 394 – Literals of MktDomain::PassIndicatorType**

| literal | description                                     |
|---------|-------------------------------------------------|
| MPM-1   | Market Power Mitigation Pass 1                  |
| MPM-2   | Market Power Mitigation Pass 2                  |
| MPM-3   | Market Power Mitigation Pass 3                  |
| MPM-4   | Market Power Mitigation Pass 4                  |
| RUC     | Residual Unit Commitment                        |
| RTPD    | Real Time Pre Dispatch                          |
| RTED    | Real Time Economic Dispatch                     |
| HA-SCUC | Hour Ahead Security Constrained Unit Commitment |
| DA      | Day Ahead                                       |

#### 6.5.7.51 PurposeFlagType enumeration

MPM Purpose Flag, for example:

Nature of threshold data:

'M' – Mitigation threshold

'R' – Reporting threshold

Table 395 shows all literals of PurposeFlagType.

**Table 395 – Literals of MktDomain::PurposeFlagType**

| literal | description |
|---------|-------------|
| M       |             |
| R       |             |

**6.5.7.52 RampCurveType enumeration**

For example:

0 – Fixed ramp rate independent of rate function unit MW output

1 – Static ramp rates as a function of unit MW output only

2 – Dynamic ramp rates as a function of unit MW output and ramping time

Table 396 shows all literals of RampCurveType.

**Table 396 – Literals of MktDomain::RampCurveType**

| literal | description                                                         |
|---------|---------------------------------------------------------------------|
| 0       | Fixed ramp rate independent of rate function unit MW output         |
| 1       | Static ramp rates as a function of unit MW output only              |
| 2       | Dynamic ramp rates as a function of unit MW output and ramping time |

**6.5.7.53 RampModeType enumeration**

For example:

0: ignore ramping limits,

1: 20-minute ramping rule,

2: 60-minute ramping rule

Table 397 shows all literals of RampModeType.

**Table 397 – Literals of MktDomain::RampModeType**

| literal | description             |
|---------|-------------------------|
| 0       | Ignore ramping limits   |
| 1       | 20-minute ramping rule, |
| 2       | 60-minute ramping rule  |

**6.5.7.54 RampRateCondition enumeration**

Ramp rate condition

Table 398 shows all literals of RampRateCondition.

**Table 398 – Literals of MktDomain::RampRateCondition**

| literal | description    |
|---------|----------------|
| WORST   |                |
| BEST    |                |
| NORMAL  |                |
| NA      | not applicable |

**6.5.7.55 RampRateType enumeration**

Ramp rate curve type.

Table 399 shows all literals of RampRateType.

**Table 399 – Literals of MktDomain::RampRateType**

| literal   | description                  |
|-----------|------------------------------|
| OP        | Operational ramp rate.       |
| REG       | Regulating ramp rate.        |
| OP_RES    | Operating reserve ramp rate. |
| LD_DROP   | Load drop ramp rate.         |
| LD_PICKUP | Load pick up rate.           |
| INTERTIE  | Intertie ramp rate.          |

**6.5.7.56 ReserveRequirementType enumeration**

For example:

Operating Reserve, Regulation, Contingency

Table 400 shows all literals of ReserveRequirementType.

**Table 400 – Literals of MktDomain::ReserveRequirementType**

| literal | description       |
|---------|-------------------|
| OPRSV   | Operating Reserve |
| CONT    | Contingency       |
| REG     | Regulation        |

**6.5.7.57 ResourceAncillaryServiceType enumeration**

Types used for resource AS qualifications

Table 401 shows all literals of ResourceAncillaryServiceType.



**Table 401 – Literals of MktDomain::ResourceAncillaryServiceType**

| literal    | description                 |
|------------|-----------------------------|
| REGUP      | Regulation Up               |
| REGDN      | Regulation Down             |
| RRSPIN     | Spinning Reserve            |
| NONSPIN    | Non Spinning Reserve        |
| RMR        | Reliability Must Run        |
| BLACKSTART | Black start                 |
| DSR        | Demand Side Reponse         |
| SYNCCOND   |                             |
| PIRP       | Intermittant resource       |
| RUC        | Reliability unit commitment |

**6.5.7.58 ResourceAssnType enumeration**

For example:

Asset Owner Sink designator for use by CRR

Asset Owner Source designator for use by CRR

Reliability Must Run

Scheduling Coordinator

Load Serving Entity

Table 402 shows all literals of ResourceAssnType.

**Table 402 – Literals of MktDomain::ResourceAssnType**

| literal | description |
|---------|-------------|
| CSNK    |             |
| CSRC    |             |
| RMR     |             |
| SC      |             |
| LSE     |             |

**6.5.7.59 ResourceCapacityType enumeration**

Resource capacity type.

Table 403 shows all literals of ResourceCapacityType.

**Table 403 – Literals of MktDomain::ResourceCapacityType**

| literal | description           |
|---------|-----------------------|
| RU      | Regulation Up.        |
| RD      | Regulation Down.      |
| SR      | Spinning reserve.     |
| NR      | Non spinning reserve. |

| literal | description           |
|---------|-----------------------|
| MO      | Must Offer.           |
| FO      | Flexible Offer.       |
| RA      | Resource Adequacy.    |
| RMR     | Reliability Must Run. |

#### 6.5.7.60 ResourceLimitIndicator enumeration

Locational AS Flags indicating whether the Upper or Lower Bound limit of the AS regional procurement is binding

Table 404 shows all literals of ResourceLimitIndicator.

**Table 404 – Literals of MktDomain::ResourceLimitIndicator**

| literal | description |
|---------|-------------|
| UPPER   |             |
| LOWER   |             |

#### 6.5.7.61 ResourceRegistrationStatus enumeration

Types of resource registration status, for example

Active

Mothballed

Planned

Decommissioned

Table 405 shows all literals of ResourceRegistrationStatus.

**Table 405 – Literals of MktDomain::ResourceRegistrationStatus**

| literal        | description                                    |
|----------------|------------------------------------------------|
| Active         | Resource registration is active                |
| Planned        | Registration status is in the planning stage   |
| Mothballed     | Resource registration has been suspended       |
| Decommissioned | Resource registration status is decommissioned |

#### 6.5.7.62 ResultsConstraintType enumeration

Market results binding constraint types.

Table 406 shows all literals of ResultsConstraintType.

**Table 406 – Literals of MktDomain::ResultsConstraintType**

| literal     | description               |
|-------------|---------------------------|
| FG_act      | Flowgate actual base case |
| Contingency | Contingency.              |

| literal   | description |
|-----------|-------------|
| Interface | Interface.  |
| Actual    | Actual.     |

#### 6.5.7.63 SelfSchedReferenceType enumeration

Indication of which type of self schedule is being referenced.

Table 407 shows all literals of SelfSchedReferenceType.

**Table 407 – Literals of MktDomain::SelfSchedReferenceType**

| literal | description                     |
|---------|---------------------------------|
| ETC     | Existing transmission contract. |
| TOR     | Transmission ownership right.   |

#### 6.5.7.64 SelfScheduleBreakdownType enumeration

Self schedule breakdown type.

Table 408 shows all literals of SelfScheduleBreakdownType.

**Table 408 – Literals of MktDomain::SelfScheduleBreakdownType**

| literal | description                     |
|---------|---------------------------------|
| ETC     | Existing transmission contract. |
| TOR     | Transmission ownership right.   |
| LPT     | Low price taker.                |

#### 6.5.7.65 SwitchStatusType enumeration

Circuit Breaker Status (closed or open) of the circuit breaker.

Table 409 shows all literals of SwitchStatusType.

**Table 409 – Literals of MktDomain::SwitchStatusType**

| literal | description    |
|---------|----------------|
| Closed  | Closed status. |
| Open    | Open status.   |

#### 6.5.7.66 TimeOfUse enumeration

Time of Use used by a CRR definition for specifying the time the CRR spans. ON – CRR spans the on peak hours of the day, OFF – CRR spans the off peak hours of the day, 24HR – CRR spans the entire day.

Table 410 shows all literals of TimeOfUse.

**Table 410 – Literals of MktDomain::TimeOfUse**

| literal | description                                           |
|---------|-------------------------------------------------------|
| ON      | Time of use spans only the on peak hours of the day.  |
| OFF     | Time of use spans only the off peak hours of the day. |
| 24HR    | Time of use spans the entire day, 24 hours.           |

#### 6.5.7.67 TradeType enumeration

Trade type.

Table 411 shows all literals of TradeType.

**Table 411 – Literals of MktDomain::TradeType**

| literal | description               |
|---------|---------------------------|
| IST     | InterSC Trade.            |
| AST     | Ancillary Services Trade. |
| UCT     | Unit Commitment Trade.    |

#### 6.5.7.68 TRType enumeration

Transmission Contract Right type -for example:

individual or chain of contract rights

Table 412 shows all literals of TRType.

**Table 412 – Literals of MktDomain::TRType**

| literal    | description   |
|------------|---------------|
| CHAIN      | TR chain      |
| INDIVIDUAL | Individual TR |

#### 6.5.7.69 UnitType enumeration

Combined Cycle

Gas Turbine

Hydro Turbine

Other

Photovoltaic

Hydro Pump-Turbine

Reciprocating Engine

Steam Turbine

Synchronous Condenser

Wind Turbine

Table 413 shows all literals of UnitType.

**Table 413 – Literals of MktDomain::UnitType**

| literal | description           |
|---------|-----------------------|
| CCYC    | Combined Cycle        |
| GTUR    | Gas Turbine           |
| HYDR    | Hydro Turbine         |
| OTHR    | Other                 |
| PHOT    | Photovoltaic          |
| PTUR    | Hydro Pump-Turbine    |
| RECP    | Reciprocating Engine  |
| STUR    | Steam Turbine         |
| SYNC    | Synchronous Condenser |
| WIND    | Wind Turbine          |

**6.5.7.70 YesNo enumeration**

Used as a flag set to Yes or No.

Table 414 shows all literals of YesNo.

**Table 414 – Literals of MktDomain::YesNo**

| literal | description |
|---------|-------------|
| YES     |             |
| NO      |             |

**6.5.8 Package ParticipantInterfaces****6.5.8.1 General**

Market participant interfaces for bids and trades.

Figure 41 shows class diagram ParticipantBids.

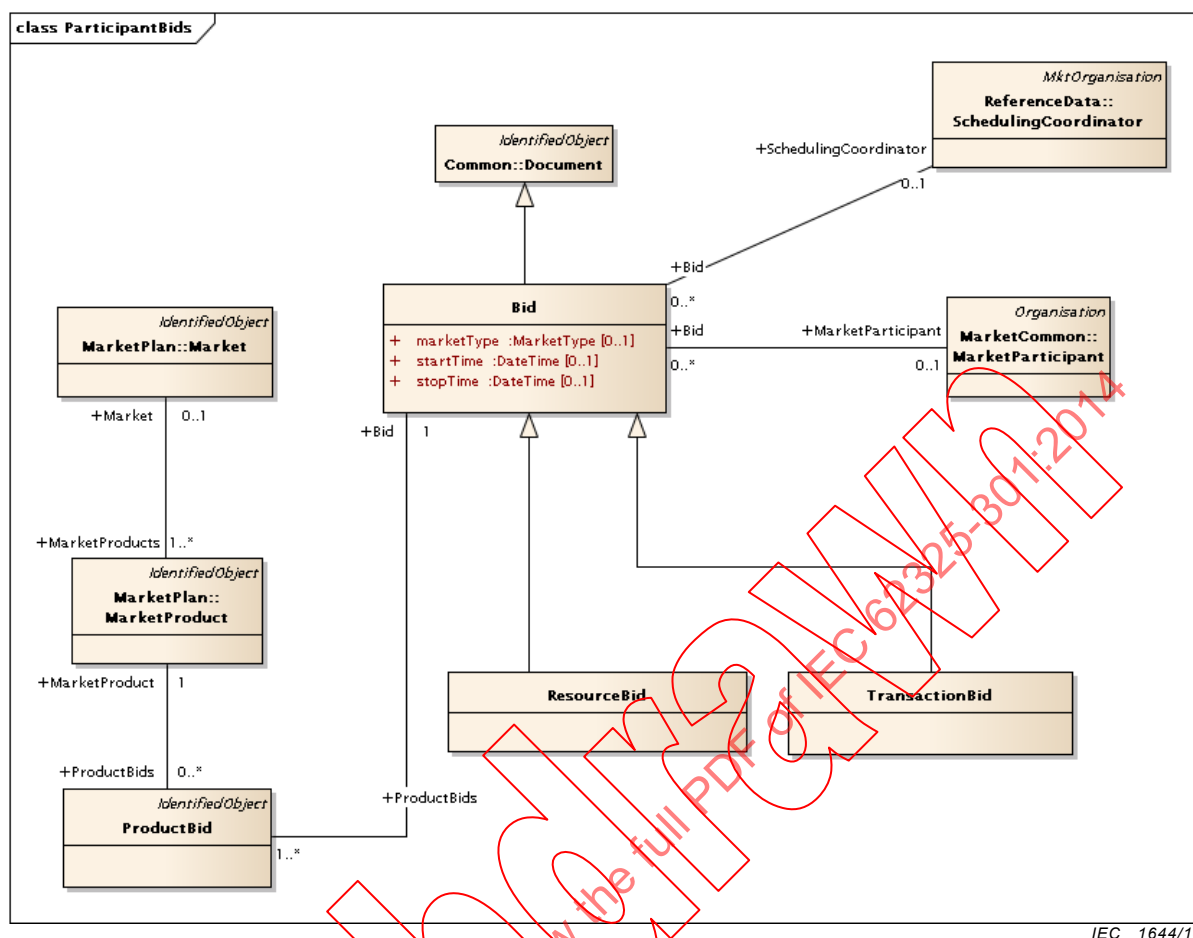


**Figure 41 – Class diagram ParticipantInterfaces::ParticipantBids**

This figure shows the overview of the class and associations that are used to model offers and bids. The term bid is used to include offers to sell and bids to buy one or more electrical products. The bid is a subclass of the document class from the 61968 package. Bids are further classified as Resource Bids or Transaction Bids. Bids are associated with Scheduling Coordinators that submit them on behalf of market participants as shown by the association between the Bid class and the Scheduling Coordinator class.

Figure 42 shows class diagram ParticipantTrades.

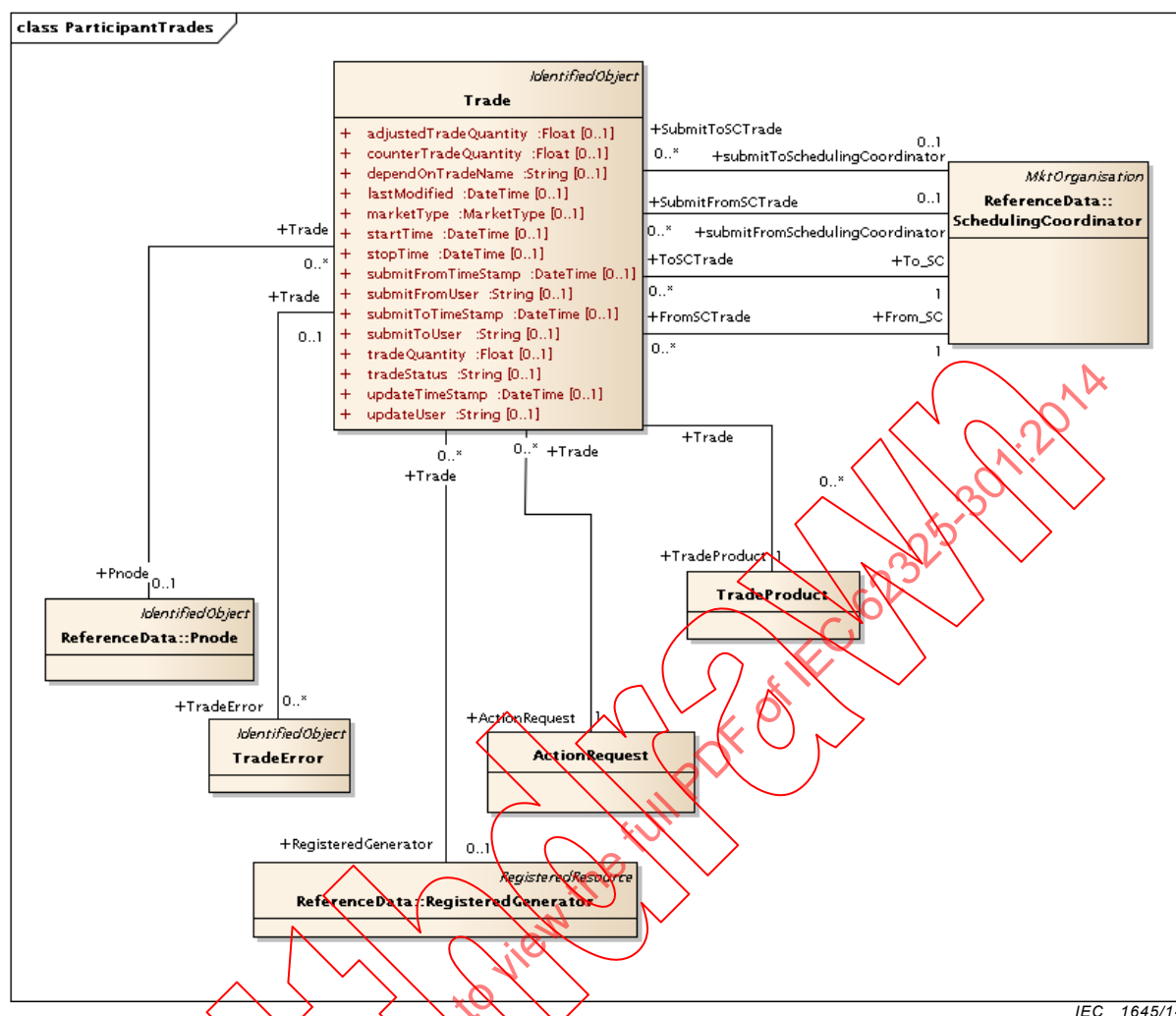


Figure 42 – Class diagram ParticipantInterfaces::ParticipantTrades

This figure shows the class and associations used to model inter scheduling coordinator financial trades. The TradeProduct class is used to indicate the electric product that is included in the trade. The SchedulingCoordinator class is used to indicate the scheduling coordinators involved in the trade.

Figure 43 shows class diagram ResourceBids.

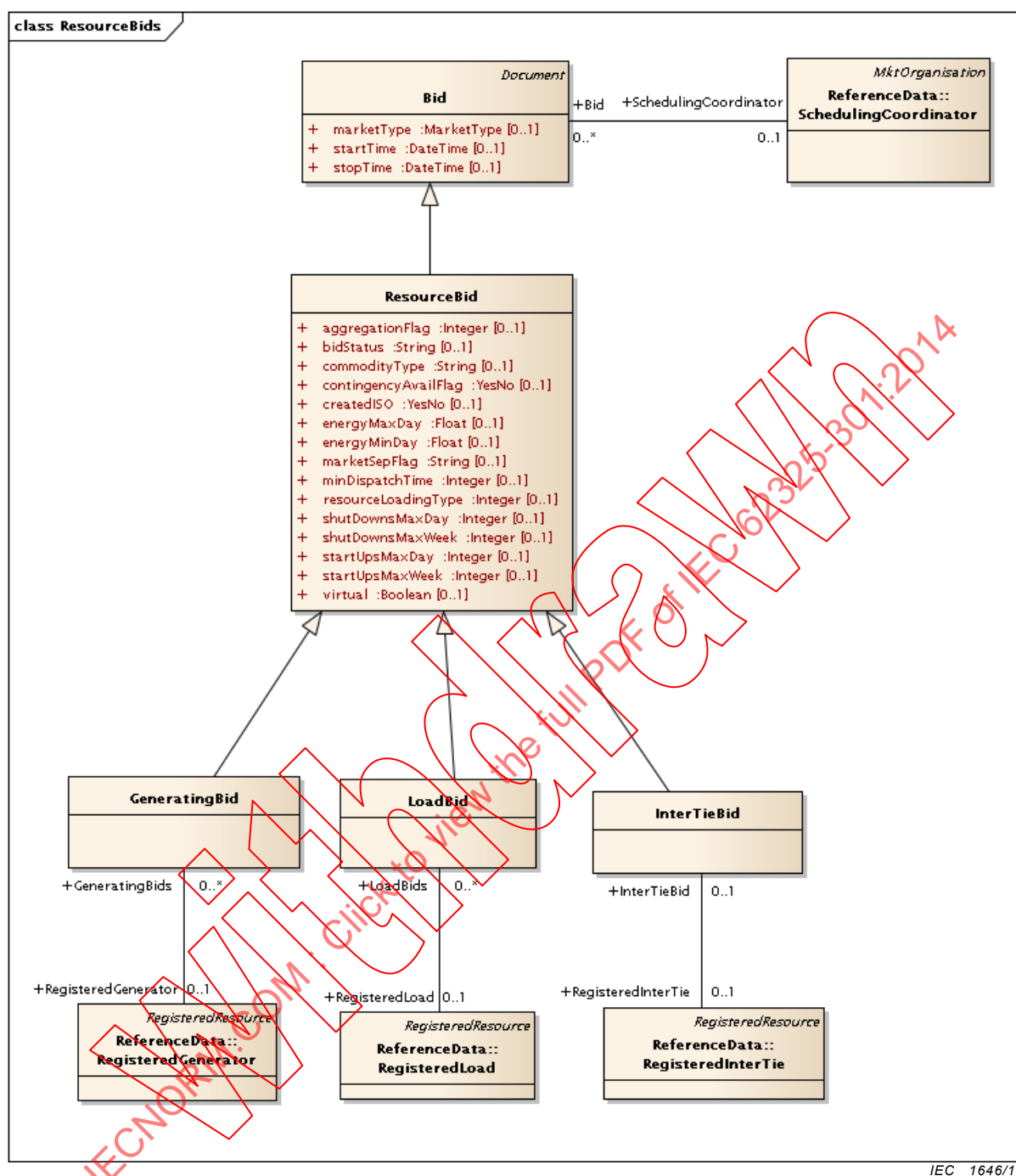
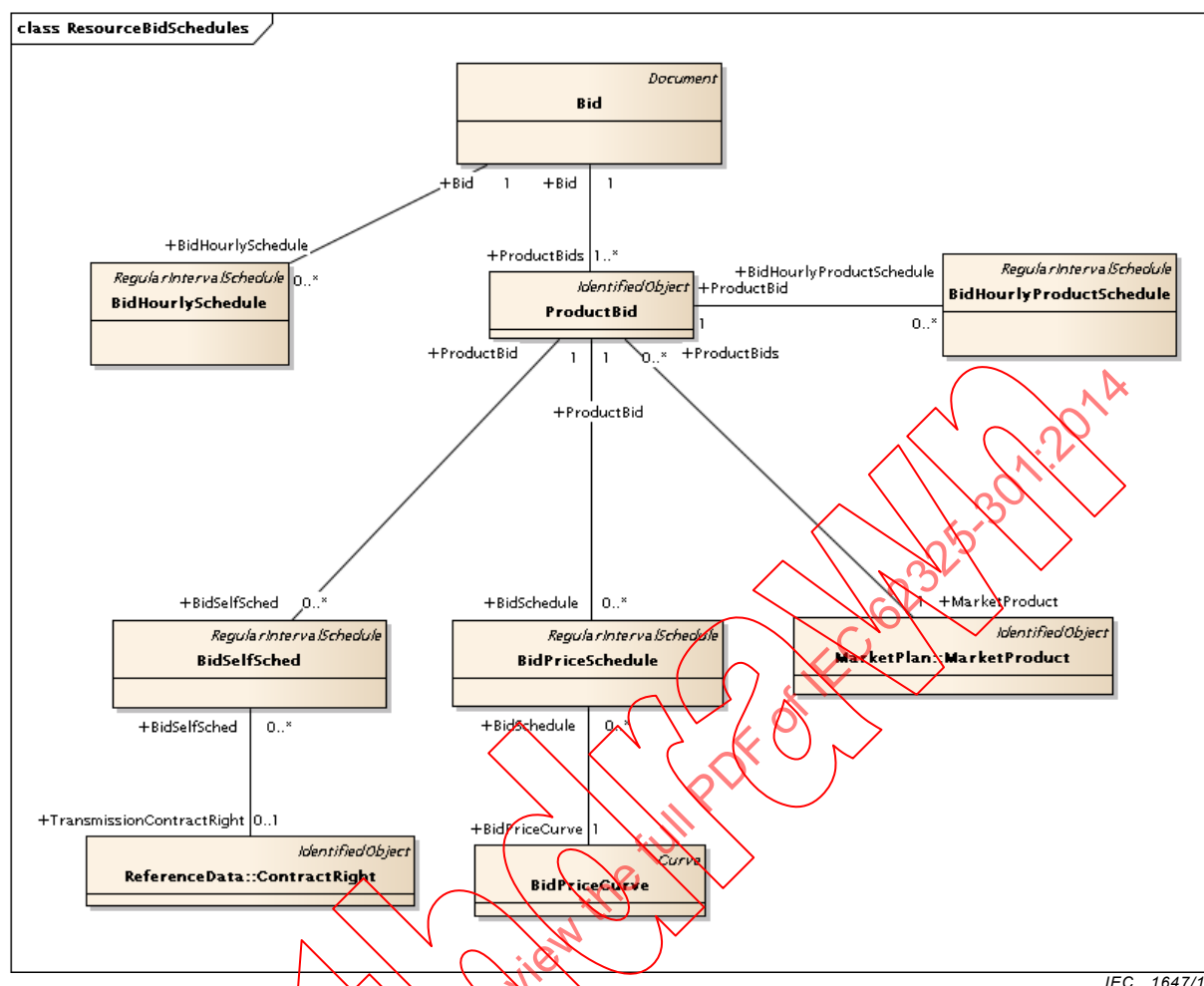


Figure 43 – Class diagram ParticipantInterfaces::ResourceBids

This figure shows the classes and associations used to model resource bids. The resource bid model includes the subclasses **GeneratingBid**, **LoadBid**, and **IntertieBid** to model the relationships to the **ResourceBid** and **Bid** classes.

Figure 44 shows class diagram **ResourceBidSchedules**.





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**Figure 44 – Class diagram ParticipantInterfaces::ResourceBidSchedules**

This figure shows the classes and associations used to model bid schedules. A scheduling coordinator may choose to submit a bid that is valid for several intervals of the market's time horizon. The classes of this model support this concept.

Figure 45 shows class diagram TransactionBids.

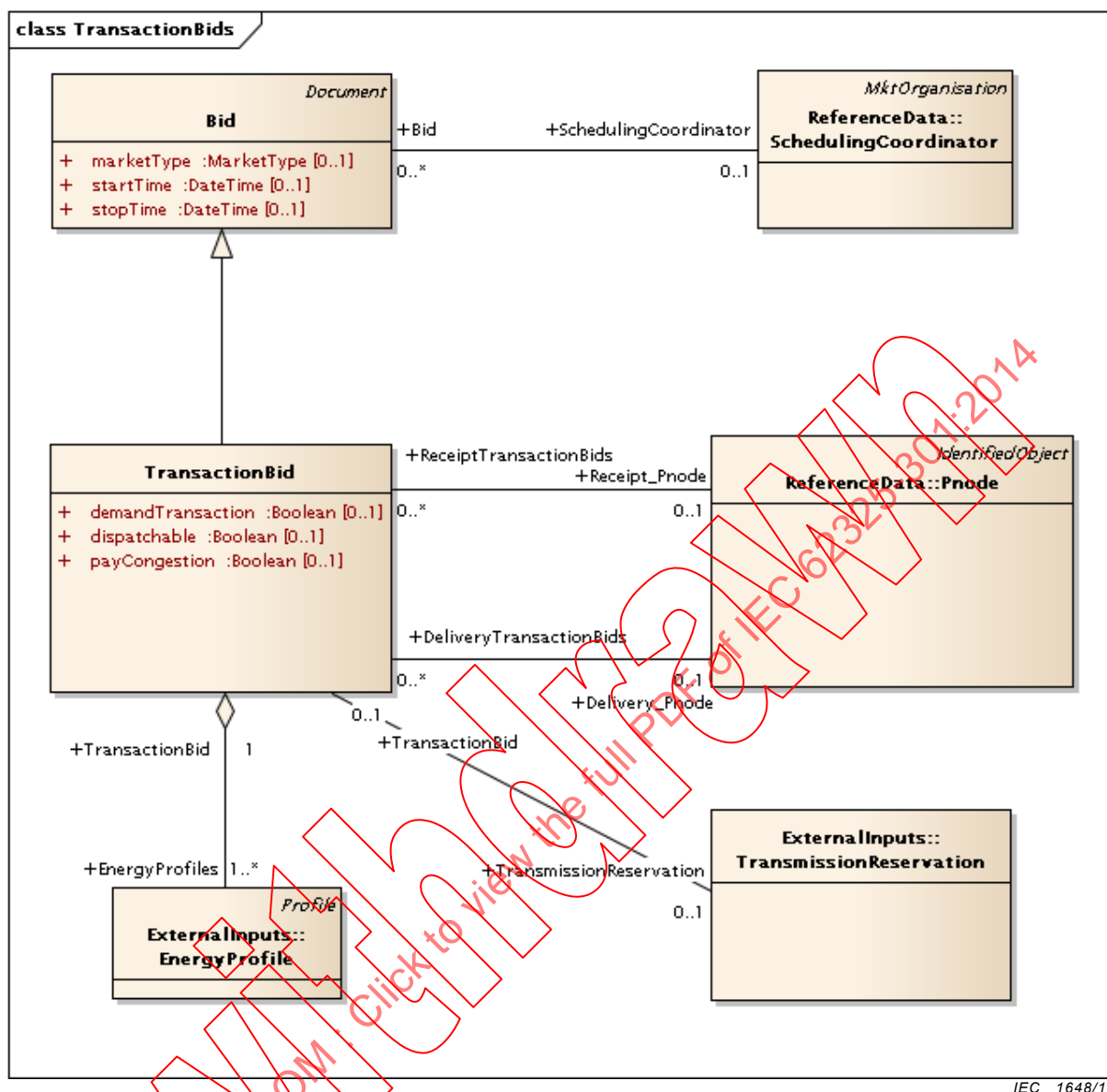


Figure 45 – Class diagram ParticipantInterfaces::TransactionBids

This figure shows the classes and associations used to model transaction bids. The TransactionBid model includes the subclasses GeneratingBid, LoadBid, and IntertieBid to model the relationships to the ResourceBid and Bid classes.

#### 6.5.8.2 ActionRequest root class

Action request against an existing Trade.

Table 415 shows all attributes of ActionRequest.

Table 415 – Attributes of ParticipantInterfaces::ActionRequest

| name       | type       | description                              |
|------------|------------|------------------------------------------|
| actionName | ActionType | Action name type for the action request. |

Table 416 shows all association ends of ActionRequest with other classes.

**Table 416 – Association ends of ParticipantInterfaces::ActionRequest with other classes**

| [mult from] | [mult to] name | type  | description |
|-------------|----------------|-------|-------------|
| [1..1]      | [0..*] Bid     | Bid   |             |
| [1..1]      | [0..*] Trade   | Trade |             |

**6.5.8.3 AreaLoadBid**

AreaLoadBid is not submitted by a market participant into the Markets. Instead, it is simply an aggregation of all LoadBids contained within a specific SubControlArea. This entity should inherit from Bid for representation of the timeframe (startTime, stopTime) and the market type.

Table 417 shows all attributes of AreaLoadBid.

**Table 417 – Attributes of ParticipantInterfaces::AreaLoadBid**

| name                 | type              | description                                                                                             |
|----------------------|-------------------|---------------------------------------------------------------------------------------------------------|
| demandBidMW          | Float             | The Demand Bid Megawatt for the area case.<br>Attribute Usage: This is Scheduled demand MW in Day Ahead |
| startTime            | DateTime          | inherited from: Bid                                                                                     |
| stopTime             | DateTime          | inherited from: Bid                                                                                     |
| marketType           | MarketType        | inherited from: Bid                                                                                     |
| type                 | String            | inherited from: Document                                                                                |
| createdDateTime      | DateTime          | inherited from: Document                                                                                |
| lastModifiedDateTime | DateTime          | inherited from: Document                                                                                |
| revisionNumber       | String            | inherited from: Document                                                                                |
| electronicAddress    | ElectronicAddress | inherited from: Document                                                                                |
| subject              | String            | inherited from: Document                                                                                |
| title                | String            | inherited from: Document                                                                                |
| docStatus            | Status            | inherited from: Document                                                                                |
| status               | Status            | inherited from: Document                                                                                |
| aliasName            | String            | inherited from: IdentifiedObject                                                                        |
| mRID                 | String            | inherited from: IdentifiedObject                                                                        |
| name                 | String            | inherited from: IdentifiedObject                                                                        |

Table 418 shows all association ends of AreaLoadBid with other classes.

**Table 418 – Association ends of ParticipantInterfaces::AreaLoadBid with other classes**

| [mult from] | [mult to] name           | type              | description         |
|-------------|--------------------------|-------------------|---------------------|
| [0..1]      | [0..*] LoadBid           | LoadBid           |                     |
| [0..*]      | [0..1] MarketParticipant | MarketParticipant | inherited from: Bid |
| [0..*]      | [1..1] EnergyMarket      | EnergyMarket      | inherited from: Bid |
| [0..1]      | [0..*] ChargeProfiles    | ChargeProfile     | inherited from: Bid |

| [mult from] | [mult to] name               | type                  | description                      |
|-------------|------------------------------|-----------------------|----------------------------------|
| [1..1]      | [0..*] MitigatedBidSegment   | MitigatedBidSegment   | inherited from: Bid              |
| [0..*]      | [0..1] SchedulingCoordinator | SchedulingCoordinator | inherited from: Bid              |
| [0..1]      | [0..*] MitigatedBid          | MitigatedBid          | inherited from: Bid              |
| [0..1]      | [0..*] RMRDetermination      | RMRDetermination      | inherited from: Bid              |
| [0..*]      | [1..1] ActionRequest         | ActionRequest         | inherited from: Bid              |
| [1..1]      | [1..*] ProductBids           | ProductBid            | inherited from: Bid              |
| [1..1]      | [0..*] BidHourlySchedule     | BidHourlySchedule     | inherited from: Bid              |
| [0..1]      | [0..*] ConfigurationEvents   | ConfigurationEvent    | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects        | DiagramObject         | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                 | Name                  | inherited from: IdentifiedObject |

#### 6.5.8.4 AttributeProperty root class

Property for a particular attribute that contains name and value

Table 419 shows all attributes of AttributeProperty.

**Table 419 – Attributes of ParticipantInterfaces::AttributeProperty**

| name          | type   | description |
|---------------|--------|-------------|
| sequence      | String |             |
| propertyName  | String |             |
| propertyValue | String |             |

Table 420 shows all association ends of AttributeProperty with other classes.

**Table 420 – Association ends of ParticipantInterfaces::AttributeProperty with other classes**

| [mult from] | [mult to] name          | type             | description |
|-------------|-------------------------|------------------|-------------|
| [0..*]      | [1..1] MktUserAttribute | MktUserAttribute |             |

#### 6.5.8.5 Bid

Represents both bids to purchase and offers to sell energy or ancillary services in an RTO-sponsored market.

Table 421 shows all attributes of Bid.

**Table 421 – Attributes of ParticipantInterfaces::Bid**

| name       | type       | description                                     |
|------------|------------|-------------------------------------------------|
| startTime  | DateTime   | Start time and date for which bid applies.      |
| stopTime   | DateTime   | Stop time and date for which bid is applicable. |
| marketType | MarketType | The market type, DAM or RTM.                    |

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 422 shows all association ends of Bid with other classes.

**Table 422 – Association ends of ParticipantInterfaces::Bid with other classes**

| [mult from] | [mult to] name               | type                  | description                                                 |
|-------------|------------------------------|-----------------------|-------------------------------------------------------------|
| [0..*]      | [0..1] MarketParticipant     | MarketParticipant     |                                                             |
| [0..*]      | [1..1] EnergyMarket          | EnergyMarket          |                                                             |
| [0..1]      | [0..*] ChargeProfiles        | ChargeProfile         |                                                             |
| [1..1]      | [0..*] MitigatedBidSegment   | MitigatedBidSegment   |                                                             |
| [0..*]      | [0..1] SchedulingCoordinator | SchedulingCoordinator |                                                             |
| [0..1]      | [0..*] MitigatedBid          | MitigatedBid          |                                                             |
| [0..1]      | [0..*] RMRDetermination      | RMRDetermination      |                                                             |
| [0..*]      | [1..1] ActionRequest         | ActionRequest         |                                                             |
| [1..1]      | [1..*] ProductBids           | ProductBid            | A bid comprises one or more product bids of market products |
| [1..1]      | [0..*] BidHourlySchedule     | BidHourlySchedule     |                                                             |
| [0..1]      | [0..*] ConfigurationEvents   | ConfigurationEvent    | inherited from: Document                                    |
| [0..1]      | [0..*] DiagramObjects        | DiagramObject         | inherited from: IdentifiedObject                            |
| [1..1]      | [0..*] Names                 | Name                  | inherited from: IdentifiedObject                            |

#### 6.5.8.6 BidDistributionFactor root class

This class allows SC to input different time intervals for distribution factors

Table 423 shows all attributes of BidDistributionFactor.

**Table 423 – Attributes of ParticipantInterfaces::BidDistributionFactor**

| name              | type     | description                                                                 |
|-------------------|----------|-----------------------------------------------------------------------------|
| timeIntervalStart | DateTime | Start of the time interval in which bid is valid (yyyy-mm-dd hh24: mi: ss). |
| timeIntervalEnd   | DateTime | End of the time interval n which bid is valid (yyyy-mm-dd hh24: mi: ss)     |

Table 424 shows all association ends of BidDistributionFactor with other classes.

**Table 424 – Association ends of ParticipantInterfaces::BidDistributionFactor with other classes**

| [mult from] | [mult to] name                 | type                    | description |
|-------------|--------------------------------|-------------------------|-------------|
| [0..1]      | [0..*] PnodeDistributionFactor | PnodeDistributionFactor |             |
| [0..*]      | [1..1] ProductBid              | ProductBid              |             |

#### 6.5.8.7 BidError

This class represent the error information for a bid that is detected during bid validation

Table 425 shows all attributes of BidError.

**Table 425 – Attributes of ParticipantInterfaces::BidError**

| name          | type     | description                                     |
|---------------|----------|-------------------------------------------------|
| errPriority   | Integer  | Priority number for the error message           |
| errMessage    | String   | error message                                   |
| ruleID        | Integer  |                                                 |
| startTime     | DateTime | hour within the bid for which the error applies |
| endTime       | DateTime | hour within the bid for which the error applies |
| logTimeStamp  | DateTime |                                                 |
| componentType | String   |                                                 |
| msgLevel      | Integer  |                                                 |
| aliasName     | String   | inherited from: IdentifiedObject                |
| mRID          | String   | inherited from: IdentifiedObject                |
| name          | String   | inherited from: IdentifiedObject                |

Table 426 shows all association ends of BidError with other classes.

**Table 426 – Association ends of ParticipantInterfaces::BidError with other classes**

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [0..*]      | [0..1] MarketProduct  | MarketProduct |                                  |
| [0..*]      | [0..*] ResourceBid    | ResourceBid   |                                  |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

#### 6.5.8.8 BidHourlyProductSchedule

Containment for bid parameters that are dependent on a market product type.

Table 427 shows all attributes of BidHourlyProductSchedule.

**Table 427 – Attributes of ParticipantInterfaces::BidHourlyProductSchedule**

| name             | type           | description                             |
|------------------|----------------|-----------------------------------------|
| endTime          | DateTime       | inherited from: RegularIntervalSchedule |
| timeStep         | Seconds        | inherited from: RegularIntervalSchedule |
| startTime        | DateTime       | inherited from: BasicIntervalSchedule   |
| value1Unit       | UnitSymbol     | inherited from: BasicIntervalSchedule   |
| value1Multiplier | UnitMultiplier | inherited from: BasicIntervalSchedule   |
| value2Unit       | UnitSymbol     | inherited from: BasicIntervalSchedule   |
| value2Multiplier | UnitMultiplier | inherited from: BasicIntervalSchedule   |
| aliasName        | String         | inherited from: IdentifiedObject        |
| mRID             | String         | inherited from: IdentifiedObject        |
| name             | String         | inherited from: IdentifiedObject        |

Table 428 shows all association ends of BidHourlyProductSchedule with other classes.

**Table 428 – Association ends of ParticipantInterfaces::BidHourlyProductSchedule with other classes**

| [mult from] | [mult to] name        | type             | description                             |
|-------------|-----------------------|------------------|-----------------------------------------|
| [0..*]      | [1..1] ProductBid     | ProductBid       |                                         |
| [1..1]      | [1..*] TimePoints     | RegularTimePoint | inherited from: RegularIntervalSchedule |
| [0..1]      | [0..*] DiagramObjects | DiagramObject    | inherited from: IdentifiedObject        |
| [1..1]      | [0..*] Names          | Name             | inherited from: IdentifiedObject        |

#### 6.5.8.9 BidHourlySchedule

Containment for bid hourly parameters that are not product dependent.

Table 429 shows all attributes of BidHourlySchedule.

**Table 429 – Attributes of ParticipantInterfaces::BidHourlySchedule**

| name             | type           | description                             |
|------------------|----------------|-----------------------------------------|
| endTime          | DateTime       | inherited from: RegularIntervalSchedule |
| timeStep         | Seconds        | inherited from: RegularIntervalSchedule |
| startTime        | DateTime       | inherited from: BasicIntervalSchedule   |
| value1Unit       | UnitSymbol     | inherited from: BasicIntervalSchedule   |
| value1Multiplier | UnitMultiplier | inherited from: BasicIntervalSchedule   |
| value2Unit       | UnitSymbol     | inherited from: BasicIntervalSchedule   |
| value2Multiplier | UnitMultiplier | inherited from: BasicIntervalSchedule   |
| aliasName        | String         | inherited from: IdentifiedObject        |
| mRID             | String         | inherited from: IdentifiedObject        |
| name             | String         | inherited from: IdentifiedObject        |

Table 430 shows all association ends of BidHourlySchedule with other classes.

**Table 430 – Association ends of ParticipantInterfaces::BidHourlySchedule with other classes**

| [mult from] | [mult to] name        | type             | description                             |
|-------------|-----------------------|------------------|-----------------------------------------|
| [0..*]      | [1..1] Bid            | Bid              |                                         |
| [1..1]      | [1..*] TimePoints     | RegularTimePoint | inherited from: RegularIntervalSchedule |
| [0..1]      | [0..*] DiagramObjects | DiagramObject    | inherited from: IdentifiedObject        |
| [1..1]      | [0..*] Names          | Name             | inherited from: IdentifiedObject        |

#### 6.5.8.10 BidPriceCurve

Relationship between unit operating price in \$/hour (Y-axis) and unit output in MW (X-axis).

Table 431 shows all attributes of BidPriceCurve.

**Table 431 – Attributes of ParticipantInterfaces::BidPriceCurve**

| name         | type           | description                      |
|--------------|----------------|----------------------------------|
| curveStyle   | CurveStyle     | inherited from: Curve            |
| xMultiplier  | UnitMultiplier | inherited from: Curve            |
| xUnit        | UnitSymbol     | inherited from: Curve            |
| y1Multiplier | UnitMultiplier | inherited from: Curve            |
| y1Unit       | UnitSymbol     | inherited from: Curve            |
| y2Multiplier | UnitMultiplier | inherited from: Curve            |
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 432 shows all association ends of BidPriceCurve with other classes.

**Table 432 – Association ends of ParticipantInterfaces::BidPriceCurve with other classes**

| [mult from] | [mult to] name        | type             | description                      |
|-------------|-----------------------|------------------|----------------------------------|
| [1..1]      | [0..*] BidSchedule    | BidPriceSchedule |                                  |
| [1..1]      | [0..*] CurveDatas     | CurveData        | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects | DiagramObject    | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name             | inherited from: IdentifiedObject |



### 6.5.8.11 BidPriceSchedule

Defines bid schedules to allow a product bid to use specified bid price curves for different time intervals.

Table 433 shows all attributes of BidPriceSchedule.

**Table 433 – Attributes of ParticipantInterfaces::BidPriceSchedule**

| name             | type                | description                                                                                                                                                                                                                                                                                                                                                  |
|------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| bidType          | BidMitigationType   | BID Type:<br>I – Initial Bid;<br>F – Final Bid                                                                                                                                                                                                                                                                                                               |
| mitigationStatus | BidMitigationStatus | Mitigation Status:<br>'S' – Mitigated by SMPM because of "misconduct"<br>'L' – Mitigated by LMPM because of "misconduct"<br>'R' – Modified by LMPM because of RMR rules<br>'M' – Mitigated because of "misconduct" both by SMPM and LMPM<br>'B' – Mitigated because of "misconduct" both by SMPM and modified by LMLM because of RMR rules<br>'Q' – original |
| endTime          | DateTime            | inherited from: RegularIntervalSchedule                                                                                                                                                                                                                                                                                                                      |
| timeStep         | Seconds             | inherited from: RegularIntervalSchedule                                                                                                                                                                                                                                                                                                                      |
| startTime        | DateTime            | inherited from: BasicIntervalSchedule                                                                                                                                                                                                                                                                                                                        |
| value1Unit       | UnitSymbol          | inherited from: BasicIntervalSchedule                                                                                                                                                                                                                                                                                                                        |
| value1Multiplier | UnitMultiplier      | inherited from: BasicIntervalSchedule                                                                                                                                                                                                                                                                                                                        |
| value2Unit       | UnitSymbol          | inherited from: BasicIntervalSchedule                                                                                                                                                                                                                                                                                                                        |
| value2Multiplier | UnitMultiplier      | inherited from: BasicIntervalSchedule                                                                                                                                                                                                                                                                                                                        |
| aliasName        | String              | inherited from: IdentifiedObject                                                                                                                                                                                                                                                                                                                             |
| mRID             | String              | inherited from: IdentifiedObject                                                                                                                                                                                                                                                                                                                             |
| name             | String              | inherited from: IdentifiedObject                                                                                                                                                                                                                                                                                                                             |

Table 434 shows all association ends of BidPriceSchedule with other classes.

**Table 434 – Association ends of ParticipantInterfaces::BidPriceSchedule with other classes**

| [mult from] | [mult to] name        | type             | description                             |
|-------------|-----------------------|------------------|-----------------------------------------|
| [0..*]      | [1..1] BidPriceCurve  | BidPriceCurve    |                                         |
| [0..*]      | [1..1] ProductBid     | ProductBid       |                                         |
| [1..1]      | [1..*] TimePoints     | RegularTimePoint | inherited from: RegularIntervalSchedule |
| [0..1]      | [0..*] DiagramObjects | DiagramObject    | inherited from: IdentifiedObject        |
| [1..1]      | [0..*] Names          | Name             | inherited from: IdentifiedObject        |

### 6.5.8.12 BidSelfSched

Defines self schedule values to be used for specified time intervals.

Table 435 shows all attributes of BidSelfSched.

**Table 435 – Attributes of ParticipantInterfaces::BidSelfSched**

| name                         | type                       | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| balancingFlag                | YesNo                      | This is a Y/N flag for a self-schedule of a resource per market per date and hour, using a specific TR ID. It indicates whether a self-schedule using a TR is balanced with another self-schedule using the same TR ID.                                                                                                                                                                                                                                                                                                                                                       |
| bidType                      | BidTypeRMR                 | bidType has two types as the required output of requirements and qualified pre-dispatch.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| priorityFlag                 | YesNo                      | This is a Y/N flag for a self-schedule of a resource per market per date and hour, using a specific TR ID. It indicates whether a self-schedule using a TR has scheduling priority in DAM/RTM.                                                                                                                                                                                                                                                                                                                                                                                |
| pumpSelfSchedMw              | Float                      | Contains the PriceTaker, ExistingTransmissionContract, TransmissionOwnershipRights pumping self schedule quantity. If this value is not null, then the unit is in pumping mode.                                                                                                                                                                                                                                                                                                                                                                                               |
| referenceType                | SelfSchedReferenceType     | Indication of which type of self schedule is being referenced.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| selfSchedMw                  | Float                      | Self scheduled value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| selfSchedSptResource         | String                     | Price Taker Export Self Sched Support Resource                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| selfSchedType                | MarketProductSelfSchedType | <p>This attribute is used to specify if a bid includes a self sched bid. If so what self sched type is it. The possible values are shown as follow but not limited to:</p> <p>'ETC' – Existing transmission contract</p> <p>'TOR' – Transmission ownership right</p> <p>'RMR' – Reliability must run</p> <p>'RGMR' – Regulatory must run</p> <p>"RMT" – Reliability must take</p> <p>"PT" – Price taker</p> <p>"LPT" – Low price taker</p> <p>"SP" – Self provision</p> <p>"RA" – Resource adequacy</p> <p>This attribute is originally defined in the BidSelfSched class</p> |
| updateType                   | MQSCHGType                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| wheelingTransactionReference | String                     | A unique identifier of a wheeling transaction. A wheeling transaction is a balanced Energy exchange among Supply and Demand Resources.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| endTime                      | DateTime                   | inherited from: RegularIntervalSchedule                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| timeStep                     | Seconds                    | inherited from: RegularIntervalSchedule                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| startTime                    | DateTime                   | inherited from: BasicIntervalSchedule                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| value1Unit                   | UnitSymbol                 | inherited from: BasicIntervalSchedule                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| value1Multiplier             | UnitMultiplier             | inherited from: BasicIntervalSchedule                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| value2Unit                   | UnitSymbol                 | inherited from: BasicIntervalSchedule                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| name             | type           | description                           |
|------------------|----------------|---------------------------------------|
| value2Multiplier | UnitMultiplier | inherited from: BasicIntervalSchedule |
| aliasName        | String         | inherited from: IdentifiedObject      |
| mRID             | String         | inherited from: IdentifiedObject      |
| name             | String         | inherited from: IdentifiedObject      |

Table 436 shows all association ends of BidSelfSched with other classes.

**Table 436 – Association ends of ParticipantInterfaces::BidSelfSched with other classes**

| [mult from] | [mult to] name                   | type             | description                             |
|-------------|----------------------------------|------------------|-----------------------------------------|
| [0..*]      | [0..1] TransmissionContractRight | ContractRight    |                                         |
| [0..*]      | [0..1] AdjacentCaset             | AdjacentCaset    |                                         |
| [0..*]      | [0..1] HostControlArea           | HostControlArea  |                                         |
| [0..*]      | [0..1] SubControlArea            | SubControlArea   |                                         |
| [0..*]      | [1..1] ProductBid                | ProductBid       |                                         |
| [1..1]      | [1..*] TimePoints                | RegularTimePoint | inherited from: RegularIntervalSchedule |
| [0..1]      | [0..*] DiagramObjects            | DiagramObject    | inherited from: IdentifiedObject        |
| [1..1]      | [0..*] Names                     | Name             | inherited from: IdentifiedObject        |

### 6.5.8.13 BidSet

As set of mutually exclusive bids for which a maximum of one may be scheduled.

Of these generating bids, only one generating bid can be scheduled at a time.

Table 437 shows all attributes of BidSet.

**Table 437 – Attributes of ParticipantInterfaces::BidSet**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 438 shows all association ends of BidSet with other classes.

**Table 438 – Association ends of ParticipantInterfaces::BidSet with other classes**

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [0..1]      | [1..*] GeneratingBids | GeneratingBid |                                  |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

#### 6.5.8.14 ChargeComponent

A Charge Component is a list of configurable charge quality items to feed into settlement calculation and/or bill determinants.

Table 439 shows all attributes of ChargeComponent.

**Table 439 – Attributes of ParticipantInterfaces::ChargeComponent**

| name            | type     | description                      |
|-----------------|----------|----------------------------------|
| deleteStatus    | String   |                                  |
| effectiveDate   | DateTime |                                  |
| terminationDate | DateTime |                                  |
| message         | String   |                                  |
| type            | String   |                                  |
| sum             | String   |                                  |
| roundOff        | String   |                                  |
| equation        | String   |                                  |
| aliasName       | String   | inherited from: IdentifiedObject |
| mRID            | String   | inherited from: IdentifiedObject |
| name            | String   | inherited from: IdentifiedObject |

Table 440 shows all association ends of ChargeComponent with other classes.

**Table 440 – Association ends of ParticipantInterfaces::ChargeComponent with other classes**

| [mult from] | [mult to] name          | type            | description                                                                                                |
|-------------|-------------------------|-----------------|------------------------------------------------------------------------------------------------------------|
| [0..*]      | [0..*] BillDeterminants | BillDeterminant | A BillDeterminant can have 0-n ChargeComponent and a ChargeComponent can associate to 0-n BillDeterminant. |
| [0..*]      | [0..*] ChargeTypes      | ChargeType      | A ChargeType can have 0-n ChargeComponent and a ChargeComponent can associate to 0-n ChargeType            |
| [0..1]      | [0..*] DiagramObjects   | DiagramObject   | inherited from: IdentifiedObject                                                                           |
| [1..1]      | [0..*] Names            | Name            | inherited from: IdentifiedObject                                                                           |

#### 6.5.8.15 ChargeGroup

Charge Group is the grouping of Charge Types for settlement invoicing purpose. Examples such as Ancillary Services, Interests, etc.

Table 441 shows all attributes of ChargeGroup.

**Table 441 – Attributes of ParticipantInterfaces::ChargeGroup**

| name            | type     | description                      |
|-----------------|----------|----------------------------------|
| marketCode      | String   |                                  |
| effectiveDate   | DateTime |                                  |
| terminationDate | DateTime |                                  |
| aliasName       | String   | inherited from: IdentifiedObject |
| mRID            | String   | inherited from: IdentifiedObject |
| name            | String   | inherited from: IdentifiedObject |

Table 442 shows all association ends of ChargeGroup with other classes.

**Table 442 – Association ends of ParticipantInterfaces::ChargeGroup with other classes**

| [mult from] | [mult to] name           | type             | description                                                                           |
|-------------|--------------------------|------------------|---------------------------------------------------------------------------------------|
| [0..*]      | [0..*] MktUserAttribute  | MktUserAttribute |                                                                                       |
| [0..*]      | [0..1] ChargeGroupParent | ChargeGroup      | A ChargeGroup instance can have relationships with other ChargeGroup instances.       |
| [0..*]      | [0..*] ChargeType        | ChargeType       | A ChargeGroup can have 0-n ChargeType. A ChargeType can associate to 0-n ChargeGroup. |
| [0..1]      | [0..*] ChargeGroupChild  | ChargeGroup      | A ChargeGroup instance can have relationships with other ChargeGroup instances.       |
| [0..1]      | [0..*] DiagramObjects    | DiagramObject    | inherited from: IdentifiedObject                                                      |
| [1..1]      | [0..*] Names             | Name             | inherited from: IdentifiedObject                                                      |

#### 6.5.8.16 ChargeType

Charge Type is the basic level configuration for settlement to process specific charges for invoicing purpose. Examples such as: Day Ahead Spinning Reserve Default Invoice Interest Charge, etc.

Table 443 shows all attributes of ChargeType.

**Table 443 – Attributes of ParticipantInterfaces::ChargeType**

| name            | type     | description              |
|-----------------|----------|--------------------------|
| effectiveDate   | DateTime |                          |
| terminationDate | DateTime |                          |
| factor          | String   |                          |
| chargeOrder     | String   |                          |
| frequencyType   | String   |                          |
| chargeVersion   | String   |                          |
| totalInterval   | String   |                          |
| type            | String   | inherited from: Document |
| createdDateTime | DateTime | inherited from: Document |

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 444 shows all association ends of ChargeType with other classes

**Table 444 – Association ends of ParticipantInterfaces::ChargeType with other classes**

| [mult from] | [mult to] name             | type               | description                                                                                     |
|-------------|----------------------------|--------------------|-------------------------------------------------------------------------------------------------|
| [0..*]      | [0..*] MktUserAttribute    | MktUserAttribute   |                                                                                                 |
| [0..*]      | [0..*] ChargeComponents    | ChargeComponent    | A ChargeType can have 0-n ChargeComponent and a ChargeComponent can associate to 0-n ChargeType |
| [0..*]      | [0..*] ChargeGroup         | ChargeGroup        | A ChargeGroup can have 0-n ChargeType. A ChargeType can associate to 0-n ChargeGroup.           |
| [0..*]      | [0..*] MajorChargeGroup    | MajorChargeGroup   | A MajorChargeGroup can have 0-n ChargeType. A ChargeType can associate to 0-n MajorChargeGroup. |
| [0..1]      | [0..*] ConfigurationEvents | ConfigurationEvent | inherited from: Document                                                                        |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject      | inherited from: IdentifiedObject                                                                |
| [1..1]      | [0..*] Names               | Name               | inherited from: IdentifiedObject                                                                |

#### 6.5.8.17 DispatchInstReply

Response from registered resource acknowledging receipt of dispatch instructions

Table 445 shows all attributes of DispatchInstReply.

**Table 445 – Attributes of ParticipantInterfaces::DispatchInstReply**

| name              | type                 | description                                                                                                                                                                                                                                                                                   |
|-------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| acceptMW          | ActivePower          | The accepted mw amount by the responder. aka response mw.                                                                                                                                                                                                                                     |
| acceptStatus      | DispatchResponseType | The accept status submitted by the responder. enumeration type needs to be defined                                                                                                                                                                                                            |
| certificationName | String               | The Subject DN is the X509 Certificate Subject DN. This is the essentially the certificate name presented by the client. In the case of ADS Certificates, this will be the user name. It may be from an API Client or the MP Client (GUI).<br>The Subject ID normally includes more than just |

| name            | type              | description                                                                                        |
|-----------------|-------------------|----------------------------------------------------------------------------------------------------|
|                 |                   | the user name (Common Name), it can also contain information such as City, Company ID, etc.        |
| clearedMW       | ActivePower       | MW amount associated with instruction. For 5 minute binding dispatches, this is the Goto MW or DOT |
| instructionTime | DateTime          | The target date/time for the received instruction.                                                 |
| instructionType | String            | instruction type:<br>commitment<br>out of sequence<br>dispatch                                     |
| passIndicator   | PassIndicatorType | The type of run for the market clearing.                                                           |
| receivedTime    | DateTime          | Timestamp indicating the time at which the instruction was received.                               |
| startTime       | DateTime          | start time                                                                                         |
| aliasName       | String            | inherited from: IdentifiedObject                                                                   |
| mRID            | String            | inherited from: IdentifiedObject                                                                   |
| name            | String            | inherited from: IdentifiedObject                                                                   |

Table 446 shows all association ends of DispatchInstReply with other classes.

**Table 446 – Association ends of ParticipantInterfaces::  
DispatchInstReply with other classes**

| [mult from] | [mult to] name            | type               | description                      |
|-------------|---------------------------|--------------------|----------------------------------|
| [0..*]      | [1..1] RegisteredResource | RegisteredResource |                                  |
| [0..1]      | [0..*] DiagramObjects     | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names              | Name               | inherited from: IdentifiedObject |

#### 6.5.8.18 EnergyPriceCurve root class

Relationship between a price in \$(or other monetary unit) /hour (Y-axis) and a MW value (X-axis).

Table 447 shows all association ends of EnergyPriceCurve with other classes.

**Table 447 – Association ends of ParticipantInterfaces::  
EnergyPriceCurve with other classes**

| [mult from] | [mult to] name            | type              | description |
|-------------|---------------------------|-------------------|-------------|
| [0..*]      | [0..*] EnergyTransactions | EnergyTransaction |             |

#### 6.5.8.19 GeneratingBid

Offer to supply energy/ancillary services from a generating unit or resource

Table 448 shows all attributes of GeneratingBid.

**Table 448 – Attributes of ParticipantInterfaces::GeneratingBid**

| name                   | type                  | description                                                                                                                                                                                                                  |
|------------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| combinedCycleUnitOffer | String                | Will indicate if the unit is part of a CC offer or not                                                                                                                                                                       |
| downTimeMax            | Float                 | Maximum down time.                                                                                                                                                                                                           |
| installedCapacity      | Float                 | Installed Capacity value                                                                                                                                                                                                     |
| lowerRampRate          | ActivePowerChangeRate | Maximum Dn ramp rate in MW/min                                                                                                                                                                                               |
| maxEmergencyMW         | ActivePower           | Power rating available for unit under emergency conditions greater than or equal to maximum economic limit.                                                                                                                  |
| maximumEconomicMW      | Float                 | Maximum high economic MW limit, that should not exceed the maximum operating MW limit                                                                                                                                        |
| minEmergencyMW         | ActivePower           | Minimum power rating for unit under emergency conditions, which is less than or equal to the economic minimum                                                                                                                |
| minimumEconomicMW      | Float                 | Low economic MW limit that shall be greater than or equal to the minimum operating MW limit                                                                                                                                  |
| noLoadCost             | Float                 | Resource fixed no load cost.                                                                                                                                                                                                 |
| notificationTime       | Float                 | Time required for crew notification prior to start up of the unit.                                                                                                                                                           |
| operatingMode          | String                | Bid operating mode ('C' – cycling, 'F' – fixed, 'M' – must run, 'U' – unavailable)                                                                                                                                           |
| raiseRampRate          | ActivePowerChangeRate | Maximum Up ramp rate in MW/min                                                                                                                                                                                               |
| rampCurveType          | Integer               | Ramp curve type:<br>0 – Fixed ramp rate independent of rate function unit MW output<br>1 – Static ramp rates as a function of unit MW output only<br>2 – Dynamic ramp rates as a function of unit MW output and ramping time |
| startupCost            | Float                 | Startup cost/price                                                                                                                                                                                                           |
| startUpRampRate        | ActivePowerChangeRate | Resource startup ramp rate (MW/minute)                                                                                                                                                                                       |
| startUpType            | Integer               | Resource startup type:<br>1 – Fixed startup time and fixed startup cost<br>2 – Startup time as a function of down time and fixed startup cost<br>3 – Startup cost as a function of down time                                 |
| upTimeMax              | Float                 | Maximum up time.                                                                                                                                                                                                             |
| aggregationFlag        | Integer               | inherited from: ResourceBid                                                                                                                                                                                                  |
| bidStatus              | String                | inherited from: ResourceBid                                                                                                                                                                                                  |
| commodityType          | String                | inherited from: ResourceBid                                                                                                                                                                                                  |
| contingencyAvailFlag   | YesNo                 | inherited from: ResourceBid                                                                                                                                                                                                  |
| createdISO             | YesNo                 | inherited from: ResourceBid                                                                                                                                                                                                  |
| energyMaxDay           | Float                 | inherited from: ResourceBid                                                                                                                                                                                                  |
| energyMinDay           | Float                 | inherited from: ResourceBid                                                                                                                                                                                                  |
| marketSepFlag          | String                | inherited from: ResourceBid                                                                                                                                                                                                  |
| minDispatchTime        | Integer               | inherited from: ResourceBid                                                                                                                                                                                                  |
| resourceLoadingType    | Integer               | inherited from: ResourceBid                                                                                                                                                                                                  |
| shutDownsMaxDay        | Integer               | inherited from: ResourceBid                                                                                                                                                                                                  |
| shutDownsMaxWeek       | Integer               | inherited from: ResourceBid                                                                                                                                                                                                  |
| startUpsMaxDay         | Integer               | inherited from: ResourceBid                                                                                                                                                                                                  |



| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| startUpsMaxWeek      | Integer           | inherited from: ResourceBid      |
| virtual              | Boolean           | inherited from: ResourceBid      |
| startTime            | DateTime          | inherited from: Bid              |
| stopTime             | DateTime          | inherited from: Bid              |
| marketType           | MarketType        | inherited from: Bid              |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 449 shows all association ends of GeneratingBid with other classes.

**Table 449 – Association ends of ParticipantInterfaces::GeneratingBid with other classes**

| [mult from] | [mult to] name               | type                  | description                      |
|-------------|------------------------------|-----------------------|----------------------------------|
| [0..1]      | [0..*] SecurityConstraints   | SecurityConstraints   |                                  |
| [1..*]      | [0..1] BidSet                | BidSet                |                                  |
| [0..1]      | [0..*] RampRateCurve         | RampRateCurve         |                                  |
| [0..*]      | [0..1] NotificationTimeCurve | NotificationTimeCurve |                                  |
| [0..*]      | [0..1] RegisteredGenerator   | RegisteredGenerator   |                                  |
| [0..*]      | [0..1] StartUpTimeCurve      | StartUpTimeCurve      |                                  |
| [0..*]      | [0..1] StartUpCostCurve      | StartUpCostCurve      |                                  |
| [0..*]      | [0..*] BidError              | BidError              | inherited from: ResourceBid      |
| [0..*]      | [0..1] MarketParticipant     | MarketParticipant     | inherited from: Bid              |
| [0..*]      | [1..1] EnergyMarket          | EnergyMarket          | inherited from: Bid              |
| [0..1]      | [0..*] ChargeProfiles        | ChargeProfile         | inherited from: Bid              |
| [1..1]      | [0..*] MitigatedBidSegment   | MitigatedBidSegment   | inherited from: Bid              |
| [0..*]      | [0..1] SchedulingCoordinator | SchedulingCoordinator | inherited from: Bid              |
| [0..1]      | [0..*] MitigatedBid          | MitigatedBid          | inherited from: Bid              |
| [0..1]      | [0..*] RMRDetermination      | RMRDetermination      | inherited from: Bid              |
| [0..*]      | [1..1] ActionRequest         | ActionRequest         | inherited from: Bid              |
| [1..1]      | [1..*] ProductBids           | ProductBid            | inherited from: Bid              |
| [1..1]      | [0..*] BidHourlySchedule     | BidHourlySchedule     | inherited from: Bid              |
| [0..1]      | [0..*] ConfigurationEvents   | ConfigurationEvent    | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects        | DiagramObject         | inherited from: IdentifiedObject |

| [mult from] | [mult to] name | type | description                      |
|-------------|----------------|------|----------------------------------|
| [1..1]      | [0..*] Names   | Name | inherited from: IdentifiedObject |

#### 6.5.8.20 HourlyPreDispatchSchedule

An indicator specifying that a resource shall have an Hourly Pre-Dispatch. The resource could be a RegisteredGenerator or a RegisteredInterTie.

This schedule is associated with the hourly parameters in a resource bid.

Table 450 shows all attributes of HourlyPreDispatchSchedule.

**Table 450 – Attributes of ParticipantInterfaces::HourlyPreDispatchSchedule**

| name             | type           | description                                                                                          |
|------------------|----------------|------------------------------------------------------------------------------------------------------|
| value            | Boolean        | Flag defining that for this hour in the resource bid the resource shall have an hourly pre-dispatch. |
| endTime          | DateTime       | inherited from: RegularIntervalSchedule                                                              |
| timeStep         | Seconds        | inherited from: RegularIntervalSchedule                                                              |
| startTime        | DateTime       | inherited from: BasicIntervalSchedule                                                                |
| value1Unit       | UnitSymbol     | inherited from: BasicIntervalSchedule                                                                |
| value1Multiplier | UnitMultiplier | inherited from: BasicIntervalSchedule                                                                |
| value2Unit       | UnitSymbol     | inherited from: BasicIntervalSchedule                                                                |
| value2Multiplier | UnitMultiplier | inherited from: BasicIntervalSchedule                                                                |
| aliasName        | String         | inherited from: IdentifiedObject                                                                     |
| mRID             | String         | inherited from: IdentifiedObject                                                                     |
| name             | String         | inherited from: IdentifiedObject                                                                     |

Table 451 shows all association ends of HourlyPreDispatchSchedule with other classes.

**Table 451 – Association ends of ParticipantInterfaces::HourlyPreDispatchSchedule with other classes**

| [mult from] | [mult to] name        | type             | description                             |
|-------------|-----------------------|------------------|-----------------------------------------|
| [0..*]      | [1..1] Bid            | Bid              | inherited from: BidHourlySchedule       |
| [1..1]      | [1..*] TimePoints     | RegularTimePoint | inherited from: RegularIntervalSchedule |
| [0..1]      | [0..*] DiagramObjects | DiagramObject    | inherited from: IdentifiedObject        |
| [1..1]      | [0..*] Names          | Name             | inherited from: IdentifiedObject        |

#### 6.5.8.21 InterTieBid

This class represents the inter tie bid

Table 452 shows all attributes of InterTieBid.

**Table 452 – Attributes of ParticipantInterfaces::InterTieBid**

| name                 | type              | description                                                                 |
|----------------------|-------------------|-----------------------------------------------------------------------------|
| minHourlyBlock       | Integer           | The minimum hourly block for an Inter-Tie Resource supplied within the bid. |
| aggregationFlag      | Integer           | inherited from: ResourceBid                                                 |
| bidStatus            | String            | inherited from: ResourceBid                                                 |
| commodityType        | String            | inherited from: ResourceBid                                                 |
| contingencyAvailFlag | YesNo             | inherited from: ResourceBid                                                 |
| createdISO           | YesNo             | inherited from: ResourceBid                                                 |
| energyMaxDay         | Float             | inherited from: ResourceBid                                                 |
| energyMinDay         | Float             | inherited from: ResourceBid                                                 |
| marketSepFlag        | String            | inherited from: ResourceBid                                                 |
| minDispatchTime      | Integer           | inherited from: ResourceBid                                                 |
| resourceLoadingType  | Integer           | inherited from: ResourceBid                                                 |
| shutDownsMaxDay      | Integer           | inherited from: ResourceBid                                                 |
| shutDownsMaxWeek     | Integer           | inherited from: ResourceBid                                                 |
| startUpsMaxDay       | Integer           | inherited from: ResourceBid                                                 |
| startUpsMaxWeek      | Integer           | inherited from: ResourceBid                                                 |
| virtual              | Boolean           | inherited from: ResourceBid                                                 |
| startTime            | DateTime          | inherited from: Bid                                                         |
| stopTime             | DateTime          | inherited from: Bid                                                         |
| marketType           | MarketType        | inherited from: Bid                                                         |
| type                 | String            | inherited from: Document                                                    |
| createdDateTime      | DateTime          | inherited from: Document                                                    |
| lastModifiedDateTime | DateTime          | inherited from: Document                                                    |
| revisionNumber       | String            | inherited from: Document                                                    |
| electronicAddress    | ElectronicAddress | inherited from: Document                                                    |
| subject              | String            | inherited from: Document                                                    |
| title                | String            | inherited from: Document                                                    |
| docStatus            | Status            | inherited from: Document                                                    |
| status               | Status            | inherited from: Document                                                    |
| aliasName            | String            | inherited from: IdentifiedObject                                            |
| mRID                 | String            | inherited from: IdentifiedObject                                            |
| name                 | String            | inherited from: IdentifiedObject                                            |

Table 453 shows all association ends of InterTieBid with other classes.

**Table 453 – Association ends of ParticipantInterfaces::InterTieBid with other classes**

| [mult from] | [mult to] name            | type               | description                 |
|-------------|---------------------------|--------------------|-----------------------------|
| [0..1]      | [0..1] RegisteredInterTie | RegisteredInterTie |                             |
| [0..1]      | [0..*] RampRateCurve      | RampRateCurve      |                             |
| [0..*]      | [0..*] BidError           | BidError           | inherited from: ResourceBid |
| [0..*]      | [0..1] MarketParticipant  | MarketParticipant  | inherited from: Bid         |

| [mult from] | [mult to] name               | type                  | description                      |
|-------------|------------------------------|-----------------------|----------------------------------|
| [0..*]      | [1..1] EnergyMarket          | EnergyMarket          | inherited from: Bid              |
| [0..1]      | [0..*] ChargeProfiles        | ChargeProfile         | inherited from: Bid              |
| [1..1]      | [0..*] MitigatedBidSegment   | MitigatedBidSegment   | inherited from: Bid              |
| [0..*]      | [0..1] SchedulingCoordinator | SchedulingCoordinator | inherited from: Bid              |
| [0..1]      | [0..*] MitigatedBid          | MitigatedBid          | inherited from: Bid              |
| [0..1]      | [0..*] RMRDetermination      | RMRDetermination      | inherited from: Bid              |
| [0..*]      | [1..1] ActionRequest         | ActionRequest         | inherited from: Bid              |
| [1..1]      | [1..*] ProductBids           | ProductBid            | inherited from: Bid              |
| [1..1]      | [0..*] BidHourlySchedule     | BidHourlySchedule     | inherited from: Bid              |
| [0..1]      | [0..*] ConfigurationEvents   | ConfigurationEvent    | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects        | DiagramObject         | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                 | Name                  | inherited from: IdentifiedObject |

#### 6.5.8.22 InterTieDispatchResponse root class

Response from an intertie resource acknowledging receipt of dispatch instructions

Table 454 shows all attributes of InterTieDispatchResponse.

**Table 454 – Attributes of ParticipantInterfaces::InterTieDispatchResponse**

| name          | type                 | description                                                                                            |
|---------------|----------------------|--------------------------------------------------------------------------------------------------------|
| acceptStatus  | DispatchResponseType | The accept status submitted by the responder. Valid values are NON-RESPONSE, ACCEPT, DECLINE, PARTIAL. |
| acceptMW      | Float                | The accepted mw amount by the responder. aka response mw.                                              |
| clearedMW     | Float                | MW amount associated with instruction. For 5 minute binding dispatches, this is the Goto MW or DOT     |
| startTime     | DateTime             | Part of the Composite key that downstream app uses to match the instruction                            |
| passIndicator | PassIndicatorType    | Part of the Composite key that downstream app uses to match the instruction                            |

Table 455 shows all association ends of InterTieDispatchResponse with other classes.

**Table 455 – Association ends of ParticipantInterfaces::InterTieDispatchResponse with other classes**

| [mult from] | [mult to] name            | type               | description |
|-------------|---------------------------|--------------------|-------------|
| [0..*]      | [1..1] RegisteredInterTie | RegisteredInterTie |             |

#### 6.5.8.23 LoadBid

Offer to supply energy/ancillary services from a load resource (participating load reduces consumption)

Table 456 shows all attributes of LoadBid.

**Table 456 – Attributes of ParticipantInterfaces::LoadBid**

| name                     | type                  | description                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| dropRampRate             | ActivePowerChangeRate | Maximum rate that load can be reduced (MW/minute)                                                                                                                                                                                                                                                                                                                                                                              |
| loadRedInitiationCost    | Money                 | load reduction initiation cost                                                                                                                                                                                                                                                                                                                                                                                                 |
| loadRedInitiationTime    | Float                 | load reduction initiation time                                                                                                                                                                                                                                                                                                                                                                                                 |
| marketDate               | DateTime              | The date represents the NextMarketDate for which the load response bids apply to.                                                                                                                                                                                                                                                                                                                                              |
| meteredValue             | Boolean               | Flag indicated that the load reduction is metered. (See above)<br><br>If priceSetting and meteredValue both equal 1, then the facility is eligible to set LMP in the real time market.                                                                                                                                                                                                                                         |
| minLoad                  | ActivePower           | Minimum MW load below which it may not be reduced.                                                                                                                                                                                                                                                                                                                                                                             |
| minLoadReduction         | ActivePower           | Minimum MW for a load reduction (e.g. MW rating of a discrete pump).                                                                                                                                                                                                                                                                                                                                                           |
| minLoadReductionCost     | Money                 | Cost in \$ at the minimum reduced load                                                                                                                                                                                                                                                                                                                                                                                         |
| minLoadReductionInterval | Float                 | Shortest period load reduction shall be maintained before load can be restored to normal levels.                                                                                                                                                                                                                                                                                                                               |
| minTimeBetLoadRed        | Float                 | Shortest time that load shall be left at normal levels before a new load reduction.                                                                                                                                                                                                                                                                                                                                            |
| pickUpRampRate           | ActivePowerChangeRate | Maximum rate load may be restored (MW/minute)                                                                                                                                                                                                                                                                                                                                                                                  |
| priceSetting             | Boolean               | Flag to indicate that the facility can set LMP Works in tandem with Metered Value. Greater chance of this being dynamic than the Metered Value, however, it is requested that Price Setting and Metered Value stay at the same source. Currently no customers have implemented the metering capability, but if this option is implemented, then Price Setting could become dynamic. However, Metered Value will remain static. |
| reqNoticeTime            | Float                 | Time period that is required from an order to reduce a load to the time that it takes to get to the minimum load reduction.                                                                                                                                                                                                                                                                                                    |
| shutdownCost             | Money                 | The fixed cost associated with committing a load reduction.                                                                                                                                                                                                                                                                                                                                                                    |
| aggregationFlag          | Integer               | inherited from: ResourceBid                                                                                                                                                                                                                                                                                                                                                                                                    |
| bidStatus                | String                | inherited from: ResourceBid                                                                                                                                                                                                                                                                                                                                                                                                    |
| commodityType            | String                | inherited from: ResourceBid                                                                                                                                                                                                                                                                                                                                                                                                    |
| contingencyAvailFlag     | YesNo                 | inherited from: ResourceBid                                                                                                                                                                                                                                                                                                                                                                                                    |
| createdISO               | YesNo                 | inherited from: ResourceBid                                                                                                                                                                                                                                                                                                                                                                                                    |
| energyMaxDay             | Float                 | inherited from: ResourceBid                                                                                                                                                                                                                                                                                                                                                                                                    |
| energyMinDay             | Float                 | inherited from: ResourceBid                                                                                                                                                                                                                                                                                                                                                                                                    |
| marketSepFlag            | String                | inherited from: ResourceBid                                                                                                                                                                                                                                                                                                                                                                                                    |
| minDispatchTime          | Integer               | inherited from: ResourceBid                                                                                                                                                                                                                                                                                                                                                                                                    |
| resourceLoadingType      | Integer               | inherited from: ResourceBid                                                                                                                                                                                                                                                                                                                                                                                                    |
| shutDownsMaxDay          | Integer               | inherited from: ResourceBid                                                                                                                                                                                                                                                                                                                                                                                                    |
| shutDownsMaxWeek         | Integer               | inherited from: ResourceBid                                                                                                                                                                                                                                                                                                                                                                                                    |

| name                 | type              | description                      |
|----------------------|-------------------|----------------------------------|
| startUpsMaxDay       | Integer           | inherited from: ResourceBid      |
| startUpsMaxWeek      | Integer           | inherited from: ResourceBid      |
| virtual              | Boolean           | inherited from: ResourceBid      |
| startTime            | DateTime          | inherited from: Bid              |
| stopTime             | DateTime          | inherited from: Bid              |
| marketType           | MarketType        | inherited from: Bid              |
| type                 | String            | inherited from: Document         |
| createdDateTime      | DateTime          | inherited from: Document         |
| lastModifiedDateTime | DateTime          | inherited from: Document         |
| revisionNumber       | String            | inherited from: Document         |
| electronicAddress    | ElectronicAddress | inherited from: Document         |
| subject              | String            | inherited from: Document         |
| title                | String            | inherited from: Document         |
| docStatus            | Status            | inherited from: Document         |
| status               | Status            | inherited from: Document         |
| aliasName            | String            | inherited from: IdentifiedObject |
| mRID                 | String            | inherited from: IdentifiedObject |
| name                 | String            | inherited from: IdentifiedObject |

Table 457 shows all association ends of LoadBid with other classes.

**Table 457 – Association ends of ParticipantInterfaces::LoadBid with other classes**

| [mult from] | [mult to] name                 | type                    | description                      |
|-------------|--------------------------------|-------------------------|----------------------------------|
| [0..1]      | [0..*] RampRateCurve           | RampRateCurve           |                                  |
| [1..1]      | [0..*] LoadReductionPriceCurve | LoadReductionPriceCurve |                                  |
| [0..*]      | [0..1] AreaLoadBid             | AreaLoadBid             |                                  |
| [0..*]      | [0..1] RegisteredLoad          | RegisteredLoad          |                                  |
| [0..*]      | [0..*] BidError                | BidError                | inherited from: ResourceBid      |
| [0..*]      | [0..1] MarketParticipant       | MarketParticipant       | inherited from: Bid              |
| [0..*]      | [1..1] EnergyMarket            | EnergyMarket            | inherited from: Bid              |
| [0..1]      | [0..*] ChargeProfiles          | ChargeProfile           | inherited from: Bid              |
| [1..1]      | [0..*] MitigatedBidSegment     | MitigatedBidSegment     | inherited from: Bid              |
| [0..*]      | [0..1] SchedulingCoordinator   | SchedulingCoordinator   | inherited from: Bid              |
| [0..1]      | [0..*] MitigatedBid            | MitigatedBid            | inherited from: Bid              |
| [0..1]      | [0..*] RMRDetermination        | RMRDetermination        | inherited from: Bid              |
| [0..*]      | [1..1] ActionRequest           | ActionRequest           | inherited from: Bid              |
| [1..1]      | [1..*] ProductBids             | ProductBid              | inherited from: Bid              |
| [1..1]      | [0..*] BidHourlySchedule       | BidHourlySchedule       | inherited from: Bid              |
| [0..1]      | [0..*] ConfigurationEvents     | ConfigurationEvent      | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects          | DiagramObject           | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                   | Name                    | inherited from: IdentifiedObject |

#### 6.5.8.24 LoadFollowingInst root class

Metered SubSystem Load Following Instruction

Table 458 shows all attributes of LoadFollowingInst.

**Table 458 – Attributes of ParticipantInterfaces::LoadFollowingInst**

| name             | type     | description                                                                                        |
|------------------|----------|----------------------------------------------------------------------------------------------------|
| mssInstructionID | String   | Unique instruction id per instruction, assigned by the SC and provided to ADS. ADS passes through. |
| startTime        | DateTime | Instruction Start Time                                                                             |
| endTime          | DateTime | Instruction End Time                                                                               |
| loadFollowingMW  | Float    | Load Following MW. Positive for follow-up and negative for follow-down                             |

Table 459 shows all association ends of LoadFollowingInst with other classes.

**Table 459 – Association ends of ParticipantInterfaces::LoadFollowingInst with other classes**

| [mult from] | [mult to] name            | type               | description |
|-------------|---------------------------|--------------------|-------------|
| [0..*]      | [1..1] RegisteredResource | RegisteredResource |             |

#### 6.5.8.25 LoadReductionPriceCurve

This is the price sensitivity that bidder expresses for allowing market load interruption. Relationship between price (Y1-axis) vs. MW (X-axis).

Table 460 shows all attributes of LoadReductionPriceCurve.

**Table 460 – Attributes of ParticipantInterfaces::LoadReductionPriceCurve**

| name         | type           | description                      |
|--------------|----------------|----------------------------------|
| curveStyle   | CurveStyle     | inherited from: Curve            |
| xMultiplier  | UnitMultiplier | inherited from: Curve            |
| xUnit        | UnitSymbol     | inherited from: Curve            |
| y1Multiplier | UnitMultiplier | inherited from: Curve            |
| y1Unit       | UnitSymbol     | inherited from: Curve            |
| y2Multiplier | UnitMultiplier | inherited from: Curve            |
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 461 shows all association ends of LoadReductionPriceCurve with other classes.

**Table 461 – Association ends of ParticipantInterfaces::  
LoadReductionPriceCurve with other classes**

| [mult from] | [mult to] name        | type           | description                      |
|-------------|-----------------------|----------------|----------------------------------|
| [0..*]      | [1..1] LoadBid        | LoadBid        |                                  |
| [0..*]      | [0..*] RegisteredLoad | RegisteredLoad |                                  |
| [1..1]      | [0..*] CurveDatas     | CurveData      | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects | DiagramObject  | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name           | inherited from: IdentifiedObject |

#### 6.5.8.26 MajorChargeGroup

A Major Charge Group is the same as Invoice Type which provides the highest level of grouping for charge types configuration. Examples as Market, FERC, RMR.

Table 462 shows all attributes of MajorChargeGroup.

**Table 462 – Attributes of ParticipantInterfaces::MajorChargeGroup**

| name            | type     | description                                |
|-----------------|----------|--------------------------------------------|
| runType         | String   |                                            |
| runVersion      | String   |                                            |
| frequencyType   | String   |                                            |
| invoiceType     | String   |                                            |
| effectiveDate   | DateTime |                                            |
| terminationDate | DateTime |                                            |
| requireAutorun  | String   |                                            |
| revisionNumber  | String   | Revision number for the major charge group |
| aliasName       | String   | inherited from: IdentifiedObject           |
| mRID            | String   | inherited from: IdentifiedObject           |
| name            | String   | inherited from: IdentifiedObject           |

Table 463 shows all association ends of MajorChargeGroup with other classes.

**Table 463 – Association ends of ParticipantInterfaces::  
MajorChargeGroup with other classes**

| [mult from] | [mult to] name           | type                 | description                                                                                     |
|-------------|--------------------------|----------------------|-------------------------------------------------------------------------------------------------|
| [1..*]      | [0..*] Settlement        | Settlement           |                                                                                                 |
| [0..*]      | [0..*] ChargeType        | ChargeType           | A MajorChargeGroup can have 0-n ChargeType. A ChargeType can associate to 0-n MajorChargeGroup. |
| [0..1]      | [0..*] MktScheduledEvent | MarketScheduledEvent |                                                                                                 |
| [1..*]      | [0..*] MarketInvoice     | MarketInvoice        |                                                                                                 |
| [0..1]      | [0..*] DiagramObjects    | DiagramObject        | inherited from: IdentifiedObject                                                                |



| [mult from] | [mult to] name | type | description                      |
|-------------|----------------|------|----------------------------------|
| [1..1]      | [0..*] Names   | Name | inherited from: IdentifiedObject |

### 6.5.8.27 MarketScheduledEvent

Signifies an event to trigger one or more activities, such as reading a meter, recalculating a bill, requesting work, when generating units shall be scheduled for maintenance, when a transformer is scheduled to be refurbished, etc.

Table 464 shows all attributes of MarketScheduledEvent.

**Table 464 – Attributes of ParticipantInterfaces::MarketScheduledEvent**

| name      | type    | description                                                                    |
|-----------|---------|--------------------------------------------------------------------------------|
| category  | String  | Category of scheduled event                                                    |
| duration  | Seconds | Duration of the scheduled event, for example, the time to ramp between values. |
| status    | Status  |                                                                                |
| aliasName | String  | inherited from: IdentifiedObject                                               |
| mRID      | String  | inherited from: IdentifiedObject                                               |
| name      | String  | inherited from: IdentifiedObject                                               |

Table 465 shows all association ends of MarketScheduledEvent with other classes.

**Table 465 – Association ends of ParticipantInterfaces::MarketScheduledEvent with other classes**

| [mult from] | [mult to] name          | type             | description                      |
|-------------|-------------------------|------------------|----------------------------------|
| [0..*]      | [0..1] MajorChargeGroup | MajorChargeGroup |                                  |
| [0..1]      | [0..*] DiagramObjects   | DiagramObject    | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names            | Name             | inherited from: IdentifiedObject |

### 6.5.8.28 NotificationTimeCurve

Notification time curve as a function of down time. Relationship between crew notification time (Y1-axis) and unit startup time (Y2-axis) vs. unit elapsed down time (X-axis).

Table 466 shows all attributes of NotificationTimeCurve.

**Table 466 – Attributes of ParticipantInterfaces::NotificationTimeCurve**

| name         | type           | description           |
|--------------|----------------|-----------------------|
| curveStyle   | CurveStyle     | inherited from: Curve |
| xMultiplier  | UnitMultiplier | inherited from: Curve |
| xUnit        | UnitSymbol     | inherited from: Curve |
| y1Multiplier | UnitMultiplier | inherited from: Curve |
| y1Unit       | UnitSymbol     | inherited from: Curve |

| name         | type           | description                      |
|--------------|----------------|----------------------------------|
| y2Multiplier | UnitMultiplier | inherited from: Curve            |
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 467 shows all association ends of NotificationTimeCurve with other classes.

**Table 467 – Association ends of ParticipantInterfaces::NotificationTimeCurve with other classes**

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [0..1]      | [0..*] GeneratingBids | GeneratingBid |                                  |
| [1..1]      | [0..*] CurveDatas     | CurveData     | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

#### 6.5.8.29 OpenTieSchedule

Result of bid validation against conditions that may exist on an interchange that becomes disconnected or is heavily discounted with respect the MW flow.

This schedule is associated with the hourly parameters in a resource bid.

Table 468 shows all attributes of OpenTieSchedule.

**Table 468 – Attributes of ParticipantInterfaces::OpenTieSchedule**

| name             | type           | description                             |
|------------------|----------------|-----------------------------------------|
| value            | Boolean        |                                         |
| endTime          | DateTime       | inherited from: RegularIntervalSchedule |
| timeStep         | Seconds        | inherited from: RegularIntervalSchedule |
| startTime        | DateTime       | inherited from: BasicIntervalSchedule   |
| value1Unit       | UnitSymbol     | inherited from: BasicIntervalSchedule   |
| value1Multiplier | UnitMultiplier | inherited from: BasicIntervalSchedule   |
| value2Unit       | UnitSymbol     | inherited from: BasicIntervalSchedule   |
| value2Multiplier | UnitMultiplier | inherited from: BasicIntervalSchedule   |
| aliasName        | String         | inherited from: IdentifiedObject        |
| mRID             | String         | inherited from: IdentifiedObject        |
| name             | String         | inherited from: IdentifiedObject        |

Table 469 shows all association ends of OpenTieSchedule with other classes.

**Table 469 – Association ends of ParticipantInterfaces::OpenTieSchedule with other classes**

| [mult from] | [mult to] name        | type             | description                             |
|-------------|-----------------------|------------------|-----------------------------------------|
| [0..*]      | [1..1] Bid            | Bid              | inherited from: BidHourlySchedule       |
| [1..1]      | [1..*] TimePoints     | RegularTimePoint | inherited from: RegularIntervalSchedule |
| [0..1]      | [0..*] DiagramObjects | DiagramObject    | inherited from: IdentifiedObject        |
| [1..1]      | [0..*] Names          | Name             | inherited from: IdentifiedObject        |

**6.5.8.30 ProductBid**

Component of a bid that pertains to one market product.

Table 470 shows all attributes of ProductBid.

**Table 470 – Attributes of ParticipantInterfaces::ProductBid**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 471 shows all association ends of ProductBid with other classes.

**Table 471 – Association ends of ParticipantInterfaces::ProductBid with other classes**

| [mult from] | [mult to] name                  | type                     | description                                                 |
|-------------|---------------------------------|--------------------------|-------------------------------------------------------------|
| [1..*]      | [1..1] Bid                      | Bid                      | A bid comprises one or more product bids of market products |
| [1..1]      | [0..*] BidDistributionFactor    | BidDistributionFactor    |                                                             |
| [1..1]      | [0..*] BidSchedule              | BidPriceSchedule         |                                                             |
| [1..1]      | [0..*] BidSelfSched             | BidSelfSched             |                                                             |
| [0..*]      | [1..1] MarketProduct            | MarketProduct            |                                                             |
| [1..1]      | [0..1] BidHourlyProductSchedule | BidHourlyProductSchedule |                                                             |
| [0..1]      | [0..*] DiagramObjects           | DiagramObject            | inherited from: IdentifiedObject                            |
| [1..1]      | [0..*] Names                    | Name                     | inherited from: IdentifiedObject                            |

**6.5.8.31 PumpingCostSchedule**

The operating cost of a Pump Storage Hydro Unit operating as a hydro pump.

This schedule is associated with the hourly parameters in a resource bid associated with a specific product within the bid.

Table 472 shows all attributes of PumpingCostSchedule.

**Table 472 – Attributes of ParticipantInterfaces::PumpingCostSchedule**

| name             | type           | description                             |
|------------------|----------------|-----------------------------------------|
| value            | Float          |                                         |
| endTime          | DateTime       | inherited from: RegularIntervalSchedule |
| timeStep         | Seconds        | inherited from: RegularIntervalSchedule |
| startTime        | DateTime       | inherited from: BasicIntervalSchedule   |
| value1Unit       | UnitSymbol     | inherited from: BasicIntervalSchedule   |
| value1Multiplier | UnitMultiplier | inherited from: BasicIntervalSchedule   |
| value2Unit       | UnitSymbol     | inherited from: BasicIntervalSchedule   |
| value2Multiplier | UnitMultiplier | inherited from: BasicIntervalSchedule   |
| aliasName        | String         | inherited from: IdentifiedObject        |
| mRID             | String         | inherited from: IdentifiedObject        |
| name             | String         | inherited from: IdentifiedObject        |

Table 473 shows all association ends of PumpingCostSchedule with other classes.

**Table 473 – Association ends of ParticipantInterfaces::PumpingCostSchedule with other classes**

| [mult from] | [mult to] name        | type             | description                              |
|-------------|-----------------------|------------------|------------------------------------------|
| [0..*]      | [1..1] ProductBid     | ProductBid       | inherited from: BidHourlyProductSchedule |
| [1..1]      | [1..*] TimePoints     | RegularTimePoint | inherited from: RegularIntervalSchedule  |
| [0..1]      | [0..*] DiagramObjects | DiagramObject    | inherited from: IdentifiedObject         |
| [1..1]      | [0..*] Names          | Name             | inherited from: IdentifiedObject         |

#### 6.5.8.32 PumpingLevelSchedule

The fixed operating level of a Pump Storage Hydro Unit operating as a hydro pump. Associated with the energy market product type.

This schedule is associated with the hourly parameters in a resource bid associated with a specific product within the bid.

Table 474 shows all attributes of PumpingLevelSchedule.

**Table 474 – Attributes of ParticipantInterfaces::PumpingLevelSchedule**

| name             | type           | description                             |
|------------------|----------------|-----------------------------------------|
| value            | Float          |                                         |
| endTime          | DateTime       | inherited from: RegularIntervalSchedule |
| timeStep         | Seconds        | inherited from: RegularIntervalSchedule |
| startTime        | DateTime       | inherited from: BasicIntervalSchedule   |
| value1Unit       | UnitSymbol     | inherited from: BasicIntervalSchedule   |
| value1Multiplier | UnitMultiplier | inherited from: BasicIntervalSchedule   |
| value2Unit       | UnitSymbol     | inherited from: BasicIntervalSchedule   |

| name             | type           | description                           |
|------------------|----------------|---------------------------------------|
| value2Multiplier | UnitMultiplier | inherited from: BasicIntervalSchedule |
| aliasName        | String         | inherited from: IdentifiedObject      |
| mRID             | String         | inherited from: IdentifiedObject      |
| name             | String         | inherited from: IdentifiedObject      |

Table 475 shows all association ends of PumpingLevelSchedule with other classes.

**Table 475 – Association ends of ParticipantInterfaces::PumpingLevelSchedule with other classes**

| [mult from] | [mult to] name        | type             | description                              |
|-------------|-----------------------|------------------|------------------------------------------|
| [0..*]      | [1..1] ProductBid     | ProductBid       | inherited from: BidHourlyProductSchedule |
| [1..1]      | [1..*] TimePoints     | RegularTimePoint | inherited from: RegularIntervalSchedule  |
| [0..1]      | [0..*] DiagramObjects | DiagramObject    | inherited from: IdentifiedObject         |
| [1..1]      | [0..*] Names          | Name             | inherited from: IdentifiedObject         |

### 6.5.8.33 PumpingShutDownCostSchedule

The cost to shutdown a Pump Storage Hydro Unit (in pump mode) or a pump.

This schedule is associated with the hourly parameters in a resource bid associated with a specific product within the bid.

Table 476 shows all attributes of PumpingShutDownCostSchedule.

**Table 476 – Attributes of ParticipantInterfaces::PumpingShutDownCostSchedule**

| name             | type           | description                             |
|------------------|----------------|-----------------------------------------|
| value            | Float          |                                         |
| endTime          | DateTime       | inherited from: RegularIntervalSchedule |
| timeStep         | Seconds        | inherited from: RegularIntervalSchedule |
| startTime        | DateTime       | inherited from: BasicIntervalSchedule   |
| value1Unit       | UnitSymbol     | inherited from: BasicIntervalSchedule   |
| value1Multiplier | UnitMultiplier | inherited from: BasicIntervalSchedule   |
| value2Unit       | UnitSymbol     | inherited from: BasicIntervalSchedule   |
| value2Multiplier | UnitMultiplier | inherited from: BasicIntervalSchedule   |
| aliasName        | String         | inherited from: IdentifiedObject        |
| mRID             | String         | inherited from: IdentifiedObject        |
| name             | String         | inherited from: IdentifiedObject        |

Table 477 shows all association ends of PumpingShutDownCostSchedule with other classes.

**Table 477 – Association ends of ParticipantInterfaces::  
PumpingShutDownCostSchedule with other classes**

| [mult from] | [mult to] name        | type             | description                              |
|-------------|-----------------------|------------------|------------------------------------------|
| [0..*]      | [1..1] ProductBid     | ProductBid       | inherited from: BidHourlyProductSchedule |
| [1..1]      | [1..*] TimePoints     | RegularTimePoint | inherited from: RegularIntervalSchedule  |
| [0..1]      | [0..*] DiagramObjects | DiagramObject    | inherited from: IdentifiedObject         |
| [1..1]      | [0..*] Names          | Name             | inherited from: IdentifiedObject         |

#### 6.5.8.34 RampRateCurve

Ramp rate as a function of resource MW output

Table 478 shows all attributes of RampRateCurve.

**Table 478 – Attributes of ParticipantInterfaces::RampRateCurve**

| name               | type               | description                                                                                                                                                                                                                                                                                                                        |
|--------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| condition          | RampRateCondition  | condition for the ramp rate                                                                                                                                                                                                                                                                                                        |
| constraintRampType | ConstraintRampType | The condition that identifies whether a Generating Resource should be constrained from Ancillary Service provision if its Schedule or Dispatch change across Trading Hours or Trading Intervals requires more than a specified fraction of the duration of the Trading Hour or Trading Interval.<br><br>Valid values are Fast/Slow |
| rampRateType       | RampRateType       | How ramp rate is applied (e.g. raise or lower, as when applied to a generation resource)                                                                                                                                                                                                                                           |
| curveStyle         | CurveStyle         | inherited from: Curve                                                                                                                                                                                                                                                                                                              |
| xMultiplier        | UnitMultiplier     | inherited from: Curve                                                                                                                                                                                                                                                                                                              |
| xUnit              | UnitSymbol         | inherited from: Curve                                                                                                                                                                                                                                                                                                              |
| y1Multiplier       | UnitMultiplier     | inherited from: Curve                                                                                                                                                                                                                                                                                                              |
| y1Unit             | UnitSymbol         | inherited from: Curve                                                                                                                                                                                                                                                                                                              |
| y2Multiplier       | UnitMultiplier     | inherited from: Curve                                                                                                                                                                                                                                                                                                              |
| y2Unit             | UnitSymbol         | inherited from: Curve                                                                                                                                                                                                                                                                                                              |
| y3Multiplier       | UnitMultiplier     | inherited from: Curve                                                                                                                                                                                                                                                                                                              |
| y3Unit             | UnitSymbol         | inherited from: Curve                                                                                                                                                                                                                                                                                                              |
| aliasName          | String             | inherited from: IdentifiedObject                                                                                                                                                                                                                                                                                                   |
| mRID               | String             | inherited from: IdentifiedObject                                                                                                                                                                                                                                                                                                   |
| name               | String             | inherited from: IdentifiedObject                                                                                                                                                                                                                                                                                                   |

Table 479 shows all association ends of RampRateCurve with other classes.

**Table 479 – Association ends of ParticipantInterfaces::  
RampRateCurve with other classes**

| [mult from] | [mult to] name            | type               | description                      |
|-------------|---------------------------|--------------------|----------------------------------|
| [0..*]      | [0..*] RegisteredResource | RegisteredResource |                                  |
| [0..*]      | [0..1] GeneratingBid      | GeneratingBid      |                                  |
| [0..*]      | [0..1] InterTieBid        | InterTieBid        |                                  |
| [0..*]      | [0..1] LoadBid            | LoadBid            |                                  |
| [1..1]      | [0..*] CurveDatas         | CurveData          | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects     | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names              | Name               | inherited from: IdentifiedObject |

### 6.5.8.35 ResourceBid

Energy bid for generation, load, or virtual type for the whole of the market-trading period (i.e., one day in day ahead market or one hour in the real time market)

Table 480 shows all attributes of ResourceBid.

**Table 480 – Attributes of ParticipantInterfaces::ResourceBid**

| name                 | type    | description                                                                                                                                                                             |
|----------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| aggregationFlag      | Integer | Aggregation flag<br>0: individual resource level<br>1: Aggregated node location<br>2: Aggregated price location)                                                                        |
| bidStatus            | String  |                                                                                                                                                                                         |
| commodityType        | String  | Energy product (commodity) type:<br>'En' – Energy<br>'Ru' – Regulation Up<br>'Rd' – Regulation Dn<br>'Sr' – Spinning Reserve<br>'Nr' – Non-Spinning Reserve<br>'Or' – Operating Reserve |
| contingencyAvailFlag | YesNo   | contingent operating reserve availability (Yes/No). Resource is available to participate with capacity only in contingency dispatch.                                                    |
| createdISO           | YesNo   | A Yes indicates that this bid was created by the ISO.                                                                                                                                   |
| energyMaxDay         | Float   | Maximum amount of energy per day which can be produced during the trading period in MWh                                                                                                 |
| energyMinDay         | Float   | Minimum amount of energy per day which has to be produced during the trading period in MWh                                                                                              |
| marketSepFlag        | String  | Market Separation Flag<br>'Y' – Enforce market separation constraints for this bid<br>'N' – Don't enforce market separation constraints for this bid.                                   |
| minDispatchTime      | Integer | minimum number of consecutive hours a resource shall be dispatched if bid is accepted                                                                                                   |

| name                 | type              | description                                                                                                                      |
|----------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------|
| resourceLoadingType  | Integer           | Resource loading curve type<br>1 – step-wise continuous loading<br>2 – piece-wise linear continuous loading<br>3 – block loading |
| shutDownsMaxDay      | Integer           | Maximum number of shutdowns per day.                                                                                             |
| shutDownsMaxWeek     | Integer           | Maximum number of shutdowns per week.                                                                                            |
| startUpsMaxDay       | Integer           | Maximum number of startups per day.                                                                                              |
| startUpsMaxWeek      | Integer           | Maximum number of startups per week.                                                                                             |
| virtual              | Boolean           | True if bid is virtual. Bid is assumed to be non-virtual if attribute is absent                                                  |
| startTime            | DateTime          | inherited from: Bid                                                                                                              |
| stopTime             | DateTime          | inherited from: Bid                                                                                                              |
| marketType           | MarketType        | inherited from: Bid                                                                                                              |
| type                 | String            | inherited from: Document                                                                                                         |
| createdDateTime      | DateTime          | inherited from: Document                                                                                                         |
| lastModifiedDateTime | DateTime          | inherited from: Document                                                                                                         |
| revisionNumber       | String            | inherited from: Document                                                                                                         |
| electronicAddress    | ElectronicAddress | inherited from: Document                                                                                                         |
| subject              | String            | inherited from: Document                                                                                                         |
| title                | String            | inherited from: Document                                                                                                         |
| docStatus            | Status            | inherited from: Document                                                                                                         |
| status               | Status            | inherited from: Document                                                                                                         |
| aliasName            | String            | inherited from: IdentifiedObject                                                                                                 |
| mRID                 | String            | inherited from: IdentifiedObject                                                                                                 |
| name                 | String            | inherited from: IdentifiedObject                                                                                                 |

Table 481 shows all association ends of ResourceBid with other classes.

**Table 481 – Association ends of ParticipantInterfaces::ResourceBid with other classes**

| [mult from] | [mult to] name               | type                  | description                      |
|-------------|------------------------------|-----------------------|----------------------------------|
| [0..*]      | [0..1] BidError              | BidError              |                                  |
| [0..*]      | [0..1] MarketParticipant     | MarketParticipant     | inherited from: Bid              |
| [0..*]      | [1..1] EnergyMarket          | EnergyMarket          | inherited from: Bid              |
| [0..1]      | [0..*] ChargeProfiles        | ChargeProfile         | inherited from: Bid              |
| [1..1]      | [0..*] MitigatedBidSegment   | MitigatedBidSegment   | inherited from: Bid              |
| [0..*]      | [0..1] SchedulingCoordinator | SchedulingCoordinator | inherited from: Bid              |
| [0..1]      | [0..*] MitigatedBid          | MitigatedBid          | inherited from: Bid              |
| [0..1]      | [0..*] RMRDetermination      | RMRDetermination      | inherited from: Bid              |
| [0..*]      | [1..1] ActionRequest         | ActionRequest         | inherited from: Bid              |
| [1..1]      | [1..*] ProductBids           | ProductBid            | inherited from: Bid              |
| [1..1]      | [0..*] BidHourlySchedule     | BidHourlySchedule     | inherited from: Bid              |
| [0..1]      | [0..*] ConfigurationEvents   | ConfigurationEvent    | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects        | DiagramObject         | inherited from: IdentifiedObject |



| [mult from] | [mult to] name | type | description                      |
|-------------|----------------|------|----------------------------------|
| [1..1]      | [0..*] Names   | Name | inherited from: IdentifiedObject |

### 6.5.8.36 StartUpCostCurve

Startup costs and time as a function of down time. Relationship between unit startup cost (Y1-axis) vs. unit elapsed down time (X-axis).

Table 482 shows all attributes of StartUpCostCurve.

**Table 482 – Attributes of ParticipantInterfaces::StartUpCostCurve**

| name         | type           | description                      |
|--------------|----------------|----------------------------------|
| curveStyle   | CurveStyle     | inherited from: Curve            |
| xMultiplier  | UnitMultiplier | inherited from: Curve            |
| xUnit        | UnitSymbol     | inherited from: Curve            |
| y1Multiplier | UnitMultiplier | inherited from: Curve            |
| y1Unit       | UnitSymbol     | inherited from: Curve            |
| y2Multiplier | UnitMultiplier | inherited from: Curve            |
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 483 shows all association ends of StartUpCostCurve with other classes.

**Table 483 – Association ends of ParticipantInterfaces::StartUpCostCurve with other classes**

| [mult from] | [mult to] name              | type                | description                      |
|-------------|-----------------------------|---------------------|----------------------------------|
| [0..1]      | [0..1] GeneratingBid        | GeneratingBid       |                                  |
| [0..*]      | [0..*] RegisteredGenerators | RegisteredGenerator |                                  |
| [1..1]      | [0..*] CurveDatas           | CurveData           | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects       | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                | Name                | inherited from: IdentifiedObject |

### 6.5.8.37 StartUpTimeCurve

Startup time curve as a function of down time, where time is specified in minutes. Relationship between unit startup time (Y1-axis) vs. unit elapsed down time (X-axis).

Table 484 shows all attributes of StartUpTimeCurve.

**Table 484 – Attributes of ParticipantInterfaces::StartUpTimeCurve**

| name         | type           | description                      |
|--------------|----------------|----------------------------------|
| curveStyle   | CurveStyle     | inherited from: Curve            |
| xMultiplier  | UnitMultiplier | inherited from: Curve            |
| xUnit        | UnitSymbol     | inherited from: Curve            |
| y1Multiplier | UnitMultiplier | inherited from: Curve            |
| y1Unit       | UnitSymbol     | inherited from: Curve            |
| y2Multiplier | UnitMultiplier | inherited from: Curve            |
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 485 shows all association ends of StartUpTimeCurve with other classes.

**Table 485 – Association ends of ParticipantInterfaces::StartUpTimeCurve with other classes**

| [mult from] | [mult to] name             | type                | description                      |
|-------------|----------------------------|---------------------|----------------------------------|
| [0..1]      | [0..*] GeneratingBid       | GeneratingBid       |                                  |
| [0..1]      | [0..1] RegisteredGenerator | RegisteredGenerator |                                  |
| [1..1]      | [0..*] CurveDatas          | CurveData           | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject |

### 6.5.8.38 Trade

Inter Scheduling Coordinator Trades to model financial trades which may impact settlement

Table 486 shows all attributes of Trade.

**Table 486 – Attributes of ParticipantInterfaces::Trade**

| name                  | type       | description                                                                                  |
|-----------------------|------------|----------------------------------------------------------------------------------------------|
| adjustedTradeQuantity | Float      | The validated and current market accepted trade amount of a physical energy trade.           |
| counterTradeQuantity  | Float      | MW quantity submitted by counter SC for the same trade                                       |
| dependOnTradeName     | String     | The Depend On IST Name points to the unique IST Name in the chain of physical energy trades. |
| lastModified          | DateTime   | Time and date the trade was last modified.                                                   |
| marketType            | MarketType |                                                                                              |
| startTime             | DateTime   | Start time and date for which trade applies.                                                 |
| stopTime              | DateTime   | Stop time and date for which trade is applicable.                                            |

| name                | type     | description                                                                                                                                                                                                               |
|---------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| submitFromTimeStamp | DateTime | Timestamp of submittal of submit From Scheduling Coordinator Trade to Market Participant Bid Submittal                                                                                                                    |
| submitFromUser      | String   | Userid of the submit From Scheduling Coordinator trade                                                                                                                                                                    |
| submitToTimeStamp   | DateTime | Timestamp of submittal of submit To Scheduling Coordinator Trade to Market Participant Bid Submittal                                                                                                                      |
| submitToUser        | String   | Userid of the submit To Scheduling Coordinator trade                                                                                                                                                                      |
| tradeQuantity       | Float    | tradeQuantity:<br>If tradeType = IST, The amount of an Energy Trade.<br>If tradeType = AST, The amount of an Ancillary Service Obligation Trade.<br>If tradeType = UCT, The amount of a Unit Commitment Obligation Trade. |
| tradeStatus         | String   | Resulting status of the trade following the rule engine processing.                                                                                                                                                       |
| updateTimeStamp     | DateTime |                                                                                                                                                                                                                           |
| updateUser          | String   |                                                                                                                                                                                                                           |
| aliasName           | String   | inherited from: IdentifiedObject                                                                                                                                                                                          |
| mRID                | String   | inherited from: IdentifiedObject                                                                                                                                                                                          |
| name                | String   | inherited from: IdentifiedObject                                                                                                                                                                                          |

Table 487 shows all association ends of Trade with other classes.

**Table 487 – Association ends of ParticipantInterfaces::Trade with other classes**

| [mult from] | [mult to] name                         | type                  | description                      |
|-------------|----------------------------------------|-----------------------|----------------------------------|
| [0..1]      | [0..*] TradeError                      | TradeError            |                                  |
| [0..*]      | [1..1] ActionRequest                   | ActionRequest         |                                  |
| [0..*]      | [0..1] Pnode                           | Pnode                 |                                  |
| [0..*]      | [0..1] submitToSchedulingCoordinator   | SchedulingCoordinator |                                  |
| [0..*]      | [1..1] TradeProduct                    | TradeProduct          |                                  |
| [0..*]      | [1..1] To_SC                           | SchedulingCoordinator |                                  |
| [0..*]      | [1..1] From_SC                         | SchedulingCoordinator |                                  |
| [0..*]      | [0..1] submitFromSchedulingCoordinator | SchedulingCoordinator |                                  |
| [0..*]      | [0..1] RegisteredGenerator             | RegisteredGenerator   |                                  |
| [0..1]      | [0..*] DiagramObjects                  | DiagramObject         | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                           | Name                  | inherited from: IdentifiedObject |

### 6.5.8.39 TradeError

Trade error and warning messages associated with the rule engine processing of the submitted trade.

Table 488 shows all attributes of TradeError.

**Table 488 – Attributes of ParticipantInterfaces::TradeError**

| name         | type     | description                                               |
|--------------|----------|-----------------------------------------------------------|
| errPriority  | Integer  | Priority number for the error message                     |
| errMessage   | String   | error message                                             |
| ruleID       | Integer  | Rule identifier which triggered the error/warning message |
| startTime    | DateTime | hour within the trade for which the error applies         |
| endTime      | DateTime | hour within the trade for which the error applies         |
| logTimeStamp | DateTime | Timestamp of logged error/warning message                 |
| aliasName    | String   | inherited from: IdentifiedObject                          |
| mRID         | String   | inherited from: IdentifiedObject                          |
| name         | String   | inherited from: IdentifiedObject                          |

Table 489 shows all association ends of TradeError with other classes.

**Table 489 – Association ends of ParticipantInterfaces::TradeError with other classes**

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [0..*]      | [0..1] Trade          | Trade         |                                  |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

### 6.5.8.40 TradeProduct root class

|                                 |                                                 |
|---------------------------------|-------------------------------------------------|
| TradeType                       | TradeProduct                                    |
| IST (InterSC Trade)             | PHY (Physical Energy Trade)                     |
| IST                             | APN (Energy Trades at Aggregated Pricing Nodes) |
| IST                             | CPT (Converted Physical Energy Trade)           |
| AST (Ancilliary Services Trade) | RUT (Regulation Up Trade)                       |
| AST                             | RDT (Regulation Down Trade)                     |
| AST                             | SRT (Spinning Reserve Trade)                    |
| AST                             | NRT (Non-Spinning Reserve Trade)                |

UCT (Unit Commitment Trade) null

Table 490 shows all attributes of TradeProduct.

**Table 490 – Attributes of ParticipantInterfaces::TradeProduct**

| name             | type      | description                                                                                                                                                                                                                                                   |
|------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| tradeType        | TradeType | IST – InterSC Trade;<br>AST – Ancillary Services Trade;<br>UCT – Unit Commitment Trade                                                                                                                                                                        |
| tradeProductType | String    | PHY (Physical Energy Trade);<br>APN (Energy Trades at Aggregated Pricing Nodes);<br>CPT (Converted Physical Energy Trade);<br>RUT (Regulation Up Trade);<br>RDT (Regulation Down Trade);<br>SRT (Spinning Reserve Trade);<br>NRT (Non-Spinning Reserve Trade) |

Table 491 shows all association ends of TradeProduct with other classes.

**Table 491 – Association ends of ParticipantInterfaces::TradeProduct with other classes**

| [mult from] | [mult to] name | type  | description |
|-------------|----------------|-------|-------------|
| [1..1]      | [0..*] Trade   | Trade |             |

#### 6.5.8.41 TransactionBid

Bilateral or scheduled transactions for energy and ancillary services considered by market clearing process

Table 492 shows all attributes of TransactionBid.

**Table 492 – Attributes of ParticipantInterfaces::TransactionBid**

| name                 | type       | description                                                                                                                              |
|----------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------|
| demandTransaction    | Boolean    | Set true if this is a demand transaction.                                                                                                |
| dispatchable         | Boolean    | Set true if this is a dispatchable transaction.                                                                                          |
| payCongestion        | Boolean    | Set true if this is a willing to pay transaction. This flag is used to determine whether a schedule is willing-to-pay-congestion or not. |
| startTime            | DateTime   | inherited from: Bid                                                                                                                      |
| stopTime             | DateTime   | inherited from: Bid                                                                                                                      |
| marketType           | MarketType | inherited from: Bid                                                                                                                      |
| type                 | String     | inherited from: Document                                                                                                                 |
| createdDateTime      | DateTime   | inherited from: Document                                                                                                                 |
| lastModifiedDateTime | DateTime   | inherited from: Document                                                                                                                 |
| revisionNumber       | String     | inherited from: Document                                                                                                                 |

| name              | type              | description                      |
|-------------------|-------------------|----------------------------------|
| electronicAddress | ElectronicAddress | inherited from: Document         |
| subject           | String            | inherited from: Document         |
| title             | String            | inherited from: Document         |
| docStatus         | Status            | inherited from: Document         |
| status            | Status            | inherited from: Document         |
| aliasName         | String            | inherited from: IdentifiedObject |
| mRID              | String            | inherited from: IdentifiedObject |
| name              | String            | inherited from: IdentifiedObject |

Table 493 shows all association ends of TransactionBid with other classes.

**Table 493 – Association ends of ParticipantInterfaces:  
TransactionBid with other classes**

| [mult from] | [mult to] name                 | type                    | description                      |
|-------------|--------------------------------|-------------------------|----------------------------------|
| [1..1]      | [1..*] EnergyProfiles          | EnergyProfile           |                                  |
| [0..1]      | [0..1] TransmissionReservation | TransmissionReservation |                                  |
| [0..1]      | [0..*] TransactionBidResults   | TransactionBidResults   |                                  |
| [0..*]      | [0..1] Receipt_Pnode           | Pnode                   |                                  |
| [0..*]      | [0..1] Delivery_Pnode          | Pnode                   |                                  |
| [0..*]      | [0..1] MarketParticipant       | MarketParticipant       | inherited from: Bid              |
| [0..*]      | [1..1] EnergyMarket            | EnergyMarket            | inherited from: Bid              |
| [0..1]      | [0..*] ChargeProfiles          | ChargeProfile           | inherited from: Bid              |
| [1..1]      | [0..*] MitigatedBidSegment     | MitigatedBidSegment     | inherited from: Bid              |
| [0..*]      | [0..1] SchedulingCoordinator   | SchedulingCoordinator   | inherited from: Bid              |
| [0..1]      | [0..*] MitigatedBid            | MitigatedBid            | inherited from: Bid              |
| [0..1]      | [0..*] RMRDetermination        | RMRDetermination        | inherited from: Bid              |
| [0..*]      | [1..1] ActionRequest           | ActionRequest           | inherited from: Bid              |
| [1..1]      | [1..*] ProductBids             | ProductBid              | inherited from: Bid              |
| [1..1]      | [0..*] BidHourlySchedule       | BidHourlySchedule       | inherited from: Bid              |
| [0..1]      | [0..*] ConfigurationEvents     | ConfigurationEvent      | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects          | DiagramObject           | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                   | Name                    | inherited from: IdentifiedObject |

## 6.5.9 Package ReferenceData

### 6.5.9.1 General

Market static reference data.

Figure 46 shows class diagram AggregateNode.

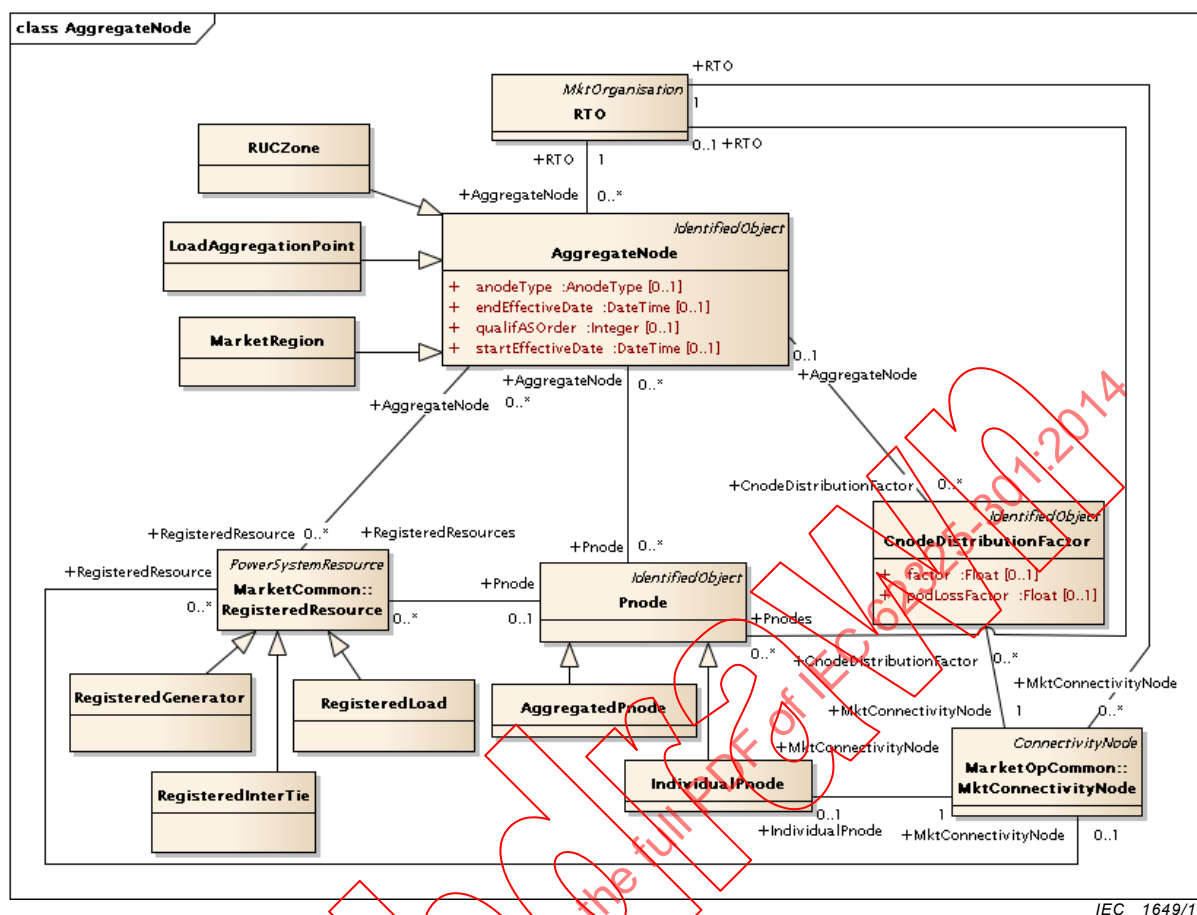
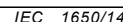


**Figure 46 – Class diagram ReferenceData::AggregateNode**

This figure shows classes and associations used to model aggregate nodes. The aggregated node allows a grouping of Pnode and Cnodes that is further defined by AnodeType. Reliability Unit Commitment zones are modeled by the RUCZone subclass. Load aggregation points are modeled by the LoadAggregationPoint subclass, and market regions by the MarketRegion subclass. Registered resources are associated with Aggregated nodes.

Figure 47 shows class diagram Contracts.



This figure shows the classes and associations used to model Contract rights. The class ContractRight is used to summarize contract information. Types of contracts include Existing Transmission Contracts (ETC), Transmission Ownership Rights (TOR), Reliability Must Run (RMR) and Reliability Must Take (RMT). ETCs and TOR represent grandfathered transmission use contracts that exist at the time of startup of an ISO. RMR and RMT affect generation. The figure shows associations with the TransmissionRightChain which may be used to model chaining of ETCs and with Scheduling Coordinators. Associations are also included to model distribution to sources and sinks (the Contract DistributionFactor class) and to registered resources (RegisteredResource class).

Figure 48 shows class diagram MeteredSubSystem.



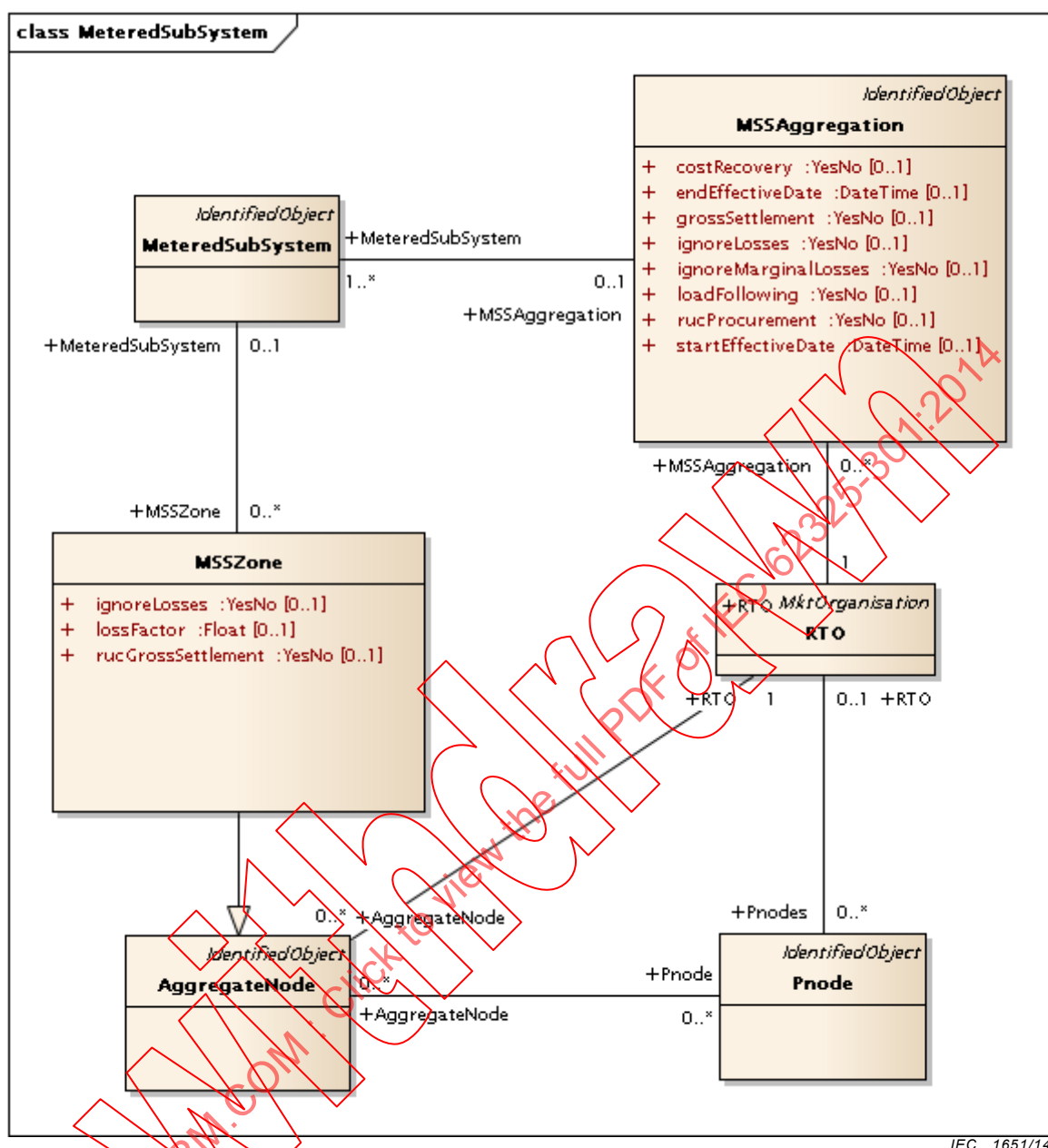


Figure 48 – Class diagram ReferenceData::MeteredSubSystem

This figure shows the classes and associations used to model metered subsystems. A metered subsystem (MSS) is a geographically contiguous system which was historically operated as a separate control area and which is now operated in accordance with a MSS agreement. Associations are shown with the class MSSZone which is used to model zones with an MSS. MSSZone is subtype of the Aggregated Node.

Figure 49 shows class diagram MultiStateGenerator.

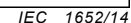
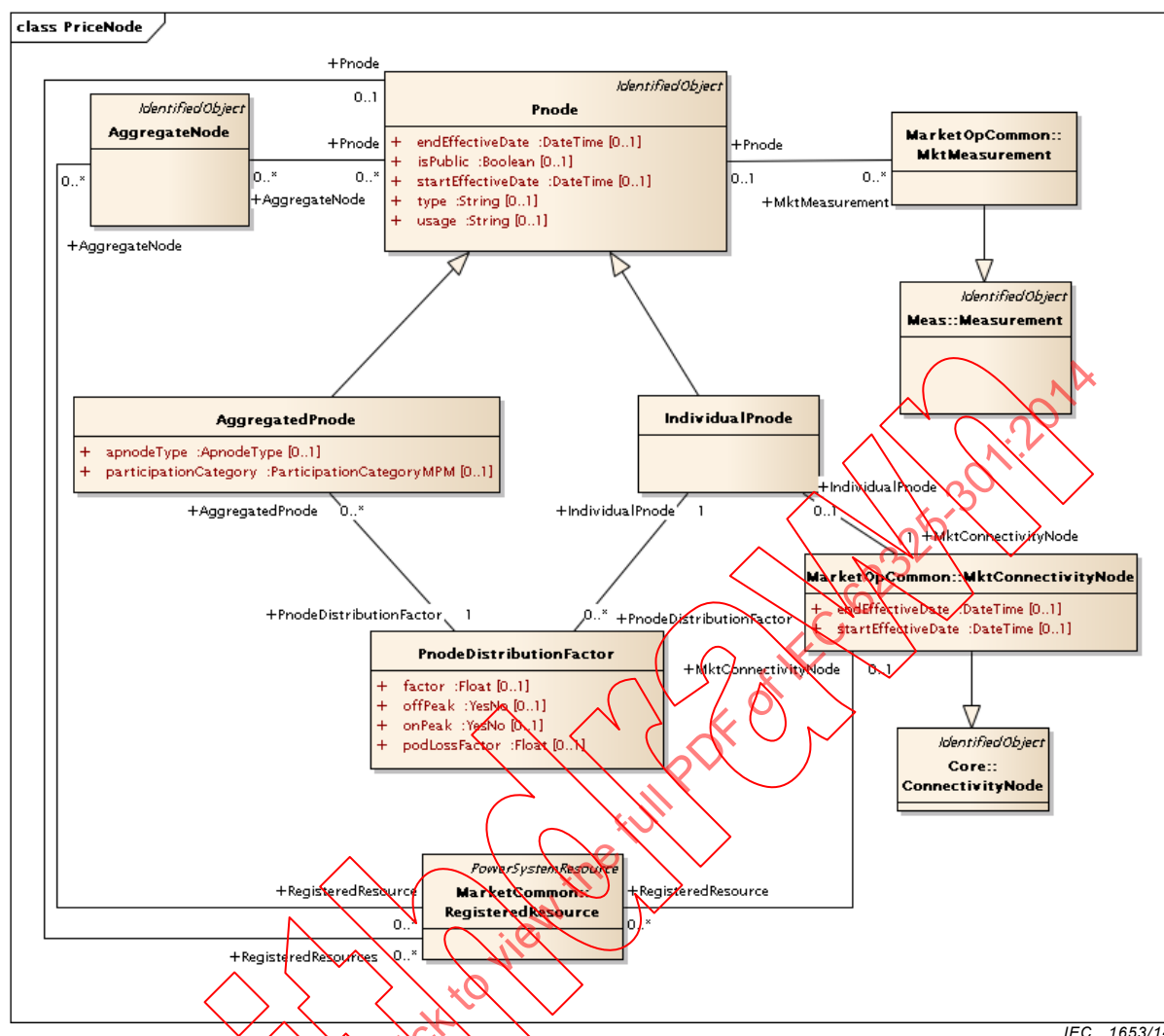


**Figure 4**

Figure 50 shows class diagram PriceNode.



IEC 1653/14

Figure 50 – Class diagram ReferenceData::PriceNode

This figure shows the classes and associations used to model pricing nodes. The pricing node is referenced by market participants, in bids/offers for energy, ancillary services, and CRRs. AggregatePnodes and IndividualPnodes are subclasses of the Pnode class. Pnodes are associated with registered resources and used in bids/offers. Pnodes are also associated with the MktMeasurement class which is used in Billing and Settlement.

Figure 51 shows class diagram RegisteredGenerator.

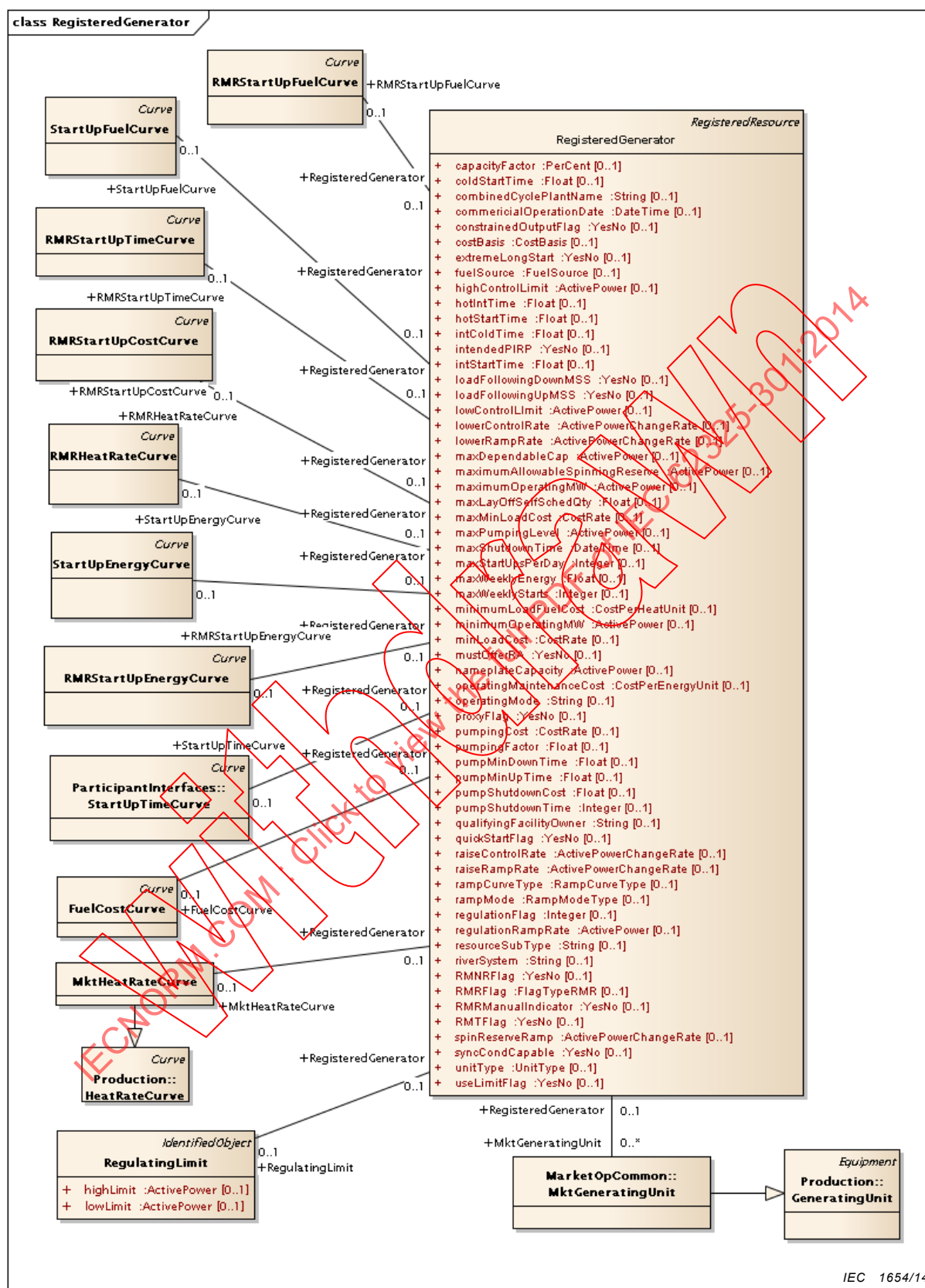


Figure 51 – Class diagram ReferenceData::RegisteredGenerator

This figure shows the classes and associations use to model registered generators. The RMRStartUpFuelCurve is used to model the cost of starting generating units classified as reliability must run units. Other classes are used to model startup cost, start up energy curve,

heat rates, and start up time for RMR units. The class FuelCostCurve is used to model the relationship between startup fuel cost and unit active power output.

Figure 52 shows class diagram RegisteredInterTie.

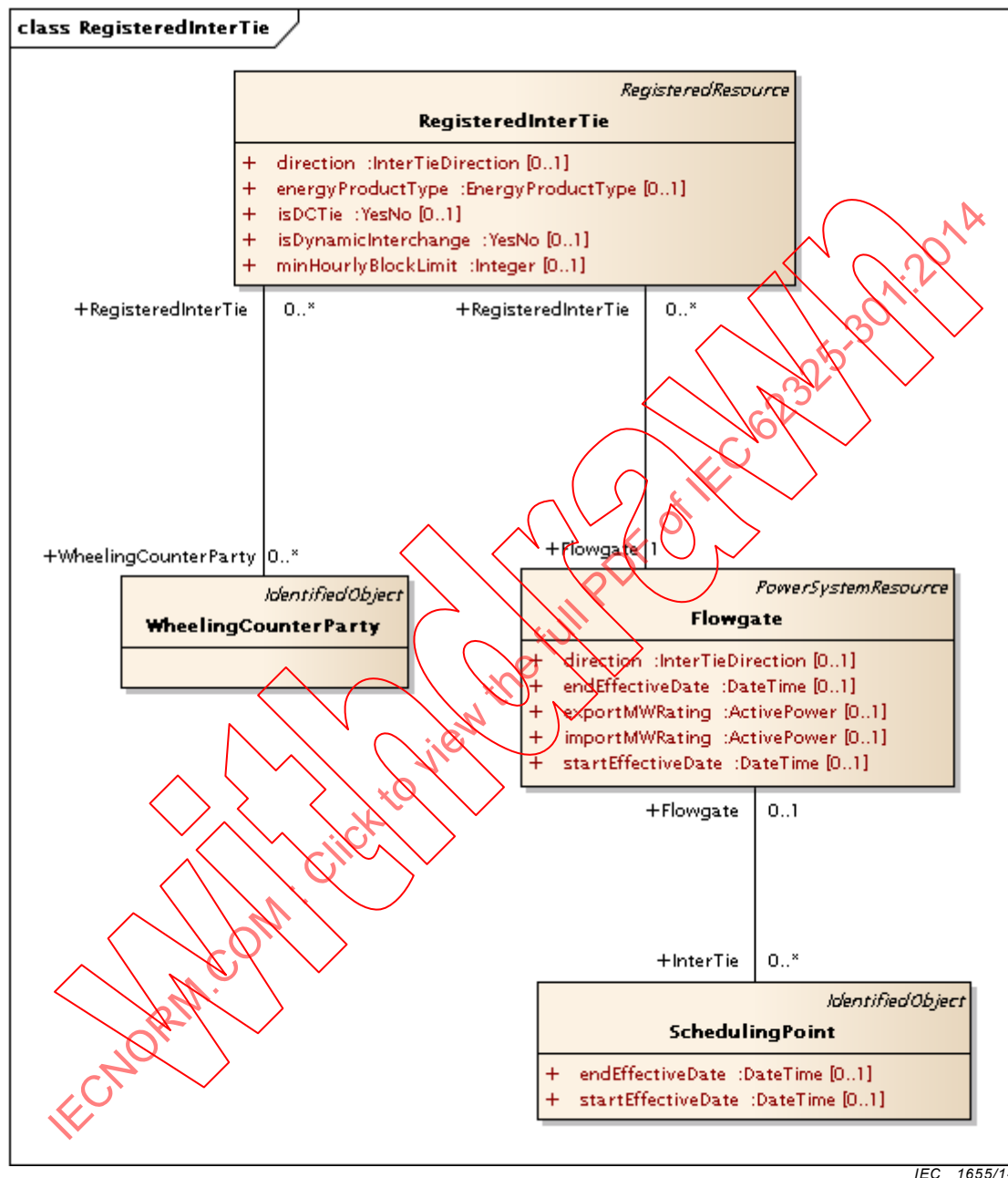


Figure 52 – Class diagram ReferenceData::RegisteredInterTie

This figure shows the classes and associations used to model registered interties. The SchedulingPoint class is associated with a flowgate which is in turn associated with a RegisteredInterTie. The RegisteredInterTie may be an AC or DC tie to a neighbouring utility entity.

Figure 53 shows class diagram RegisteredLoad.

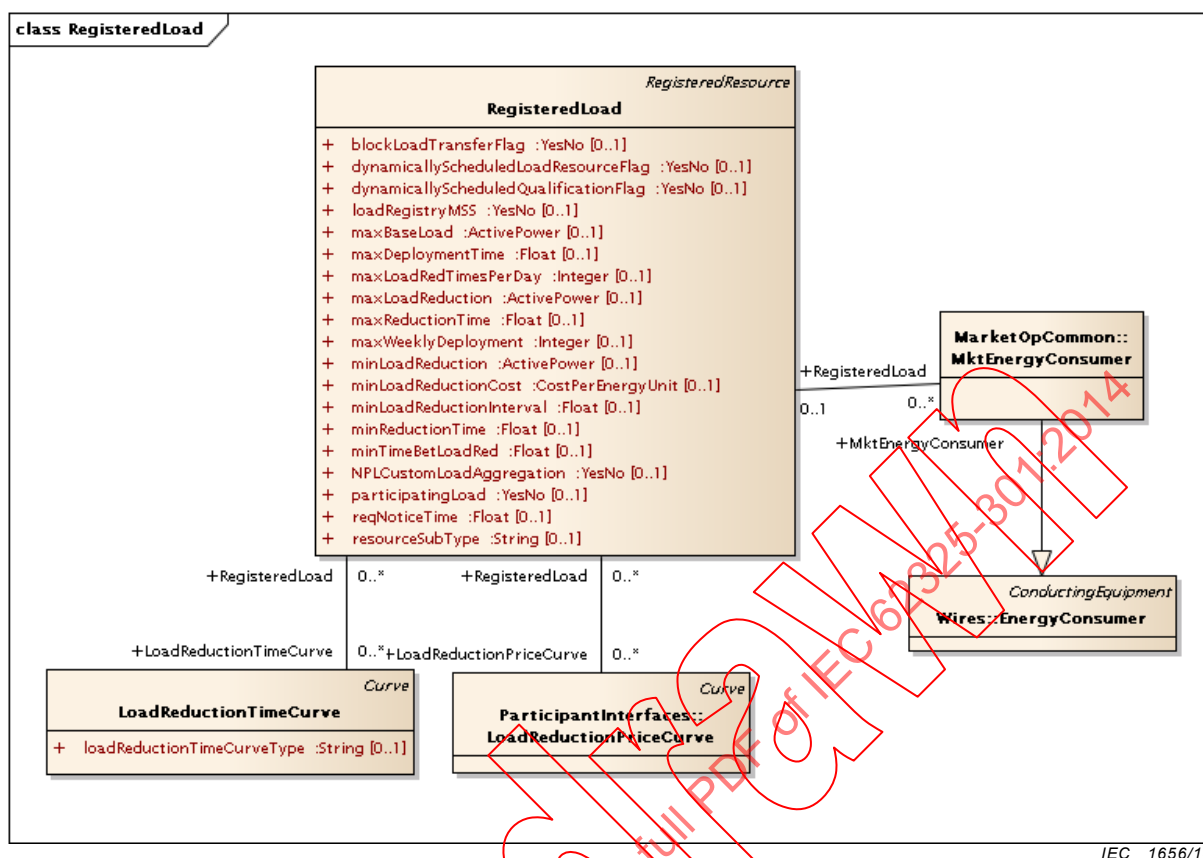
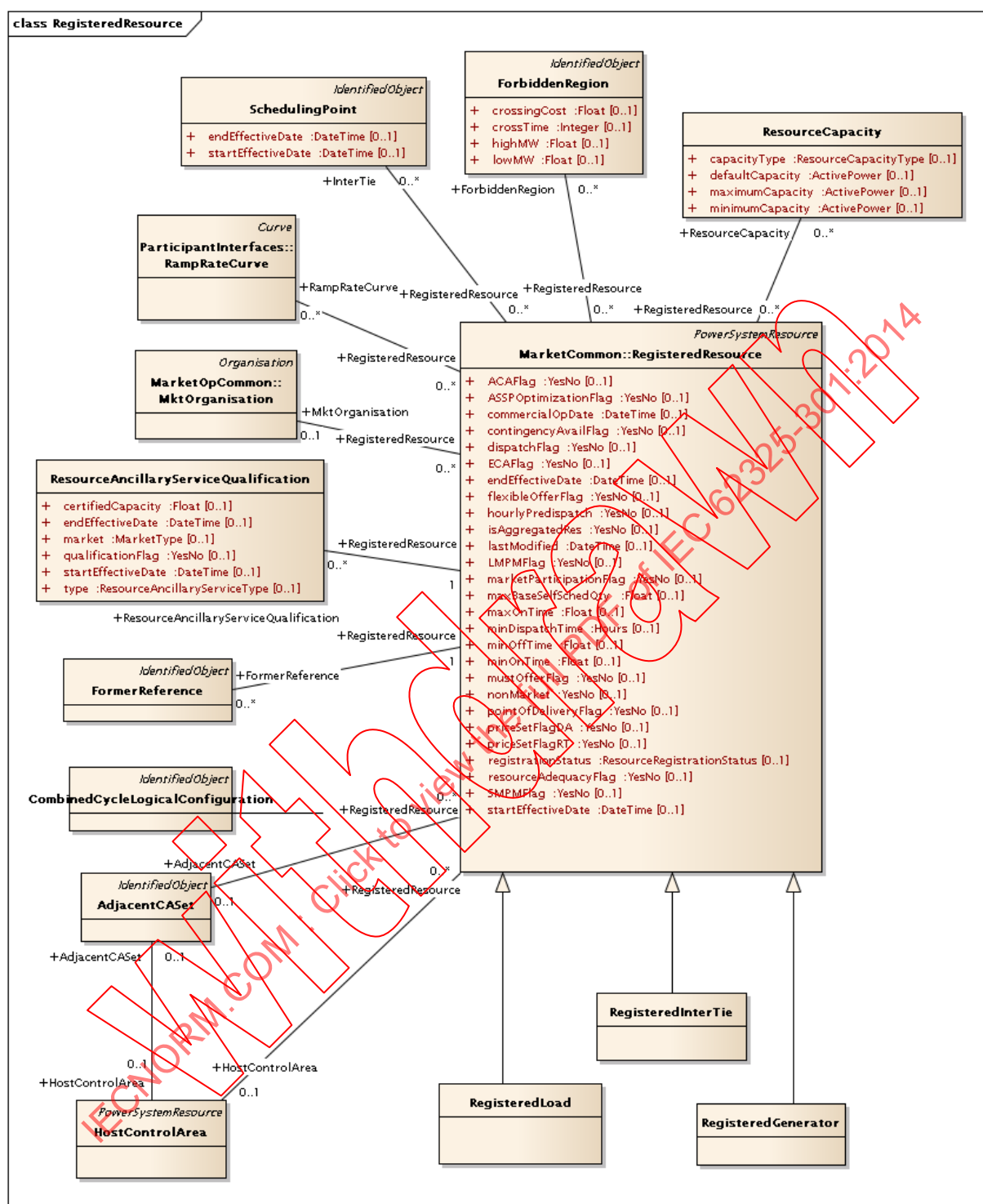


Figure 53 – Class diagram ReferenceData::RegisteredLoad

This figure shows the classes and associations use to model registered loads. RegisterLoads may participate in the market by offering to reduce baseline consumption of energy and one or more electrical products (energy, ancillary services) in return for a payment. The LoadReductionTimeCurve class and the LoadReductionPriceCure class are used to model the parameters of load reduction offer. The MktEnergyConsumer class models the location of the load in the network.

Figure 54 shows class diagram RegisteredResource.



IEC 1657/14

Figure 54 – Class diagram ReferenceData::RegisteredResource

This figure shows the classes and associations used to model registered resources. The RegisteredResource class is the parent class of the RegisteredGenerator, RegisteredInterTie, and RegisteredLoad subclasses. Major classes include the ResourceAncillaryServiceQualification class that is used to describe the ancillary services that the resource is qualified to offer. The ResourceCapability, the ForbiddenRegion and RampRateCurve classes are used to model technical capabilities of the resource. The SchedulingPoint class models the points on the boundary to other utility entities where the resource can deliver market products to the RTO.

Figure 55 shows class diagram RTO.

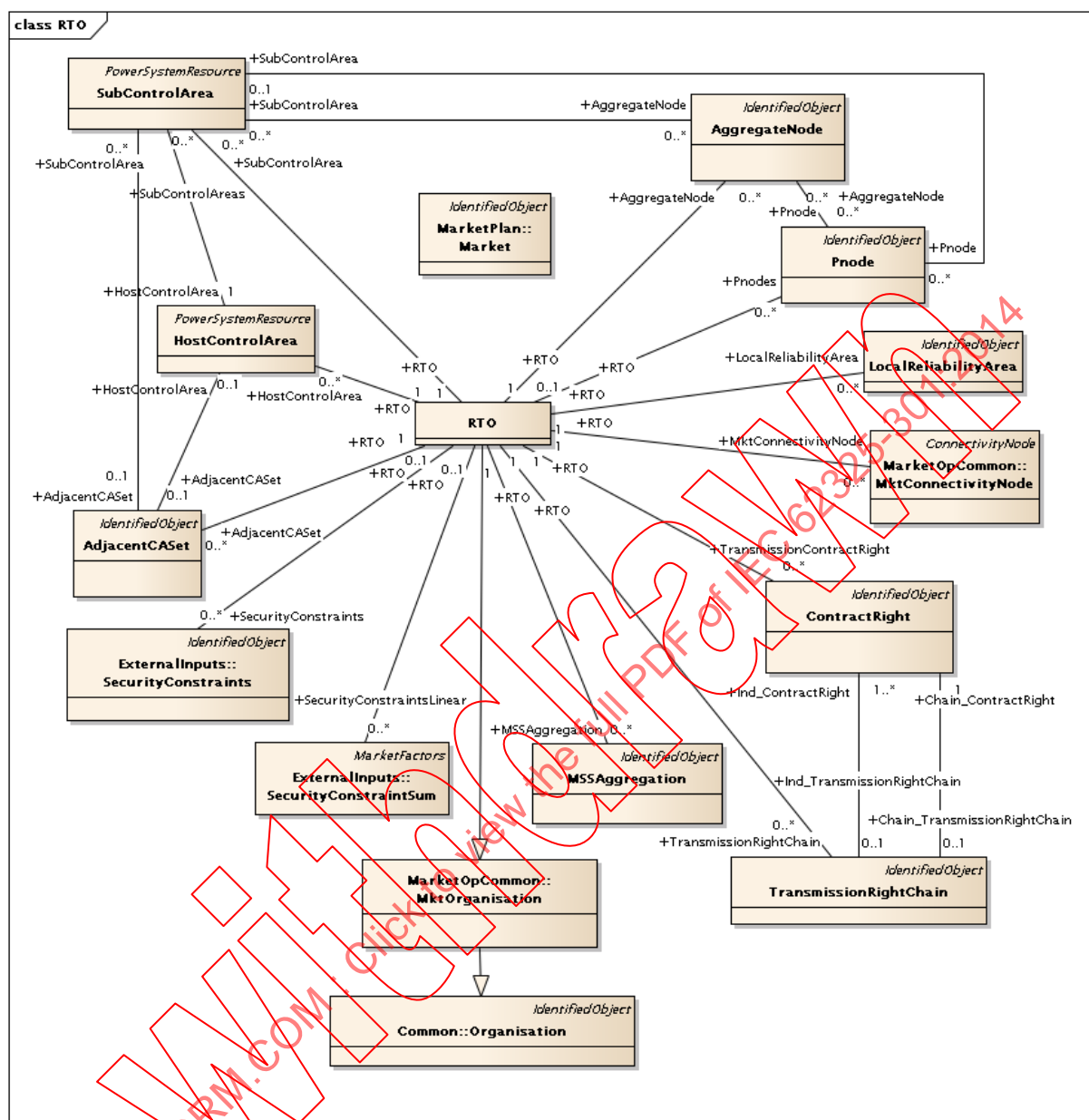


Figure 55 – Class diagram ReferenceData::RTO

This figure shows the classes and associations used to model a Regional Transmission Organization that operates an electricity market. The major classes and relationships are shown at an overview level. Supporting figures appear throughout the standard.

### 6.5.9.2 AdjacentCaset

Groups Adjacent Control Areas

Table 494 shows all attributes of AdjacentCaset.



**Table 494 – Attributes of ReferenceData::AdjacentCaset**

| name               | type     | description                      |
|--------------------|----------|----------------------------------|
| endEffectiveDate   | DateTime | end effective date               |
| lossPercentage     | Float    | Loss percentage                  |
| startEffectiveDate | DateTime | start effective date             |
| aliasName          | String   | inherited from: IdentifiedObject |
| mRID               | String   | inherited from: IdentifiedObject |
| name               | String   | inherited from: IdentifiedObject |

Table 495 shows all association ends of AdjacentCaset with other classes.

**Table 495 – Association ends of ReferenceData::AdjacentCaset with other classes**

| [mult from] | [mult to] name            | type               | description                      |
|-------------|---------------------------|--------------------|----------------------------------|
| [0..1]      | [0..*] BidSelfSched       | BidSelfSched       |                                  |
| [0..1]      | [0..*] SubControlArea     | SubControlArea     |                                  |
| [0..1]      | [0..*] RegisteredResource | RegisteredResource |                                  |
| [0..*]      | [1..1] RTO                | RTO                |                                  |
| [0..1]      | [0..1] HostControlArea    | HostControlArea    |                                  |
| [0..1]      | [0..*] DiagramObjects     | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names              | Name               | inherited from: IdentifiedObject |

### 6.5.9.3 AggregatedPnode

An aggregated pricing node is a specialized type of pricing node used to model items such as System Zone, Default Price Zone, Custom Price Zone, Control Area, Aggregated Generation, Aggregated Participating Load, Aggregated Non-Participating Load, Trading Hub, Designated Control Area(DCA) Zone

Table 496 shows all attributes of AggregatedPnode.

**Table 496 – Attributes of ReferenceData::AggregatedPnode**

| name                  | type                         | description                                                                                                                                                                                                                                                                                                                     |
|-----------------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| apnodeType            | ApnodeType                   | Aggregate Price Node Types                                                                                                                                                                                                                                                                                                      |
| participationCategory | ParticipationCategoryMP<br>M | Designated Control Area participation in LMP price measurement<br><br>'Y' – Participates in both Local Market Power Mitigation (LMPM) and System Market Power Mitigation (SMPM)<br><br>'N' – Not included in LMP price measures<br><br>'S' – Participatesin SMPM price measures<br><br>'L' – Participatesin LMPM price measures |
| endEffectiveDate      | DateTime                     | inherited from: Pnode                                                                                                                                                                                                                                                                                                           |
| isPublic              | Boolean                      | inherited from: Pnode                                                                                                                                                                                                                                                                                                           |
| startEffectiveDate    | DateTime                     | inherited from: Pnode                                                                                                                                                                                                                                                                                                           |
| type                  | String                       | inherited from: Pnode                                                                                                                                                                                                                                                                                                           |
| usage                 | String                       | inherited from: Pnode                                                                                                                                                                                                                                                                                                           |

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 497 shows all association ends of AggregatedPnode with other classes.

**Table 497 – Association ends of ReferenceData::AggregatedPnode with other classes**

| [mult from] | [mult to] name                 | type                    | description                      |
|-------------|--------------------------------|-------------------------|----------------------------------|
| [0..1]      | [1..*] GenDistributionFactor   | GenDistributionFactor   |                                  |
| [0..1]      | [1..*] LoadDistributionFactor  | LoadDistributionFactor  |                                  |
| [1..1]      | [1..*] MPMTestResults          | MPMTestResults          |                                  |
| [0..*]      | [1..1] PnodeDistributionFactor | PnodeDistributionFactor |                                  |
| [0..*]      | [0..*] TACArea                 | TACArea                 |                                  |
| [1..1]      | [0..*] TradingHubValues        | TradingHubValues        |                                  |
| [0..*]      | [1..*] MPMTestThreshold        | MPMTestThreshold        |                                  |
| [0..1]      | [0..*] MktCombinedCyclePlant   | MktCombinedCyclePlant   |                                  |
| [0..1]      | [0..*] RegisteredResources     | RegisteredResource      | inherited from: Pnode            |
| [0..*]      | [0..*] SourceCRRSegment        | CRRSegment              | inherited from: Pnode            |
| [0..*]      | [0..*] SinkCRRSegment          | CRRSegment              | inherited from: Pnode            |
| [0..1]      | [0..*] MktMeasurement          | MktMeasurement          | inherited from: Pnode            |
| [1..1]      | [0..*] ExPostResults           | ExPostPricingResults    | inherited from: Pnode            |
| [0..1]      | [1..*] PnodeResults            | PnodeResults            | inherited from: Pnode            |
| [0..1]      | [0..*] Trade                   | Trade                   | inherited from: Pnode            |
| [0..1]      | [0..*] ReceiptTransactionBids  | TransactionBid          | inherited from: Pnode            |
| [0..1]      | [0..*] DeliveryTransactionBids | TransactionBid          | inherited from: Pnode            |
| [0..*]      | [0..1] SubControlArea          | SubControlArea          | inherited from: Pnode            |
| [0..*]      | [0..*] AggregateNode           | AggregateNode           | inherited from: Pnode            |
| [1..1]      | [0..*] OrgPnodeAllocation      | OrgPnodeAllocation      | inherited from: Pnode            |
| [0..*]      | [0..1] RTO                     | RTO                     | inherited from: Pnode            |
| [0..1]      | [0..*] DiagramObjects          | DiagramObject           | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                   | Name                    | inherited from: IdentifiedObject |

#### 6.5.9.4 AggregateNode

An aggregated node can define a typed grouping further defined by the AnodeType enumeratuion. Types range from System Zone/Regions to Market Energy Regions to Aggregated Loads and Aggregated Generators.

Table 498 shows all attributes of AggregateNode.

**Table 498 – Attributes of ReferenceData::AggregateNode**

| name             | type      | description             |
|------------------|-----------|-------------------------|
| anodeType        | AnodeType | Type of aggregated node |
| endEffectiveDate | DateTime  | end effective date      |

| name               | type     | description                                                                                                                                                                                                   |
|--------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| qualifASOrder      | Integer  | Processing Order for AS self-provisions for this region. The priority of this attribute directs the awards of any resource that resides in overlapping regions. The regions are processed in priority manner. |
| startEffectiveDate | DateTime | start effective date                                                                                                                                                                                          |
| aliasName          | String   | inherited from: IdentifiedObject                                                                                                                                                                              |
| mRID               | String   | inherited from: IdentifiedObject                                                                                                                                                                              |
| name               | String   | inherited from: IdentifiedObject                                                                                                                                                                              |

Table 499 shows all association ends of AggregateNode with other classes.

**Table 499 – Association ends of ReferenceData::AggregateNode with other classes**

| [mult from] | [mult to] name                 | type                    | description                      |
|-------------|--------------------------------|-------------------------|----------------------------------|
| [0..*]      | [0..*] Pnode                   | Pnode                   |                                  |
| [0..*]      | [0..*] SubControlArea          | SubControlArea          |                                  |
| [0..1]      | [0..*] CnodeDistributionFactor | CnodeDistributionFactor |                                  |
| [0..*]      | [0..*] RegisteredResource      | RegisteredResource      |                                  |
| [0..1]      | [0..*] AreaLoadCurve           | AreaLoadCurve           |                                  |
| [0..*]      | [1..1] RTO                     | RTO                     |                                  |
| [0..1]      | [0..*] DiagramObjects          | DiagramObject           | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                   | Name                    | inherited from: IdentifiedObject |

#### 6.5.9.5 BidPriceCap root class

This class represent the bid price cap.

Table 500 shows all attributes of BidPriceCap.

**Table 500 – Attributes of ReferenceData::BidPriceCap**

| name         | type              | description                                                          |
|--------------|-------------------|----------------------------------------------------------------------|
| marketType   | MarketType        | Market Type of the cap (DAM or RTM)                                  |
| bidFloor     | CostPerEnergyUnit | Bid Floor, (\$/MWH)                                                  |
| bidCeiling   | CostPerEnergyUnit | Bid Ceiling (\$/MWH)                                                 |
| defaultPrice | CostPerEnergyUnit | Bid Default Price(\$/MWH)                                            |
| bidFloorAS   | CostPerEnergyUnit | Bid Floor (\$/MWH) for generic AS versus a specific market product   |
| bidCeilingAS | CostPerEnergyUnit | Bid Ceiling (\$/MWH) for generic AS versus a specific market product |

Table 501 shows all association ends of BidPriceCap with other classes.

**Table 501 – Association ends of ReferenceData::BidPriceCap with other classes**

| [mult from] | [mult to] name       | type          | description |
|-------------|----------------------|---------------|-------------|
| [0..*]      | [0..1] MarketProduct | MarketProduct |             |

#### 6.5.9.6 CnodeDistributionFactor

Participation factors per Cnode. Used to calculate "participation" of Cnode in an AggregateNode. Each Cnode associated to an AggregateNode would be assigned a participation factor for its participation within the AggregateNode.

Table 502 shows all attributes of CnodeDistributionFactor.

**Table 502 – Attributes of ReferenceData::CnodeDistributionFactor**

| name          | type   | description                                                    |
|---------------|--------|----------------------------------------------------------------|
| factor        | Float  | Used to calculate "participation" of Cnode in an AggregateNode |
| podLossFactor | Float  | Point of delivery loss factor                                  |
| aliasName     | String | inherited from: IdentifiedObject                               |
| mRID          | String | inherited from: IdentifiedObject                               |
| name          | String | inherited from: IdentifiedObject                               |

Table 503 shows all association ends of CnodeDistributionFactor with other classes.

**Table 503 – Association ends of ReferenceData::CnodeDistributionFactor with other classes**

| [mult from] | [mult to] name             | type                | description                      |
|-------------|----------------------------|---------------------|----------------------------------|
| [0..*]      | [1..1] MktConnectivityNode | MktConnectivityNode |                                  |
| [0..*]      | [0..1] SubControlArea      | SubControlArea      |                                  |
| [0..*]      | [0..1] AggregateNode       | AggregateNode       |                                  |
| [0..*]      | [0..1] HostControlArea     | HostControlArea     |                                  |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject |

#### 6.5.9.7 CombinedCycleConfiguration

Configuration options for combined cycle units.

For example, a Combined Cycle with (CT1, CT2, ST1) will have (CT1, ST1) and (CT2, ST1) configurations as part of (1CT + 1ST logical configuration).

Table 504 shows all attributes of CombinedCycleConfiguration.

**Table 504 – Attributes of ReferenceData::CombinedCycleConfiguration**

| name                            | type                  | description                                                                                                   |
|---------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------|
| primaryConfiguration            | Boolean               | Whether this CombinedCycleConfiguration is the primary configuration in the associated Logical configuration? |
| ShutdownFlag                    | Boolean               | Whether Combined Cycle Plant can be shut-down in this Configuration?                                          |
| StartupFlag                     | Boolean               | Whether Combined Cycle Plant can be started in this Logical Configuration?                                    |
| capacityFactor                  | PerCent               | inherited from: RegisteredGenerator                                                                           |
| coldStartTime                   | Float                 | inherited from: RegisteredGenerator                                                                           |
| combinedCyclePlantName          | String                | inherited from: RegisteredGenerator                                                                           |
| commercialOperationDate         | DateTime              | inherited from: RegisteredGenerator                                                                           |
| constrainedOutputFlag           | YesNo                 | inherited from: RegisteredGenerator                                                                           |
| costBasis                       | CostBasis             | inherited from: RegisteredGenerator                                                                           |
| extremeLongStart                | YesNo                 | inherited from: RegisteredGenerator                                                                           |
| fuelSource                      | FuelSource            | inherited from: RegisteredGenerator                                                                           |
| highControlLimit                | ActivePower           | inherited from: RegisteredGenerator                                                                           |
| hotIntTime                      | Float                 | inherited from: RegisteredGenerator                                                                           |
| hotStartTime                    | Float                 | inherited from: RegisteredGenerator                                                                           |
| intColdTime                     | Float                 | inherited from: RegisteredGenerator                                                                           |
| intendedPIRP                    | YesNo                 | inherited from: RegisteredGenerator                                                                           |
| intStartTime                    | Float                 | inherited from: RegisteredGenerator                                                                           |
| loadFollowingDownMSS            | YesNo                 | inherited from: RegisteredGenerator                                                                           |
| loadFollowingUpMSS              | YesNo                 | inherited from: RegisteredGenerator                                                                           |
| lowControlLimit                 | ActivePower           | inherited from: RegisteredGenerator                                                                           |
| lowerControlRate                | ActivePowerChangeRate | inherited from: RegisteredGenerator                                                                           |
| lowerRampRate                   | ActivePowerChangeRate | inherited from: RegisteredGenerator                                                                           |
| maxDependableCap                | ActivePower           | inherited from: RegisteredGenerator                                                                           |
| maximumAllowableSpinningReserve | ActivePower           | inherited from: RegisteredGenerator                                                                           |
| maximumOperatingMW              | ActivePower           | inherited from: RegisteredGenerator                                                                           |
| maxLayOffSelfSchedQty           | Float                 | inherited from: RegisteredGenerator                                                                           |
| maxMinLoadCost                  | CostRate              | inherited from: RegisteredGenerator                                                                           |
| maxPumpingLevel                 | ActivePower           | inherited from: RegisteredGenerator                                                                           |
| maxShutdownTime                 | DateTime              | inherited from: RegisteredGenerator                                                                           |
| maxStartUpsPerDay               | Integer               | inherited from: RegisteredGenerator                                                                           |
| maxWeeklyEnergy                 | Float                 | inherited from: RegisteredGenerator                                                                           |
| maxWeeklyStarts                 | Integer               | inherited from: RegisteredGenerator                                                                           |
| minimumLoadFuelCost             | CostPerHeatUnit       | inherited from: RegisteredGenerator                                                                           |
| minimumOperatingMW              | ActivePower           | inherited from: RegisteredGenerator                                                                           |
| minLoadCost                     | CostRate              | inherited from: RegisteredGenerator                                                                           |
| mustOfferRA                     | YesNo                 | inherited from: RegisteredGenerator                                                                           |
| nameplateCapacity               | ActivePower           | inherited from: RegisteredGenerator                                                                           |
| operatingMaintenanceCost        | CostPerEnergyUnit     | inherited from: RegisteredGenerator                                                                           |
| operatingMode                   | String                | inherited from: RegisteredGenerator                                                                           |
| proxyFlag                       | YesNo                 | inherited from: RegisteredGenerator                                                                           |

| name                    | type                  | description                         |
|-------------------------|-----------------------|-------------------------------------|
| pumpingCost             | CostRate              | inherited from: RegisteredGenerator |
| pumpingFactor           | Float                 | inherited from: RegisteredGenerator |
| pumpMinDownTime         | Float                 | inherited from: RegisteredGenerator |
| pumpMinUpTime           | Float                 | inherited from: RegisteredGenerator |
| pumpShutdownCost        | Float                 | inherited from: RegisteredGenerator |
| pumpShutdownTime        | Integer               | inherited from: RegisteredGenerator |
| qualifyingFacilityOwner | String                | inherited from: RegisteredGenerator |
| quickStartFlag          | YesNo                 | inherited from: RegisteredGenerator |
| raiseControlRate        | ActivePowerChangeRate | inherited from: RegisteredGenerator |
| raiseRampRate           | ActivePowerChangeRate | inherited from: RegisteredGenerator |
| rampCurveType           | RampCurveType         | inherited from: RegisteredGenerator |
| rampMode                | RampModeType          | inherited from: RegisteredGenerator |
| regulationFlag          | Integer               | inherited from: RegisteredGenerator |
| regulationRampRate      | ActivePower           | inherited from: RegisteredGenerator |
| resourceSubType         | String                | inherited from: RegisteredGenerator |
| riverSystem             | String                | inherited from: RegisteredGenerator |
| RMNRFlag                | YesNo                 | inherited from: RegisteredGenerator |
| RMRFlag                 | FlagTypeRMR           | inherited from: RegisteredGenerator |
| RMRManualIndicator      | YesNo                 | inherited from: RegisteredGenerator |
| RMTFlag                 | YesNo                 | inherited from: RegisteredGenerator |
| spinReserveRamp         | ActivePowerChangeRate | inherited from: RegisteredGenerator |
| syncCondCapable         | YesNo                 | inherited from: RegisteredGenerator |
| unitType                | UnitType              | inherited from: RegisteredGenerator |
| useLimitFlag            | YesNo                 | inherited from: RegisteredGenerator |
| ACAFlag                 | YesNo                 | inherited from: RegisteredResource  |
| ASSPOptimizationFlag    | YesNo                 | inherited from: RegisteredResource  |
| commercialOpDate        | DateTime              | inherited from: RegisteredResource  |
| contingencyAvailFlag    | YesNo                 | inherited from: RegisteredResource  |
| dispatchFlag            | YesNo                 | inherited from: RegisteredResource  |
| ECAFlag                 | YesNo                 | inherited from: RegisteredResource  |
| endEffectiveDate        | DateTime              | inherited from: RegisteredResource  |
| flexibleOfferFlag       | YesNo                 | inherited from: RegisteredResource  |
| hourlyPredispatch       | YesNo                 | inherited from: RegisteredResource  |
| isAggregatedRes         | YesNo                 | inherited from: RegisteredResource  |
| lastModified            | DateTime              | inherited from: RegisteredResource  |
| LMPMFlag                | YesNo                 | inherited from: RegisteredResource  |
| marketParticipationFlag | YesNo                 | inherited from: RegisteredResource  |
| maxBaseSelfSchedQty     | Float                 | inherited from: RegisteredResource  |
| maxOnTime               | Float                 | inherited from: RegisteredResource  |
| minDispatchTime         | Hours                 | inherited from: RegisteredResource  |
| minOffTime              | Float                 | inherited from: RegisteredResource  |
| minOnTime               | Float                 | inherited from: RegisteredResource  |
| mustOfferFlag           | YesNo                 | inherited from: RegisteredResource  |
| nonMarket               | YesNo                 | inherited from: RegisteredResource  |

| name                 | type                       | description                        |
|----------------------|----------------------------|------------------------------------|
| pointOfDeliveryFlag  | YesNo                      | inherited from: RegisteredResource |
| priceSetFlagDA       | YesNo                      | inherited from: RegisteredResource |
| priceSetFlagRT       | YesNo                      | inherited from: RegisteredResource |
| registrationStatus   | ResourceRegistrationStatus | inherited from: RegisteredResource |
| resourceAdequacyFlag | YesNo                      | inherited from: RegisteredResource |
| SMPMFlag             | YesNo                      | inherited from: RegisteredResource |
| startEffectiveDate   | DateTime                   | inherited from: RegisteredResource |
| aliasName            | String                     | inherited from: IdentifiedObject   |
| mRID                 | String                     | inherited from: IdentifiedObject   |
| name                 | String                     | inherited from: IdentifiedObject   |

Table 505 shows all association ends of CombinedCycleConfiguration with other classes.

**Table 505 – Association ends of ReferenceData:  
CombinedCycleConfiguration with other classes**

| [mult from] | [mult to] name                           | type                              | description                         |
|-------------|------------------------------------------|-----------------------------------|-------------------------------------|
| [1..1]      | [0..*] CombinedCycleConfigurationMember  | CombinedCycleConfigurationMember  |                                     |
| [1..1]      | [0..*] FromTransitionState               | CombinedCycleTransitionState      |                                     |
| [1..1]      | [0..*] ToTransitionState                 | CombinedCycleTransitionState      |                                     |
| [1..*]      | [0..1] CombinedCycleLogicalConfiguration | CombinedCycleLogicalConfiguration |                                     |
| [0..1]      | [0..*] MktGeneratingUnit                 | MktGeneratingUnit                 | inherited from: RegisteredGenerator |
| [0..1]      | [0..*] GeneratingBids                    | GeneratingBid                     | inherited from: RegisteredGenerator |
| [0..1]      | [0..1] StartUpTimeCurve                  | StartUpTimeCurve                  | inherited from: RegisteredGenerator |
| [0..1]      | [0..*] Trade                             | Trade                             | inherited from: RegisteredGenerator |
| [0..1]      | [0..1] MktHeatRateCurve                  | MktHeatRateCurve                  | inherited from: RegisteredGenerator |
| [0..1]      | [0..1] StartUpFuelCurve                  | StartUpFuelCurve                  | inherited from: RegisteredGenerator |
| [0..1]      | [0..1] RegulatingLimit                   | RegulatingLimit                   | inherited from: RegisteredGenerator |
| [0..1]      | [0..1] StartUpEnergyCurve                | StartUpEnergyCurve                | inherited from: RegisteredGenerator |
| [0..1]      | [0..1] RMRStartUpTimeCurve               | RMRStartUpTimeCurve               | inherited from: RegisteredGenerator |
| [0..1]      | [0..1] RMRStartUpFuelCurve               | RMRStartUpFuelCurve               | inherited from: RegisteredGenerator |
| [0..1]      | [0..1] RMRStartUpEnergyCurve             | RMRStartUpEnergyCurve             | inherited from: RegisteredGenerator |
| [0..1]      | [0..1] RMRStartUpCostCurve               | RMRStartUpCostCurve               | inherited from: RegisteredGenerator |
| [0..1]      | [0..1] RMRHeatRateCurve                  | RMRHeatRateCurve                  | inherited from: RegisteredGenerator |
| [0..1]      | [0..*] AuxillaryObject                   | AuxiliaryObject                   | inherited from: RegisteredGenerator |
| [1..1]      | [1..1] EnergyPriceIndex                  | EnergyPriceIndex                  | inherited from: RegisteredGenerator |
| [0..1]      | [0..*] UnitInitialConditions             | UnitInitialConditions             | inherited from: RegisteredGenerator |
| [0..*]      | [0..*] StartUpCostCurves                 | StartUpCostCurve                  | inherited from: RegisteredGenerator |
| [0..1]      | [0..1] FuelCostCurve                     | FuelCostCurve                     | inherited from: RegisteredGenerator |



| [mult from] | [mult to] name                               | type                                  | description                         |
|-------------|----------------------------------------------|---------------------------------------|-------------------------------------|
| [0..*]      | [0..1] FuelRegion                            | FuelRegion                            | inherited from: RegisteredGenerator |
| [0..*]      | [0..1] LocalReliabilityArea                  | LocalReliabilityArea                  | inherited from: RegisteredGenerator |
| [0..1]      | [0..*] SubstitutionResourceList              | SubstitutionResourceList              | inherited from: RegisteredResource  |
| [0..*]      | [0..*] SubControlArea                        | SubControlArea                        | inherited from: RegisteredResource  |
| [1..1]      | [0..*] ResourceAncillaryServiceQualification | ResourceAncillaryServiceQualification | inherited from: RegisteredResource  |
| [0..*]      | [0..*] ResourceCapacity                      | ResourceCapacity                      | inherited from: RegisteredResource  |
| [0..*]      | [0..*] InterTie                              | SchedulingPoint                       | inherited from: RegisteredResource  |
| [1..1]      | [0..*] OrgResOwnership                       | OrgResOwnership                       | inherited from: RegisteredResource  |
| [1..1]      | [0..*] FormerReference                       | FormerReference                       | inherited from: RegisteredResource  |
| [0..*]      | [0..*] ForbiddenRegion                       | ForbiddenRegion                       | inherited from: RegisteredResource  |
| [0..1]      | [0..*] ContractDistributionFactor            | ContractDistributionFactor            | inherited from: RegisteredResource  |
| [0..*]      | [0..*] AggregateNode                         | AggregateNode                         | inherited from: RegisteredResource  |
| [0..*]      | [0..1] AdjacentCASet                         | AdjacentCASet                         | inherited from: RegisteredResource  |
| [0..*]      | [0..*] RampRateCurve                         | RampRateCurve                         | inherited from: RegisteredResource  |
| [1..1]      | [0..*] LoadFollowingInst                     | LoadFollowingInst                     | inherited from: RegisteredResource  |
| [1..1]      | [0..*] DispatchInstReply                     | DispatchInstReply                     | inherited from: RegisteredResource  |
| [0..1]      | [0..*] ResourceLoadFollowingInst             | ResourceLoadFollowingInst             | inherited from: RegisteredResource  |
| [0..1]      | [0..*] ResourceDispatchResults               | ResourceDispatchResults               | inherited from: RegisteredResource  |
| [0..1]      | [0..*] RUCAwardInstruction                   | RUCAwardInstruction                   | inherited from: RegisteredResource  |
| [0..1]      | [0..*] RMROperatorInput                      | RMROperatorInput                      | inherited from: RegisteredResource  |
| [0..1]      | [0..*] MPMResourceStatus                     | MPMResourceStatus                     | inherited from: RegisteredResource  |
| [0..1]      | [0..*] DopInstruction                        | DopInstruction                        | inherited from: RegisteredResource  |
| [1..1]      | [0..*] Commitments                           | Commitments                           | inherited from: RegisteredResource  |
| [1..1]      | [0..*] IntermittentResourceEligibility       | IntermittentResourceEligibility       | inherited from: RegisteredResource  |
| [0..1]      | [0..*] ExpectedEnergyValues                  | ExpectedEnergyValues                  | inherited from: RegisteredResource  |
| [0..1]      | [0..*] AllocationResultValues                | AllocationResultValues                | inherited from: RegisteredResource  |
| [0..*]      | [0..1] MktOrganisation                       | MktOrganisation                       | inherited from: RegisteredResource  |
| [0..*]      | [0..1] MktConnectivityNode                   | MktConnectivityNode                   | inherited from: RegisteredResource  |
| [0..*]      | [0..*] TimeSeries                            | TimeSeries                            | inherited from: RegisteredResource  |
| [1..1]      | [0..1] ResourceVerifiableCosts               | ResourceVerifiableCosts               | inherited from: RegisteredResource  |
| [0..*]      | [0..1] Pnode                                 | Pnode                                 | inherited from: RegisteredResource  |
| [0..*]      | [0..*] MPMTestThreshold                      | MPMTestThreshold                      | inherited from: RegisteredResource  |
| [0..*]      | [0..1] HostControlArea                       | HostControlArea                       | inherited from: RegisteredResource  |
| [0..*]      | [0..*] ControlAreaDesignation                | ControlAreaDesignation                | inherited from: RegisteredResource  |
| [0..1]      | [0..*] ResourceAwardInstruction              | ResourceAwardInstruction              | inherited from: RegisteredResource  |
| [0..1]      | [0..*] LoadFollowingOperatorInput            | LoadFollowingOperatorInput            | inherited from: RegisteredResource  |
| [1..1]      | [0..*] Instructions                          | Instructions                          | inherited from: RegisteredResource  |
| [0..1]      | [0..*] ExPostResourceResults                 | ExPostResourceResults                 | inherited from: RegisteredResource  |
| [0..1]      | [0..*] DotInstruction                        | DotInstruction                        | inherited from: RegisteredResource  |



| [mult from] | [mult to] name        | type           | description                         |
|-------------|-----------------------|----------------|-------------------------------------|
| [1..1]      | [0..1] DefaultBid     | DefaultBid     | inherited from: RegisteredResource  |
| [0..*]      | [0..*] EnergyMarkets  | EnergyMarket   | inherited from: RegisteredResource  |
| [0..*]      | [0..1] PSRType        | PSRType        | inherited from: PowerSystemResource |
| [0..1]      | [0..*] Measurements   | Measurement    | inherited from: PowerSystemResource |
| [1..1]      | [0..*] OperatingShare | OperatingShare | inherited from: PowerSystemResource |
| [0..*]      | [0..*] PsrLists       | PsrList        | inherited from: PowerSystemResource |
| [1..1]      | [0..1] OutageSchedule | OutageSchedule | inherited from: PowerSystemResource |
| [0..*]      | [0..*] ReportingGroup | ReportingGroup | inherited from: PowerSystemResource |
| [0..1]      | [0..*] DiagramObjects | DiagramObject  | inherited from: IdentifiedObject    |
| [1..1]      | [0..*] Names          | Name           | inherited from: IdentifiedObject    |

#### 6.5.9.8 CombinedCycleConfigurationMember

Configuration Member of CCP Configuration.

Table 506 shows all attributes of CombinedCycleConfigurationMember.

**Table 506 – Attributes of ReferenceData::CombinedCycleConfigurationMember**

| name      | type    | description                      |
|-----------|---------|----------------------------------|
| primary   | Boolean | primary configuration.           |
| steam     | Boolean | Steam plant.                     |
| aliasName | String  | inherited from: IdentifiedObject |
| mRID      | String  | inherited from: IdentifiedObject |
| name      | String  | inherited from: IdentifiedObject |

Table 507 shows all association ends of CombinedCycleConfigurationMember with other classes.

**Table 507 – Association ends of ReferenceData::  
CombinedCycleConfigurationMember with other classes**

| [mult from] | [mult to] name                    | type                       | description                      |
|-------------|-----------------------------------|----------------------------|----------------------------------|
| [0..*]      | [1..1] MktThermalGeneratingUnit   | MktThermalGeneratingUnit   |                                  |
| [0..*]      | [1..1] CombinedCycleConfiguration | CombinedCycleConfiguration |                                  |
| [0..1]      | [0..*] DiagramObjects             | DiagramObject              | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                      | Name                       | inherited from: IdentifiedObject |

#### 6.5.9.9 CombinedCycleLogicalConfiguration

Logical Configuration of a Combined Cycle plant.

Operating Combined Cycle Plant (CCP) configurations are represented as Logical CCP Resources. Logical representation shall be used for Market applications to optimize and control Market Operations. Logical representation is also necessary for controlling the number of CCP configurations and to temper performance issues that may otherwise occur.

For example, (2CT configuration), (1CT + 1ST configuration) are examples of logical configuration, without specifying the specific CT and ST participating in the configuration.

Table 508 shows all attributes of CombinedCycleLogicalConfiguration.

**Table 508 – Attributes of ReferenceData::CombinedCycleLogicalConfiguration**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 509 shows all association ends of CombinedCycleLogicalConfiguration with other classes.

**Table 509 – Association ends of ReferenceData::CombinedCycleLogicalConfiguration with other classes**

| [mult from] | [mult to] name                       | type                       | description                      |
|-------------|--------------------------------------|----------------------------|----------------------------------|
| [0..1]      | [1..*]<br>CombinedCycleConfiguration | CombinedCycleConfiguration |                                  |
| [1..*]      | [0..1] MktCombinedCyclePlant         | MktCombinedCyclePlant      |                                  |
| [0..1]      | [0..*] DiagramObjects                | DiagramObject              | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                         | Name                       | inherited from: IdentifiedObject |

#### 6.5.9.10 CombinedCycleTransitionState root class

Defines the available from and to Transition States for the Combine Cycle Configurations.

Table 510 shows all attributes of CombinedCycleTransitionState.

**Table 510 – Attributes of ReferenceData::CombinedCycleTransitionState**

| name         | type    | description                                                                           |
|--------------|---------|---------------------------------------------------------------------------------------|
| upTransition | Boolean | Flag indicating whether this is an UP transition.<br>If not, it is a DOWN transition. |

Table 511 shows all association ends of CombinedCycleTransitionState with other classes.

**Table 511 – Association ends of ReferenceData::  
CombinedCycleTransitionState with other classes**

| [mult from] | [mult to] name           | type                           | description |
|-------------|--------------------------|--------------------------------|-------------|
| [0..*]      | [1..1] FromConfiguration | CombinedCycleConfigurat<br>ion |             |
| [0..*]      | [1..1] ToConfiguration   | CombinedCycleConfigurat<br>ion |             |

#### 6.5.9.11 CongestionArea

Designated Congestion Area Definition (DCA)

Table 512 shows all attributes of CongestionArea.

**Table 512 – Attributes of ReferenceData::CongestionArea**

| name                  | type                         | description                      |
|-----------------------|------------------------------|----------------------------------|
| apnodeType            | ApnodeType                   | inherited from: AggregatedPnode  |
| participationCategory | ParticipationCategoryMP<br>M | inherited from: AggregatedPnode  |
| endEffectiveDate      | DateTime                     | inherited from: Pnode            |
| isPublic              | Boolean                      | inherited from: Pnode            |
| startEffectiveDate    | DateTime                     | inherited from: Pnode            |
| type                  | String                       | inherited from: Pnode            |
| usage                 | String                       | inherited from: Pnode            |
| aliasName             | String                       | inherited from: IdentifiedObject |
| mRID                  | String                       | inherited from: IdentifiedObject |
| name                  | String                       | inherited from: IdentifiedObject |

Table 513 shows all association ends of CongestionArea with other classes.

**Table 513 – Association ends of ReferenceData::CongestionArea with other classes**

| [mult from] | [mult to] name                 | type                    | description                     |
|-------------|--------------------------------|-------------------------|---------------------------------|
| [0..*]      | [0..*] IndividualPnode         | IndividualPnode         |                                 |
| [0..1]      | [1..*] GenDistributionFactor   | GenDistributionFactor   | inherited from: AggregatedPnode |
| [0..1]      | [1..*] LoadDistributionFactor  | LoadDistributionFactor  | inherited from: AggregatedPnode |
| [1..1]      | [1..*] MPMTTestResults         | MPMTTestResults         | inherited from: AggregatedPnode |
| [0..*]      | [1..1] PnodeDistributionFactor | PnodeDistributionFactor | inherited from: AggregatedPnode |
| [0..*]      | [0..*] TACArea                 | TACArea                 | inherited from: AggregatedPnode |
| [1..1]      | [0..*] TradingHubValues        | TradingHubValues        | inherited from: AggregatedPnode |
| [0..*]      | [1..*] MPMTTestThreshold       | MPMTTestThreshold       | inherited from: AggregatedPnode |
| [0..1]      | [0..*] MktCombinedCyclePlant   | MktCombinedCyclePlant   | inherited from: AggregatedPnode |
| [0..1]      | [0..*] RegisteredResources     | RegisteredResource      | inherited from: Pnode           |
| [0..*]      | [0..*] SourceCRRSegment        | CRRSegment              | inherited from: Pnode           |
| [0..*]      | [0..*] SinkCRRSegment          | CRRSegment              | inherited from: Pnode           |

| [mult from] | [mult to] name                 | type                 | description                      |
|-------------|--------------------------------|----------------------|----------------------------------|
| [0..1]      | [0..*] MktMeasurement          | MktMeasurement       | inherited from: Pnode            |
| [1..1]      | [0..*] ExPostResults           | ExPostPricingResults | inherited from: Pnode            |
| [0..1]      | [1..*] PnodeResults            | PnodeResults         | inherited from: Pnode            |
| [0..1]      | [0..*] Trade                   | Trade                | inherited from: Pnode            |
| [0..1]      | [0..*] ReceiptTransactionBids  | TransactionBid       | inherited from: Pnode            |
| [0..1]      | [0..*] DeliveryTransactionBids | TransactionBid       | inherited from: Pnode            |
| [0..*]      | [0..1] SubControlArea          | SubControlArea       | inherited from: Pnode            |
| [0..*]      | [0..*] AggregateNode           | AggregateNode        | inherited from: Pnode            |
| [1..1]      | [0..*] OrgPnodeAllocation      | OrgPnodeAllocation   | inherited from: Pnode            |
| [0..*]      | [0..1] RTO                     | RTO                  | inherited from: Pnode            |
| [0..1]      | [0..*] DiagramObjects          | DiagramObject        | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                   | Name                 | inherited from: IdentifiedObject |

#### 6.5.9.12 ContractDistributionFactor root class

Distribution among resources at the sink point or source point

Table 514 shows all attributes of ContractDistributionFactor.

**Table 514 – Attributes of ReferenceData::ContractDistributionFactor**

| name       | type  | description                                                                                           |
|------------|-------|-------------------------------------------------------------------------------------------------------|
| factor     | Float | MW value that this resource provides to the overall contract.                                         |
| sourceFlag | YesNo | This value will be set to YES if the referenced Cnode is defined as the source point in the contract. |
| sinkFlag   | YesNo | This value will be set to YES if the referenced Cnode is defined as the sink point in the contract.   |

Table 515 shows all association ends of ContractDistributionFactor with other classes.

**Table 515 – Association ends of ReferenceData::ContractDistributionFactor with other classes**

| [mult from] | [mult to] name                   | type               | description |
|-------------|----------------------------------|--------------------|-------------|
| [0..*]      | [0..1] RegisteredResource        | RegisteredResource |             |
| [0..*]      | [0..1] TransmissionContractRight | ContractRight      |             |
| [0..*]      | [0..1] Flowgate                  | Flowgate           |             |

#### 6.5.9.13 ContractRight

Provides definition of Transmission Ownership Right and Existing Transmission Contract identifiers for use by SCUC. RMR contract hosting: Startup lead time, Contract Service Limits,

Max Service Hours, Max MWs, Max Start-ups, Ramp Rate, Max Net Dependable Capacity, Min Capacity and Unit Substitution for DAM/RTM to retrieve;

Table 516 shows all attributes of ContractRight.

**Table 516 – Attributes of ReferenceData::ContractRight**

| name                     | type              | description                                                                                                                                                                                                                                                                                                                                            |
|--------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| chainOrder               | Integer           | When used in conjunction with a Transmission Right contract chain, this is the precedence for the contracts.                                                                                                                                                                                                                                           |
| contractMW               | Float             | MW value of the contract                                                                                                                                                                                                                                                                                                                               |
| contractPrice            | CostPerEnergyUnit | Financial value of the contract                                                                                                                                                                                                                                                                                                                        |
| contractPriority         | Integer           | Priority for the contract. This should be unique among all contracts for a specific resource. This value is the directive for the SCUC algorithm on the order to satisfy/cut contracts.                                                                                                                                                                |
| contractStatus           | String            | Contract status                                                                                                                                                                                                                                                                                                                                        |
| contractType             | ContractType      | type of the contract. Possible values are but not limited by:<br>ETC, TOR or RMR and RMT self schedules                                                                                                                                                                                                                                                |
| endEffectiveDate         | DateTime          | end effective date                                                                                                                                                                                                                                                                                                                                     |
| financialLocation        | YesNo             | Indicator if the location associated with this contract is financial (e.g. pricing nodes) or physical (e.g. connectivity nodes).                                                                                                                                                                                                                       |
| financialRightsDAM       | YesNo             | Flag to indicate this contract provides financial rights in the DA Market                                                                                                                                                                                                                                                                              |
| financialRightsRTM       | YesNo             | Flag to indicate this contract provides financial rights in the RT Market                                                                                                                                                                                                                                                                              |
| fuelAdder                | Float             | Estimated Fuel Adder                                                                                                                                                                                                                                                                                                                                   |
| latestSchedMinutes       | Integer           | This indicates the latest schedule minutes (e.g. t – xx) that this resource can be notified to respond. This attribute is only used if the market type is not supplied.                                                                                                                                                                                |
| latestSchedMktType       | MarketType        | This indicates the latest schedule market type a contract can be applied to. This is used in conjunction with the latestSchedMinutes attribute to determine the latest time this contract can be called in. The possible values for this attribute are: DAM, RTM or it can be omitted. If omitted, the latestSchedMinutes attribute defines the value. |
| maximumScheduleQuantity  | Float             | Maximum schedule MW quantity                                                                                                                                                                                                                                                                                                                           |
| maximumServiceHours      | Integer           | Maximum service hours                                                                                                                                                                                                                                                                                                                                  |
| maximumStartups          | Integer           | Maximum startups                                                                                                                                                                                                                                                                                                                                       |
| maxNetDependableCapacity | Float             | Maximum Net Dependable Capacity                                                                                                                                                                                                                                                                                                                        |
| minimumLoad              | Float             | Minimum Load                                                                                                                                                                                                                                                                                                                                           |
| minimumScheduleQuantity  | Float             | Minimum schedule quantity                                                                                                                                                                                                                                                                                                                              |
| physicalRightsDAM        | YesNo             | Flag to indicate this contract provides physical rights in the DA Market                                                                                                                                                                                                                                                                               |
| physicalRightsRTM        | YesNo             | Flag to indicate this contract provides physical rights in the RT Market                                                                                                                                                                                                                                                                               |
| startEffectiveDate       | DateTime          | start effective date                                                                                                                                                                                                                                                                                                                                   |
| startupLeadTime          | Integer           | Start up lead time                                                                                                                                                                                                                                                                                                                                     |
| TRType                   | TRType            | Transmission Right type – is this an individual contract right or a chain contract right. Types =                                                                                                                                                                                                                                                      |

| name      | type   | description                      |
|-----------|--------|----------------------------------|
|           |        | CHAIN or INDIVIDUAL              |
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 517 shows all association ends of ContractRight with other classes.

**Table 517 – Association ends of ReferenceData::ContractRight with other classes**

| [mult from] | [mult to] name                          | type                                  | description                      |
|-------------|-----------------------------------------|---------------------------------------|----------------------------------|
| [1..1]      | [0..*] TREntitlement                    | TREntitlement                         |                                  |
| [0..1]      | [0..*] BidSelfSched                     | BidSelfSched                          |                                  |
| [0..1]      | [0..*] ContractDistributionFactor       | ContractDistributionFactor            |                                  |
| [0..1]      | [0..*] SubstitutionResourceList         | SubstitutionResourceList              |                                  |
| [1..1]      | [0..*] TransmissionInterfaceEntitlement | TransmissionInterfaceRightEntitlement |                                  |
| [0..*]      | [1..1] RTO                              | RTO                                   |                                  |
| [0..*]      | [1..1] SchedulingCoordinator            | SchedulingCoordinator                 |                                  |
| [1..*]      | [0..1] Ind_TransmissionRightChain       | TransmissionRightChain                |                                  |
| [1..1]      | [0..1] Chain_TransmissionRightChain     | TransmissionRightChain                |                                  |
| [0..1]      | [0..*] DiagramObjects                   | DiagramObject                         | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                            | Name                                  | inherited from: IdentifiedObject |

#### 6.5.9.14 ControlAreaDesignation root class

Indicates Control Area associated with self-schedule.

Table 518 shows all attributes of ControlAreaDesignation.

**Table 518 – Attributes of ReferenceData::ControlAreaDesignation**

| name     | type  | description |
|----------|-------|-------------|
| attained | YesNo | Attained.   |
| native   | YesNo | Native.     |

Table 519 shows all association ends of ControlAreaDesignation with other classes.

**Table 519 – Association ends of ReferenceData::ControlAreaDesignation with other classes**

| [mult from] | [mult to] name            | type               | description |
|-------------|---------------------------|--------------------|-------------|
| [0..*]      | [0..*] RegisteredResource | RegisteredResource |             |
| [0..*]      | [0..*] SubControlArea     | SubControlArea     |             |

### 6.5.9.15 Flowgate

A flowgate, is single or group of transmission elements intended to model MW flow impact relating to transmission limitations and transmission service usage.

Table 520 shows all attributes of Flowgate.

**Table 520 – Attributes of ReferenceData::Flowgate**

| name               | type              | description                                     |
|--------------------|-------------------|-------------------------------------------------|
| direction          | InterTieDirection | The direction of the flowgate, export or import |
| endEffectiveDate   | DateTime          | end effective date                              |
| exportMWRating     | ActivePower       | Export MW rating                                |
| importMWRating     | ActivePower       | Import MW rating                                |
| startEffectiveDate | DateTime          | start effective date                            |
| aliasName          | String            | inherited from: IdentifiedObject                |
| mRID               | String            | inherited from: IdentifiedObject                |
| name               | String            | inherited from: IdentifiedObject                |

Table 521 shows all association ends of Flowgate with other classes.

**Table 521 – Association ends of ReferenceData::Flowgate with other classes**

| [mult from] | [mult to] name                      | type                                  | description |
|-------------|-------------------------------------|---------------------------------------|-------------|
| [0..*]      | [0..*] MktLine                      | MktLine                               |             |
| [0..*]      | [0..*] MktPowerTransformer          | MktPowerTransformer                   |             |
| [0..1]      | [0..1] SecurityConstraints          | SecurityConstraints                   |             |
| [0..1]      | [0..*] TransmissionCapacity         | TransmissionCapacity                  |             |
| [0..1]      | [0..*] TransmissionRightEntitlement | TransmissionInterfaceRightEntitlement |             |
| [1..1]      | [1..*] ConstraintResults            | ConstraintResults                     |             |
| [0..1]      | [0..*] ContractDistributionFactor   | ContractDistributionFactor            |             |
| [1..1]      | [0..*] FlowgateRelief               | FlowgateRelief                        |             |
| [1..1]      | [0..*] RegisteredInterTie           | RegisteredInterTie                    |             |
| [0..*]      | [0..1] To_SubControlArea            | SubControlArea                        |             |
| [1..1]      | [0..*] FlowgateValue                | FlowgateValue                         |             |
| [0..*]      | [0..1] From_SubControlArea          | SubControlArea                        |             |
| [0..1]      | [0..*] InterTie                     | SchedulingPoint                       |             |
| [0..1]      | [0..1] CRR                          | CRR                                   |             |
| [0..1]      | [0..*] MktTerminal                  | MktTerminal                           |             |

| [mult from] | [mult to] name                     | type                        | description                         |
|-------------|------------------------------------|-----------------------------|-------------------------------------|
| [0..1]      | [0..*] GeneratingUnitDynamicValues | GeneratingUnitDynamicValues |                                     |
| [0..*]      | [0..1] GenericConstraints          | GenericConstraints          |                                     |
| [0..*]      | [0..1] HostControlArea             | HostControlArea             |                                     |
| [0..*]      | [0..1] PSRTYPE                     | PSRTYPE                     | inherited from: PowerSystemResource |
| [0..1]      | [0..*] Measurements                | Measurement                 | inherited from: PowerSystemResource |
| [1..1]      | [0..*] OperatingShare              | OperatingShare              | inherited from: PowerSystemResource |
| [0..*]      | [0..*] PsrLists                    | PsrList                     | inherited from: PowerSystemResource |
| [1..1]      | [0..1] OutageSchedule              | OutageSchedule              | inherited from: PowerSystemResource |
| [0..*]      | [0..*] ReportingGroup              | ReportingGroup              | inherited from: PowerSystemResource |
| [0..1]      | [0..*] DiagramObjects              | DiagramObject               | inherited from: IdentifiedObject    |
| [1..1]      | [0..*] Names                       | Name                        | inherited from: IdentifiedObject    |

#### 6.5.9.16 FlowgatePartner

Flowgate defined partner

Table 522 shows all attributes of FlowgatePartner.

**Table 522 – Attributes of ReferenceData::FlowgatePartner**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 523 shows all association ends of FlowgatePartner with other classes.

**Table 523 – Association ends of ReferenceData::FlowgatePartner with other classes**

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [0..1]      | [0..1] FlowgateValue  | FlowgateValue |                                  |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

#### 6.5.9.17 FlowgateRelief root class

IDC (Interchange Distribution Calculator) sends data for a TLR (Transmission Loading Relief).

Table 524 shows all attributes of FlowgateRelief.

**Table 524 – Attributes of ReferenceData::FlowgateRelief**

| name          | type     | description                                                                        |
|---------------|----------|------------------------------------------------------------------------------------|
| effectiveDate | DateTime | Date/Time when record becomes effective<br>Used to determine when a record becomes |



| name             | type     | description                                                                                                                                                                                                           |
|------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  |          | effective.                                                                                                                                                                                                            |
| terminateDate    | DateTime | Date/Time when record is no longer effective<br>Used to determine when a record is no longer effective                                                                                                                |
| idcTargetMktFlow | Integer  | Energy Flow level that should be maintained according to the TLR rules as specified by the IDC.<br><br>For Realtime Markets use in dispatch to control constraints under TLR and calculate unconstrained market flows |

Table 525 shows all association ends of FlowgateRelief with other classes.

**Table 525 – Association ends of ReferenceData::FlowgateRelief with other classes**

| [mult from] | [mult to] name  | type     | description |
|-------------|-----------------|----------|-------------|
| [0..*]      | [1..1] Flowgate | Flowgate |             |

#### 6.5.9.18 FlowgateValue root class

Day Ahead, Network Native Load, Economic Dispatch, values used for calculation of Network Native Load (NNL) Determinator process.

Table 526 shows all attributes of FlowgateValue.

**Table 526 – Attributes of ReferenceData::FlowgateValue**

| name                  | type              | description                                                                                                                                                                                                        |
|-----------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| economicDispatchLimit | Integer           | Limit for Economic Dispatch priority 6 energy flow on the specified flowgate for the specified time period.                                                                                                        |
| effectiveDate         | DateTime          | Date/Time when record becomes effective<br>Used to determine when a record becomes effective                                                                                                                       |
| firmNetworkLimit      | Integer           | Limit for firm flow on the specified flowgate for the specified time period. The amount of energy flow over a specified flowgate due to generation in the market which can be classified as Firm Network priority. |
| flowDirectionFlag     | FlowDirectionType | Specifies the direction of energy flow in the flowgate                                                                                                                                                             |
| mktFlow               | Integer           | The amount of energy flow over a specified flowgate due to generation in the market.                                                                                                                               |
| netFirmNetworkLimit   | Integer           | Net Energy flow in flowgate for the associated FlowgatePartner                                                                                                                                                     |

Table 527 shows all association ends of FlowgateValue with other classes.

**Table 527 – Association ends of ReferenceData::FlowgateValue with other classes**

| [mult from] | [mult to] name         | type            | description |
|-------------|------------------------|-----------------|-------------|
| [0..*]      | [1..1] Flowgate        | Flowgate        |             |
| [0..1]      | [0..1] FlowgatePartner | FlowgatePartner |             |

**6.5.9.19 ForbiddenRegion**

Forbidden region is operating ranges where the units are unable to maintain steady operation without causing equipment damage. The four attributes that define a forbidden region are the low MW, the High MW, the crossing time, and the crossing cost.

Table 528 shows all attributes of ForbiddenRegion.

**Table 528 – Attributes of ReferenceData::ForbiddenRegion**

| name         | type    | description                                        |
|--------------|---------|----------------------------------------------------|
| crossingCost | Float   | Cost associated with crossing the forbidden region |
| crossTime    | Integer | Time to cross the forbidden region in minutes.     |
| highMW       | Float   | High end of the region definition                  |
| lowMW        | Float   | Low end of the region definition.                  |
| aliasName    | String  | Inherited from: IdentifiedObject                   |
| mRID         | String  | Inherited from: IdentifiedObject                   |
| name         | String  | Inherited from: IdentifiedObject                   |

Table 529 shows all association ends of ForbiddenRegion with other classes.

**Table 529 – Association ends of ReferenceData::ForbiddenRegion with other classes**

| [mult from] | [mult to] name            | type               | description                      |
|-------------|---------------------------|--------------------|----------------------------------|
| [0..*]      | [0..*] RegisteredResource | RegisteredResource |                                  |
| [0..1]      | [0..*] DiagramObjects     | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names              | Name               | inherited from: IdentifiedObject |

**6.5.9.20 FormerReference**

Used to indicate former references to the same piece of equipment. The ID, name, and effectivity dates are utilized.

Table 530 shows all attributes of FormerReference.

**Table 530 – Attributes of ReferenceData::FormerReference**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |

| name | type   | description                      |
|------|--------|----------------------------------|
| name | String | inherited from: IdentifiedObject |

Table 531 shows all association ends of FormerReference with other classes.

**Table 531 – Association ends of ReferenceData::FormerReference with other classes**

| [mult from] | [mult to] name            | type               | description                      |
|-------------|---------------------------|--------------------|----------------------------------|
| [0..*]      | [1..1] RegisteredResource | RegisteredResource |                                  |
| [0..1]      | [0..*] DiagramObjects     | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names              | Name               | inherited from: IdentifiedObject |

### 6.5.9.21 FuelCostCurve

Relationship between unit fuel cost in \$/kWh(Y-axis) and unit output in MW (X-axis).

Table 532 shows all attributes of FuelCostCurve.

**Table 532 – Attributes of ReferenceData::FuelCostCurve**

| name         | type           | description                      |
|--------------|----------------|----------------------------------|
| curveStyle   | CurveStyle     | inherited from: Curve            |
| xMultiplier  | UnitMultiplier | inherited from: Curve            |
| xUnit        | UnitSymbol     | inherited from: Curve            |
| y1Multiplier | UnitMultiplier | inherited from: Curve            |
| y1Unit       | UnitSymbol     | inherited from: Curve            |
| y2Multiplier | UnitMultiplier | inherited from: Curve            |
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 533 shows all association ends of FuelCostCurve with other classes.

**Table 533 – Association ends of ReferenceData::FuelCostCurve with other classes**

| [mult from] | [mult to] name             | type                | description                      |
|-------------|----------------------------|---------------------|----------------------------------|
| [0..1]      | [0..1] RegisteredGenerator | RegisteredGenerator |                                  |
| [1..1]      | [0..*] CurveDatas          | CurveData           | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject |

### 6.5.9.22 FuelRegion

Indication of region for fuel inventory purposes

Table 534 shows all attributes of FuelRegion.

**Table 534 – Attributes of ReferenceData::FuelRegion**

| name               | type     | description                      |
|--------------------|----------|----------------------------------|
| endEffectiveDate   | DateTime | end effective date               |
| fuelRegionType     | String   | The type of fuel region          |
| lastModified       | DateTime | Time of last update              |
| startEffectiveDate | DateTime | start effective date             |
| aliasName          | String   | inherited from: IdentifiedObject |
| mRID               | String   | inherited from: IdentifiedObject |
| name               | String   | inherited from: IdentifiedObject |

Table 535 shows all association ends of FuelRegion with other classes.

**Table 535 – Association ends of ReferenceData::FuelRegion with other classes**

| [mult from] | [mult to] name             | type                | description                      |
|-------------|----------------------------|---------------------|----------------------------------|
| [0..1]      | [0..*] RegisteredGenerator | RegisteredGenerator |                                  |
| [0..*]      | [1..1] RTO                 | RTO                 |                                  |
| [1..1]      | [1..1] OilPrice            | OilPrice            |                                  |
| [1..1]      | [1..1] GasPrice            | GasPrice            |                                  |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject |

### 6.5.9.23 GasPrice root class

Price of gas in monetary units

Table 536 shows all attributes of GasPrice.

**Table 536 – Attributes of ReferenceData::GasPrice**

| name          | type  | description                                             |
|---------------|-------|---------------------------------------------------------|
| gasPriceIndex | Float | The average natural gas price at a defined fuel region. |

Table 537 shows all association ends of GasPrice with other classes.

**Table 537 – Association ends of ReferenceData::GasPrice with other classes**

| [mult from] | [mult to] name    | type       | description |
|-------------|-------------------|------------|-------------|
| [1..1]      | [1..1] FuelRegion | FuelRegion |             |

### 6.5.9.24 HostControlArea

A HostControlArea has a set of tie points and a set of generator controls (i.e., AGC). It also has a total load, including transmission and distribution losses.

Table 538 shows all attributes of HostControlArea.

**Table 538 – Attributes of ReferenceData::HostControlArea**

| name                | type            | description                                                                                                                             |
|---------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| areaControlMode     | AreaControlMode | The area's present control mode: (CF = constant frequency) or (CTL = constant tie-line) or (TLB = tie-line bias) or (OFF = off control) |
| endEffectiveDate    | DateTime        | end effective date                                                                                                                      |
| freqSetPoint        | Frequency       | The present power system frequency set point for automatic generation control                                                           |
| frequencyBiasFactor | Float           | The control area's frequency bias factor, in MW/0.1 Hz, for automatic generation control (AGC)                                          |
| startEffectiveDate  | DateTime        | start effective date                                                                                                                    |
| aliasName           | String          | inherited from: IdentifiedObject                                                                                                        |
| mRID                | String          | inherited from: IdentifiedObject                                                                                                        |
| name                | String          | inherited from: IdentifiedObject                                                                                                        |

Table 539 shows all association ends of HostControlArea with other classes.

**Table 539 – Association ends of ReferenceData::HostControlArea with other classes**

| [mult from] | [mult to] name                 | type                      | description                                        |
|-------------|--------------------------------|---------------------------|----------------------------------------------------|
| [0..1]      | [0..*] RegisteredResource      | RegisteredResource        |                                                    |
| [1..1]      | [0..*] SysLoadDistribuFactor   | SysLoadDistributionFactor |                                                    |
| [0..1]      | [0..*] TransferInterface       | TransferInterface         |                                                    |
| [0..1]      | [0..*] LossClearingResults     | LossClearingResults       |                                                    |
| [0..1]      | [0..*] BidSelfSched            | BidSelfSched              |                                                    |
| [0..1]      | [0..1] AdjacentCASet           | AdjacentCASet             |                                                    |
| [0..1]      | [0..*] CnodeDistributionFactor | CnodeDistributionFactor   |                                                    |
| [0..1]      | [0..*] Flowgate                | Flowgate                  |                                                    |
| [1..1]      | [0..*] SubControlAreas         | SubControlArea            | The interchange area may operate as a control area |
| [0..*]      | [1..1] RTO                     | RTO                       |                                                    |
| [0..*]      | [0..1] PSRType                 | PSRType                   | inherited from: PowerSystemResource                |
| [0..1]      | [0..*] Measurements            | Measurement               | inherited from: PowerSystemResource                |
| [1..1]      | [0..*] OperatingShare          | OperatingShare            | inherited from: PowerSystemResource                |
| [0..*]      | [0..*] PsrLists                | PsrList                   | inherited from: PowerSystemResource                |
| [1..1]      | [0..1] OutageSchedule          | OutageSchedule            | inherited from: PowerSystemResource                |
| [0..*]      | [0..*] ReportingGroup          | ReportingGroup            | inherited from: PowerSystemResource                |
| [0..1]      | [0..*] DiagramObjects          | DiagramObject             | inherited from: IdentifiedObject                   |
| [1..1]      | [0..*] Names                   | Name                      | inherited from: IdentifiedObject                   |

### 6.5.9.25 IndividualPnode

Individual pricing node based on Pnode

Table 540 shows all attributes of IndividualPnode.

**Table 540 – Attributes of ReferenceData::IndividualPnode**

| name               | type     | description                      |
|--------------------|----------|----------------------------------|
| endEffectiveDate   | DateTime | inherited from: Pnode            |
| isPublic           | Boolean  | inherited from: Pnode            |
| startEffectiveDate | DateTime | inherited from: Pnode            |
| type               | String   | inherited from: Pnode            |
| usage              | String   | inherited from: Pnode            |
| aliasName          | String   | inherited from: IdentifiedObject |
| mRID               | String   | inherited from: IdentifiedObject |
| name               | String   | inherited from: IdentifiedObject |

Table 541 shows all association ends of IndividualPnode with other classes.

**Table 541 – Association ends of ReferenceData::IndividualPnode with other classes**

| [mult from] | [mult to] name                 | type                    | description                      |
|-------------|--------------------------------|-------------------------|----------------------------------|
| [0..1]      | [1..1] MktConnectivityNode     | MktConnectivityNode     |                                  |
| [0..1]      | [0..1] GenDistributionFactor   | GenDistributionFactor   |                                  |
| [0..1]      | [0..1] LoadDistributionFactor  | LoadDistributionFactor  |                                  |
| [1..1]      | [0..*] PnodeDistributionFactor | PnodeDistributionFactor |                                  |
| [0..*]      | [0..*] CongestionArea          | CongestionArea          |                                  |
| [0..1]      | [0..*] RegisteredResources     | RegisteredResource      | inherited from: Pnode            |
| [0..*]      | [0..*] SourceCRRSegment        | CRRSegment              | inherited from: Pnode            |
| [0..*]      | [0..*] SinkCRRSegment          | CRRSegment              | inherited from: Pnode            |
| [0..1]      | [0..*] MktMeasurement          | MktMeasurement          | inherited from: Pnode            |
| [1..1]      | [0..*] ExPostResults           | ExPostPricingResults    | inherited from: Pnode            |
| [0..1]      | [1..*] PnodeResults            | PnodeResults            | inherited from: Pnode            |
| [0..1]      | [0..*] Trade                   | Trade                   | inherited from: Pnode            |
| [0..1]      | [0..*] ReceiptTransactionBids  | TransactionBid          | inherited from: Pnode            |
| [0..1]      | [0..*] DeliveryTransactionBids | TransactionBid          | inherited from: Pnode            |
| [0..*]      | [0..1] SubControlArea          | SubControlArea          | inherited from: Pnode            |
| [0..*]      | [0..*] AggregateNode           | AggregateNode           | inherited from: Pnode            |
| [1..1]      | [0..*] OrgPnodeAllocation      | OrgPnodeAllocation      | inherited from: Pnode            |
| [0..*]      | [0..1] RTO                     | RTO                     | inherited from: Pnode            |
| [0..1]      | [0..*] DiagramObjects          | DiagramObject           | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                   | Name                    | inherited from: IdentifiedObject |

### 6.5.9.26 LoadAggregationPoint

A specialized class of type AggregatedNode type. Defines Load Aggregation Points.

Table 542 shows all attributes of LoadAggregationPoint.

**Table 542 – Attributes of ReferenceData::LoadAggregationPoint**

| name               | type      | description                      |
|--------------------|-----------|----------------------------------|
| anodeType          | AnodeType | inherited from: AggregateNode    |
| endEffectiveDate   | DateTime  | inherited from: AggregateNode    |
| qualifASOrder      | Integer   | inherited from: AggregateNode    |
| startEffectiveDate | DateTime  | inherited from: AggregateNode    |
| aliasName          | String    | inherited from: IdentifiedObject |
| mRID               | String    | inherited from: IdentifiedObject |
| name               | String    | inherited from: IdentifiedObject |

Table 543 shows all association ends of LoadAggregationPoint with other classes.

**Table 543 – Association ends of ReferenceData::LoadAggregationPoint with other classes**

| [mult from] | [mult to] name                 | type                    | description                      |
|-------------|--------------------------------|-------------------------|----------------------------------|
| [0..*]      | [0..*] Pnode                   | Pnode                   | inherited from: AggregateNode    |
| [0..*]      | [0..*] SubControlArea          | SubControlArea          | inherited from: AggregateNode    |
| [0..1]      | [0..*] CnodeDistributionFactor | CnodeDistributionFactor | inherited from: AggregateNode    |
| [0..*]      | [0..*] RegisteredResource      | RegisteredResource      | inherited from: AggregateNode    |
| [0..1]      | [0..*] AreaLoadCurve           | AreaLoadCurve           | inherited from: AggregateNode    |
| [0..*]      | [1..1] RTO                     | RTO                     | inherited from: AggregateNode    |
| [0..1]      | [0..*] DiagramObjects          | DiagramObject           | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                   | Name                    | inherited from: IdentifiedObject |

### 6.5.9.27 LoadRatio root class

Representing the ratio of the load share for the associated SC.

Table 544 shows all attributes of LoadRatio.

**Table 544 – Attributes of ReferenceData::LoadRatio**

| name              | type     | description                                                              |
|-------------------|----------|--------------------------------------------------------------------------|
| intervalStartTime | DateTime | Interval Start Time                                                      |
| intervalEndTime   | DateTime | Interval End Time                                                        |
| share             | PerCent  | Share in percentage of total Market load for the selected time interval. |

Table 545 shows all association ends of LoadRatio with other classes.

**Table 545 – Association ends of ReferenceData::LoadRatio with other classes**

| [mult from] | [mult to] name               | type                  | description |
|-------------|------------------------------|-----------------------|-------------|
| [1..1]      | [0..1] SchedulingCoordinator | SchedulingCoordinator |             |

### 6.5.9.28 LoadReductionTimeCurve

This is the curve that describes the load reduction time. Relationship between time (Y1-axis) vs. MW (X-axis).

Table 546 shows all attributes of LoadReductionTimeCurve.

**Table 546 – Attributes of ReferenceData::LoadReductionTimeCurve**

| name                       | type           | description                                                             |
|----------------------------|----------------|-------------------------------------------------------------------------|
| loadReductionTimeCurveType | String         | type of the curve. Possible values are but not limited to:<br>Max, Min, |
| curveStyle                 | CurveStyle     | inherited from: Curve                                                   |
| xMultiplier                | UnitMultiplier | inherited from: Curve                                                   |
| xUnit                      | UnitSymbol     | inherited from: Curve                                                   |
| y1Multiplier               | UnitMultiplier | inherited from: Curve                                                   |
| y1Unit                     | UnitSymbol     | inherited from: Curve                                                   |
| y2Multiplier               | UnitMultiplier | inherited from: Curve                                                   |
| y2Unit                     | UnitSymbol     | inherited from: Curve                                                   |
| y3Multiplier               | UnitMultiplier | inherited from: Curve                                                   |
| y3Unit                     | UnitSymbol     | inherited from: Curve                                                   |
| aliasName                  | String         | inherited from: IdentifiedObject                                        |
| mRID                       | String         | inherited from: IdentifiedObject                                        |
| name                       | String         | inherited from: IdentifiedObject                                        |

Table 547 shows all association ends of LoadReductionTimeCurve with other classes.

**Table 547 – Association ends of ReferenceData::LoadReductionTimeCurve with other classes**

| [mult from] | [mult to] name        | type           | description                      |
|-------------|-----------------------|----------------|----------------------------------|
| [0..*]      | [0..*] RegisteredLoad | RegisteredLoad |                                  |
| [1..1]      | [0..*] CurveDatas     | CurveData      | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects | DiagramObject  | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name           | inherited from: IdentifiedObject |

### 6.5.9.29 LocalReliabilityArea

Allows definition of reliability areas (eg load pockets) within the ISO/RTO



Table 548 shows all attributes of LocalReliabilityArea.

**Table 548 – Attributes of ReferenceData::LocalReliabilityArea**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 549 shows all association ends of LocalReliabilityArea with other classes.

**Table 549 – Association ends of ReferenceData::LocalReliabilityArea with other classes**

| [mult from] | [mult to] name             | type                | description                      |
|-------------|----------------------------|---------------------|----------------------------------|
| [0..1]      | [0..*] RegisteredGenerator | RegisteredGenerator |                                  |
| [0..*]      | [1..1] RTO                 | RTO                 |                                  |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject |

### 6.5.9.30 MarketPerson

General purpose information for name and other information to contact people.

Table 550 shows all attributes of MarketPerson.

**Table 550 – Attributes of ReferenceData::MarketPerson**

| name                       | type              | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| category                   | String            | Category of this person relative to utility operations, classified according to the utility's corporate standards and practices. Examples include employee, contractor, agent, not affiliated, etc.<br><br>This field is not used to indicate whether this person is a customer of the utility. Often an employee or contractor is also a customer. Customer information is gained with relationship to Organisation and CustomerData. In similar fashion, this field does not indicate the various roles this person may fill as part of utility operations. |
| electronicAddressAlternate | ElectronicAddress | Alternate Electronic address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| electronicAddressPrimary   | ElectronicAddress | Primary Electronic address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| firstName                  | String            | Person's first name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| governmentID               | String            | Unique identifier for person relative to its governing authority, for example a federal tax identifier (such as a Social Security number in the United States).                                                                                                                                                                                                                                                                                                                                                                                               |
| landlinePhone              | TelephoneNumber   | Landline phone number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| lastName                   | String            | Person's last (family, sir) name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| mName                      | String            | Middle name(s) or initial(s).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| mobilePhone                | TelephoneNumber   | Mobile phone number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| prefix                     | String            | A prefix or title for the person's name, such as                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| name        | type   | description                                                                                       |
|-------------|--------|---------------------------------------------------------------------------------------------------|
|             |        | Miss, Mister, Doctor, etc.                                                                        |
| specialNeed | String | Special service needs for the person (contact) are described; examples include life support, etc. |
| status      | Status |                                                                                                   |
| suffix      | String | A suffix for the person's name, such as II, III, etc.                                             |
| userID      | String | The user name for the person; required to log in.                                                 |
| aliasName   | String | inherited from: IdentifiedObject                                                                  |
| mRID        | String | inherited from: IdentifiedObject                                                                  |
| name        | String | inherited from: IdentifiedObject                                                                  |

Table 551 shows all association ends of MarketPerson with other classes.

**Table 551 – Association ends of ReferenceData::MarketPerson with other classes**

| [mult from] | [mult to] name         | type            | description                      |
|-------------|------------------------|-----------------|----------------------------------|
| [0..1]      | [0..*] MarketSkills    | MarketSkill     |                                  |
| [0..*]      | [0..*] MktOrganisation | MktOrganisation |                                  |
| [0..1]      | [0..*] DiagramObjects  | DiagramObject   | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names           | Name            | inherited from: IdentifiedObject |

#### 6.5.9.31 MarketQualificationRequirement

Certain skills are required and shall be certified in order for a person (typically a member of a crew) to be qualified to work on types of equipment.

Table 552 shows all attributes of MarketQualificationRequirement.

**Table 552 – Attributes of ReferenceData::MarketQualificationRequirement**

| name            | type     | description                                                                                                                                                                                    |
|-----------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| effectiveDate   | DateTime | Effective date of the privilege, terminate date of the privilege, or effective date of the application for the organization                                                                    |
| expirationDate  | DateTime | This is the terminate date of the application for the organization<br>The specific organization can no longer access the application as of the terminate date                                  |
| qualificationID | String   | Qualification identifier.                                                                                                                                                                      |
| status          | Integer  | The status of the privilege. Shows the status of the user's qualification.<br><br>The current statuses are: 1=New, 2=Active, 3=Refused, 4=Terminated, 5=Withdrawn and it is subject to update. |
| statusType      | String   | This is the name of the status of the qualification and is used to display the status of the user's or organization's status.                                                                  |
| aliasName       | String   | inherited from: IdentifiedObject                                                                                                                                                               |
| mRID            | String   | inherited from: IdentifiedObject                                                                                                                                                               |

| name | type   | description                      |
|------|--------|----------------------------------|
| name | String | inherited from: IdentifiedObject |

Table 553 shows all association ends of MarketQualificationRequirement with other classes.

**Table 553 – Association ends of ReferenceData::  
MarketQualificationRequirement with other classes**

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [0..*]      | [0..*] MarketSkills   | MarketSkill   |                                  |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

### 6.5.9.32 MarketRegion

A specialized class of AggregatedNode type. Defines the MarketRegions. Regions could be system Market Regions, Energy Regions or Ancillary Service Regions.

Table 554 shows all attributes of MarketRegion.

**Table 554 – Attributes of ReferenceData::MarketRegion**

| name               | type      | description                      |
|--------------------|-----------|----------------------------------|
| anodeType          | AnodeType | inherited from: AggregateNode    |
| endEffectiveDate   | DateTime  | inherited from: AggregateNode    |
| qualifASOrder      | Integer   | inherited from: AggregateNode    |
| startEffectiveDate | DateTime  | inherited from: AggregateNode    |
| aliasName          | String    | inherited from: IdentifiedObject |
| mRID               | String    | inherited from: IdentifiedObject |
| name               | String    | inherited from: IdentifiedObject |

Table 555 shows all association ends of MarketRegion with other classes.

**Table 555 – Association ends of ReferenceData::MarketRegion with other classes**

| [mult from] | [mult to] name                   | type                      | description                   |
|-------------|----------------------------------|---------------------------|-------------------------------|
| [1..1]      | [0..*] ReserveDemandCurve        | ReserveDemandCurve        |                               |
| [1..1]      | [1..*] MarketRegionResults       | MarketRegionResults       |                               |
| [1..1]      | [0..*] ExPostMarketRegionResults | ExPostMarketRegionResults |                               |
| [0..*]      | [0..*] Pnode                     | Pnode                     | inherited from: AggregateNode |
| [0..*]      | [0..*] SubControlArea            | SubControlArea            | inherited from: AggregateNode |
| [0..1]      | [0..*] CnodeDistributionFactor   | CnodeDistributionFactor   | inherited from: AggregateNode |
| [0..*]      | [0..*] RegisteredResource        | RegisteredResource        | inherited from: AggregateNode |
| [0..1]      | [0..*] AreaLoadCurve             | AreaLoadCurve             | inherited from: AggregateNode |

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [0..*]      | [1..1] RTO            | RTO           | inherited from: AggregateNode    |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

### 6.5.9.33 MarketSkill

Proficiency level of a craft, which is required to operate or maintain a particular type of asset and/or perform certain types of work.

Table 556 shows all attributes of MarketSkill.

**Table 556 – Attributes of ReferenceData::MarketSkill**

| name                 | type              | description                                        |
|----------------------|-------------------|----------------------------------------------------|
| certificationPeriod  | DateTimeInterval  | Interval between the certification and its expiry. |
| effectiveDateTime    | DateTime          | Date and time the skill became effective.          |
| level                | String            | Level of skill for a Craft.                        |
| type                 | String            | inherited from: Document                           |
| createdDateTime      | DateTime          | inherited from: Document                           |
| lastModifiedDateTime | DateTime          | inherited from: Document                           |
| revisionNumber       | String            | inherited from: Document                           |
| electronicAddress    | ElectronicAddress | inherited from: Document                           |
| subject              | String            | inherited from: Document                           |
| title                | String            | inherited from: Document                           |
| docStatus            | Status            | inherited from: Document                           |
| status               | Status            | inherited from: Document                           |
| aliasName            | String            | inherited from: IdentifiedObject                   |
| mRID                 | String            | inherited from: IdentifiedObject                   |
| name                 | String            | inherited from: IdentifiedObject                   |

Table 557 shows all association ends of MarketSkill with other classes.

**Table 557 – Association ends of ReferenceData::MarketSkill with other classes**

| [mult from] | [mult to] name                         | type                           | description                      |
|-------------|----------------------------------------|--------------------------------|----------------------------------|
| [0..*]      | [0..*] MarketQualificationRequirements | MarketQualificationRequirement |                                  |
| [0..*]      | [0..1] MarketPerson                    | MarketPerson                   |                                  |
| [0..1]      | [0..*] ConfigurationEvents             | ConfigurationEvent             | inherited from: Document         |
| [0..1]      | [0..*] DiagramObjects                  | DiagramObject                  | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                           | Name                           | inherited from: IdentifiedObject |

#### 6.5.9.34 MaxStartUpCostCurve

The maximum Startup costs and time as a function of down time. Relationship between unit startup cost (Y1-axis) vs. unit elapsed down time (X-axis). This is used to validate the information provided in the Bid.

Table 558 shows all attributes of MaxStartUpCostCurve.

**Table 558 – Attributes of ReferenceData::MaxStartUpCostCurve**

| name         | type           | description                      |
|--------------|----------------|----------------------------------|
| curveStyle   | CurveStyle     | inherited from: Curve            |
| xMultiplier  | UnitMultiplier | inherited from: Curve            |
| xUnit        | UnitSymbol     | inherited from: Curve            |
| y1Multiplier | UnitMultiplier | inherited from: Curve            |
| y1Unit       | UnitSymbol     | inherited from: Curve            |
| y2Multiplier | UnitMultiplier | inherited from: Curve            |
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 559 shows all association ends of MaxStartUpCostCurve with other classes.

**Table 559 – Association ends of ReferenceData::MaxStartUpCostCurve with other classes**

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [1..1]      | [0..*] CurveDatas     | CurveData     | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

#### 6.5.9.35 MeteredSubSystem

A metered subsystem

Table 560 shows all attributes of MeteredSubSystem.

**Table 560 – Attributes of ReferenceData::MeteredSubSystem**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 561 shows all association ends of MeteredSubSystem with other classes.

**Table 561 – Association ends of ReferenceData::MeteredSubSystem with other classes**

| [mult from] | [mult to] name        | type           | description                      |
|-------------|-----------------------|----------------|----------------------------------|
| [0..1]      | [0..*] MSSZone        | MSSZone        |                                  |
| [1..*]      | [0..1] MSSAggregation | MSSAggregation |                                  |
| [0..1]      | [0..*] DiagramObjects | DiagramObject  | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name           | inherited from: IdentifiedObject |

### 6.5.9.36 MktCombinedCyclePlant

Subclass of Production: CombinedCyclePlant from IEC 61970 package.

A set of combustion turbines and steam turbines where the exhaust heat from the combustion turbines is recovered to make steam for the steam turbines, resulting in greater overall plant efficiency

Table 562 shows all attributes of MktCombinedCyclePlant.

**Table 562 – Attributes of ReferenceData::MktCombinedCyclePlant**

| name                 | type        | description                        |
|----------------------|-------------|------------------------------------|
| combCyclePlantRating | ActivePower | inherited from: CombinedCyclePlant |
| aliasName            | String      | inherited from: IdentifiedObject   |
| mRID                 | String      | inherited from: IdentifiedObject   |
| name                 | String      | inherited from: IdentifiedObject   |

Table 563 shows all association ends of MktCombinedCyclePlant with other classes.

**Table 563 – Association ends of ReferenceData::MktCombinedCyclePlant with other classes**

| [mult from] | [mult to] name                           | type                              | description                         |
|-------------|------------------------------------------|-----------------------------------|-------------------------------------|
| [0..*]      | [0..1] AggregatedPnode                   | AggregatedPnode                   |                                     |
| [0..1]      | [1..*] CombinedCycleLogicalConfiguration | CombinedCycleLogicalConfiguration |                                     |
| [0..1]      | [0..*] ThermalGeneratingUnits            | ThermalGeneratingUnit             | inherited from: CombinedCyclePlant  |
| [0..*]      | [0..1] PSRType                           | PSRType                           | inherited from: PowerSystemResource |
| [0..1]      | [0..*] Measurements                      | Measurement                       | inherited from: PowerSystemResource |
| [1..1]      | [0..*] OperatingShare                    | OperatingShare                    | inherited from: PowerSystemResource |
| [0..*]      | [0..*] PsrLists                          | PsrList                           | inherited from: PowerSystemResource |
| [1..1]      | [0..1] OutageSchedule                    | OutageSchedule                    | inherited from: PowerSystemResource |
| [0..*]      | [0..*] ReportingGroup                    | ReportingGroup                    | inherited from: PowerSystemResource |
| [0..1]      | [0..*] DiagramObjects                    | DiagramObject                     | inherited from: IdentifiedObject    |
| [1..1]      | [0..*] Names                             | Name                              | inherited from: IdentifiedObject    |

### 6.5.9.37 MktConductingEquipment

Subclass of IEC 61970:Core:ConductingEquipment

Table 564 shows all attributes of MktConductingEquipment.

**Table 564 – Attributes of ReferenceData::MktConductingEquipment**

| name              | type    | description                      |
|-------------------|---------|----------------------------------|
| aggregate         | Boolean | inherited from: Equipment        |
| normallyInService | Boolean | inherited from: Equipment        |
| aliasName         | String  | inherited from: IdentifiedObject |
| mRID              | String  | inherited from: IdentifiedObject |
| name              | String  | inherited from: IdentifiedObject |

Table 565 shows all association ends of MktConductingEquipment with other classes.

**Table 565 – Association ends of ReferenceData::MktConductingEquipment with other classes**

| [mult from] | [mult to] name              | type                 | description                         |
|-------------|-----------------------------|----------------------|-------------------------------------|
| [0..*]      | [0..1] BaseVoltage          | BaseVoltage          | inherited from: ConductingEquipment |
| [1..1]      | [0..*] Terminals            | Terminal             | inherited from: ConductingEquipment |
| [0..*]      | [0..*] ProtectionEquipments | ProtectionEquipment  | inherited from: ConductingEquipment |
| [1..1]      | [0..*] ClearanceTags        | ClearanceTag         | inherited from: ConductingEquipment |
| [1..1]      | [0..1] SvStatus             | SvStatus             | inherited from: ConductingEquipment |
| [0..*]      | [0..1] EquipmentContainer   | EquipmentContainer   | inherited from: Equipment           |
| [1..1]      | [0..*] ContingencyEquipment | ContingencyEquipment | inherited from: Equipment           |
| [0..1]      | [0..*] OperationalLimitSet  | OperationalLimitSet  | inherited from: Equipment           |
| [0..*]      | [0..1] PSRType              | PSRType              | inherited from: PowerSystemResource |
| [0..1]      | [0..*] Measurements         | Measurement          | inherited from: PowerSystemResource |
| [1..1]      | [0..*] OperatingShare       | OperatingShare       | inherited from: PowerSystemResource |
| [0..*]      | [0..*] PsrLists             | PsrList              | inherited from: PowerSystemResource |
| [1..1]      | [0..1] OutageSchedule       | OutageSchedule       | inherited from: PowerSystemResource |
| [0..*]      | [0..*] ReportingGroup       | ReportingGroup       | inherited from: PowerSystemResource |
| [0..1]      | [0..*] DiagramObjects       | DiagramObject        | inherited from: IdentifiedObject    |
| [1..1]      | [0..*] Names                | Name                 | inherited from: IdentifiedObject    |

### 6.5.9.38 MktContingency

Subclass of IEC 61970:Contingency

Table 566 shows all attributes of MktContingency.

**Table 566 – Attributes of ReferenceData::MktContingency**

| name             | type    | description      |
|------------------|---------|------------------|
| loadRolloverFlag | Boolean | load change flag |

| name                   | type    | description                                                                                                                                          |
|------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        |         | Flag that indicates whether load rollover and load pickup should be processed for this contingency                                                   |
| ltcControlFlag         | Boolean | ltc enable flag<br>Flag that indicates if LTCs regulate voltage during the solution of the contingency                                               |
| participationFactorSet | String  | Participation Factor flag<br>An indication which set of generator participation factors should be used to re-allocate generation in this contingency |
| screeningFlag          | Boolean | screening flag for outage<br>Flag that indicated whether screening is bypassed for the contingency                                                   |
| mustStudy              | Boolean | inherited from: Contingency                                                                                                                          |
| aliasName              | String  | inherited from: IdentifiedObject                                                                                                                     |
| mRID                   | String  | inherited from: IdentifiedObject                                                                                                                     |
| name                   | String  | inherited from: IdentifiedObject                                                                                                                     |

Table 567 shows all association ends of MktContingency with other classes.

**Table 567 – Association ends of ReferenceData::MktContingency with other classes**

| [mult from] | [mult to] name                    | type                       | description                      |
|-------------|-----------------------------------|----------------------------|----------------------------------|
| [1..1]      | [0..*] ContingencyConstraintLimit | ContingencyConstraintLimit |                                  |
| [0..1]      | [0..1] TransferInterfaceSolutionA | TransferInterfaceSolution  |                                  |
| [0..1]      | [0..1] TransferInterfaceSolutionB | TransferInterfaceSolution  |                                  |
| [1..1]      | [0..*] ConstraintResults          | ConstraintResults          |                                  |
| [1..1]      | [0..*] ContingencyElement         | ContingencyElement         | inherited from: Contingency      |
| [0..1]      | [0..*] DiagramObjects             | DiagramObject              | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                      | Name                       | inherited from: IdentifiedObject |

### 6.5.9.39 MktHeatRateCurve

Subclass of IEC 61970: Generation: Production:HeatRateCurve

Table 568 shows all attributes of MktHeatRateCurve.

**Table 568 – Attributes of ReferenceData::MktHeatRateCurve**

| name         | type           | description                   |
|--------------|----------------|-------------------------------|
| isNetGrossP  | Boolean        | inherited from: HeatRateCurve |
| curveStyle   | CurveStyle     | inherited from: Curve         |
| xMultiplier  | UnitMultiplier | inherited from: Curve         |
| xUnit        | UnitSymbol     | inherited from: Curve         |
| y1Multiplier | UnitMultiplier | inherited from: Curve         |



| name         | type           | description                      |
|--------------|----------------|----------------------------------|
| y1Unit       | UnitSymbol     | inherited from: Curve            |
| y2Multiplier | UnitMultiplier | inherited from: Curve            |
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 569 shows all association ends of MktHeatRateCurve with other classes.

**Table 569 – Association ends of ReferenceData::MktHeatRateCurve with other classes**

| [mult from] | [mult to] name                 | type                    | description                      |
|-------------|--------------------------------|-------------------------|----------------------------------|
| [0..1]      | [0..1] RegisteredGenerator     | RegisteredGenerator     |                                  |
| [1..1]      | [0..1] ResourceVerifiableCosts | ResourceVerifiableCosts |                                  |
| [0..1]      | [1..1] ThermalGeneratingUnit   | ThermalGeneratingUnit   | inherited from: HeatRateCurve    |
| [1..1]      | [0..*] CurveDatas              | CurveData               | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects          | DiagramObject           | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                   | Name                    | inherited from: IdentifiedObject |

#### 6.5.9.40 MktThermalGeneratingUnit

Subclass of ThermalGeneratingUnit from Production Package in IEC 61970.

Table 570 shows all attributes of MktThermalGeneratingUnit.

**Table 570 – Attributes of ReferenceData::MktThermalGeneratingUnit**

| name                | type                  | description                           |
|---------------------|-----------------------|---------------------------------------|
| oMCost              | CostPerHeatUnit       | inherited from: ThermalGeneratingUnit |
| allocSpinResP       | ActivePower           | inherited from: GeneratingUnit        |
| autoCntrlMarginP    | ActivePower           | inherited from: GeneratingUnit        |
| baseP               | ActivePower           | inherited from: GeneratingUnit        |
| controlDeadband     | ActivePower           | inherited from: GeneratingUnit        |
| controlPulseHigh    | Seconds               | inherited from: GeneratingUnit        |
| controlPulseLow     | Seconds               | inherited from: GeneratingUnit        |
| controlResponseRate | ActivePowerChangeRate | inherited from: GeneratingUnit        |
| dispReserveFlag     | Boolean               | inherited from: GeneratingUnit        |
| efficiency          | PU                    | inherited from: GeneratingUnit        |
| energyMinP          | HeatRate              | inherited from: GeneratingUnit        |
| fastStartFlag       | Boolean               | inherited from: GeneratingUnit        |
| fuelPriority        | Integer               | inherited from: GeneratingUnit        |
| genControlMode      | GeneratorControlMode  | inherited from: GeneratingUnit        |

| name                            | type                   | description                      |
|---------------------------------|------------------------|----------------------------------|
| genControlSource                | GeneratorControlSource | inherited from: GeneratingUnit   |
| genOperatingMode                | GeneratorOperatingMode | inherited from: GeneratingUnit   |
| governorMPL                     | PU                     | inherited from: GeneratingUnit   |
| governorSCD                     | PerCent                | inherited from: GeneratingUnit   |
| highControlLimit                | ActivePower            | inherited from: GeneratingUnit   |
| initialIP                       | ActivePower            | inherited from: GeneratingUnit   |
| longPF                          | Float                  | inherited from: GeneratingUnit   |
| lowControlLimit                 | ActivePower            | inherited from: GeneratingUnit   |
| lowerRampRate                   | ActivePowerChangeRate  | inherited from: GeneratingUnit   |
| maxEconomicP                    | ActivePower            | inherited from: GeneratingUnit   |
| maximumAllowableSpinningReserve | ActivePower            | inherited from: GeneratingUnit   |
| maxOperatingP                   | ActivePower            | inherited from: GeneratingUnit   |
| minEconomicP                    | ActivePower            | inherited from: GeneratingUnit   |
| minimumOffTime                  | Seconds                | inherited from: GeneratingUnit   |
| minOperatingP                   | ActivePower            | inherited from: GeneratingUnit   |
| modelDetail                     | Classification         | inherited from: GeneratingUnit   |
| nominalIP                       | ActivePower            | inherited from: GeneratingUnit   |
| normalIPF                       | Float                  | inherited from: GeneratingUnit   |
| penaltyFactor                   | Float                  | inherited from: GeneratingUnit   |
| raiseRampRate                   | ActivePowerChangeRate  | inherited from: GeneratingUnit   |
| ratedGrossMaxP                  | ActivePower            | inherited from: GeneratingUnit   |
| ratedGrossMinP                  | ActivePower            | inherited from: GeneratingUnit   |
| ratedNetMaxP                    | ActivePower            | inherited from: GeneratingUnit   |
| shortPF                         | Float                  | inherited from: GeneratingUnit   |
| spinReserveRamp                 | ActivePowerChangeRate  | inherited from: GeneratingUnit   |
| startupCost                     | Money                  | inherited from: GeneratingUnit   |
| startupTime                     | Seconds                | inherited from: GeneratingUnit   |
| stepChange                      | ActivePower            | inherited from: GeneratingUnit   |
| tieLinePF                       | Float                  | inherited from: GeneratingUnit   |
| variableCost                    | Money                  | inherited from: GeneratingUnit   |
| aggregate                       | Boolean                | inherited from: Equipment        |
| normallyInService               | Boolean                | inherited from: Equipment        |
| aliasName                       | String                 | inherited from: IdentifiedObject |
| mRID                            | String                 | inherited from: IdentifiedObject |
| name                            | String                 | inherited from: IdentifiedObject |

Table 571 shows all association ends of MktThermalGeneratingUnit with other classes.

**Table 571 – Association ends of ReferenceData::  
MktThermalGeneratingUnit with other classes**

| [mult from] | [mult to] name                       | type                    | description |
|-------------|--------------------------------------|-------------------------|-------------|
| [1..1]      | [0..*]<br>CombinedCycleConfiguration | CombinedCycleConfigurat |             |

| [mult from] | [mult to] name                     | type                       | description                           |
|-------------|------------------------------------|----------------------------|---------------------------------------|
|             | Member                             | ionMember                  |                                       |
| [0..1]      | [0..1] CAESPlant                   | CAESPlant                  | inherited from: ThermalGeneratingUnit |
| [0..*]      | [0..1] CogenerationPlant           | CogenerationPlant          | inherited from: ThermalGeneratingUnit |
| [0..*]      | [0..1] CombinedCyclePlant          | CombinedCyclePlant         | inherited from: ThermalGeneratingUnit |
| [1..1]      | [0..*] EmissionAccounts            | EmissionAccount            | inherited from: ThermalGeneratingUnit |
| [1..1]      | [0..*] EmissionCurves              | EmissionCurve              | inherited from: ThermalGeneratingUnit |
| [1..1]      | [0..*] FossilFuels                 | FossilFuel                 | inherited from: ThermalGeneratingUnit |
| [1..1]      | [0..*] FuelAllocationSchedules     | FuelAllocationSchedule     | inherited from: ThermalGeneratingUnit |
| [1..1]      | [0..1] HeatInputCurve              | HeatInputCurve             | inherited from: ThermalGeneratingUnit |
| [1..1]      | [0..1] HeatRateCurve               | HeatRateCurve              | inherited from: ThermalGeneratingUnit |
| [1..1]      | [0..1] IncrementalHeatRateCurve    | IncrementalHeatRateCurve   | inherited from: ThermalGeneratingUnit |
| [1..1]      | [0..1] ShutdownCurve               | ShutdownCurve              | inherited from: ThermalGeneratingUnit |
| [1..1]      | [0..1] StartupModel                | StartupModel               | inherited from: ThermalGeneratingUnit |
| [0..1]      | [1..*] SynchronousMachines         | SynchronousMachine         | inherited from: GeneratingUnit        |
| [1..1]      | [0..1] GenUnitOpSchedule           | GenUnitOpSchedule          | inherited from: GeneratingUnit        |
| [1..1]      | [0..*] GrossToNetActivePowerCurves | GrossToNetActivePowerCurve | inherited from: GeneratingUnit        |
| [1..1]      | [0..*] GenUnitOpCostCurves         | GenUnitOpCostCurve         | inherited from: GeneratingUnit        |
| [1..1]      | [0..*] ControlAreaGeneratingUnit   | ControlAreaGeneratingUnit  | inherited from: GeneratingUnit        |
| [0..*]      | [0..1] EquipmentContainer          | EquipmentContainer         | inherited from: Equipment             |
| [1..1]      | [0..*] ContingencyEquipment        | ContingencyEquipment       | inherited from: Equipment             |
| [0..1]      | [0..*] OperationalLimitSet         | OperationalLimitSet        | inherited from: Equipment             |
| [0..*]      | [0..1] PSRType                     | PSRType                    | inherited from: PowerSystemResource   |
| [0..1]      | [0..*] Measurements                | Measurement                | inherited from: PowerSystemResource   |
| [1..1]      | [0..*] OperatingShare              | OperatingShare             | inherited from: PowerSystemResource   |
| [0..*]      | [0..*] PsrLists                    | PsrList                    | inherited from: PowerSystemResource   |
| [1..1]      | [0..1] OutageSchedule              | OutageSchedule             | inherited from: PowerSystemResource   |
| [0..*]      | [0..*] ReportingGroup              | ReportingGroup             | inherited from: PowerSystemResource   |
| [0..1]      | [0..*] DiagramObjects              | DiagramObject              | inherited from: IdentifiedObject      |
| [1..1]      | [0..*] Names                       | Name                       | inherited from: IdentifiedObject      |

#### 6.5.9.41 MPMTTestCategory

Provides a reference to the Market Power Mitigation test identifiers and methods for the results of the DA or RT markets. Specific data is the test identifier (Price, Conduct, or Impact) and the test method (System MPM, Local MPM, Alternate System MPM, or Alternate Local MPM).

Table 572 shows all attributes of MPMTTestCategory.

**Table 572 – Attributes of ReferenceData::MPMTTestCategory**

| name           | type                   | description           |
|----------------|------------------------|-----------------------|
| testIdentifier | MPMTTestIdentifierType | 1 – Global Price Test |

| name        | type              | description                                                                                                                  |
|-------------|-------------------|------------------------------------------------------------------------------------------------------------------------------|
|             |                   | 2 – Global Conduct Test<br>3 – Global Impact Test<br>4 – Local Price Test<br>5 – Local Conduct Test<br>6 – Local Impact Test |
| testMethod  | MPMTestMethodType | The method of performing the market power monitoring. Examples are Normal (default) thresholds or Alternate thresholds.      |
| purposeFlag | PurposeFlagType   | Nature of threshold data:<br>'M' – Mitigation threshold<br>'R' – Reporting threshold                                         |
| aliasName   | String            | inherited from: IdentifiedObject                                                                                             |
| mRID        | String            | inherited from: IdentifiedObject                                                                                             |
| name        | String            | inherited from: IdentifiedObject                                                                                             |

Table 573 shows all association ends of MPMTestCategory with other classes.

**Table 573 – Association ends of ReferenceData::MPMTestCategory with other classes**

| [mult from] | [mult to] name           | type              | description                      |
|-------------|--------------------------|-------------------|----------------------------------|
| [1..1]      | [0..*] MPMResourceStatus | MPMResourceStatus |                                  |
| [1..1]      | [0..*] MPMTestResults    | MPMTestResults    |                                  |
| [1..1]      | [0..*] MPMTestThreshold  | MPMTestThreshold  |                                  |
| [0..1]      | [0..*] DiagramObjects    | DiagramObject     | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names             | Name              | inherited from: IdentifiedObject |

#### 6.5.9.42 MPMTestThreshold root class

Market Power Mitigation (MPM) test thresholds for resource as well as designated congestion areas (DCAs)

Table 574 shows all attributes of MPMTestThreshold.

**Table 574 – Attributes of ReferenceData::MPMTestThreshold**

| name       | type              | description              |
|------------|-------------------|--------------------------|
| price      | CostPerEnergyUnit | Price Threshold in \$/MW |
| percent    | PerCent           | Price Threshold in %     |
| marketType | MarketType        | Market Type (DAM, RTM)   |

Table 575 shows all association ends of MPMTestThreshold with other classes.

**Table 575 – Association ends of ReferenceData::MPMTestThreshold with other classes**

| [mult from] | [mult to] name            | type               | description |
|-------------|---------------------------|--------------------|-------------|
| [0..*]      | [0..*] RegisteredResource | RegisteredResource |             |
| [1..*]      | [0..*] AggregatedPnode    | AggregatedPnode    |             |
| [0..*]      | [1..1] MPMTestCategory    | MPMTestCategory    |             |

**6.5.9.43 MSSAggregation**

Metered Sub-System aggregation of MSS Zones.

Table 576 shows all attributes of MSSAggregation.

**Table 576 – Attributes of ReferenceData::MSSAggregation**

| name                 | type     | description                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| costRecovery         | YesNo    | Charge for Emission Costs, Start Up Costs, or Minimum Load Costs.                                                                                                                                                                                                                                                                                                                                                                         |
| endEffectiveDate     | DateTime | end effective date                                                                                                                                                                                                                                                                                                                                                                                                                        |
| grossSettlement      | YesNo    | MSS Load Following may select Net vs. Gross settlement. Net Settlement requires the net Demand settled at the MSS LAP and Net Supply needs to settle at the equivalent to the weighted average price of the MSS generation. Gross load will be settled at the System LAP and the Gross supply will be settled at the LMP. MSS Aggregation that elects gross settlement shall have to identify if its resources are Load Following or not. |
| ignoreLosses         | YesNo    | Provides an indication if losses are to be ignored for this zone. Also referred to as Exclude Marginal Losses.                                                                                                                                                                                                                                                                                                                            |
| ignoreMarginalLosses | YesNo    | Provides an indication if marginal losses are to be ignored for this zone.                                                                                                                                                                                                                                                                                                                                                                |
| loadFollowing        | YesNo    | Indication that this particular MSSA participates in the Load Following function.                                                                                                                                                                                                                                                                                                                                                         |
| rucProcurement       | YesNo    | Indicates that RUC will be procured by the ISO or self provided.                                                                                                                                                                                                                                                                                                                                                                          |
| startEffectiveDate   | DateTime | start effective date                                                                                                                                                                                                                                                                                                                                                                                                                      |
| aliasName            | String   | inherited from: IdentifiedObject                                                                                                                                                                                                                                                                                                                                                                                                          |
| mRID                 | String   | inherited from: IdentifiedObject                                                                                                                                                                                                                                                                                                                                                                                                          |
| name                 | String   | inherited from: IdentifiedObject                                                                                                                                                                                                                                                                                                                                                                                                          |

Table 577 shows all association ends of MSSAggregation with other classes.

**Table 577 – Association ends of ReferenceData::MSSAggregation with other classes**

| [mult from] | [mult to] name          | type             | description                      |
|-------------|-------------------------|------------------|----------------------------------|
| [0..1]      | [1..*] MeteredSubSystem | MeteredSubSystem |                                  |
| [0..*]      | [1..1] RTO              | RTO              |                                  |
| [0..1]      | [0..*] DiagramObjects   | DiagramObject    | inherited from: IdentifiedObject |

| [mult from] | [mult to] name | type | description                      |
|-------------|----------------|------|----------------------------------|
| [1..1]      | [0..*] Names   | Name | inherited from: IdentifiedObject |

#### 6.5.9.44 MSSZone

Model to define a zone within a Metered Sub System

Table 578 shows all attributes of MSSZone.

**Table 578 – Attributes of ReferenceData::MSSZone**

| name               | type      | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ignoreLosses       | YesNo     | Provides an indication if losses are to be ignored for this metered subsystem zone.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| lossFactor         | Float     | This is the default loss factor for the Metered Sub-System (MSS) zone. The actual losses are calculated during the RT market.                                                                                                                                                                                                                                                                                                                                                                                |
| rucGrossSettlement | YesNo     | Metered Sub-System (MSS) Load Following may select Net vs. Gross settlement. Net Settlement requires the net Demand settled at the Metered Sub-System (MSS) Load Aggregation Point (LAP) and Net Supply needs to settle at the equivalent to the weighted average price of the MSS generation. Gross load will be settled at the System LAP and the Gross supply will be settled at the LMP. MSS Aggregation that elects gross settlement shall have to identify if its resources are Load Following or not. |
| anodeType          | AnodeType | inherited from: AggregateNode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| endEffectiveDate   | DateTime  | inherited from: AggregateNode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| qualifASOrder      | Integer   | inherited from: AggregateNode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| startEffectiveDate | DateTime  | inherited from: AggregateNode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| aliasName          | String    | inherited from: IdentifiedObject                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| mRID               | String    | inherited from: IdentifiedObject                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| name               | String    | inherited from: IdentifiedObject                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

Table 579 shows all association ends of MSSZone with other classes.

**Table 579 – Association ends of ReferenceData::MSSZone with other classes**

| [mult from] | [mult to] name                 | type                    | description                      |
|-------------|--------------------------------|-------------------------|----------------------------------|
| [0..*]      | [0..1] MeteredSubSystem        | MeteredSubSystem        |                                  |
| [0..*]      | [0..*] Pnode                   | Pnode                   | inherited from: AggregateNode    |
| [0..*]      | [0..*] SubControlArea          | SubControlArea          | inherited from: AggregateNode    |
| [0..1]      | [0..*] CnodeDistributionFactor | CnodeDistributionFactor | inherited from: AggregateNode    |
| [0..*]      | [0..*] RegisteredResource      | RegisteredResource      | inherited from: AggregateNode    |
| [0..1]      | [0..*] AreaLoadCurve           | AreaLoadCurve           | inherited from: AggregateNode    |
| [0..*]      | [1..1] RTO                     | RTO                     | inherited from: AggregateNode    |
| [0..1]      | [0..*] DiagramObjects          | DiagramObject           | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                   | Name                    | inherited from: IdentifiedObject |

**6.5.9.45 OilPrice root class**

Price of oil in monetary units

Table 580 shows all attributes of OilPrice.

**Table 580 – Attributes of ReferenceData::OilPrice**

| name          | type  | description                                     |
|---------------|-------|-------------------------------------------------|
| oilPriceIndex | Float | The average oil price at a defined fuel region. |

Table 581 shows all association ends of OilPrice with other classes.

**Table 581 – Association ends of ReferenceData::OilPrice with other classes**

| [mult from] | [mult to] name    | type       | description |
|-------------|-------------------|------------|-------------|
| [1..1]      | [1..1] FuelRegion | FuelRegion |             |

**6.5.9.46 OrgPnodeAllocation**

This class models the allocation between asset owners and pricing nodes

Table 582 shows all attributes of OrgPnodeAllocation.

**Table 582 – Attributes of ReferenceData::OrgPnodeAllocation**

| name               | type        | description                                       |
|--------------------|-------------|---------------------------------------------------|
| endEffectiveDate   | DateTime    | end effective date                                |
| maxMWAllocation    | ActivePower | Maximum MW for the Source/Sink for the Allocation |
| startEffectiveDate | DateTime    | start effective date                              |
| aliasName          | String      | inherited from: IdentifiedObject                  |
| mRID               | String      | inherited from: IdentifiedObject                  |
| name               | String      | inherited from: IdentifiedObject                  |

Table 583 shows all association ends of OrgPnodeAllocation with other classes.

**Table 583 – Association ends of ReferenceData::OrgPnodeAllocation with other classes**

| [mult from] | [mult to] name         | type            | description                      |
|-------------|------------------------|-----------------|----------------------------------|
| [0..*]      | [1..1] MktOrganisation | MktOrganisation |                                  |
| [0..*]      | [1..1] Pnode           | Pnode           |                                  |
| [0..1]      | [0..*] DiagramObjects  | DiagramObject   | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names           | Name            | inherited from: IdentifiedObject |

### 6.5.9.47 OrgResOwnership

This class model the ownership percent and type of ownership between resource and organisation

Table 584 shows all attributes of OrgResOwnership.

**Table 584 – Attributes of ReferenceData::OrgResOwnership**

| name                            | type             | description                                                              |
|---------------------------------|------------------|--------------------------------------------------------------------------|
| asscType                        | ResourceAssnType | association type for the association between Organisation and Resource:  |
| endEffectiveDate                | DateTime         | end effective date                                                       |
| masterSchedulingCoordinatorFlag | YesNo            | Flag to indicate that the SC representing the Resource is the Master SC. |
| ownershipPercent                | PerCent          | ownership percentage for each resource                                   |
| startEffectiveDate              | DateTime         | start effective date                                                     |
| aliasName                       | String           | inherited from: IdentifiedObject                                         |
| mRID                            | String           | inherited from: IdentifiedObject                                         |
| name                            | String           | inherited from: IdentifiedObject                                         |

Table 585 shows all association ends of OrgResOwnership with other classes.

**Table 585 – Association ends of ReferenceData::OrgResOwnership with other classes**

| [mult from] | [mult to] name            | type               | description                      |
|-------------|---------------------------|--------------------|----------------------------------|
| [0..*]      | [1..1] MktOrganisation    | MktOrganisation    |                                  |
| [0..*]      | [1..1] RegisteredResource | RegisteredResource |                                  |
| [0..1]      | [0..*] DiagramObjects     | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names              | Name               | inherited from: IdentifiedObject |

### 6.5.9.48 Pnode

A pricing node is directly associated with a connectivity node. It is a pricing location for which market participants submit their bids, offers, buy/sell CRRs, and settle.

Table 586 shows all attributes of Pnode.

**Table 586 – Attributes of ReferenceData::Pnode**

| name               | type     | description                                                                                                                                                               |
|--------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| endEffectiveDate   | DateTime | End effective date of the period in which the price node definition is valid.                                                                                             |
| isPublic           | Boolean  | If true, this Pnode is public (prices are published for DA/RT and FTR markets), otherwise it is private (location is not usable by market for bidding/FTRs/transactions). |
| startEffectiveDate | DateTime | Start effective date of the period in which the price node definition is valid.                                                                                           |
| type               | String   | Pnode type                                                                                                                                                                |



| name      | type   | description                                                                                                                     |
|-----------|--------|---------------------------------------------------------------------------------------------------------------------------------|
| usage     | String | Price node usage:<br>'Control Area'<br>'Regulation Region'<br>'Price Zone'<br>'Spin Region'<br>'Non-Spin Region'<br>'Price Hub' |
| aliasName | String | inherited from: IdentifiedObject                                                                                                |
| mRID      | String | inherited from: IdentifiedObject                                                                                                |
| name      | String | inherited from: IdentifiedObject                                                                                                |

Table 587 shows all association ends of Pnode with other classes.

**Table 587 – Association ends of ReferenceData::Pnode with other classes**

| [mult from] | [mult to] name                 | type                 | description                                                                              |
|-------------|--------------------------------|----------------------|------------------------------------------------------------------------------------------|
| [0..1]      | [0..*] RegisteredResources     | RegisteredResource   | A registered resource injects power at one or more connectivity nodes related to a pnode |
| [0..*]      | [0..*] SourceCRRSegment        | CRRSegment           |                                                                                          |
| [0..*]      | [0..*] SinkCRRSegment          | CRRSegment           |                                                                                          |
| [0..1]      | [0..*] MktMeasurement          | MktMeasurement       |                                                                                          |
| [1..1]      | [0..*] ExPostResults           | ExPostPricingResults |                                                                                          |
| [0..1]      | [1..*] PnodeResults            | PnodeResults         |                                                                                          |
| [0..1]      | [0..*] Trade                   | Trade                |                                                                                          |
| [0..1]      | [0..*] ReceiptTransactionBids  | TransactionBid       |                                                                                          |
| [0..1]      | [0..*] DeliveryTransactionBids | TransactionBid       |                                                                                          |
| [0..*]      | [0..1] SubControlArea          | SubControlArea       |                                                                                          |
| [0..*]      | [0..*] AggregatorNode          | AggregateNode        |                                                                                          |
| [1..1]      | [0..*] OrgPnodeAllocation      | OrgPnodeAllocation   |                                                                                          |
| [0..*]      | [0..1] RTO                     | RTO                  |                                                                                          |
| [0..1]      | [0..*] DiagramObjects          | DiagramObject        | inherited from: IdentifiedObject                                                         |
| [1..1]      | [0..*] Names                   | Name                 | inherited from: IdentifiedObject                                                         |

#### 6.5.9.49 PnodeDistributionFactor root class

This class allows SC to input different distribution factors for pricing node

Table 588 shows all attributes of PnodeDistributionFactor.

**Table 588 – Attributes of ReferenceData::PnodeDistributionFactor**

| name   | type  | description                                                                                                                                                                                         |
|--------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| factor | Float | Used to calculate "participation" of Pnode in an AggregatePnode. For example, for regulation region this factor is 1 and total sum of all factors for a specific regulation region does not have to |

| name          | type  | description                                                           |
|---------------|-------|-----------------------------------------------------------------------|
|               |       | be 1. For pricing zone the total sum of all factors has to be 1.      |
| offPeak       | YesNo | Indication that this distribution factor is to apply during off peak. |
| onPeak        | YesNo | Indication that this factor is to apply during Peak periods.          |
| podLossFactor | Float | Point of delivery loss factor                                         |

Table 589 shows all association ends of PnodeDistributionFactor with other classes.

**Table 589 – Association ends of ReferenceData::PnodeDistributionFactor with other classes**

| [mult from] | [mult to] name               | type                  | description |
|-------------|------------------------------|-----------------------|-------------|
| [0..*]      | [0..1] BidDistributionFactor | BidDistributionFactor |             |
| [1..1]      | [0..*] AggregatedPnode       | AggregatedPnode       |             |
| [0..*]      | [1..1] IndividualPnode       | IndividualPnode       |             |

#### 6.5.9.50 RegisteredGenerator

Model of a generator that is registered to participate in the market

Table 590 shows all attributes of RegisteredGenerator.

**Table 590 – Attributes of ReferenceData::RegisteredGenerator**

| name                    | type       | description                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| capacityFactor          | PerCent    | Capacity Factor                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| coldStartTime           | Float      | Cold start time.                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| combinedCyclePlantName  | String     | Name of the Combined Cycle Plant (valid for Combined Cycle modes or configurations)                                                                                                                                                                                                                                                                                                                                                              |
| commercialOperationDate | DateTime   |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| constrainedOutputFlag   | YesNo      | Constrained Output Generator (COG) Indicator (Yes/No), per Generating Resource                                                                                                                                                                                                                                                                                                                                                                   |
| costBasis               | CostBasis  |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| extremeLongStart        | YesNo      | Some long-start up time units may need to receive start up instruction before DA market results are available. Long-Start resources may be either physical resources within the control with start-up times greater than 18 hours or the long-start contractual inter-tie commitment that shall be completed by 6 am one-day ahead. Therefore, there is a need for a process to determine the commitment of such resources before the DA market. |
| fuelSource              | FuelSource | Values: Natural Gas Based Resource, Non Natural Gas Based Resource<br>"NG" – Natural-Gas-Based Resource – a Resource that is powered by Natural Gas<br>"NNG" – Non-Natural-Gas-Based Resource – a Resource that is powered by some other fuel than Natural Gas                                                                                                                                                                                   |

| name                            | type                  | description                                                                                                                                      |
|---------------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| highControlLimit                | ActivePower           | High limit for secondary (AGC) control                                                                                                           |
| hotIntTime                      | Float                 | Hot-to-intermediate time (Seasonal)                                                                                                              |
| hotStartTime                    | Float                 | Hot start time.                                                                                                                                  |
| intColdTime                     | Float                 | Intermediate-to-cold time (Seasonal)                                                                                                             |
| intendedPIRP                    | YesNo                 | Provides an indication that this resource is intending to participate in the intermittent resource program.                                      |
| intStartTime                    | Float                 | Intermediate start time.                                                                                                                         |
| loadFollowingDownMSS            | YesNo                 | Certifies resources for use in MSS Load Following Down                                                                                           |
| loadFollowingUpMSS              | YesNo                 | Certifies resources for use in MSS Load Following Up                                                                                             |
| lowControlLimit                 | ActivePower           | Low limit for secondary (AGC) control                                                                                                            |
| lowerControlRate                | ActivePowerChangeRate | Regulation down response rate in MW per minute                                                                                                   |
| lowerRampRate                   | ActivePowerChangeRate |                                                                                                                                                  |
| maxDependableCap                | ActivePower           | Maximum Dependable Capacity (MNDC).                                                                                                              |
| maximumAllowableSpinningReserve | ActivePower           | Maximum allowable spinning reserve. Spinning reserve will never be considered greater than this value regardless of the current operating point. |
| maximumOperatingMW              | ActivePower           | This is the maximum operating MW limit the dispatcher can enter for this unit                                                                    |
| maxLayOffSelfSchedQty           | Float                 |                                                                                                                                                  |
| maxMinLoadCost                  | CostRate              | The registered maximum Minimum Load Cost of a Generating Resource registered with a Cost Basis of "Bid Cost".                                    |
| maxPumpingLevel                 | ActivePower           | max pumping level of a hydro pump unit                                                                                                           |
| maxShutdownTime                 | DateTime              | Maximum time this device can be shut down.                                                                                                       |
| maxStartUpsPerDay               | Integer               | maximum start ups per day                                                                                                                        |
| maxWeeklyEnergy                 | Float                 | Maximum weekly Energy (Seasonal)                                                                                                                 |
| maxWeeklyStarts                 | Integer               | Maximum weekly starts (seasonal parameter)                                                                                                       |
| minimumLoadFuelCost             | CostPerHeatUnit       | The cost for the fuel required to get a Generating Resource to operate at the minimum load level                                                 |
| minimumOperatingMW              | ActivePower           | This is the minimum operating MW limit the dispatcher can enter for this unit.                                                                   |
| minLoadCost                     | CostRate              | minimum load cost. Value is (currency/hr)                                                                                                        |
| mustOfferRA                     | YesNo                 | Flag to indicate that this unit is a resource adequacy resource and must offer.                                                                  |
| nameplateCapacity               | ActivePower           | MW value stated on the nameplate of the Generator -- the value it potentially could provide.                                                     |
| operatingMaintenanceCost        | CostPerEnergyUnit     | The portion of the Operating Cost of a Generating Resource that is not related to fuel cost.                                                     |
| operatingMode                   | String                | Combined Cycle operating mode.                                                                                                                   |
| proxyFlag                       | YesNo                 |                                                                                                                                                  |
| pumpingCost                     | CostRate              |                                                                                                                                                  |
| pumpingFactor                   | Float                 | Pumping factor for pump storage units, conversion factor between generating and pumping.                                                         |
| pumpMinDownTime                 | Float                 | The minimum down time for the pump in a pump storage unit.                                                                                       |

| name                    | type                  | description                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| pumpMinUpTime           | Float                 | The minimum up time aspect for the pump in a pump storage unit                                                                                                                                                                                                                                                                                                                                                                                           |
| pumpShutdownCost        | Float                 | The cost to shutdown a pump during the pump aspect of a pump storage unit.                                                                                                                                                                                                                                                                                                                                                                               |
| pumpShutdownTime        | Integer               | The shutdown time (minutes) of the pump aspect of a pump storage unit.                                                                                                                                                                                                                                                                                                                                                                                   |
| qualifyingFacilityOwner | String                |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| quickStartFlag          | YesNo                 | Quick start flag (Yes/No)                                                                                                                                                                                                                                                                                                                                                                                                                                |
| raiseControlRate        | ActivePowerChangeRate | Regulation up response rate in MW per minute                                                                                                                                                                                                                                                                                                                                                                                                             |
| raiseRampRate           | ActivePowerChangeRate |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| rampCurveType           | RampCurveType         | Ramp curve type:<br>0 – Fixed ramp rate independent of rate function unit MW output<br>1 – Static ramp rates as a function of unit MW output only<br>2 – Dynamic ramp rates as a function of unit MW output and ramping time                                                                                                                                                                                                                             |
| rampMode                | RampModeType          | Ramping mode<br>0: ignore ramping limits<br>1: 20-minute ramping rule<br>2: 60-minute ramping rule                                                                                                                                                                                                                                                                                                                                                       |
| regulationFlag          | Integer               | 0 = Unit is not on regulation<br>1 = Unit is on AGC and regulating<br>2 = Unit is suppose to be on regulation but it is not under regulation now                                                                                                                                                                                                                                                                                                         |
| regulationRampRate      | ActivePower           | For the outage scheduling services                                                                                                                                                                                                                                                                                                                                                                                                                       |
| resourceSubType         | String                | CCGT90 Combined Cycle greater than 90 MW<br>CCLE90 Combined Cycle less than or equal to 90 MW<br>CLLIG Coal and Lignite<br>DSL Diesel<br>GASSTM Gas-Steam<br>GSNONR Gas Steam Non-Reheat Boiler<br>GSREH Gas Steam Reheat Boiler<br>GSSUP Gas Steam Supercritical Boiler<br>HYDRO Hydro<br>NUC Nuclear<br>RENEW Renewable<br>SCGT90 Simple Cycle greater than 90 MW<br>SCLE90 Simple Cycle less than or equal to 90 MW<br>WIND Wind<br>PS Pumped Storage |
| riverSystem             | String                | River System the Resource is tied to.                                                                                                                                                                                                                                                                                                                                                                                                                    |
| RMNRFlag                | YesNo                 | Reliability must not run (RMNR) flag: indicated whether the RMR unit is set as an RMNR in the current market                                                                                                                                                                                                                                                                                                                                             |
| RMRFlag                 | FlagTypeRMR           | Reliability must run (RMR) flag: indicates whether the unit is RMR; Indicates whether the unit is RMR:                                                                                                                                                                                                                                                                                                                                                   |

| name                    | type                       | description                                                                                                                                                                         |
|-------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         |                            | N' – not an RMR unit<br>'1' – RMR Condition 1 unit<br>'2' – RMR Condition 2 unit                                                                                                    |
| RMRManualIndicator      | YesNo                      | Indicates the RMR Manual pre-determination status [Y/N]                                                                                                                             |
| RMTFlag                 | YesNo                      | Reliability must take (RMT) flag (Yes/No): indicates whether the unit is RMT                                                                                                        |
| spinReserveRamp         | ActivePowerChangeRate      |                                                                                                                                                                                     |
| syncCondCapable         | YesNo                      | Is the Resource Synchronous Condenser capable Resource?                                                                                                                             |
| unitType                | UnitType                   | Generating unit type: Combined Cycle, Gas Turbine, Hydro Turbine, Other, Photovoltaic, Hydro Pump-Turbine, Reciprocating Engine, Steam Turbine, Synchronous Condenser, Wind Turbine |
| useLimitFlag            | YesNo                      | Use limit flag: indicates if the use limited resource is fully scheduled (or has some slack for real-time dispatch) (Y/N)                                                           |
| ACAFlag                 | YesNo                      | inherited from: RegisteredResource                                                                                                                                                  |
| ASSPOptimizationFlag    | YesNo                      | inherited from: RegisteredResource                                                                                                                                                  |
| commercialOpDate        | DateTime                   | inherited from: RegisteredResource                                                                                                                                                  |
| contingencyAvailFlag    | YesNo                      | inherited from: RegisteredResource                                                                                                                                                  |
| dispatchFlag            | YesNo                      | inherited from: RegisteredResource                                                                                                                                                  |
| ECAFlag                 | YesNo                      | inherited from: RegisteredResource                                                                                                                                                  |
| endEffectiveDate        | DateTime                   | inherited from: RegisteredResource                                                                                                                                                  |
| flexibleOfferFlag       | YesNo                      | inherited from: RegisteredResource                                                                                                                                                  |
| hourlyPredispatch       | YesNo                      | inherited from: RegisteredResource                                                                                                                                                  |
| isAggregatedRes         | YesNo                      | inherited from: RegisteredResource                                                                                                                                                  |
| lastModified            | DateTime                   | inherited from: RegisteredResource                                                                                                                                                  |
| LMPMFlag                | YesNo                      | inherited from: RegisteredResource                                                                                                                                                  |
| marketParticipationFlag | YesNo                      | inherited from: RegisteredResource                                                                                                                                                  |
| maxBaseSelfSchedQty     | Float                      | inherited from: RegisteredResource                                                                                                                                                  |
| maxOnTime               | Float                      | inherited from: RegisteredResource                                                                                                                                                  |
| minDispatchTime         | Hours                      | inherited from: RegisteredResource                                                                                                                                                  |
| minOffTime              | Float                      | inherited from: RegisteredResource                                                                                                                                                  |
| minOnTime               | Float                      | inherited from: RegisteredResource                                                                                                                                                  |
| mustOfferFlag           | YesNo                      | inherited from: RegisteredResource                                                                                                                                                  |
| nonMarket               | YesNo                      | inherited from: RegisteredResource                                                                                                                                                  |
| pointOfDeliveryFlag     | YesNo                      | inherited from: RegisteredResource                                                                                                                                                  |
| priceSetFlagDA          | YesNo                      | inherited from: RegisteredResource                                                                                                                                                  |
| priceSetFlagRT          | YesNo                      | inherited from: RegisteredResource                                                                                                                                                  |
| registrationStatus      | ResourceRegistrationStatus | inherited from: RegisteredResource                                                                                                                                                  |
| resourceAdequacyFlag    | YesNo                      | inherited from: RegisteredResource                                                                                                                                                  |
| SMPMFlag                | YesNo                      | inherited from: RegisteredResource                                                                                                                                                  |
| startEffectiveDate      | DateTime                   | inherited from: RegisteredResource                                                                                                                                                  |
| aliasName               | String                     | inherited from: IdentifiedObject                                                                                                                                                    |
| mRID                    | String                     | inherited from: IdentifiedObject                                                                                                                                                    |

| name | type   | description                      |
|------|--------|----------------------------------|
| name | String | inherited from: IdentifiedObject |

Table 591 shows all association ends of RegisteredGenerator with other classes.

**Table 591 – Association ends of ReferenceData::  
RegisteredGenerator with other classes**

| [mult from] | [mult to] name                               | type                                  | description                        |
|-------------|----------------------------------------------|---------------------------------------|------------------------------------|
| [0..1]      | [0..*] MktGeneratingUnit                     | MktGeneratingUnit                     |                                    |
| [0..1]      | [0..*] GeneratingBids                        | GeneratingBid                         |                                    |
| [0..1]      | [0..1] StartUpTimeCurve                      | StartUpTimeCurve                      |                                    |
| [0..1]      | [0..*] Trade                                 | Trade                                 |                                    |
| [0..1]      | [0..1] MktHeatRateCurve                      | MktHeatRateCurve                      |                                    |
| [0..1]      | [0..1] StartUpFuelCurve                      | StartUpFuelCurve                      |                                    |
| [0..1]      | [0..1] RegulatingLimit                       | RegulatingLimit                       |                                    |
| [0..1]      | [0..1] StartUpEnergyCurve                    | StartUpEnergyCurve                    |                                    |
| [0..1]      | [0..1] RMRStartUpTimeCurve                   | RMRStartUpTimeCurve                   |                                    |
| [0..1]      | [0..1] RMRStartUpFuelCurve                   | RMRStartUpFuelCurve                   |                                    |
| [0..1]      | [0..1] RMRStartUpEnergyCurve                 | RMRStartUpEnergyCurve                 |                                    |
| [0..1]      | [0..1] RMRStartUpCostCurve                   | RMRStartUpCostCurve                   |                                    |
| [0..1]      | [0..1] RMRHeatRateCurve                      | RMRHeatRateCurve                      |                                    |
| [0..1]      | [0..*] AuxillaryObject                       | AuxiliaryObject                       |                                    |
| [1..1]      | [1..1] EnergyPriceIndex                      | EnergyPriceIndex                      |                                    |
| [0..1]      | [0..*] UnitInitialConditions                 | UnitInitialConditions                 |                                    |
| [0..*]      | [0..*] StartUpCostCurves                     | StartUpCostCurve                      |                                    |
| [0..1]      | [0..1] FuelCostCurve                         | FuelCostCurve                         |                                    |
| [0..*]      | [0..1] FuelRegion                            | FuelRegion                            |                                    |
| [0..*]      | [0..1] LocalReliabilityArea                  | LocalReliabilityArea                  |                                    |
| [0..1]      | [0..*] SubstitutionResourceList              | SubstitutionResourceList              | inherited from: RegisteredResource |
| [0..*]      | [0..*] SubControlArea                        | SubControlArea                        | inherited from: RegisteredResource |
| [1..1]      | [0..*] ResourceAncillaryServiceQualification | ResourceAncillaryServiceQualification | inherited from: RegisteredResource |
| [0..*]      | [0..*] ResourceCapacity                      | ResourceCapacity                      | inherited from: RegisteredResource |
| [0..*]      | [0..*] InterTie                              | SchedulingPoint                       | inherited from: RegisteredResource |
| [1..1]      | [0..*] OrgResOwnership                       | OrgResOwnership                       | inherited from: RegisteredResource |
| [1..1]      | [0..*] FormerReference                       | FormerReference                       | inherited from: RegisteredResource |
| [0..*]      | [0..*] ForbiddenRegion                       | ForbiddenRegion                       | inherited from: RegisteredResource |
| [0..1]      | [0..*] ContractDistributionFactor            | ContractDistributionFactor            | inherited from: RegisteredResource |
| [0..*]      | [0..*] AggregateNode                         | AggregateNode                         | inherited from: RegisteredResource |
| [0..*]      | [0..1] AdjacentCASet                         | AdjacentCASet                         | inherited from: RegisteredResource |
| [0..*]      | [0..*] RampRateCurve                         | RampRateCurve                         | inherited from: RegisteredResource |
| [1..1]      | [0..*] LoadFollowingInst                     | LoadFollowingInst                     | inherited from: RegisteredResource |

| [mult from] | [mult to] name                         | type                            | description                         |
|-------------|----------------------------------------|---------------------------------|-------------------------------------|
| [1..1]      | [0..*] DispatchInstReply               | DispatchInstReply               | inherited from: RegisteredResource  |
| [0..1]      | [0..*] ResourceLoadFollowingInst       | ResourceLoadFollowingInst       | inherited from: RegisteredResource  |
| [0..1]      | [0..*] ResourceDispatchResults         | ResourceDispatchResults         | inherited from: RegisteredResource  |
| [0..1]      | [0..*] RUCAwardInstruction             | RUCAwardInstruction             | inherited from: RegisteredResource  |
| [0..1]      | [0..*] RMROperatorInput                | RMROperatorInput                | inherited from: RegisteredResource  |
| [0..1]      | [0..*] MPMResourceStatus               | MPMResourceStatus               | inherited from: RegisteredResource  |
| [0..1]      | [0..*] DopInstruction                  | DopInstruction                  | inherited from: RegisteredResource  |
| [1..1]      | [0..*] Commitments                     | Commitments                     | inherited from: RegisteredResource  |
| [1..1]      | [0..*] IntermittentResourceEligibility | IntermittentResourceEligibility | inherited from: RegisteredResource  |
| [0..1]      | [0..*] ExpectedEnergyValues            | ExpectedEnergyValues            | inherited from: RegisteredResource  |
| [0..1]      | [0..*] AllocationResultValues          | AllocationResultValues          | inherited from: RegisteredResource  |
| [0..*]      | [0..1] MktOrganisation                 | MktOrganisation                 | inherited from: RegisteredResource  |
| [0..*]      | [0..1] MktConnectivityNode             | MktConnectivityNode             | inherited from: RegisteredResource  |
| [0..*]      | [0..*] TimeSeries                      | TimeSeries                      | inherited from: RegisteredResource  |
| [1..1]      | [0..1] ResourceVerifiableCosts         | ResourceVerifiableCosts         | inherited from: RegisteredResource  |
| [0..*]      | [0..1] Pnode                           | Pnode                           | inherited from: RegisteredResource  |
| [0..*]      | [0..*] MPMTestThreshold                | MPMTestThreshold                | inherited from: RegisteredResource  |
| [0..*]      | [0..1] HostControlArea                 | HostControlArea                 | inherited from: RegisteredResource  |
| [0..*]      | [0..*] ControlAreaDesignation          | ControlAreaDesignation          | inherited from: RegisteredResource  |
| [0..1]      | [0..*] ResourceAwardInstruction        | ResourceAwardInstruction        | inherited from: RegisteredResource  |
| [0..1]      | [0..*] LoadFollowingOperatorInput      | LoadFollowingOperatorInput      | inherited from: RegisteredResource  |
| [1..1]      | [0..*] Instructions                    | Instructions                    | inherited from: RegisteredResource  |
| [0..1]      | [0..*] ExPostResourceResults           | ExPostResourceResults           | inherited from: RegisteredResource  |
| [0..1]      | [0..*] DotInstruction                  | DotInstruction                  | inherited from: RegisteredResource  |
| [1..1]      | [0..1] DefaultBid                      | DefaultBid                      | inherited from: RegisteredResource  |
| [0..*]      | [0..*] EnergyMarkets                   | EnergyMarket                    | inherited from: RegisteredResource  |
| [0..*]      | [0..1] PSRType                         | PSRType                         | inherited from: PowerSystemResource |
| [0..1]      | [0..*] Measurements                    | Measurement                     | inherited from: PowerSystemResource |
| [1..1]      | [0..*] OperatingShare                  | OperatingShare                  | inherited from: PowerSystemResource |
| [0..*]      | [0..*] PsrLists                        | PsrList                         | inherited from: PowerSystemResource |
| [1..1]      | [0..1] OutageSchedule                  | OutageSchedule                  | inherited from: PowerSystemResource |
| [0..*]      | [0..*] ReportingGroup                  | ReportingGroup                  | inherited from: PowerSystemResource |
| [0..1]      | [0..*] DiagramObjects                  | DiagramObject                   | inherited from: IdentifiedObject    |
| [1..1]      | [0..*] Names                           | Name                            | inherited from: IdentifiedObject    |

#### 6.5.9.51 RegisteredInterTie

This class represents the inter tie resource.

Table 592 shows all attributes of RegisteredInterTie.



**Table 592 – Attributes of ReferenceData::RegisteredInterTie**

| name                    | type                       | description                                                                                   |
|-------------------------|----------------------------|-----------------------------------------------------------------------------------------------|
| direction               | InterTieDirection          | indicate the direction (export/import) of an intertie resource                                |
| energyProductType       | EnergyProductType          | Under each major product type, the commodity type can be applied to further specify the type. |
| isDCTie                 | YesNo                      | Flag to indicated whether this Inter-tie is a DC Tie.                                         |
| isDynamicInterchange    | YesNo                      | check if the inter-tie resource is registered for the dynamic interchange..                   |
| minHourlyBlockLimit     | Integer                    | The registered upper bound of minimum hourly block for an Inter-Tie Resource                  |
| ACAFlag                 | YesNo                      | inherited from: RegisteredResource                                                            |
| ASSPOptimizationFlag    | YesNo                      | inherited from: RegisteredResource                                                            |
| commercialOpDate        | DateTime                   | inherited from: RegisteredResource                                                            |
| contingencyAvailFlag    | YesNo                      | inherited from: RegisteredResource                                                            |
| dispatchFlag            | YesNo                      | inherited from: RegisteredResource                                                            |
| ECAFlag                 | YesNo                      | inherited from: RegisteredResource                                                            |
| endEffectiveDate        | DateTime                   | inherited from: RegisteredResource                                                            |
| flexibleOfferFlag       | YesNo                      | inherited from: RegisteredResource                                                            |
| hourlyPredispatch       | YesNo                      | inherited from: RegisteredResource                                                            |
| isAggregatedRes         | YesNo                      | inherited from: RegisteredResource                                                            |
| lastModified            | DateTime                   | inherited from: RegisteredResource                                                            |
| LMPMFlag                | YesNo                      | inherited from: RegisteredResource                                                            |
| marketParticipationFlag | YesNo                      | inherited from: RegisteredResource                                                            |
| maxBaseSelfSchedQty     | Float                      | inherited from: RegisteredResource                                                            |
| maxOnTime               | Float                      | inherited from: RegisteredResource                                                            |
| minDispatchTime         | Hours                      | inherited from: RegisteredResource                                                            |
| minOffTime              | Float                      | inherited from: RegisteredResource                                                            |
| minOnTime               | Float                      | inherited from: RegisteredResource                                                            |
| mustOfferFlag           | YesNo                      | inherited from: RegisteredResource                                                            |
| nonMarket               | YesNo                      | inherited from: RegisteredResource                                                            |
| pointOfDeliveryFlag     | YesNo                      | inherited from: RegisteredResource                                                            |
| priceSetFlagDA          | YesNo                      | inherited from: RegisteredResource                                                            |
| priceSetFlagRT          | YesNo                      | inherited from: RegisteredResource                                                            |
| registrationStatus      | ResourceRegistrationStatus | inherited from: RegisteredResource                                                            |
| resourceAdequacyFlag    | YesNo                      | inherited from: RegisteredResource                                                            |
| SMPMFlag                | YesNo                      | inherited from: RegisteredResource                                                            |
| startEffectiveDate      | DateTime                   | inherited from: RegisteredResource                                                            |
| aliasName               | String                     | inherited from: IdentifiedObject                                                              |
| mRID                    | String                     | inherited from: IdentifiedObject                                                              |
| name                    | String                     | inherited from: IdentifiedObject                                                              |

Table 593 shows all association ends of RegisteredInterTie with other classes.



**Table 593 – Association ends of ReferenceData::RegisteredInterTie with other classes**

| [mult from] | [mult to] name                               | type                                  | description                        |
|-------------|----------------------------------------------|---------------------------------------|------------------------------------|
| [1..1]      | [0..*] InterTieDispatchResponse              | InterTieDispatchResponse              |                                    |
| [0..1]      | [0..*] InterchangeSchedule                   | InterchangeSchedule                   |                                    |
| [0..1]      | [0..1] InterTieBid                           | InterTieBid                           |                                    |
| [0..*]      | [1..1] Flowgate                              | Flowgate                              |                                    |
| [0..*]      | [0..*] WheelingCounterParty                  | WheelingCounterParty                  |                                    |
| [0..1]      | [0..*] SubstitutionResourceList              | SubstitutionResourceList              | inherited from: RegisteredResource |
| [0..*]      | [0..*] SubControlArea                        | SubControlArea                        | inherited from: RegisteredResource |
| [1..1]      | [0..*] ResourceAncillaryServiceQualification | ResourceAncillaryServiceQualification | inherited from: RegisteredResource |
| [0..*]      | [0..*] ResourceCapacity                      | ResourceCapacity                      | inherited from: RegisteredResource |
| [0..*]      | [0..*] InterTie                              | SchedulingPoint                       | inherited from: RegisteredResource |
| [1..1]      | [0..*] OrgResOwnership                       | OrgResOwnership                       | inherited from: RegisteredResource |
| [1..1]      | [0..*] FormerReference                       | FormerReference                       | inherited from: RegisteredResource |
| [0..*]      | [0..*] ForbiddenRegion                       | ForbiddenRegion                       | inherited from: RegisteredResource |
| [0..1]      | [0..*] ContractDistributionFactor            | ContractDistributionFactor            | inherited from: RegisteredResource |
| [0..*]      | [0..*] AggregateNode                         | AggregateNode                         | inherited from: RegisteredResource |
| [0..*]      | [0..1] AdjacentCASet                         | AdjacentCASet                         | inherited from: RegisteredResource |
| [0..*]      | [0..*] RampRateCurve                         | RampRateCurve                         | inherited from: RegisteredResource |
| [1..1]      | [0..*] LoadFollowingInst                     | LoadFollowingInst                     | inherited from: RegisteredResource |
| [1..1]      | [0..*] DispatchInstReply                     | DispatchInstReply                     | inherited from: RegisteredResource |
| [0..1]      | [0..*] ResourceLoadFollowingInst             | ResourceLoadFollowingInst             | inherited from: RegisteredResource |
| [0..1]      | [0..*] ResourceDispatchResults               | ResourceDispatchResults               | inherited from: RegisteredResource |
| [0..1]      | [0..*] RUCAwardInstruction                   | RUCAwardInstruction                   | inherited from: RegisteredResource |
| [0..1]      | [0..*] RMROperatorInput                      | RMROperatorInput                      | inherited from: RegisteredResource |
| [0..1]      | [0..*] MPMResourceStatus                     | MPMResourceStatus                     | inherited from: RegisteredResource |
| [0..1]      | [0..*] DopInstruction                        | DopInstruction                        | inherited from: RegisteredResource |
| [1..1]      | [0..*] Commitments                           | Commitments                           | inherited from: RegisteredResource |
| [1..1]      | [0..*] IntermittentResourceEligibility       | IntermittentResourceEligibility       | inherited from: RegisteredResource |
| [0..1]      | [0..*] ExpectedEnergyValues                  | ExpectedEnergyValues                  | inherited from: RegisteredResource |
| [0..1]      | [0..*] AllocationResultValues                | AllocationResultValues                | inherited from: RegisteredResource |
| [0..*]      | [0..1] MktOrganisation                       | MktOrganisation                       | inherited from: RegisteredResource |
| [0..*]      | [0..1] MktConnectivityNode                   | MktConnectivityNode                   | inherited from: RegisteredResource |
| [0..*]      | [0..*] TimeSeries                            | TimeSeries                            | inherited from: RegisteredResource |
| [1..1]      | [0..1] ResourceVerifiableCosts               | ResourceVerifiableCosts               | inherited from: RegisteredResource |
| [0..*]      | [0..1] Pnode                                 | Pnode                                 | inherited from: RegisteredResource |
| [0..*]      | [0..*] MPMTTestThreshold                     | MPMTTestThreshold                     | inherited from: RegisteredResource |
| [0..*]      | [0..1] HostControlArea                       | HostControlArea                       | inherited from: RegisteredResource |
| [0..*]      | [0..*] ControlAreaDesignation                | ControlAreaDesignation                | inherited from: RegisteredResource |
| [0..1]      | [0..*]                                       | ResourceAwardInstruction              | inherited from: RegisteredResource |

| [mult from] | [mult to] name                    | type                       | description                         |
|-------------|-----------------------------------|----------------------------|-------------------------------------|
|             | ResourceAwardInstruction          | n                          |                                     |
| [0..1]      | [0..*] LoadFollowingOperatorInput | LoadFollowingOperatorInput | inherited from: RegisteredResource  |
| [1..1]      | [0..*] Instructions               | Instructions               | inherited from: RegisteredResource  |
| [0..1]      | [0..*] ExPostResourceResults      | ExPostResourceResults      | inherited from: RegisteredResource  |
| [0..1]      | [0..*] DotInstruction             | DotInstruction             | inherited from: RegisteredResource  |
| [1..1]      | [0..1] DefaultBid                 | DefaultBid                 | inherited from: RegisteredResource  |
| [0..*]      | [0..*] EnergyMarkets              | EnergyMarket               | inherited from: RegisteredResource  |
| [0..*]      | [0..1] PSRType                    | PSRType                    | inherited from: PowerSystemResource |
| [0..1]      | [0..*] Measurements               | Measurement                | inherited from: PowerSystemResource |
| [1..1]      | [0..*] OperatingShare             | OperatingShare             | inherited from: PowerSystemResource |
| [0..*]      | [0..*] PsrLists                   | PsrList                    | inherited from: PowerSystemResource |
| [1..1]      | [0..1] OutageSchedule             | OutageSchedule             | inherited from: PowerSystemResource |
| [0..*]      | [0..*] ReportingGroup             | ReportingGroup             | inherited from: PowerSystemResource |
| [0..1]      | [0..*] DiagramObjects             | DiagramObject              | inherited from: IdentifiedObject    |
| [1..1]      | [0..*] Names                      | Name                       | inherited from: IdentifiedObject    |

#### 6.5.9.52 RegisteredLoad

Model of a load that is registered to participate in the market (demand reduction)

Table 594 shows all attributes of RegisteredLoad.

**Table 594 – Attributes of ReferenceData::RegisteredLoad**

| name                                  | type              | description                                                                                                                                                                                                                                                          |
|---------------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| blockLoadTransferFlag                 | YesNo             | Flag to indicate that the Resource is Block Load pseudo resource ('Y', 'N')                                                                                                                                                                                          |
| dynamicallyScheduledLoadResourceFlag  | YesNo             | Flag to indicate that a Load Resource is part of a DSR Load                                                                                                                                                                                                          |
| dynamicallyScheduledQualificationFlag | YesNo             | Qualification status (used for DSR qualification)                                                                                                                                                                                                                    |
| loadRegistryMSS                       | YesNo             | Non-participating load registry as a MSS load                                                                                                                                                                                                                        |
| maxBaseLoad                           | ActivePower       | Maximum Base Load (MW), per Participating Load Resource                                                                                                                                                                                                              |
| maxDeploymentTime                     | Float             | Maximum Deployment time (seconds)                                                                                                                                                                                                                                    |
| maxLoadRedTimesPerDay                 | Integer           | Maximum Number of Daily Load Curtailments                                                                                                                                                                                                                            |
| maxLoadReduction                      | ActivePower       | maximum load reduction                                                                                                                                                                                                                                               |
| maxReductionTime                      | Float             | Maximum Load Reduction Time (min), per Participating Load Resource                                                                                                                                                                                                   |
| maxWeeklyDeployment                   | Integer           | Maximum weekly deployments                                                                                                                                                                                                                                           |
| minLoadReduction                      | ActivePower       | Minimum MW for a load reduction (e.g., MW rating of a discrete pump).<br><br>This attribute may be used also in the LoadBid class. The reason that the attribute is also modeled in this class is that it is resource attribute and needs to be persistently stored. |
| minLoadReductionCost                  | CostPerEnergyUnit | minimum load reduction cost. Single number for the load                                                                                                                                                                                                              |

| name                     | type     | description                                                                                                                                                                                                                                                                                                                |
|--------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| minLoadReductionInterval | Float    | Shortest period load reduction shall be maintained before load can be restored to normal levels.<br><br>This attribute may be used also in the LoadBid class. The reason that the attribute is also modeled in this class is that it is resource attribute and needs to be persistently stored.                            |
| minReductionTime         | Float    | Minimum Load Reduction Time (min), per Participating Load Resource                                                                                                                                                                                                                                                         |
| minTimeBetLoadRed        | Float    | Shortest time that load shall be left at normal levels before a new load reduction.<br><br>This attribute may be used also in the LoadBid class. The reason that the attribute is also modeled in this class is that it is resource attribute and needs to be persistently stored.                                         |
| NPLCustomLoadAggregation | YesNo    | A Non-Participating Load Resource aggregation scheme with resource-specific Distribution Factors that are submitted with the Bid and for which the distributed Energy is settled at the relevant Distribution Location marginal prices.                                                                                    |
| participatingLoad        | YesNo    | Participating Load flag: indicates whether the load resource is participates in load reduction actions.                                                                                                                                                                                                                    |
| reqNoticeTime            | Float    | Time period that is required from an order to reduce a load to the time that it takes to get to the minimum load reduction.<br><br>This attribute may be used also in the LoadBid class. The reason that the attribute is also modeled in this class is that it is resource attribute and needs to be persistently stored. |
| resourceSubType          | String   | CLR     Controllable Load<br>NCLR   Non-Controllable Load                                                                                                                                                                                                                                                                  |
| ACAFlag                  | YesNo    | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| ASSPOptimizationFlag     | YesNo    | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| commercialOpDate         | DateTime | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| contingencyAvailFlag     | YesNo    | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| dispatchFlag             | YesNo    | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| ECAFlag                  | YesNo    | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| endEffectiveDate         | DateTime | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| flexibleOfferFlag        | YesNo    | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| hourlyPredispatch        | YesNo    | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| isAggregatedRes          | YesNo    | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| lastModified             | DateTime | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| LMPMFlag                 | YesNo    | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| marketParticipationFlag  | YesNo    | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| maxBaseSelfSchedQty      | Float    | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| maxOnTime                | Float    | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| minDispatchTime          | Hours    | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| minOffTime               | Float    | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| minOnTime                | Float    | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| mustOfferFlag            | YesNo    | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| nonMarket                | YesNo    | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |
| pointOfDeliveryFlag      | YesNo    | inherited from: RegisteredResource                                                                                                                                                                                                                                                                                         |

| name                 | type                       | description                        |
|----------------------|----------------------------|------------------------------------|
| priceSetFlagDA       | YesNo                      | inherited from: RegisteredResource |
| priceSetFlagRT       | YesNo                      | inherited from: RegisteredResource |
| registrationStatus   | ResourceRegistrationStatus | inherited from: RegisteredResource |
| resourceAdequacyFlag | YesNo                      | inherited from: RegisteredResource |
| SMPMFlag             | YesNo                      | inherited from: RegisteredResource |
| startEffectiveDate   | DateTime                   | inherited from: RegisteredResource |
| aliasName            | String                     | inherited from: IdentifiedObject   |
| mRID                 | String                     | inherited from: IdentifiedObject   |
| name                 | String                     | inherited from: IdentifiedObject   |

Table 595 shows all association ends of RegisteredLoad with other classes.

**Table 595 – Association ends of ReferenceData::RegisteredLoad with other classes**

| [mult from] | [mult to] name                               | type                                  | description                        |
|-------------|----------------------------------------------|---------------------------------------|------------------------------------|
| [0..1]      | [0..*] MktEnergyConsumer                     | MktEnergyConsumer                     |                                    |
| [0..*]      | [1..1] MktLoadArea                           | MktLoadArea                           |                                    |
| [0..1]      | [0..*] LoadBids                              | LoadBid                               |                                    |
| [0..*]      | [0..*] LoadReductionPriceCurve               | LoadReductionPriceCurve               |                                    |
| [0..*]      | [0..*] LoadReductionTimeCurve                | LoadReductionTimeCurve                |                                    |
| [0..1]      | [0..*] AuxillaryObject                       | AuxillaryObject                       |                                    |
| [0..1]      | [0..*] SubstitutionResourceList              | SubstitutionResourceList              | inherited from: RegisteredResource |
| [0..*]      | [0..*] SubControlArea                        | SubControlArea                        | inherited from: RegisteredResource |
| [1..1]      | [0..*] ResourceAncillaryServiceQualification | ResourceAncillaryServiceQualification | inherited from: RegisteredResource |
| [0..*]      | [0..*] ResourceCapacity                      | ResourceCapacity                      | inherited from: RegisteredResource |
| [0..*]      | [0..*] InterTie                              | SchedulingPoint                       | inherited from: RegisteredResource |
| [1..1]      | [0..*] OrgResOwnership                       | OrgResOwnership                       | inherited from: RegisteredResource |
| [1..1]      | [0..*] FormerReference                       | FormerReference                       | inherited from: RegisteredResource |
| [0..*]      | [0..*] ForbiddenRegion                       | ForbiddenRegion                       | inherited from: RegisteredResource |
| [0..1]      | [0..*] ContractDistributionFactor            | ContractDistributionFactor            | inherited from: RegisteredResource |
| [0..*]      | [0..*] AggregateNode                         | AggregateNode                         | inherited from: RegisteredResource |
| [0..*]      | [0..1] AdjacentCASet                         | AdjacentCASet                         | inherited from: RegisteredResource |
| [0..*]      | [0..*] RampRateCurve                         | RampRateCurve                         | inherited from: RegisteredResource |
| [1..1]      | [0..*] LoadFollowingInst                     | LoadFollowingInst                     | inherited from: RegisteredResource |
| [1..1]      | [0..*] DispatchInstReply                     | DispatchInstReply                     | inherited from: RegisteredResource |
| [0..1]      | [0..*] ResourceLoadFollowingInst             | ResourceLoadFollowingInst             | inherited from: RegisteredResource |
| [0..1]      | [0..*] ResourceDispatchResults               | ResourceDispatchResults               | inherited from: RegisteredResource |
| [0..1]      | [0..*] RUCAwardInstruction                   | RUCAwardInstruction                   | inherited from: RegisteredResource |
| [0..1]      | [0..*] RMROperatorInput                      | RMROperatorInput                      | inherited from: RegisteredResource |

| [mult from] | [mult to] name                         | type                            | description                         |
|-------------|----------------------------------------|---------------------------------|-------------------------------------|
| [0..1]      | [0..*] MPMResourceStatus               | MPMResourceStatus               | inherited from: RegisteredResource  |
| [0..1]      | [0..*] DopInstruction                  | DopInstruction                  | inherited from: RegisteredResource  |
| [1..1]      | [0..*] Commitments                     | Commitments                     | inherited from: RegisteredResource  |
| [1..1]      | [0..*] IntermittentResourceEligibility | IntermittentResourceEligibility | inherited from: RegisteredResource  |
| [0..1]      | [0..*] ExpectedEnergyValues            | ExpectedEnergyValues            | inherited from: RegisteredResource  |
| [0..1]      | [0..*] AllocationResultValues          | AllocationResultValues          | inherited from: RegisteredResource  |
| [0..*]      | [0..1] MktOrganisation                 | MktOrganisation                 | inherited from: RegisteredResource  |
| [0..*]      | [0..1] MktConnectivityNode             | MktConnectivityNode             | inherited from: RegisteredResource  |
| [0..*]      | [0..*] TimeSeries                      | TimeSeries                      | inherited from: RegisteredResource  |
| [1..1]      | [0..1] ResourceVerifiableCosts         | ResourceVerifiableCosts         | inherited from: RegisteredResource  |
| [0..*]      | [0..1] Pnode                           | Pnode                           | inherited from: RegisteredResource  |
| [0..*]      | [0..*] MPMTestThreshold                | MPMTestThreshold                | inherited from: RegisteredResource  |
| [0..*]      | [0..1] HostControlArea                 | HostControlArea                 | inherited from: RegisteredResource  |
| [0..*]      | [0..*] ControlAreaDesignation          | ControlAreaDesignation          | inherited from: RegisteredResource  |
| [0..1]      | [0..*] ResourceAwardInstruction        | ResourceAwardInstruction        | inherited from: RegisteredResource  |
| [0..1]      | [0..*] LoadFollowingOperatorInput      | LoadFollowingOperatorInput      | inherited from: RegisteredResource  |
| [1..1]      | [0..*] Instructions                    | Instructions                    | inherited from: RegisteredResource  |
| [0..1]      | [0..*] ExPostResourceResults           | ExPostResourceResults           | inherited from: RegisteredResource  |
| [0..1]      | [0..*] DotInstruction                  | DotInstruction                  | inherited from: RegisteredResource  |
| [1..1]      | [0..1] DefaultBid                      | DefaultBid                      | inherited from: RegisteredResource  |
| [0..*]      | [0..*] EnergyMarkets                   | EnergyMarket                    | inherited from: RegisteredResource  |
| [0..*]      | [0..1] PSRType                         | PSRType                         | inherited from: PowerSystemResource |
| [0..1]      | [0..*] Measurements                    | Measurement                     | inherited from: PowerSystemResource |
| [1..1]      | [0..*] OperatingShare                  | OperatingShare                  | inherited from: PowerSystemResource |
| [0..*]      | [0..*] PsrLists                        | PsrList                         | inherited from: PowerSystemResource |
| [1..1]      | [0..1] OutageSchedule                  | OutageSchedule                  | inherited from: PowerSystemResource |
| [0..*]      | [0..*] ReportingGroup                  | ReportingGroup                  | inherited from: PowerSystemResource |
| [0..1]      | [0..*] DiagramObjects                  | DiagramObject                   | inherited from: IdentifiedObject    |
| [1..1]      | [0..*] Names                           | Name                            | inherited from: IdentifiedObject    |

### 6.5.9.53 RegulatingLimit

This class represents the physical characteristic of a generator regarding the regulating limit

Table 596 shows all attributes of RegulatingLimit.

**Table 596 – Attributes of ReferenceData::RegulatingLimit**

| name      | type        | description                      |
|-----------|-------------|----------------------------------|
| highLimit | ActivePower |                                  |
| lowLimit  | ActivePower |                                  |
| aliasName | String      | inherited from: IdentifiedObject |

| name | type   | description                      |
|------|--------|----------------------------------|
| mRID | String | inherited from: IdentifiedObject |
| name | String | inherited from: IdentifiedObject |

Table 597 shows all association ends of RegulatingLimit with other classes.

**Table 597 – Association ends of ReferenceData::RegulatingLimit with other classes**

| [mult from] | [mult to] name             | type                | description                      |
|-------------|----------------------------|---------------------|----------------------------------|
| [0..1]      | [0..1] RegisteredGenerator | RegisteredGenerator |                                  |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject |

#### 6.5.9.54 ResourceAncillaryServiceQualification root class

Ancillary Services that a resource is qualified to provide

Table 598 shows all attributes of ResourceAncillaryServiceQualification.

**Table 598 – Attributes of ReferenceData::ResourceAncillaryServiceQualification**

| name               | type                          | description                                                                                   |
|--------------------|-------------------------------|-----------------------------------------------------------------------------------------------|
| certifiedCapacity  | Float                         | Certified capacity for associated resource and market type and ancillary service type product |
| endEffectiveDate   | DateTime                      | Ancillary Service Qualification end date                                                      |
| market             | MarketType                    | market type                                                                                   |
| qualificationFlag  | YesNo                         | Status of the qualification ('Y' = Active, 'N' = Inactive)                                    |
| startEffectiveDate | DateTime                      | Ancillary Service Qualification effective from date                                           |
| type               | ResourceAncillaryService Type | Type of service based on ResourceAncillaryServiceType enumeration                             |

Table 599 shows all association ends of ResourceAncillaryServiceQualification with other classes.

**Table 599 – Association ends of ReferenceData::ResourceAncillaryServiceQualification with other classes**

| [mult from] | [mult to] name            | type               | description                                                                                                                                                                                                                  |
|-------------|---------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [0..*]      | [1..1] RegisteredResource | RegisteredResource | RegisteredResources are qualified for resource ancillary service types (which include market product types as well as other types such as BlackStart) by the association to the class ResourceAncillaryServiceQualification. |

### 6.5.9.55 ResourceCapacity root class

This class model the various capacities of a resource. A resource may have numbers of capacities related to operating, ancillary services, energy trade and so forth. The types are but not limited to:

Ancillary Service

Regulation Up

Regulation Dn

Spinning Reserve

Non-Spinning Reserve

Operating Reserve

RUC

Energy Trade

Table 600 shows all attributes of ResourceCapacity.

**Table 600 – Attributes of ReferenceData::ResourceCapacity**

| name            | type                 | description                                                                                                                                                      |
|-----------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| capacityType    | ResourceCapacityType | capacity type<br>The types are but not limited to:<br>Regulation Up<br>Regulation Dn<br>Spinning Reserve<br>Non-Spinning Reserve<br>FOO capacity<br>MOO capacity |
| maximumCapacity | ActivePower          | maximum capacity                                                                                                                                                 |
| minimumCapacity | ActivePower          | minimum capacity                                                                                                                                                 |
| defaultCapacity | ActivePower          | default capacity                                                                                                                                                 |

Table 601 shows all association ends of ResourceCapacity with other classes.

**Table 601 – Association ends of ReferenceData::ResourceCapacity with other classes**

| [mult from] | [mult to] name            | type               | description |
|-------------|---------------------------|--------------------|-------------|
| [0..*]      | [0..*] RegisteredResource | RegisteredResource |             |

### 6.5.9.56 ResourceOperationMaintenanceCost

To model the Operation and Maintenance (O and M) costs of a generation resource.

Table 602 shows all attributes of ResourceOperationMaintenanceCost.



**Table 602 – Attributes of ReferenceData::ResourceOperationMaintenanceCost**

| name                                   | type           | description                                                                        |
|----------------------------------------|----------------|------------------------------------------------------------------------------------|
| gasPercentAboveLowSustainedLimit       | PerCent        | Percentage of Fuel Index Price (gas) for operating above Low Sustained Limit (LSL) |
| oilPercentAboveLowSustainedLimit       | PerCent        | Percentage of Fuel Oil Price (FOP) for operating above Low Sustained Limit (LSL)   |
| omCostColdStartup                      | Float          | Verifiable O&M Cost (\$), Cold Startup                                             |
| omCostHotStartup                       | Float          | Verifiable O&M Cost (\$), Hot Startup                                              |
| omCostIntermediateStartup              | Float          | Verifiable O&M Cost (\$), Intermediate Startup                                     |
| omCostLowSustainedLimit                | Float          | Verifiable O&M Cost (\$/MWh), LSL                                                  |
| solidfuelPercentAboveLowSustainedLimit | PerCent        | Percentage of Solid Fuel for operating above Low Sustained Limit (LSL)             |
| curveStyle                             | CurveStyle     | inherited from: Curve                                                              |
| xMultiplier                            | UnitMultiplier | inherited from: Curve                                                              |
| xUnit                                  | UnitSymbol     | inherited from: Curve                                                              |
| y1Multiplier                           | UnitMultiplier | inherited from: Curve                                                              |
| y1Unit                                 | UnitSymbol     | inherited from: Curve                                                              |
| y2Multiplier                           | UnitMultiplier | inherited from: Curve                                                              |
| y2Unit                                 | UnitSymbol     | inherited from: Curve                                                              |
| y3Multiplier                           | UnitMultiplier | inherited from: Curve                                                              |
| y3Unit                                 | UnitSymbol     | inherited from: Curve                                                              |
| aliasName                              | String         | inherited from: IdentifiedObject                                                   |
| mRID                                   | String         | inherited from: IdentifiedObject                                                   |
| name                                   | String         | inherited from: IdentifiedObject                                                   |

Table 603 shows all association ends of ResourceOperationMaintenanceCost with other classes.

**Table 603 – Association ends of ReferenceData::ResourceOperationMaintenanceCost with other classes**

| [mult from] | [mult to] name                 | type                    | description                      |
|-------------|--------------------------------|-------------------------|----------------------------------|
| [1..1]      | [0..1] ResourceVerifiableCosts | ResourceVerifiableCosts |                                  |
| [1..1]      | [0..1] CurveDatas              | CurveData               | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects          | DiagramObject           | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                   | Name                    | inherited from: IdentifiedObject |

#### 6.5.9.57 ResourceStartupCost root class

To model the startup costs of a generation resource.

Table 604 shows all attributes of ResourceStartupCost.

**Table 604 – Attributes of ReferenceData::ResourceStartupCost**

| name            | type  | description                                     |
|-----------------|-------|-------------------------------------------------|
| fuelColdStartup | Float | Verifiable Cold Start Up Fuel (MMBtu per start) |
| fuelHotStartup  | Float | Verifiable Hot Start Up Fuel (MMBtu per start)  |



| name                                | type    | description                                                   |
|-------------------------------------|---------|---------------------------------------------------------------|
| fuelIntermediateStartup             | Float   | Verifiable Intermediate Start Up Fuel (MMBtu per start)       |
| fuelLowSustainedLimit               | Float   | Minimum-Energy fuel, MMBtu/MWh                                |
| gasPercentColdStartup               | PerCent | Percentage of Fuel Index Price (gas) for cold startup         |
| gasPercentHotStartup                | PerCent | Percentage of Fuel Index Price (gas) for hot startup          |
| gasPercentIntermediateStartup       | PerCent | Percentage of Fuel Index Price (gas) for intermediate startup |
| gasPercentLowSustainedLimit         | PerCent | Percentage of FIP (gas) for operating at LSL                  |
| oilPercentColdStartup               | PerCent | Percentage of Fuel Oil Price (FOP) for cold startup           |
| oilPercentHotStartup                | PerCent | Percentage of Fuel Oil Price (FOP) for hot startup            |
| oilPercentIntermediateStartup       | PerCent | Percentage of Fuel Oil Price (FOP) for intermediate startup   |
| oilPercentLowSustainedLimit         | PerCent | Percentage of FOP (oil) for operating at LSL                  |
| solidfuelPercentColdStartup         | PerCent | Percentage of Solid Fuel for cold startup                     |
| solidfuelPercentHotStartup          | PerCent | Percentage of Solid Fuel for hot startup                      |
| solidfuelPercentIntermediateStartup | PerCent | Percentage of Solid Fuel for intermediate startup             |
| solidfuelPercentLowSustainedLimit   | PerCent | Percentage of Solid Fuel for operating at LSL                 |

Table 605 shows all association ends of ResourceStartupCost with other classes.

**Table 605 – Association ends of ReferenceData::  
ResourceStartupCost with other classes**

| [mult from] | [mult to] name                 | type                    | description |
|-------------|--------------------------------|-------------------------|-------------|
| [0..*]      | [1..1] ResourceVerifiableCosts | ResourceVerifiableCosts |             |

#### 6.5.9.58 ResourceVerifiableCosts root class

This class is defined to describe the verifiable costs associated with a generation resource.

Table 606 shows all association ends of ResourceVerifiableCosts with other classes.

**Table 606 – Association ends of ReferenceData::  
ResourceVerifiableCosts with other classes**

| [mult from] | [mult to] name                          | type                             | description |
|-------------|-----------------------------------------|----------------------------------|-------------|
| [0..1]      | [1..1] RegisteredResource               | RegisteredResource               |             |
| [0..1]      | [1..1] MktHeatRateCurve                 | MktHeatRateCurve                 |             |
| [0..1]      | [1..1] ResourceOperationMaintenanceCost | ResourceOperationMaintenanceCost |             |
| [1..1]      | [0..*] ResourceStartupCost              | ResourceStartupCost              |             |

### 6.5.9.59 RMRHeatRateCurve

Model to support processing of reliability must run units.

Table 607 shows all attributes of RMRHeatRateCurve.

**Table 607 – Attributes of ReferenceData::RMRHeatRateCurve**

| name         | type           | description                      |
|--------------|----------------|----------------------------------|
| curveStyle   | CurveStyle     | inherited from: Curve            |
| xMultiplier  | UnitMultiplier | inherited from: Curve            |
| xUnit        | UnitSymbol     | inherited from: Curve            |
| y1Multiplier | UnitMultiplier | inherited from: Curve            |
| y1Unit       | UnitSymbol     | inherited from: Curve            |
| y2Multiplier | UnitMultiplier | inherited from: Curve            |
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 608 shows all association ends of RMRHeatRateCurve with other classes.

**Table 608 – Association ends of ReferenceData::RMRHeatRateCurve with other classes**

| [mult from] | [mult to] name             | type                | description                      |
|-------------|----------------------------|---------------------|----------------------------------|
| [0..1]      | [0..1] RegisteredGenerator | RegisteredGenerator |                                  |
| [1..1]      | [0..*] CurveDatas          | CurveData           | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject |

### 6.5.9.60 RMRStartUpCostCurve

Model to support processing of reliability must run units.

Table 609 shows all attributes of RMRStartUpCostCurve.

**Table 609 – Attributes of ReferenceData::RMRStartUpCostCurve**

| name         | type           | description           |
|--------------|----------------|-----------------------|
| curveStyle   | CurveStyle     | inherited from: Curve |
| xMultiplier  | UnitMultiplier | inherited from: Curve |
| xUnit        | UnitSymbol     | inherited from: Curve |
| y1Multiplier | UnitMultiplier | inherited from: Curve |
| y1Unit       | UnitSymbol     | inherited from: Curve |
| y2Multiplier | UnitMultiplier | inherited from: Curve |

| name         | type           | description                      |
|--------------|----------------|----------------------------------|
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 610 shows all association ends of RMRStartUpCostCurve with other classes.

**Table 610 – Association ends of ReferenceData::  
RMRStartUpCostCurve with other classes**

| [mult from] | [mult to] name             | type                | description                      |
|-------------|----------------------------|---------------------|----------------------------------|
| [0..1]      | [0..1] RegisteredGenerator | RegisteredGenerator |                                  |
| [1..1]      | [0..*] CurveDatas          | CurveData           | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject |

#### 6.5.9.61 RMRStartUpEnergyCurve

Model to support processing of reliability must run units.

Table 611 shows all attributes of RMRStartUpEnergyCurve.

**Table 611 – Attributes of ReferenceData::RMRStartUpEnergyCurve**

| name         | type           | description                      |
|--------------|----------------|----------------------------------|
| curveStyle   | CurveStyle     | inherited from: Curve            |
| xMultiplier  | UnitMultiplier | inherited from: Curve            |
| xUnit        | UnitSymbol     | inherited from: Curve            |
| y1Multiplier | UnitMultiplier | inherited from: Curve            |
| y1Unit       | UnitSymbol     | inherited from: Curve            |
| y2Multiplier | UnitMultiplier | inherited from: Curve            |
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 612 shows all association ends of RMRStartUpEnergyCurve with other classes.

**Table 612 – Association ends of ReferenceData::  
RMRStartUpEnergyCurve with other classes**

| [mult from] | [mult to] name             | type                | description                      |
|-------------|----------------------------|---------------------|----------------------------------|
| [0..1]      | [0..1] RegisteredGenerator | RegisteredGenerator |                                  |
| [1..1]      | [0..*] CurveDatas          | CurveData           | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject |

#### 6.5.9.62 RMRStartUpFuelCurve

Model to support processing of reliability must run units.

Table 613 shows all attributes of RMRStartUpFuelCurve.

**Table 613 – Attributes of ReferenceData::  
RMRStartUpFuelCurve**

| name         | type           | description                      |
|--------------|----------------|----------------------------------|
| curveStyle   | CurveStyle     | inherited from: Curve            |
| xMultiplier  | UnitMultiplier | inherited from: Curve            |
| xUnit        | UnitSymbol     | inherited from: Curve            |
| y1Multiplier | UnitMultiplier | inherited from: Curve            |
| y1Unit       | UnitSymbol     | inherited from: Curve            |
| y2Multiplier | UnitMultiplier | inherited from: Curve            |
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 614 shows all association ends of RMRStartUpFuelCurve with other classes.

**Table 614 – Association ends of ReferenceData::  
RMRStartUpFuelCurve with other classes**

| [mult from] | [mult to] name             | type                | description                      |
|-------------|----------------------------|---------------------|----------------------------------|
| [0..1]      | [0..1] RegisteredGenerator | RegisteredGenerator |                                  |
| [1..1]      | [0..*] CurveDatas          | CurveData           | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject |

#### 6.5.9.63 RMRStartUpTimeCurve

Model to support processing of reliability must run units.

Table 615 shows all attributes of RMRStartUpTimeCurve.

**Table 615 – Attributes of ReferenceData::RMRStartUpTimeCurve**

| name         | type           | description                      |
|--------------|----------------|----------------------------------|
| curveStyle   | CurveStyle     | inherited from: Curve            |
| xMultiplier  | UnitMultiplier | inherited from: Curve            |
| xUnit        | UnitSymbol     | inherited from: Curve            |
| y1Multiplier | UnitMultiplier | inherited from: Curve            |
| y1Unit       | UnitSymbol     | inherited from: Curve            |
| y2Multiplier | UnitMultiplier | inherited from: Curve            |
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 616 shows all association ends of RMRStartUpTimeCurve with other classes.

**Table 616 – Association ends of ReferenceData::RMRStartUpTimeCurve with other classes**

| [mult from] | [mult to] name             | type                | description                      |
|-------------|----------------------------|---------------------|----------------------------------|
| [0..1]      | [0..1] RegisteredGenerator | RegisteredGenerator |                                  |
| [1..1]      | [0..*] CurveDatas          | CurveData           | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject |

#### 6.5.9.64 RTO

Regional transmission operator.

Table 617 shows all attributes of RTO.

**Table 617 – Attributes of ReferenceData::RTO**

| name                     | type          | description                     |
|--------------------------|---------------|---------------------------------|
| creditFlag               | YesNo         | inherited from: MktOrganisation |
| creditStartEffectiveDate | DateTime      | inherited from: MktOrganisation |
| endEffectiveDate         | DateTime      | inherited from: MktOrganisation |
| lastModified             | DateTime      | inherited from: MktOrganisation |
| organisationID           | Integer       | inherited from: MktOrganisation |
| qualificationStatus      | String        | inherited from: MktOrganisation |
| startEffectiveDate       | DateTime      | inherited from: MktOrganisation |
| streetAddress            | StreetAddress | inherited from: Organisation    |

| name              | type              | description                      |
|-------------------|-------------------|----------------------------------|
| postalAddress     | PostalAddress     | inherited from: Organisation     |
| phone1            | TelephoneNumber   | inherited from: Organisation     |
| phone2            | TelephoneNumber   | inherited from: Organisation     |
| electronicAddress | ElectronicAddress | inherited from: Organisation     |
| aliasName         | String            | inherited from: IdentifiedObject |
| mRID              | String            | inherited from: IdentifiedObject |
| name              | String            | inherited from: IdentifiedObject |

Table 618 shows all association ends of RTO with other classes.

**Table 618 – Association ends of ReferenceData::RTO with other classes**

| [mult from] | [mult to] name                   | type                   | description                      |
|-------------|----------------------------------|------------------------|----------------------------------|
| [1..1]      | [0..*] MktConnectivityNode       | MktConnectivityNode    |                                  |
| [1..1]      | [0..*] AdjacentCASet             | AdjacentCASet          |                                  |
| [1..1]      | [0..*] AggregateNode             | AggregateNode          |                                  |
| [1..1]      | [0..*] TransmissionContractRight | ContractRight          |                                  |
| [1..1]      | [0..*] FuelRegion                | FuelRegion             |                                  |
| [1..1]      | [0..*] HostControlArea           | HostControlArea        |                                  |
| [1..1]      | [0..*] LocalReliabilityArea      | LocalReliabilityArea   |                                  |
| [0..1]      | [0..*] Pnodes                    | Pnode                  |                                  |
| [1..1]      | [0..*] SubControlArea            | SubControlArea         |                                  |
| [1..1]      | [0..*] TransmissionRightChain    | TransmissionRightChain |                                  |
| [0..1]      | [0..*] EnergyMarkets             | EnergyMarket           |                                  |
| [0..1]      | [0..*] SecurityConstraints       | SecurityConstraints    |                                  |
| [0..1]      | [0..*] SecurityConstraintsLinear | SecurityConstraintSum  |                                  |
| [1..1]      | [0..*] MSSAggregation            | MSSAggregation         |                                  |
| [1..1]      | [0..*] CRROrgRole                | CRROrgRole             | inherited from: MktOrganisation  |
| [0..*]      | [0..*] MarketPerson              | MarketPerson           | inherited from: MktOrganisation  |
| [0..1]      | [0..*] RegisteredResource        | RegisteredResource     | inherited from: MktOrganisation  |
| [1..1]      | [0..*] OrgResOwnership           | OrgResOwnership        | inherited from: MktOrganisation  |
| [1..1]      | [0..*] OrgPnodeAllocation        | OrgPnodeAllocation     | inherited from: MktOrganisation  |
| [1..1]      | [0..*] SchedulingCoordinator     | SchedulingCoordinator  | inherited from: MktOrganisation  |
| [0..1]      | [0..*] Roles                     | OrganisationRole       | inherited from: Organisation     |
| [0..1]      | [0..*] DiagramObjects            | DiagramObject          | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                     | Name                   | inherited from: IdentifiedObject |

#### 6.5.9.65 RUCZone

A specialized class of type AggregatedNode type. Defines RUC Zones. A forecast region represents a collection of Nodes for which the Market operator has developed sufficient historical demand and relevant weather data to perform a demand forecast for such area. The

Market Operator may further adjust this forecast to ensure that the Reliability Unit Commitment produces adequate local capacity procurement.

Table 619 shows all attributes of RUCZone.

**Table 619 – Attributes of ReferenceData::RUCZone**

| name               | type      | description                      |
|--------------------|-----------|----------------------------------|
| anodeType          | AnodeType | inherited from: AggregateNode    |
| endEffectiveDate   | DateTime  | inherited from: AggregateNode    |
| qualifASOrder      | Integer   | inherited from: AggregateNode    |
| startEffectiveDate | DateTime  | inherited from: AggregateNode    |
| aliasName          | String    | inherited from: IdentifiedObject |
| mRID               | String    | inherited from: IdentifiedObject |
| name               | String    | inherited from: IdentifiedObject |

Table 620 shows all association ends of RUCZone with other classes.

**Table 620 – Association ends of ReferenceData::RUCZone with other classes**

| [mult from] | [mult to] name                 | type                    | description                      |
|-------------|--------------------------------|-------------------------|----------------------------------|
| [0..1]      | [0..*] LossClearingResults     | LossClearingResults     |                                  |
| [0..*]      | [0..*] Pnode                   | Pnode                   | inherited from: AggregateNode    |
| [0..*]      | [0..*] SubControlArea          | SubControlArea          | inherited from: AggregateNode    |
| [0..1]      | [0..*] CnodeDistributionFactor | CnodeDistributionFactor | inherited from: AggregateNode    |
| [0..*]      | [0..*] RegisteredResource      | RegisteredResource      | inherited from: AggregateNode    |
| [0..1]      | [0..*] AreaLoadCurve           | AreaLoadCurve           | inherited from: AggregateNode    |
| [0..*]      | [1..1] RTO                     | RTO                     | inherited from: AggregateNode    |
| [0..1]      | [0..*] DiagramObjects          | DiagramObject           | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                   | Name                    | inherited from: IdentifiedObject |

#### 6.5.9.66 SchedulingCoordinator

Market participants could be represented by Scheduling Coordinators (SCs) that are registered with the RTO/ISO. One participant could register multiple SCs with the RTO/ISO. Many market participants can do business with the RTO/ISO using a single SC. One SC could schedule multiple generators. A load scheduling point could be used by multiple SCs. Each SC could schedule load at multiple scheduling points. An inter-tie scheduling point can be used by multiple SCs. Each SC can schedule interchange at multiple inter-tie scheduling points.

Table 621 shows all attributes of SchedulingCoordinator.

**Table 621 – Attributes of ReferenceData::SchedulingCoordinator**

| name       | type   | description                                                |
|------------|--------|------------------------------------------------------------|
| scid       | String | This is the short name or Scheduling Coordinator ID field. |
| creditFlag | YesNo  | inherited from: MktOrganisation                            |

| name                     | type              | description                      |
|--------------------------|-------------------|----------------------------------|
| creditStartEffectiveDate | DateTime          | inherited from: MktOrganisation  |
| endEffectiveDate         | DateTime          | inherited from: MktOrganisation  |
| lastModified             | DateTime          | inherited from: MktOrganisation  |
| organisationID           | Integer           | inherited from: MktOrganisation  |
| qualificationStatus      | String            | inherited from: MktOrganisation  |
| startEffectiveDate       | DateTime          | inherited from: MktOrganisation  |
| streetAddress            | StreetAddress     | inherited from: Organisation     |
| postalAddress            | PostalAddress     | inherited from: Organisation     |
| phone1                   | TelephoneNumber   | inherited from: Organisation     |
| phone2                   | TelephoneNumber   | inherited from: Organisation     |
| electronicAddress        | ElectronicAddress | inherited from: Organisation     |
| aliasName                | String            | inherited from: IdentifiedObject |
| mRID                     | String            | inherited from: IdentifiedObject |
| name                     | String            | inherited from: IdentifiedObject |

Table 622 shows all association ends of SchedulingCoordinator with other classes.

**Table 622 – Association ends of ReferenceData::  
SchedulingCoordinator with other classes**

| [mult from] | [mult to] name                   | type                      | description                      |
|-------------|----------------------------------|---------------------------|----------------------------------|
| [0..*]      | [1..1] MktOrgansation            | MktOrganisation           |                                  |
| [0..1]      | [0..*] SubmitToSCTrade           | Trade                     |                                  |
| [1..1]      | [0..*] ToSCTrade                 | Trade                     |                                  |
| [1..1]      | [0..*] FromSCTrade               | Trade                     |                                  |
| [0..1]      | [0..*] SubmitFromSCTrade         | Trade                     |                                  |
| [1..1]      | [0..*] TransmissionContractRight | ContractRight             |                                  |
| [0..1]      | [0..*] Bid                       | Bid                       |                                  |
| [0..1]      | [1..1] LoadRatio                 | LoadRatio                 |                                  |
| [1..1]      | [0..*]                           | SchedulingCoordinatorUser |                                  |
| [1..1]      | [0..*] CRROrgRole                | CRROrgRole                | inherited from: MktOrganisation  |
| [0..*]      | [0..*] MarketPerson              | MarketPerson              | inherited from: MktOrganisation  |
| [0..1]      | [0..*] RegisteredResource        | RegisteredResource        | inherited from: MktOrganisation  |
| [1..1]      | [0..*] OrgResOwnership           | OrgResOwnership           | inherited from: MktOrganisation  |
| [1..1]      | [0..*] OrgPnodeAllocation        | OrgPnodeAllocation        | inherited from: MktOrganisation  |
| [1..1]      | [0..*] SchedulingCoordinator     | SchedulingCoordinator     | inherited from: MktOrganisation  |
| [0..1]      | [0..*] Roles                     | OrganisationRole          | inherited from: Organisation     |
| [0..1]      | [0..*] DiagramObjects            | DiagramObject             | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names                     | Name                      | inherited from: IdentifiedObject |



**6.5.9.67 SchedulingCoordinatorUser root class**

Describing users of a Scheduling Coordinator

Table 623 shows all attributes of SchedulingCoordinatorUser.

**Table 623 – Attributes of ReferenceData::SchedulingCoordinatorUser**

| name               | type     | description                                                                                            |
|--------------------|----------|--------------------------------------------------------------------------------------------------------|
| startEffectiveDate | DateTime | Login ID Effective Date                                                                                |
| endEffectiveDate   | DateTime | Login ID Expiration Date                                                                               |
| loginID            | String   | Login ID                                                                                               |
| loginRole          | String   | Assigned roles (these are roles with either Read or Read/Write privileges on different Market Systems) |

Table 624 shows all association ends of SchedulingCoordinatorUser with other classes.

**Table 624 – Association ends of ReferenceData::SchedulingCoordinatorUser with other classes**

| [mult from] | [mult to] name | type                  | description |
|-------------|----------------|-----------------------|-------------|
| [0..*]      | [1..1]         | SchedulingCoordinator |             |

**6.5.9.68 SchedulingPoint**

Connection to other organizations at the boundary of the ISO/RTO.

Table 625 shows all attributes of SchedulingPoint.

**Table 625 – Attributes of ReferenceData::SchedulingPoint**

| name               | type     | description                      |
|--------------------|----------|----------------------------------|
| endEffectiveDate   | DateTime | End effective date.              |
| startEffectiveDate | DateTime | Start effective date.            |
| aliasName          | String   | inherited from: IdentifiedObject |
| mRID               | String   | inherited from: IdentifiedObject |
| name               | String   | inherited from: IdentifiedObject |

Table 626 shows all association ends of SchedulingPoint with other classes.

**Table 626 – Association ends of ReferenceData::SchedulingPoint with other classes**

| [mult from] | [mult to] name             | type                | description |
|-------------|----------------------------|---------------------|-------------|
| [0..*]      | [0..*] RegisteredResource  | RegisteredResource  |             |
| [0..1]      | [0..*] InterchangeSchedule | InterchangeSchedule |             |
| [0..*]      | [0..1] Flowgate            | Flowgate            |             |

| [mult from] | [mult to] name        | type          | description                      |
|-------------|-----------------------|---------------|----------------------------------|
| [0..1]      | [0..*] DiagramObjects | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names          | Name          | inherited from: IdentifiedObject |

#### 6.5.9.69 StartUpEnergyCurve

The energy consumption of a generating resource to complete a start-up from the StartUpEnergyCurve. Definition of the StartUpEnergyCurve includes, xvalue as the cooling time and y1value as the MW value.

Table 627 shows all attributes of StartUpEnergyCurve.

**Table 627 – Attributes of ReferenceData::StartUpEnergyCurve**

| name         | type           | description                      |
|--------------|----------------|----------------------------------|
| curveStyle   | CurveStyle     | inherited from: Curve            |
| xMultiplier  | UnitMultiplier | inherited from: Curve            |
| xUnit        | UnitSymbol     | inherited from: Curve            |
| y1Multiplier | UnitMultiplier | inherited from: Curve            |
| y1Unit       | UnitSymbol     | inherited from: Curve            |
| y2Multiplier | UnitMultiplier | inherited from: Curve            |
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 628 shows all association ends of StartUpEnergyCurve with other classes.

**Table 628 – Association ends of ReferenceData::StartUpEnergyCurve with other classes**

| [mult from] | [mult to] name             | type                | description                      |
|-------------|----------------------------|---------------------|----------------------------------|
| [0..1]      | [0..1] RegisteredGenerator | RegisteredGenerator |                                  |
| [1..1]      | [0..*] CurveDatas          | CurveData           | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject |

#### 6.5.9.70 StartUpFuelCurve

The fuel consumption of a Generating Resource to complete a Start-Up.(x=cooling time) Form Startup Fuel Curve. xAxisData -> cooling time, y1AxisData -> MBtu

Table 629 shows all attributes of StartUpFuelCurve.

**Table 629 – Attributes of ReferenceData::StartUpFuelCurve**

| name         | type           | description                      |
|--------------|----------------|----------------------------------|
| curveStyle   | CurveStyle     | inherited from: Curve            |
| xMultiplier  | UnitMultiplier | inherited from: Curve            |
| xUnit        | UnitSymbol     | inherited from: Curve            |
| y1Multiplier | UnitMultiplier | inherited from: Curve            |
| y1Unit       | UnitSymbol     | inherited from: Curve            |
| y2Multiplier | UnitMultiplier | inherited from: Curve            |
| y2Unit       | UnitSymbol     | inherited from: Curve            |
| y3Multiplier | UnitMultiplier | inherited from: Curve            |
| y3Unit       | UnitSymbol     | inherited from: Curve            |
| aliasName    | String         | inherited from: IdentifiedObject |
| mRID         | String         | inherited from: IdentifiedObject |
| name         | String         | inherited from: IdentifiedObject |

Table 630 shows all association ends of StartUpFuelCurve with other classes.

**Table 630 – Association ends of ReferenceData::StartUpFuelCurve with other classes**

| [mult from] | [mult to] name             | type                | description                      |
|-------------|----------------------------|---------------------|----------------------------------|
| [0..1]      | [0..1] RegisteredGenerator | RegisteredGenerator |                                  |
| [1..1]      | [0..*] CurveDatas          | CurveData           | inherited from: Curve            |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject       | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name                | inherited from: IdentifiedObject |

#### 6.5.9.71 SubControlArea

An area defined for the purpose of tracking interchange with surrounding areas via tie points; may or may not serve as a control area.

Table 631 shows all attributes of SubControlArea.

**Table 631 – Attributes of ReferenceData::SubControlArea**

| name                | type     | description                                                                                                                                                                                                   |
|---------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| areaShortName       | String   | Market area short name, which is the regulation zone. It references AGC regulation zone name.                                                                                                                 |
| constantCoefficient | Float    | Loss estimate constant coefficient                                                                                                                                                                            |
| embeddedControlArea | YesNo    | Used in conjunction with the InternalCA flag. If the InternalCA flag is YES, this flag does not apply. If the InternaCA flag is NO, this flag provides an indication of AdjacentCA (NO) or Embedded CA (YES). |
| endEffectiveDate    | DateTime | end effective date                                                                                                                                                                                            |
| internalCA          | YesNo    | A Yes/No indication that this control area is contained internal to the system.                                                                                                                               |
| linearCoefficient   | Float    | Loss estimate linear coefficient                                                                                                                                                                              |
| localCA             | YesNo    | Indication that this control area is the local                                                                                                                                                                |

| name                 | type     | description                                                               |
|----------------------|----------|---------------------------------------------------------------------------|
|                      |          | control area.                                                             |
| maxSelfSchedMW       | Float    | Maximum amount of self schedule MWs allowed for an embedded control area. |
| minSelfSchedMW       | Float    | Minimum amount of self schedule MW allowed for an embedded control area.  |
| quadraticCoefficient | Float    | Loss estimate quadratic coefficient                                       |
| startEffectiveDate   | DateTime | start effective date                                                      |
| aliasName            | String   | inherited from: IdentifiedObject                                          |
| mRID                 | String   | inherited from: IdentifiedObject                                          |
| name                 | String   | inherited from: IdentifiedObject                                          |

Table 632 shows all association ends of SubControlArea with other classes.

**Table 632 – Association ends of ReferenceData::SubControlArea with other classes**

| [mult from] | [mult to] name                   | type                    | description                                        |
|-------------|----------------------------------|-------------------------|----------------------------------------------------|
| [1..1]      | [0..*] Export_EnergyTransactions | EnergyTransaction       | Energy is transferred between interchange areas    |
| [1..1]      | [0..*] Import_EnergyTransactions | EnergyTransaction       | Energy is transferred between interchange areas    |
| [0..1]      | [0..*] GeneralClearingResults    | GeneralClearingResults  |                                                    |
| [0..1]      | [0..*] BidSelfSched              | BidSelfSched            |                                                    |
| [0..*]      | [0..*] RegisteredResource        | RegisteredResource      |                                                    |
| [0..1]      | [0..*] ExPostLossResults         | ExPostLossResults       |                                                    |
| [0..1]      | [1..*] LossClearingResults       | LossClearingResults     |                                                    |
| [0..*]      | [0..1] AdjacentCASet             | AdjacentCASet           |                                                    |
| [0..*]      | [0..*] AggregateNode             | AggregateNode           |                                                    |
| [0..1]      | [0..*] CnodeDistributionFactor   | CnodeDistributionFactor |                                                    |
| [0..*]      | [0..*] ControlAreaDesignation    | ControlAreaDesignation  |                                                    |
| [0..1]      | [0..*] To_Flowgate               | Flowgate                |                                                    |
| [0..1]      | [0..*] From_Flowgate             | Flowgate                |                                                    |
| [0..*]      | [1..1] HostControlArea           | HostControlArea         | The interchange area may operate as a control area |
| [0..1]      | [0..*] Pnode                     | Pnode                   |                                                    |
| [0..*]      | [1..1] RTO                       | RTO                     |                                                    |
| [0..*]      | [0..1] PSRType                   | PSRType                 | inherited from: PowerSystemResource                |
| [0..1]      | [0..*] Measurements              | Measurement             | inherited from: PowerSystemResource                |
| [1..1]      | [0..*] OperatingShare            | OperatingShare          | inherited from: PowerSystemResource                |
| [0..*]      | [0..*] PsrLists                  | PsrList                 | inherited from: PowerSystemResource                |
| [1..1]      | [0..1] OutageSchedule            | OutageSchedule          | inherited from: PowerSystemResource                |
| [0..*]      | [0..*] ReportingGroup            | ReportingGroup          | inherited from: PowerSystemResource                |
| [0..1]      | [0..*] DiagramObjects            | DiagramObject           | inherited from: IdentifiedObject                   |
| [1..1]      | [0..*] Names                     | Name                    | inherited from: IdentifiedObject                   |

### 6.5.9.72 SubstitutionResourceList root class

List of resources that can be substituted for within the bounds of a Contract definition. This class has a precedence and a resource.

Table 633 shows all attributes of SubstitutionResourceList.

**Table 633 – Attributes of ReferenceData::SubstitutionResourceList**

| name       | type    | description                                                                                                 |
|------------|---------|-------------------------------------------------------------------------------------------------------------|
| precedence | Integer | An indicator of the order a resource should be substituted. The lower the number the higher the precedence. |

Table 634 shows all association ends of SubstitutionResourceList with other classes.

**Table 634 – Association ends of ReferenceData::SubstitutionResourceList with other classes**

| [mult from] | [mult to] name                   | type               | description |
|-------------|----------------------------------|--------------------|-------------|
| [0..*]      | [0..1] RegisteredResource        | RegisteredResource |             |
| [0..*]      | [0..1] TransmissionContractRight | ContractRight      |             |

### 6.5.9.73 TACArea

Transmission Access Charge Area. Charges assessed, on behalf of the Participating Transmission Owner, to parties who require access to the controlled grid.

Table 635 shows all attributes of TACArea.

**Table 635 – Attributes of ReferenceData::TACArea**

| name               | type     | description                      |
|--------------------|----------|----------------------------------|
| endEffectiveDate   | DateTime | end effective date               |
| startEffectiveDate | DateTime | start effective date             |
| aliasName          | String   | inherited from: IdentifiedObject |
| mRID               | String   | inherited from: IdentifiedObject |
| name               | String   | inherited from: IdentifiedObject |

Table 636 shows all association ends of TACArea with other classes.

**Table 636 – Association ends of ReferenceData::TACArea with other classes**

| [mult from] | [mult to] name         | type            | description                      |
|-------------|------------------------|-----------------|----------------------------------|
| [0..1]      | [0..*] AreaLoadCurve   | AreaLoadCurve   |                                  |
| [0..*]      | [0..*] AggregatedPnode | AggregatedPnode |                                  |
| [0..1]      | [0..*] DiagramObjects  | DiagramObject   | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names           | Name            | inherited from: IdentifiedObject |

#### 6.5.9.74 TransmissionRightChain

Allows chaining of TransmissionContractRights. Many individual contract rights can be included in the definition of a TransmissionRightChain. A TransmissionRightChain is also defined as a TransmissionContractRight itself.

Table 637 shows all attributes of TransmissionRightChain.

**Table 637 – Attributes of ReferenceData::TransmissionRightChain**

| name               | type     | description                      |
|--------------------|----------|----------------------------------|
| endEffectiveDate   | DateTime | end effective date               |
| startEffectiveDate | DateTime | start effective date             |
| aliasName          | String   | inherited from: IdentifiedObject |
| mRID               | String   | inherited from: IdentifiedObject |
| name               | String   | inherited from: IdentifiedObject |

Table 638 shows all association ends of TransmissionRightChain with other classes.

**Table 638 – Association ends of ReferenceData::TransmissionRightChain with other classes**

| [mult from] | [mult to] name             | type          | description                      |
|-------------|----------------------------|---------------|----------------------------------|
| [0..1]      | [1..*] Ind_ContractRight   | ContractRight |                                  |
| [0..1]      | [1..1] Chain_ContractRight | ContractRight |                                  |
| [0..*]      | [1..1] RTO                 | RTO           |                                  |
| [0..1]      | [0..*] DiagramObjects      | DiagramObject | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names               | Name          | inherited from: IdentifiedObject |

#### 6.5.9.75 WheelingCounterParty

Counter party in a wheeling transaction.

Table 639 shows all attributes of WheelingCounterParty.

**Table 639 – Attributes of ReferenceData::WheelingCounterParty**

| name      | type   | description                      |
|-----------|--------|----------------------------------|
| aliasName | String | inherited from: IdentifiedObject |
| mRID      | String | inherited from: IdentifiedObject |
| name      | String | inherited from: IdentifiedObject |

Table 640 shows all association ends of WheelingCounterParty with other classes.

**Table 640 – Association ends of ReferenceData::  
WheelingCounterParty with other classes**

| [mult from] | [mult to] name            | type               | description                      |
|-------------|---------------------------|--------------------|----------------------------------|
| [0..*]      | [0..*] RegisteredInterTie | RegisteredInterTie |                                  |
| [0..1]      | [0..*] DiagramObjects     | DiagramObject      | inherited from: IdentifiedObject |
| [1..1]      | [0..*] Names              | Name               | inherited from: IdentifiedObject |

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<sup>1</sup> To be published.



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## COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

**CADRE POUR LES COMMUNICATIONS  
POUR LE MARCHÉ DE L'ÉNERGIE –****Partie 301: Extensions du modèle d'information  
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Le texte de cette norme est issu des documents suivants:

| FDIS         | Rapport de vote |
|--------------|-----------------|
| 57/1438/FDIS | 57/1469/RVD     |

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette norme.

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Tout au long du présent document, les références sont basées sur le modèle UML. Les références à des paquetages et classes UML spécifiques sont effectuées en citant le nom du paquetage ou de la classe entre guillemets simples (par ex: 'IEC 61970' ou 'IdentifiedObject').

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## INTRODUCTION

La présente Norme internationale fait partie de la série de normes IEC 62325 concernant les échanges d'informations relatives au marché déréglementé de l'énergie. Elle a été initialement fondée sur les travaux réalisés par les gestionnaires de réseaux de transport européens TF 14 EDI (Echange de données informatisé) et dans le cadre des publications EPRI TR 1009455 et TR 1011431 (Extensions du CIM pour la prise en charge des opérations du marché phase 1 et phase 2).

Le principal objectif de la série de normes IEC 62325 est de produire des normes destinées à faciliter l'intégration de logiciels d'application pour le marché, développés de façon indépendante par différents fournisseurs, dans un système de gestion de marché, et entre des systèmes de gestion de marché et des systèmes participant au marché. Cela se fait par la définition d'échanges de messages pour permettre à ces applications ou systèmes d'accéder aux données publiques et d'échanger des informations, indépendamment de la façon dont ces informations sont représentées en interne.

Le modèle d'information commun (CIM) spécifie la base de la sémantique pour cet échange de messages. Les spécifications de profil, qui sont contenues dans d'autres parties de la série IEC 62325, précisent le contenu des messages échangés. Elles prennent en charge les marchés de type européen, fondés sur les normes européennes et sur les concepts d'accès de tiers au réseau et de répartition du marché en zones, et les marchés de type américain, caractérisés par une gestion de la production à J-1 effectuée par un opérateur du marché, par un équilibrage intrajournalier et en temps réel via un système de répartition central, et par le règlement selon les prix marginaux locaux. Ces marchés sont utilisés aux Etats-Unis et dans d'autres régions du monde, et ne se limitent pas exclusivement à l'Amérique du Nord.

Le CIM est un modèle abstrait contenant tous les objets principaux d'une entreprise de distribution d'électricité habituellement nécessaires pour représenter les opérations d'une entreprise d'électricité. Ce modèle inclut les classes et les attributs publics de ces objets, ainsi que les relations entre eux.

Les objets représentés dans le CIM sont de nature abstraite et peuvent être utilisés dans une large gamme d'applications. L'utilisation du CIM n'est pas limitée à son application dans un système de gestion de marché. Il convient que cette norme soit comprise comme un outil permettant l'intégration dans tout domaine où un modèle de système de marché est nécessaire pour faciliter l'interopérabilité et la compatibilité de connexion entre des applications et des systèmes indépendants de toute mise en œuvre particulière.

Les normes IEC 62325 font partie d'une série de normes. Les normes IEC 61970 définissent les interfaces de programmation d'application EMS et les normes IEC 61968 définissent les interfaces système pour la gestion de distribution. L'IEC 62325-301 correspond aux normes IEC 61970-301 et IEC 61968-11, qui décrivent des parties du modèle d'information commun applicables aux interfaces de modélisation des systèmes EMS, DMS et MMS. Alors qu'il existe plusieurs normes de l'IEC qui traitent des différentes parties du CIM, un seul modèle d'information unifié comprenant le CIM est derrière tous ces documents normatifs individuels.

## **CADRE POUR LES COMMUNICATIONS POUR LE MARCHÉ DE L'ÉNERGIE –**

### **Partie 301: Extensions du modèle d'information commun (CIM) pour les marchés**

#### **1 Domaine d'application**

La présente partie de la norme IEC 62325 spécifie le modèle d'information commun relatif aux communications pour le marché de l'énergie.

Le modèle d'information commun (CIM) est un modèle abstrait de tous les objets principaux d'une entreprise de distribution d'électricité habituellement impliqués dans les opérations de l'entreprise et dans la gestion du marché de l'électricité. En fournissant une façon normalisée de représenter des ressources de systèmes électriques comme classes et attributs d'objets ainsi que leurs relations, le CIM facilite l'intégration des applications de système de gestion de marché (MMS) développées de façon indépendante par différents fournisseurs, entre des systèmes MMS complets développés de façon indépendante, ou entre un système MMS et d'autres systèmes concernés par différents aspects de la gestion de marché, tels que l'attribution de la capacité, la gestion à 24 h, l'équilibrage, le règlement, etc.

Le CIM facilite l'intégration en définissant un langage commun (c'est-à-dire une sémantique) fondé sur le modèle CIM pour permettre à ces applications ou systèmes d'accéder aux données publiques et d'échanger des informations indépendamment de la représentation interne de ces informations.

Les classes d'objets représentées dans le CIM sont de nature abstraite et peuvent être utilisées dans une large gamme d'applications. L'utilisation du CIM n'est pas limitée à son application dans un système de gestion de marché.

A cause de la taille du CIM complet, les classes d'objets qui le composent sont regroupées en un certain nombre de paquetages logiques, qui représentent chacun une certaine partie du système électrique modélisé. Les collections de ces paquetages sont fournies progressivement sous forme de Normes internationales distinctes. La présente Norme internationale spécifie un ensemble de paquetages qui offrent une vue logique sur les aspects fonctionnels de la gestion d'un marché de l'électricité qui est partagée par toutes les applications. D'autres normes spécifient des aspects plus spécifiques du modèle qui ne sont nécessaires qu'à certaines applications. Le Paragraphe 4.2 ci-dessous définit le découpage actuel des paquetages dans les documents normatifs.

#### **2 Références normatives**

Les documents suivants sont cités en référence de manière normative, en intégralité ou en partie, dans le présent document et sont indispensables pour son application. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 61968-11, *Intégration d'applications pour les services électriques – Interfaces système pour la gestion de distribution – Partie 11: Extensions du modèle d'information commun (CIM) pour la distribution*

IEC 61970-301, *Interface de programmation d'application pour système de gestion d'énergie (EMS-API) – Partie 301: Base de modèle d'information commun (CIM)*

IEC 62325-450, *Cadre pour les communications pour le marché de l'énergie – Partie 450: Règles de modélisation de profils et de contextes*

Object management group: UML 2.0, *Specification* – disponible à l'adresse <http://www.omg.org>

### 3 Termes, définitions et abréviations

Pour les besoins du présent document, les termes et définitions de l'IEC 61970-2 ainsi que les suivants s'appliquent.

#### 3.1 Termes et définitions

##### 3.1.1

##### **interface de programmation d'application**

##### **API (application program interface en anglais)**

ensemble des fonctions publiques offertes par un composant exécutable d'application et destinées à être utilisées par d'autres composants exécutables d'application

[SOURCE: IEC 61970-2:2004, 3.4]

##### 3.1.2

##### **CIM model manager**

gestionnaire de modèle conforme au CIM

##### 3.1.3

##### **Extensible Markup Language**

##### **XML**

est un langage de marquage qui définit un ensemble de règles pour le codage des documents dans un format lisible à la fois par l'homme et la machine

##### 3.1.4

##### **XML Schema Description**

##### **XSD**

est un langage XML utilisé pour décrire et contrôler le contenu des documents XML

##### 3.1.5

##### **marchés intrajournaliers**

marchés de programmation intrajournalière qui affinent l'engagement et les programmes produits par les marchés du jour d'avant

##### 3.1.6

##### **prévision de charge**

système de prévision de charge qui prédit la charge pour l'horizon temporel spécifié

##### 3.1.7

##### **système de gestion de marché**

##### **MMS (Market Management System en anglais)**

système informatique comprenant une plate-forme logicielle offrant les services de support de base et un ensemble d'applications offrant les fonctionnalités requises pour une gestion efficace du marché de l'électricité

Note 1 à l'article: Ces systèmes informatiques intégrés à un marché de l'électricité peuvent comprendre un service de support à l'attribution de la capacité, à la planification de l'énergie, aux services auxiliaires ou autres, aux opérations et aux règlements en temps réel.

### 3.1.8

#### **scheduler**

système de programmation pour les ressources

### 3.1.9

#### **accès tiers**

concept dans les systèmes de gestion de marché qui permet aux tiers d'utiliser le système de transmission au même titre que les autres

### 3.1.10

#### **langage de modélisation unifié**

##### **UML (Unified Modeling Language en anglais)**

langage de modélisation dans le domaine de l'ingénierie logicielle orientée objet qui est géré par l'Object Management Group (OMG)

### 3.1.11

#### **schéma RDF**

##### **RDFS (RDF Schema en anglais)**

recommandation W3C qui fournit des éléments de base pour la description des ontologies

### 3.1.12

#### **langage d'ontologies Web**

##### **OWL (Ontology Web Language en anglais)**

recommandation W3C qui fournit un langage de représentation de connaissances pour la création d'ontologies

## 3.2 Abréviations

### 3.2.1

#### **B and S (Billing and Settlement en anglais)**

facturation et règlement

### 3.2.2

#### **CRR (Congestion Revenue Rights en anglais)**

droits à revenu de congestion

### 3.2.3

#### **DAM (Day Ahead Market en anglais)**

marché à J-1 qui détermine l'engagement et les programmes des ressources

### 3.2.4

#### **DMS (Distribution Management System en anglais)**

système de gestion de la distribution

### 3.2.5

#### **EMS (Energy Management System en anglais)**

système de gestion d'énergie

### 3.2.6

#### **MDMS (Meter Data Management System en anglais)**

système de gestion des données de compteur

### 3.2.7

#### **RTM (Real Time Market en anglais)**

marchés en temps réel qui finalisent la répartition pour les ressources système

## 4 Spécification du CIM

### 4.1 Notation de modélisation du CIM

Le CIM est défini à l'aide de techniques de modélisation orientées objet. Plus précisément, la spécification du CIM utilise la notation du langage de modélisation unifié (UML), qui définit le CIM comme un groupe de paquetages.

Chaque paquetage du CIM contient un ou plusieurs diagrammes de classe montrant sous forme graphique toutes les classes de ce paquetage et leurs relations. Chaque classe est ensuite définie de façon textuelle en mettant l'accent sur ses attributs et ses relations avec d'autres classes.

La notation UML est décrite dans les documents de l'Object Management Group (OMG) et dans plusieurs autres manuels publiés.

### 4.2 Paquetages CIM

Le CIM est fractionné en un ensemble de paquetages. Un paquetage est un moyen général permettant de grouper des éléments liés à un modèle. Les paquetages ont été choisis pour simplifier la conception, la compréhension et la révision du modèle. Le modèle d'information commun se compose de l'ensemble des paquetages. Des entités peuvent avoir des associations dépassant les limites de plusieurs paquetages. Chaque application peut utiliser des informations représentées dans plusieurs paquetages.

Le CIM complet est fractionné en groupes de paquetages, ce qui facilite la gestion et la maintenance. La norme IEC 62325-301 inclut les paquetages suivants:

- 'MarketCommon'
- 'MarketManagement'
- 'MarketOperations'

Les paquetages utilisés par la norme IEC 61970-301 et les paquetages utilisés par la norme IEC 61968-11 décrivent des parties supplémentaires du CIM qui traitent d'autres vues logiques des opérations d'une entreprise de service public, comprenant les modèles des fils, de la topologie, de la production, de la charge, des interruptions de service, du patrimoine, des emplacements, des activités, des clients, de la documentation et des travaux, et des modèles de réseau spécifiques à la distribution.

NOTE Les limites d'un paquetage n'impliquent pas de limites pour les applications. Une application peut utiliser des entités CIM de différents paquetages.

La Figure 1 présente les dépendances de paquetages. Le paquetage 'IEC 62325' et ses sous-paquetages dépendent des paquetages 'IEC 61970' et 'IEC 61968'. Le paquetage 'IEC 61970' est utilisé par la série de normes IEC 61970 comme un modèle central qui représente les ressources des systèmes électriques et leurs relations. Le paquetage 'IEC 61968' est utilisé par la série de normes IEC 61968 qui décrit les vues logiques des opérations d'une entreprise de service public, y compris vue du patrimoine, des emplacements, des activités, des clients, de la documentation et des travaux, et des modèles de comptage. Les lignes tiretées indiquent une relation de dépendance, la flèche allant du paquetage dépendant vers le paquetage dont il dépend.



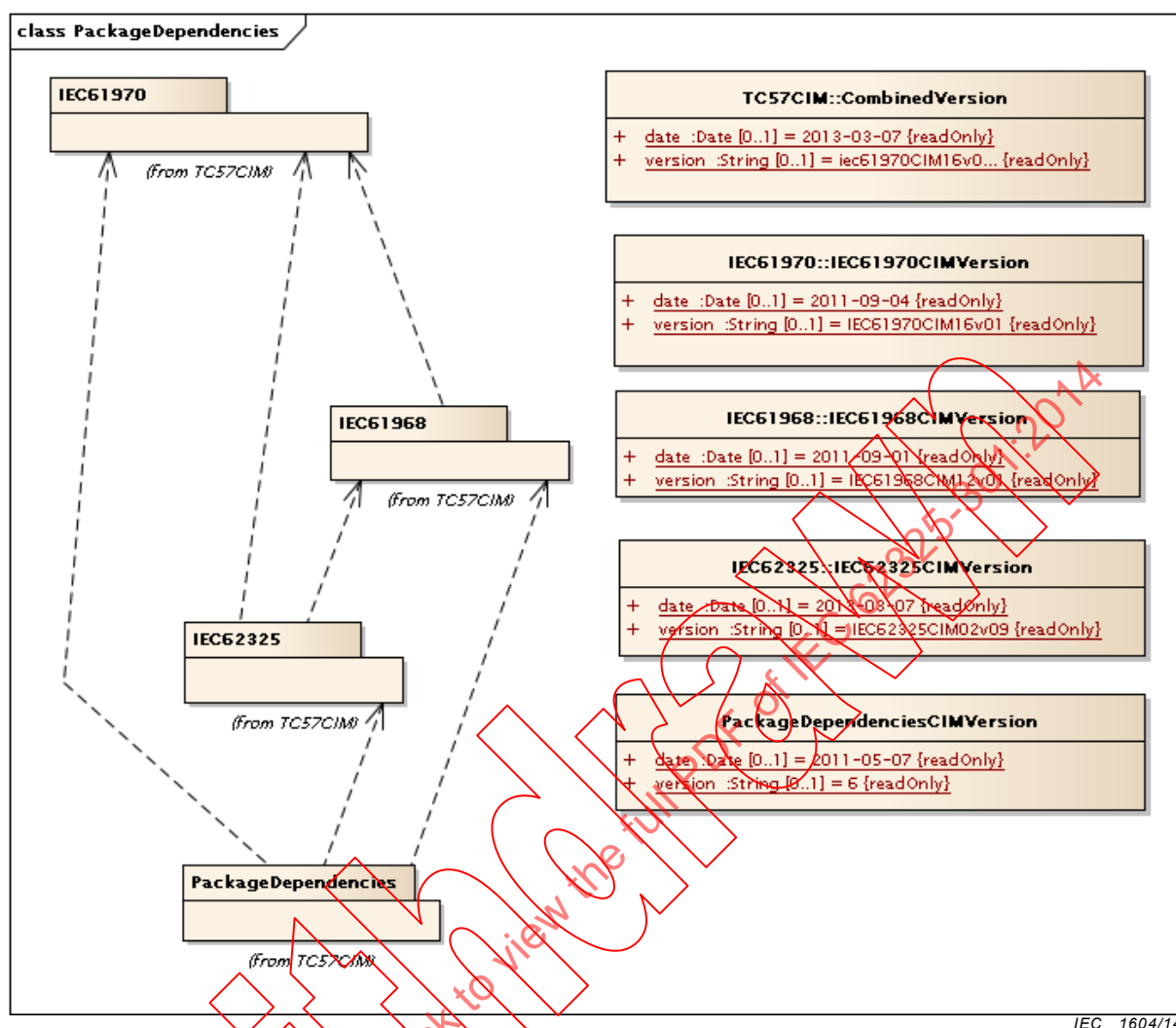


**Figure 1 – Diagramme des dépendances de paquetages 'TC 57CIM'**

La Figure 2 représente les paquetages définis pour l'IEC 62325-301 et leurs relations de dépendance. Les lignes tiretées indiquent une relation de dépendance, la flèche allant du paquetage dépendant vers le paquetage dont il dépend.



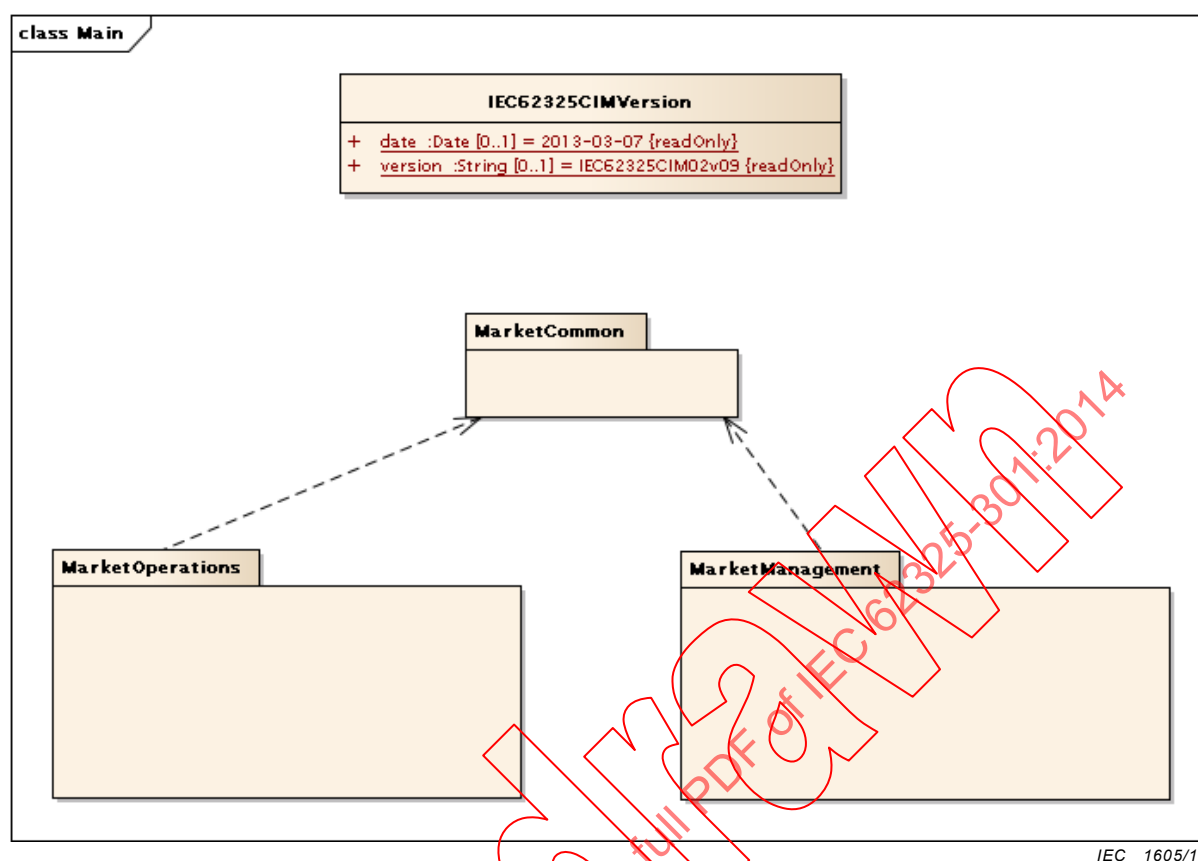


**Figure 2 – Diagramme des dépendances de paquets "IEC 62325"**

L'Article 6 contient la spécification associée à chacun des paquets du CIM.

NOTE Le contenu du CIM défini dans la présente spécification a été créé automatiquement à partir de la version IEC 62325CIM02v09 du modèle électronique UML du CIM, qui est disponible auprès du groupe des utilisateurs du CIM (CIM Users Group).

### 4.3 Classes CIM et relations

#### 4.3.1 Classes

Le ou les diagrammes de classe de chaque paquetage du CIM représentent toutes les classes du paquetage et leurs relations. Lorsque des relations existent avec des classes appartenant à d'autres paquets, ces classes sont également représentées.

Les classes et les objets modélisent ce qui se trouve dans un système électrique et qui doit être représenté de la même façon pour les applications du marché. Une classe est une description d'un objet réel, tel qu'une offre, une ressource consignée ou une charge consignée, qui doit être représenté comme faisant partie de l'ensemble du marché de l'électricité dans un MMS. Parmi les autres types d'objet figurent des éléments tels que les programmes et les mesures que des applications MMS doivent également traiter, analyser et enregistrer. De tels objets nécessitent une représentation commune pour atteindre les objectifs de compatibilité de connexion et d'interopérabilité de la présente norme. Un objet particulier d'un système électrique ayant une identité unique est modélisé comme une instance de la classe à laquelle il appartient.

Le CIM est défini pour faciliter l'échange de données. Comme défini dans le présent document, les entités du CIM n'ont pas de comportement. L'IEC 62325-450 *Règles de modélisation de profils et de contextes* définit les principes de modélisation pour générer un profil et les principes du cadre de modélisation pour définir la charge utile de message.

Les classes comportent des attributs qui décrivent les caractéristiques des objets. Chaque classe du CIM contient les attributs décrivant et identifiant une instance spécifique de la classe. Seuls les attributs d'intérêt public pour les applications MMS sont inclus dans les descriptions de classes.

Chaque attribut possède un type qui identifie le type d'attribut dont il s'agit. Les attributs typiques sont de type 'Integer' (entier), 'Float' (flottant), 'Boolean' (booléen), 'String' (chaîne), 'Datetime' (date et heure), 'Date', 'Duration' (durée) et 'Decimal' (décimal), qui sont appelés types primitifs. Cependant, de nombreux types supplémentaires sont définis comme partie intégrante de la spécification CIM. Par exemple, 'RegisteredGenerator' a un attribut 'maxDependableCap' de type 'ActivePower'. La définition de nombreux types partagés est contenue dans le paquetage 'Domain' décrit à l'Article 6. Les stéréotypes 'Primitive', 'enumeration', 'CIMDatatype' et 'Compound' de l'UML sont ajoutés aux classes utilisées comme types:

- Le stéréotype 'CIMDatatype' est utilisé avec une sémantique spécifique du CIM pour décrire un type ayant plusieurs attributs {'value', 'unit', 'multiplier', 'denominatorUnit', 'denominatorMultiplier'}, qui implique une mise en correspondance personnalisée avec des artefacts de sérialisation tels que RDFS, OWL et XSD. Les classes ayant ces stéréotypes ne participent pas à des relations de généralisation ou d'association et sont simplement utilisées comme types pour des attributs.
- Le stéréotype 'enumeration' est utilisé pour décrire le type d'un attribut avec une liste énumérée de choix.
- Le stéréotype 'Compound' est utilisé pour décrire des ensembles d'attributs liés qui sont couramment réutilisés. Les classes 'Compound' peuvent se composer d'attributs de type 'Primitive', 'enumeration', 'CIMDatatype' ou d'autres classes 'Compound', à condition que les classes 'Compound' ne soient pas récursives.

Tous les attributs du CIM sont implicitement facultatifs en ce sens que les profils utilisant le CIM peuvent les éliminer tous.

Les relations entre les classes révèlent la façon dont elles sont structurées les unes par rapport aux autres. Les classes CIM sont reliées de différentes façons, comme décrit dans les 4.3.2, 4.3.3 et 4.3.4.

#### 4.3.2 Generalization (généralisation)

Une généralisation est une relation entre une classe générale et une classe plus spécifique. La classe la plus spécifique ne peut contenir que des informations supplémentaires. Par exemple, 'RegisteredGenerator' est une sous-classe spécifique de 'RegisteredResource'. La généralisation permet à une classe spécifique d'hériter d'attributs et de relations de toutes les classes plus générales situées au-dessus d'elle.

La Figure 3 est un exemple de généralisation. Dans cet exemple issu du paquetage 'MarketCommon', un 'MarketParticipant' est un type plus spécifique de 'Organisation'. 'Organisation' hérite également de 'IdentifiedObject'.

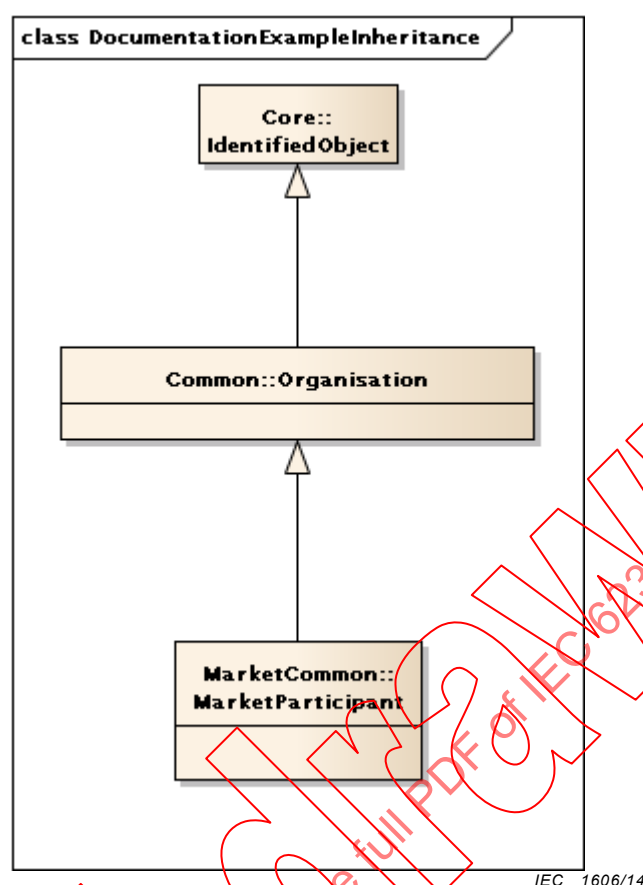


Figure 3 – Exemple de généralisation

#### 4.3.3 Simple Association (association simple)

Une association est une connexion conceptuelle entre des classes. Chaque association a deux "extrémités d'association". Les "extrémités d'association" étaient appelées "rôles" avant la spécification UML 2.0. Chaque extrémité d'association décrit le rôle que la classe cible (c'est-à-dire la classe vers laquelle l'extrémité d'association part) a en relation avec la classe source (c'est-à-dire la classe à partir de laquelle l'extrémité d'association part). La coutume est d'attribuer aux extrémités d'association le nom de la classe cible avec ou sans qualificatif (verbe, nom, ou adverbe). Chaque extrémité d'association possède aussi une cardinalité/multiplicité, qui est une indication du nombre d'objets qui peuvent prendre part à la relation décrite. Dans le CIM, les associations ne sont pas nommées, seules les extrémités d'association le sont. Par exemple, dans le CIM, il existe une association entre un 'MarketParticipant' et un 'MarketRole' (voir la Figure 4, qui est issue du paquetage 'MarketCommon'). La multiplicité est montrée aux deux extrémités de l'association. Dans cet exemple, un objet 'MarketParticipant' peut faire référence à 0 ou à plusieurs objets 'MarketRole', et un 'MarketRole' peut être référencé dans 0 ou plusieurs objets 'MarketParticipant'.

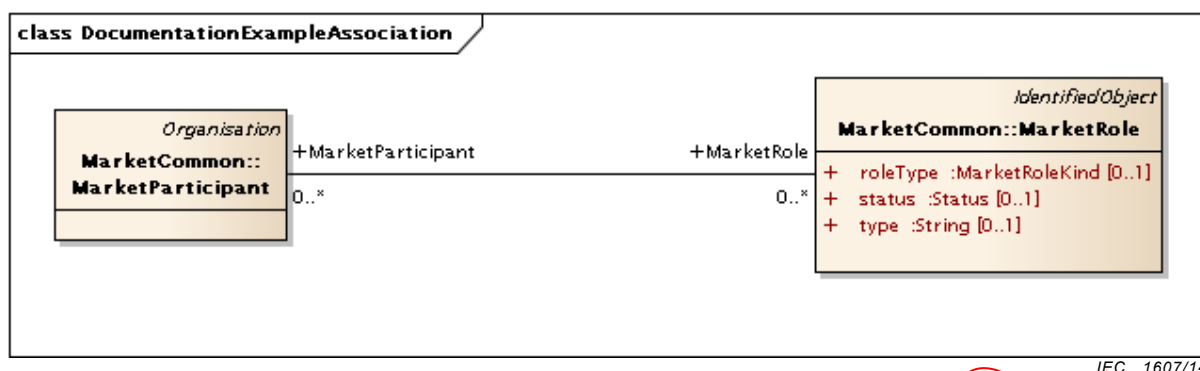


Figure 4 – Exemple d'association simple

#### 4.3.4 Aggregation (agrégation)

L'agrégation est un cas spécial d'association. L'agrégation indique que la relation entre les classes est une sorte de relation classe entière/classe partielle, où la classe entière "consists of" (se compose de) ou "contains" (contient) la classe partielle et cette classe partielle est une "part of" (partie de) la classe entière. La classe partielle n'hérite pas de la classe entière comme dans la généralisation. La Figure 5 illustre une agrégation entre la classe 'EnergyProfile' et la classe 'EnergyTransaction', qui est issue du paquetage 'ExternalInputs'. Elle indique également qu'un 'EnergyProfile' peut faire partie d'un seul objet 'EnergyTransaction', mais qu'un objet 'EnergyTransaction' peut contenir n'importe quel nombre d'objets 'EnergyProfile'. Dans le cadre de l'utilisation du CIM comme modèle d'information, l'agrégation n'a pas d'interprétation précise ou formelle au-delà d'une association simple, et permet de représenter visuellement une utilisation normale.

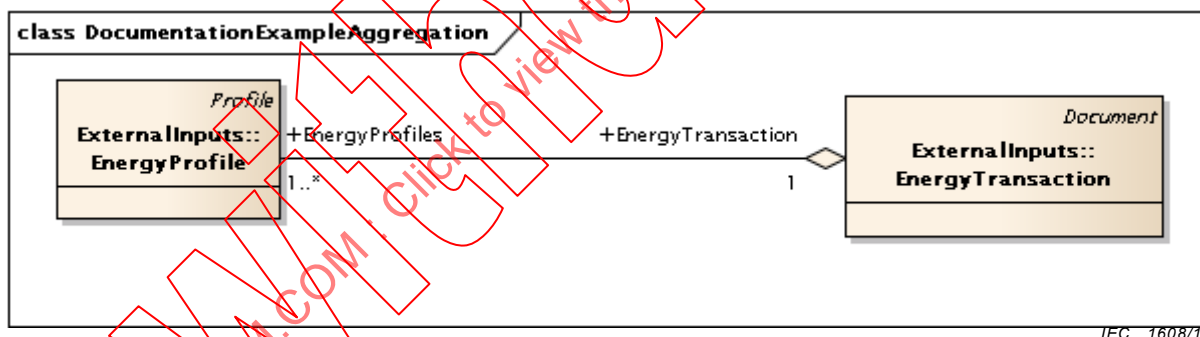


Figure 5 – Exemple d'agrégation

#### 4.4 Concepts du modèle CIM et exemples

##### 4.4.1 Paquetage 'Common Market'

Le modèle Common Market décrit les participants du marché ainsi que leurs rôles. Les rôles définis du marché figurent dans une liste ('MarketRoleKind'). Un MarketParticipant peut jouer plusieurs rôles dans un marché (voir Figure 6).

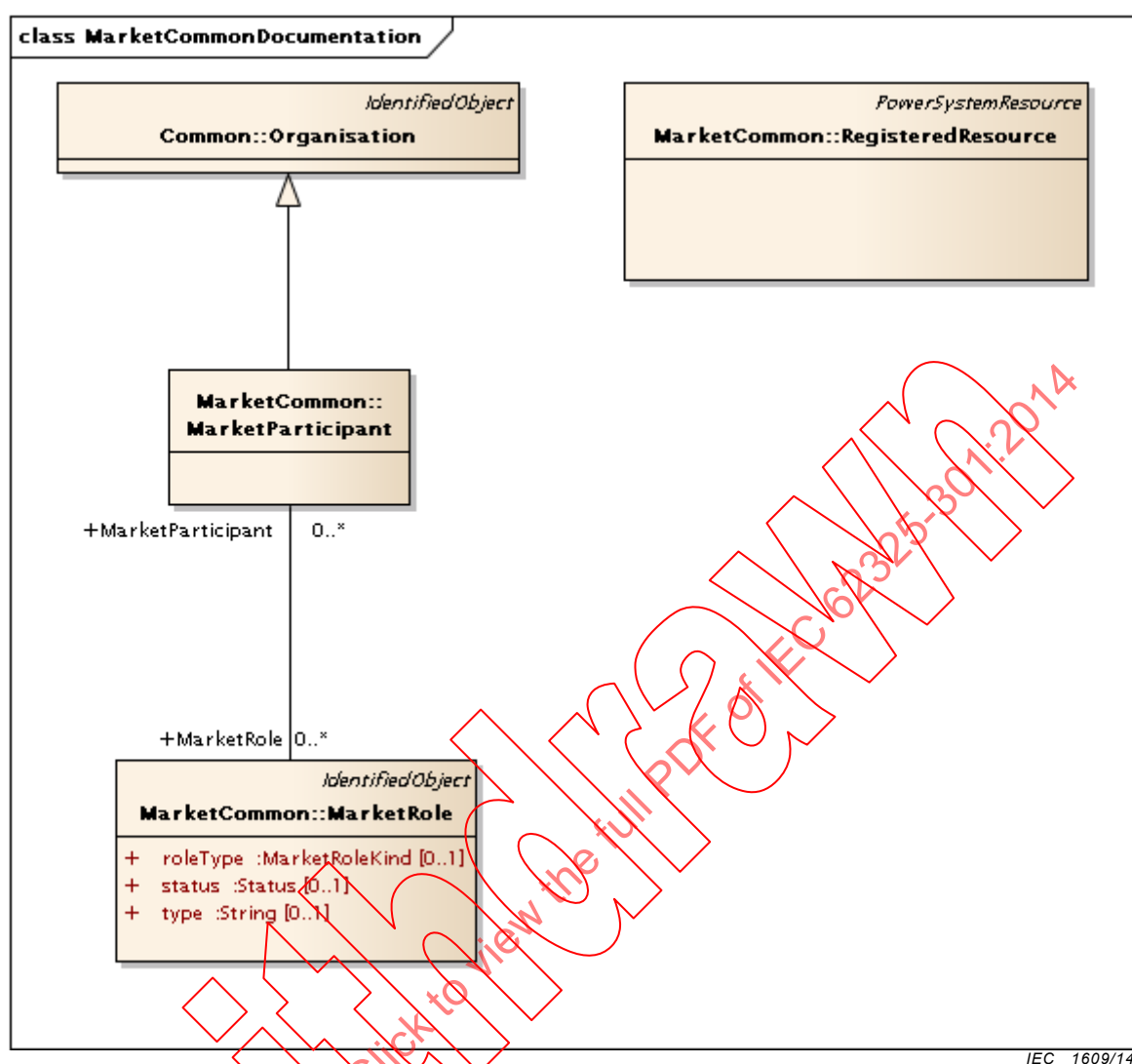


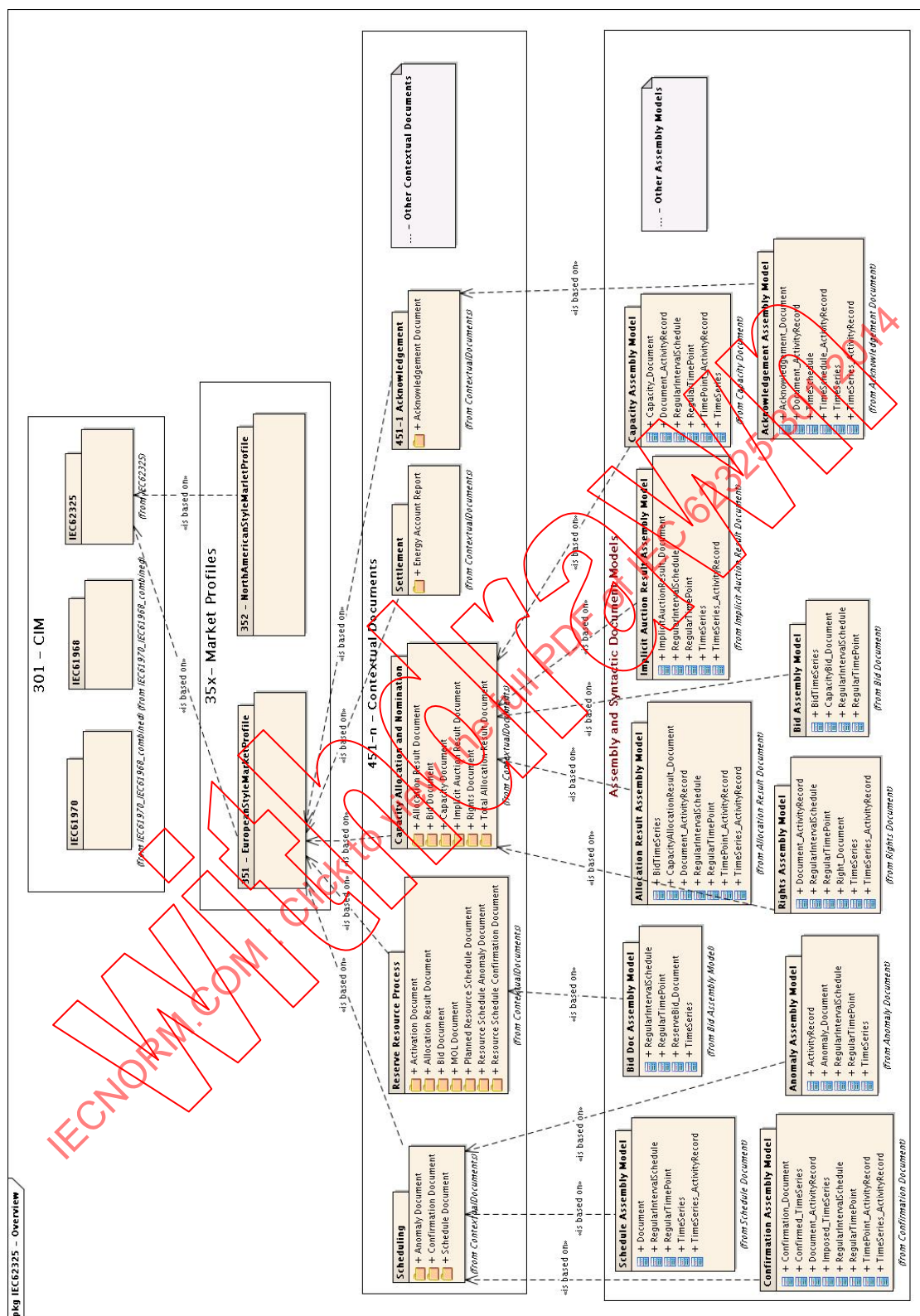
Figure 6 – Modèle Common Market

#### 4.4.2 Paquetage 'MarketManagement'

Le modèle Market Management décrit un ensemble cohérent de classes à utiliser avec le modèle Common Market pour générer un profil. Dans ce cas, le profil doit être utilisé lorsque le marché de l'électricité est principalement basé sur un accès réglementé de tiers au réseau, c'est-à-dire que les gestionnaires de réseaux de transport doivent donner aux fournisseurs d'électricité un accès non discriminatoire:

- au réseau de transport pour qu'ils puissent fournir de l'énergie à leurs clients;
- et aux transactions du marché de gros et de détail (bilatérales ou via une installation d'échange d'énergie entre réseaux) servant à l'échange d'énergie.

Le paquetage 'MarketManagement' fait référence à ce qui est ultérieurement appelé système européen de gestion de marché. La Figure 7 présente le cadre de modélisation en couche à construire du CIM jusqu'à la spécification des messages. Ce cadre de modélisation définit la façon de générer des documents contextualisés pour échanger des informations en partant des concepts CIM du paquetage 'MarketManagement' jusqu'à la définition d'un profil de marché.



IEC 1610/14

## Légende

| Anglais                           | Français                                 |
|-----------------------------------|------------------------------------------|
| From IEC 61970_IEC 61968_combined | A partir de IEC 61970_IEC 61968_combined |
| From IEC 62325                    | A partir de IEC 62325                    |
| Market Profiles                   | Profils de marché                        |

| Anglais                                | Français                                                            |
|----------------------------------------|---------------------------------------------------------------------|
| Is based on                            | Est basé sur                                                        |
| Contextual Documents                   | Documents contextuels                                               |
| Assembly and Syntactic Document Models | Modèles de documents d'assemblage et de syntaxe                     |
| Other Contextual Documents             | Autres documents contextuels                                        |
| Other Assembly Models                  | Autres modèles d'assemblage                                         |
| Scheduling                             | Programmation                                                       |
| Reserve Resource Process               | Processus de ressources en réserve                                  |
| Capacity Allocation and Nomination     | Attribution de la capacité et désignation                           |
| Settlement                             | Règlement                                                           |
| 451-1 Acknowledgement                  | 451-1 Acknowledgement (Acquittement)                                |
| From Contextual Documents              | A partir de Contextual Documents                                    |
| Schedule Assembly Model                | Modèle d'assemblage de programmation                                |
| Bid Doc Assembly Model                 | Modèle d'assemblage de document d'offre                             |
| Allocation Result Assembly Model       | Modèle d'assemblage de résultat de l'attribution                    |
| Implicit Auction Result Assembly Model | Modèle d'assemblage de résultat des ventes aux enchères implicites  |
| Capacity Assembly Model                | Modèle d'assemblage de capacité                                     |
| From Schedule Document                 | A partir du document de programme                                   |
| From Bid Assembly Model                | A partir du modèle d'assemblage d'offre                             |
| From Allocation Result Document        | A partir du document de résultat de l'attribution                   |
| From Implicit Auction Result Document  | A partir du document de résultat des ventes aux enchères implicites |
| From Capacity Document                 | A partir du document de capacité                                    |
| Confirmation Assembly Model            | Modèle d'assemblage de confirmation                                 |
| Anomaly Assembly Model                 | Modèle d'assemblage d'anomalie                                      |
| Rights Assembly Model                  | Modèle d'assemblage de droits                                       |
| Bid Assembly Model                     | Modèle d'assemblage d'offre                                         |
| Acknowledgement Assembly Model         | Modèle d'assemblage de reconnaissance                               |
| From Confirmation Document             | A partir du document de confirmation                                |
| From Anomaly Document                  | A partir du document d'anomalie                                     |
| From Rights Document                   | A partir du document de droits                                      |
| From Bid Document                      | A partir du document d'offre                                        |
| From Acknowledgement document          | A partir du document de reconnaissance                              |

**Figure 7 – Présentation du modèle Market Management**

Comme indiqué dans la Figure 7, un jeu spécifique de documents contextualisés est fourni pour chaque processus métier nécessaire à l'exploitation d'un marché de l'électricité. Comme indiqué dans la Figure 7, les profils de marché sont spécifiés dans l'IEC 62325-351 et les documents contextualisés sont décrits dans les normes IEC 62325-451-1, IEC 62325-451-2, etc.

La Figure 8 montre les classes du paquetage 'MarketManagement'.



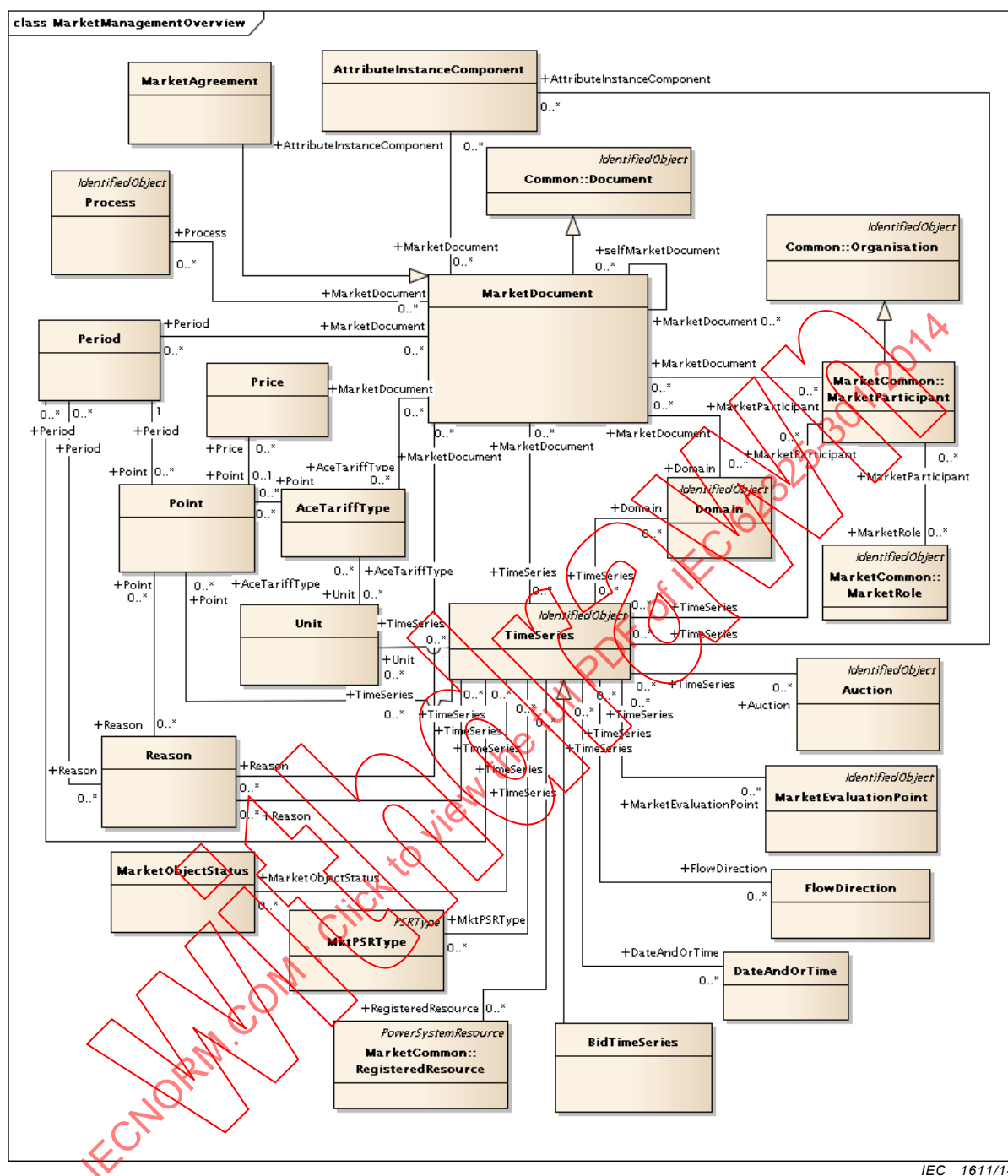


Figure 8 – Modèle Market Management

Dans ce modèle Market Management, un rôle clé est donné au concept de 'MarketDocument', c'est-à-dire que les transactions du marché de l'électricité sont basées sur des échanges contractuels d'informations entre les participants du marché via un jeu de documents donné en fonction du processus métier.

Comme indiqué dans la Figure 7, un jeu spécifique de documents contextualisés est fourni pour chaque processus métier nécessaire à l'exploitation d'un marché de l'électricité. A titre d'exemple, voici une liste non exhaustive des processus:

- processus d'acquittement étant donné que l'échange d'informations est basé sur des échanges contractuels, il est important d'obtenir une reconnaissance fonctionnelle du document échangé et pas seulement une reconnaissance technique;



- processus de programmation: ce processus décrit la façon d'échanger les informations relatives aux programmes (programmes de production, programmes de charge, programmes d'échanges commerciaux bilatéraux, programmes d'échange d'énergie entre réseaux, etc.);
- processus de règlement: ce processus décrit comment échanger les informations nécessaires au règlement du marché de l'électricité, à savoir la comparaison entre l'énergie programmée et les compteurs relevés;
- processus d'attribution de la capacité de transport et de désignation ce processus décrit les ventes aux enchères explicites et implicites de la capacité de transport dans le cadre du commerce transfrontalier. Il inclut également le marché secondaire des droits de capacité, c'est-à-dire la revente de droits de capacité;
- processus de ressources en réserve: ce processus décrit la programmation des ressources, c'est-à-dire les unités de production et la charge pouvant être répartie, et la vente aux enchères de la capacité et notamment l'activation par le gestionnaire de réseau de la réserve tertiaire à des fins d'équilibrage;
- etc.

La classe 'Process' (voir Figure 8) permet de définir pour un document donné le processus vers lequel le flux d'informations est dirigé. Par exemple, le Schedule Document peut être utilisé dans différents processus tels que "forecast", "long term", "day ahead", "intra day", etc.

Dans un 'MarketDocument', un autre concept important doit être souligné: le concept 'TimeSeries' (voir Figure 9) basé sur les participants du marché (classe 'MarketParticipant') jouant un rôle (classe 'MarketRole') dans un processus métier du marché (classe 'Process') qui peuvent échanger des programmes de volume/prix relatifs à un domaine d'énergie (classe Domain) pour un type business donné (tel que le "commerce intérieur", le "commerce transfrontalier", la "réserve primaire", la "réserve secondaire", la "réserve tertiaire", etc.). Ces documents constituent la base à partir de laquelle les échanges sont fondés afin de gérer les échanges d'énergie, les d'offres, l'attribution de capacité, les ressources d'énergie en réserve et le règlement.

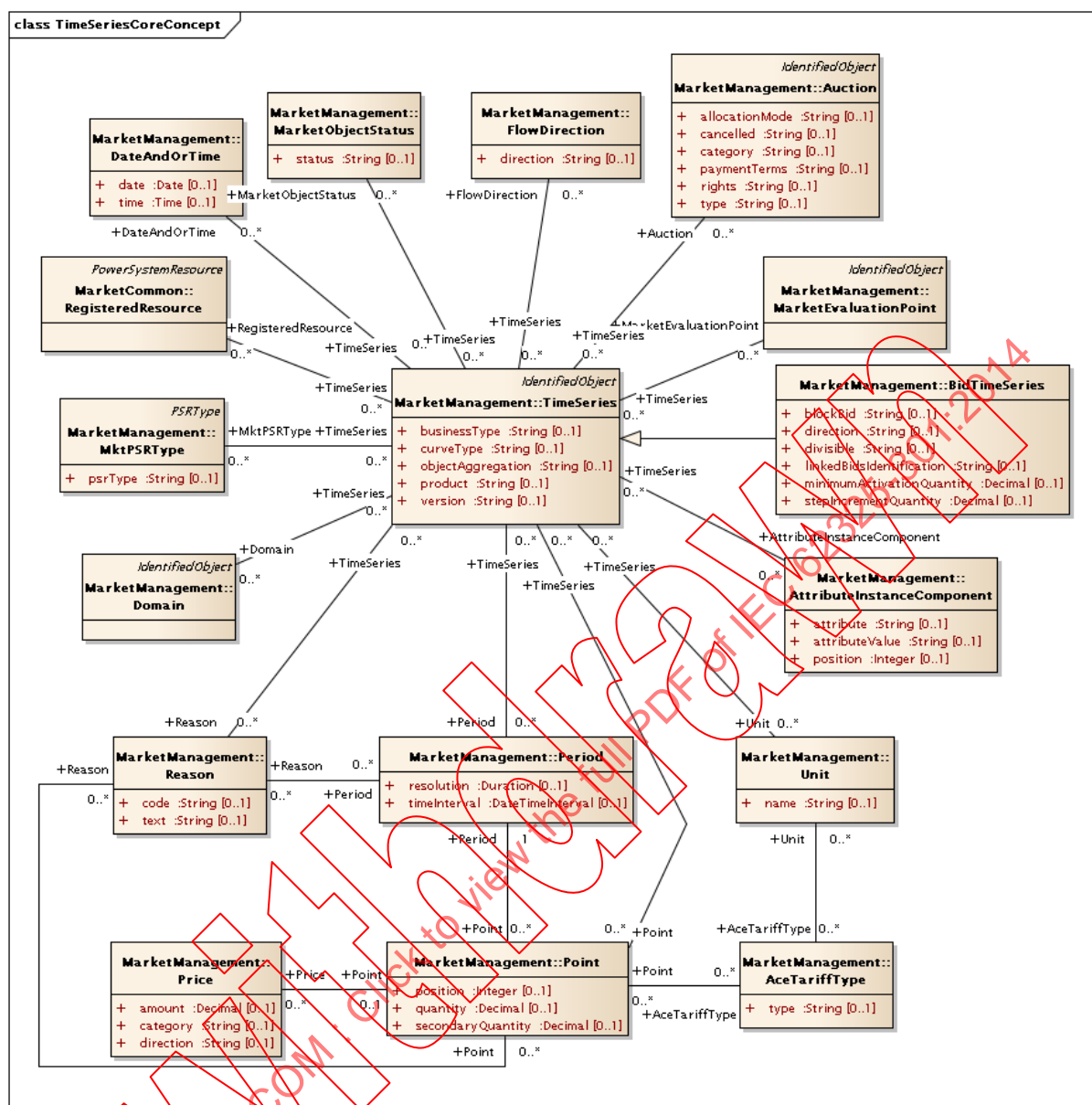


**Figure 9 – Concept de base 'TimeSeries' 'MarketManagement'**

Pour gérer les quantités et les prix de manière contractuelle dans le marché de l'électricité, les attributs de type 'Decimal' ont été intégrés à la modélisation.

#### 4.4.3 Paquetage 'MarketOperations'

#### 4.4.3.1 Opérations du marché

Le paquetage 'MarketOperations' décrit un ensemble cohérent de classes à utiliser avec le modèle Common Market (et d'autres parties du CIM décrites dans les normes IEC 61970-301 et IEC 61968-11) pour générer un profil. Dans ce cas, le profil doit être utilisé pour le marché de l'électricité de type américain caractérisé par une gestion de la production à J-1 effectuée par un opérateur du marché, par un équilibrage intrajournalier et en temps réel via un système de répartition central, et par le règlement selon les prix marginaux locaux.

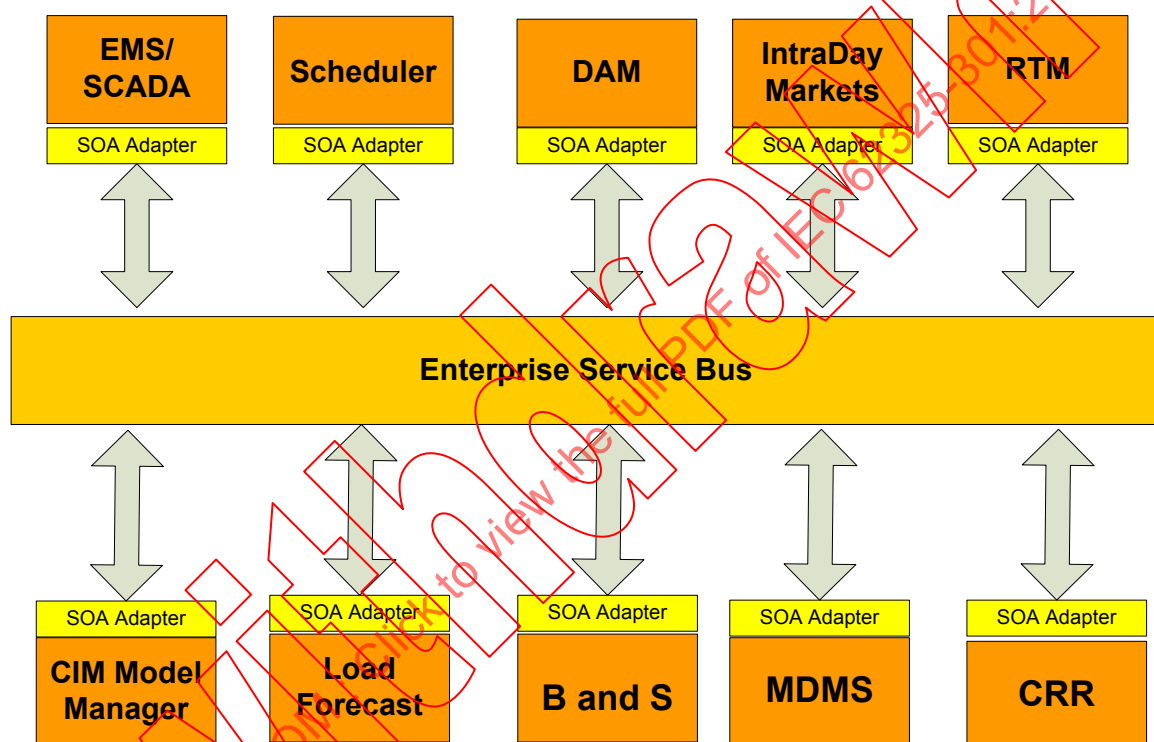
Le marché de l'électricité de type américain inclut également la vente aux enchères des droits à revenu de congestion (CRR, *Congestion Revenue Rights*), qui sont des instruments financiers que les participants du marché achètent pour se couvrir des frais de congestion.

Sont également inclus la gestion des données de compteur, la facturation et le règlement. Le paquetage 'MarketOperations' comprend des modèles prenant en charge ces caractéristiques.

Les Paragraphes 4.4.3.2 à 4.4.3.6 décrivent les principaux concepts référencés dans le paquetage 'MarketOperations'.

#### 4.4.3.2 Systèmes informatiques d'un opérateur du marché

La Figure 10 présente les systèmes informatiques d'un opérateur type des marchés de l'électricité de type américain qui sont référencés dans le paquetage 'MarketOperations'. L'opérateur du marché peut également être un gestionnaire des réseaux de transport régionaux (RTO, Regional Transmission Operator) ou un gestionnaire de réseau indépendant (ISO, Independent System Operator). Ces systèmes informatiques sont identifiés comme suit:



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#### Légende

| Anglais                | Français                    |
|------------------------|-----------------------------|
| IntraDay Markets       | Marchés intrajournaliers    |
| SOA Adapter            | Adaptateur SOA              |
| Enterprise Service Bus | Bus de service d'entreprise |

**Figure 10 – Systèmes informatiques de l'opérateur d'un marché de l'électricité de type américain**

#### 4.4.3.3 Interfaces du gestionnaire des réseaux de transport régionaux

La Figure 11 présente le modèle d'interface UML d'un gestionnaire des réseaux de transport régionaux (RTO) capable de prendre en charge les interfaces de la Figure 10. Les principales classes sont brièvement résumées: les classes 'AggregateNode' et 'Pnode' sont utilisées afin de modéliser les nœuds de tarification pour lesquels les prix marginaux locaux sont calculés selon une moyenne pondérée. La classe 'LocalReliabilityArea' est utilisée pour identifier et modéliser les poches de charge dans le RTO. La classe 'MktConnectivityNode' est utilisée pour étendre la classe 'ConnectivityNode' de l'IEC 61970 avec les données du marché. Les

classes 'TransmissionRightChain', 'ContractRight' et 'MSSAggregation' permettent de modéliser les contrats existants afin d'utiliser le réseau de transport et de représenter les droits de propriété de transport maintenus en vertu d'une clause d'antériorité. Les classes 'Organisation' et 'MktOrganisation' identifient le RTO. Les classes 'SecurityConstraints' et 'SecurityConstraintSum' sont utilisées pour représenter les contraintes du système, telles que les nomogrammes qui sont proches des contraintes de stabilité transitoire. Les classes 'HostControlArea', 'SubControlArea' et 'AdjacentCAsSet' sont utilisées pour modéliser les données et prendre en charge les opérations des zones de commande. Les modèles de ressource et les données du propriétaire de transport participant sont inclus dans leurs classes associées. Pour plus de détails sur le modèle RTO, voir l'Article 6.

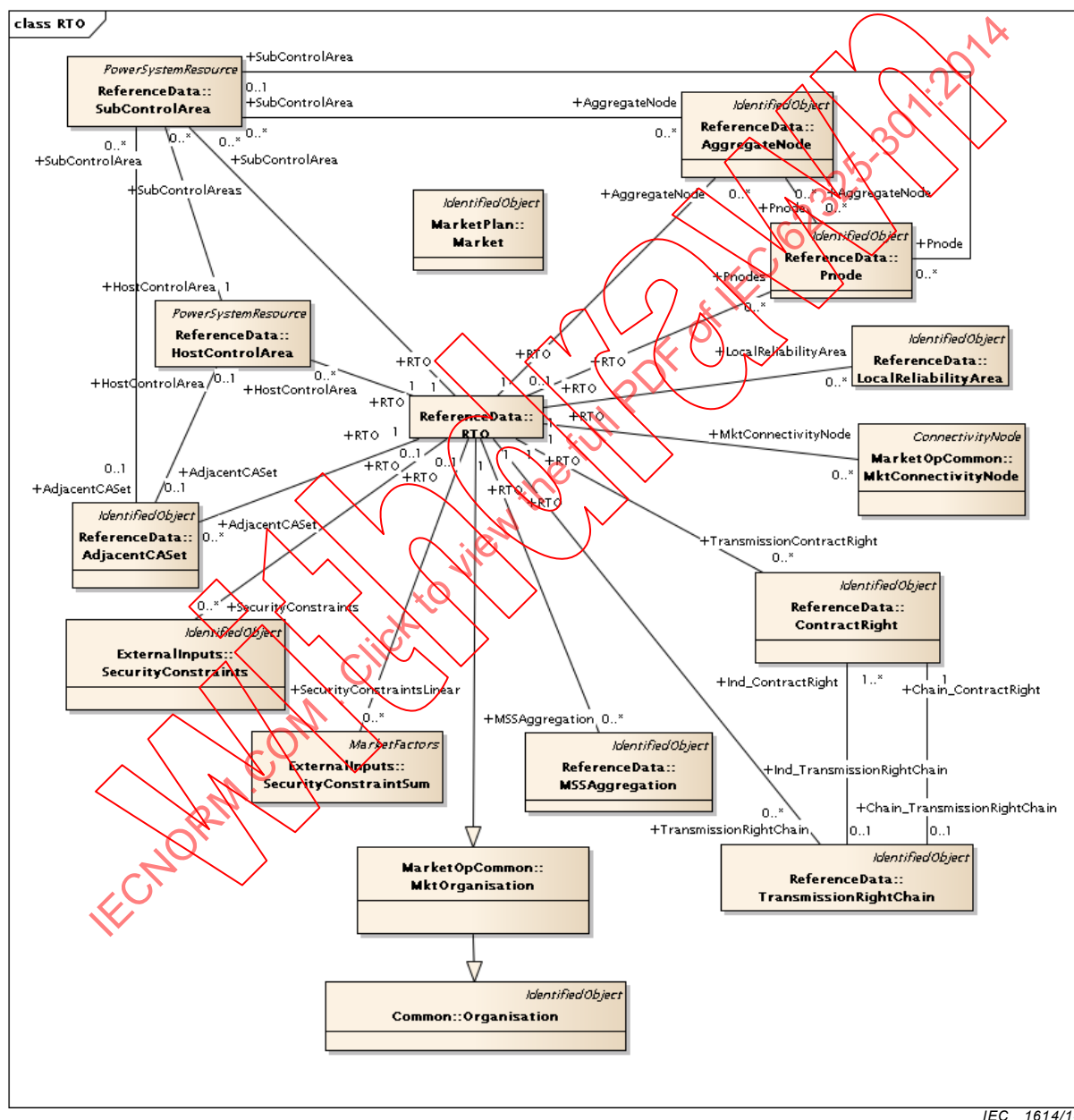


Figure 11 – Organisation de transport régional pour le marché de l'électricité de type américain

#### 4.4.3.4 Modèle Resource

La Figure 12 donne un aperçu de haut niveau du modèle UML qui prend en charge les données du modèle de ressource du marché de l'électricité de type américain. La

classe 'RegisteredResource' est une classe parent qui présente les sous-classes suivantes: 'RegisteredLoad', 'RegisteredInterTie' et 'RegisteredGenerator'. Elle est associée aux classes 'AggregateNode', 'Pnode' et 'MktConnectivityNode' afin de prendre en charge les ressources agrégées et physiques. Les associations avec 'AggregateNode' et 'AggregatedPnode' (l'association est héritée de 'Pnode') prennent en charge la définition des ressources agrégées sur la base d'un nœud agrégé ou d'un nœud de tarification agrégé. Les associations avec 'IndividualPnode' (héritées de 'Pnode') et 'MktConnectivityNode' prennent en charge la définition des ressources physiques sur la base d'un nœud de tarification ou de connectivité. D'autres associations sont également disponibles via les sous-classes 'RegisteredLoad', 'RegisteredInterTie' et 'RegisteredGenerator' pour prendre en charge les ressources agrégées et physiques par un lien direct aux ressources physiques définies dans le modèle de réseau de système électrique. 'RegisteredLoad' est associé à 'MktEnergyConsumer', 'RegisteredInterTie' à 'Flowgate' et 'RegisteredGenerator' à 'MktGeneratingUnit'.

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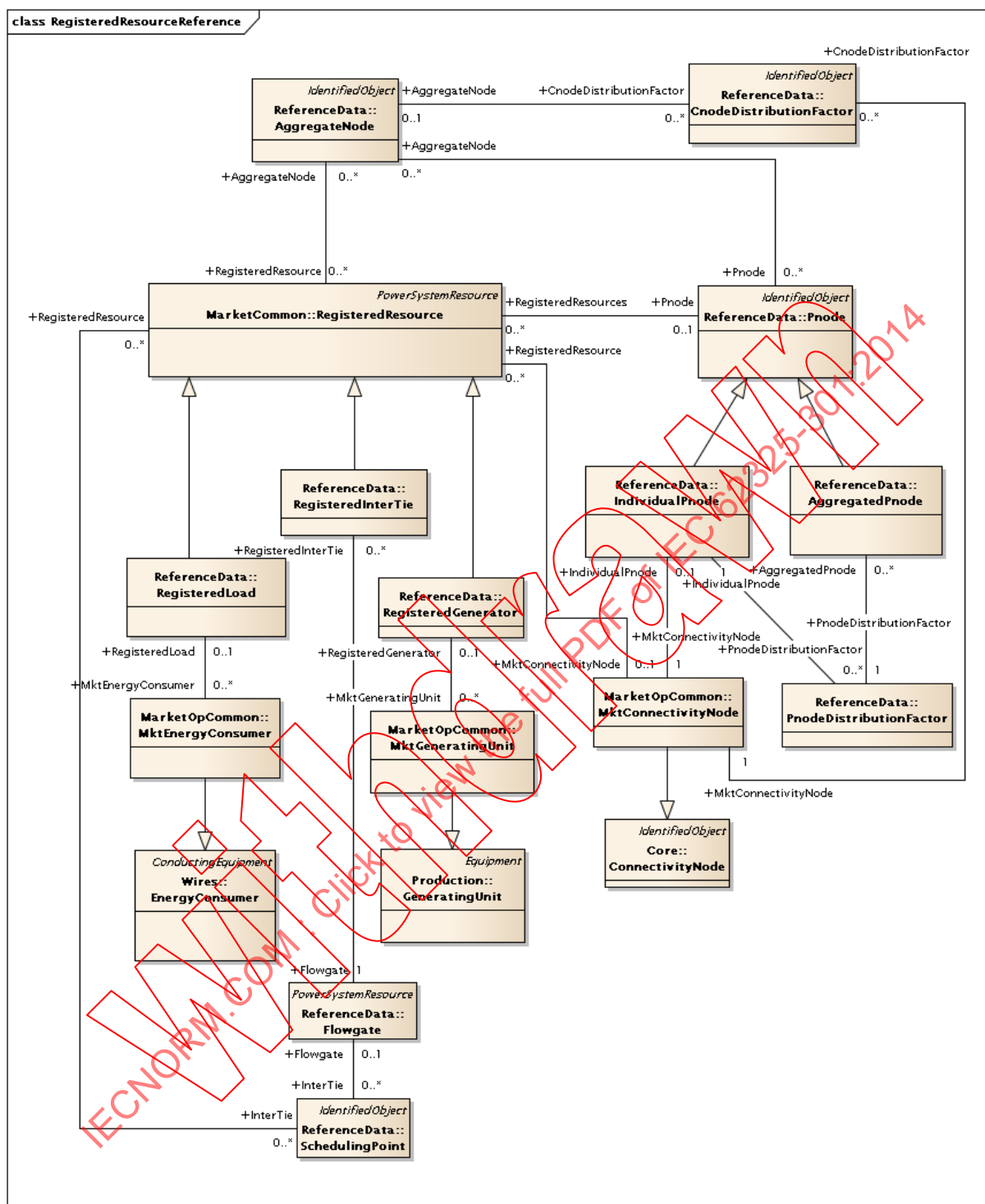


**Figure 12 – Définition de référence de RegisteredResource pour le marché de l'électricité de type américain**

#### 4.4.3.5 Modèle Bid/Offer

Les marchés de l'électricité de type américain sont basés sur des offres de vente et d'achat de produits d'électricité qui sont négociées par un opérateur du marché soumis aux contraintes du réseau et des ressources. Les enchères et les offres comprennent des paires de quantité de prix et des données techniques relatives à la capacité du participant du marché à fournir les produits mentionnés.

La Figure 13 montre une vue générale des classes et des associations qui sont utilisées pour modéliser les offres et les offres. Le terme "offre" («bid») inclut les offres de vente et d'achat d'un ou plusieurs produits d'électricité. La classe 'Bid' est une sous-classe de la classe 'Document' du paquetage 'IEC 61968'. Les Bid sont elles-mêmes classées en 'ResourceBid' et 'TransactionBid'. Les 'ResourceBid' sont des offres basées sur des ressources physiques (ou virtuelles) qui sont situées dans la zone de couverture du RTO, c'est-à-dire directement sous le contrôle opérationnel du RTO. Les 'TransactionBid' sont des accords bilatéraux conclus entre les participants du marché, qui sont mentionnés au RTO comme étant des contraintes dans l'ajustement du marché. Le RTO décide si les accords bilatéraux peuvent être conclus dans le respect des normes de fiabilité du système.

Les offres sont associées aux coordinateurs de programmation qui les envoient au nom des participants du marché, comme le montre l'association entre la classe 'Bid' et la classe 'SchedulingCoordinator'. On doit noter que si cette association est facultative, l'association entre la classe 'Bid' et la classe 'MarketParticipant' doit être exigée. Autrement dit, tandis que les deux associations à la classe 'Bid' sont facultatives dans le modèle, si l'une des deux fait partie du profil, alors l'une des associations entre la classe 'Bid' et la classe 'SchedulingCoordinator' ou 'MarketParticipant' est exigée.

La classe Bid est reliée à la classe 'BidProduct' et aux classes 'MarketProduct'. Ces associations sont utilisées pour modéliser les offres relatives aux services énergétiques et auxiliaires. Une autre association entre la classe 'Bid' et la classe 'Market' indique le marché visé par l'offre (J-1, temps réel, etc.).

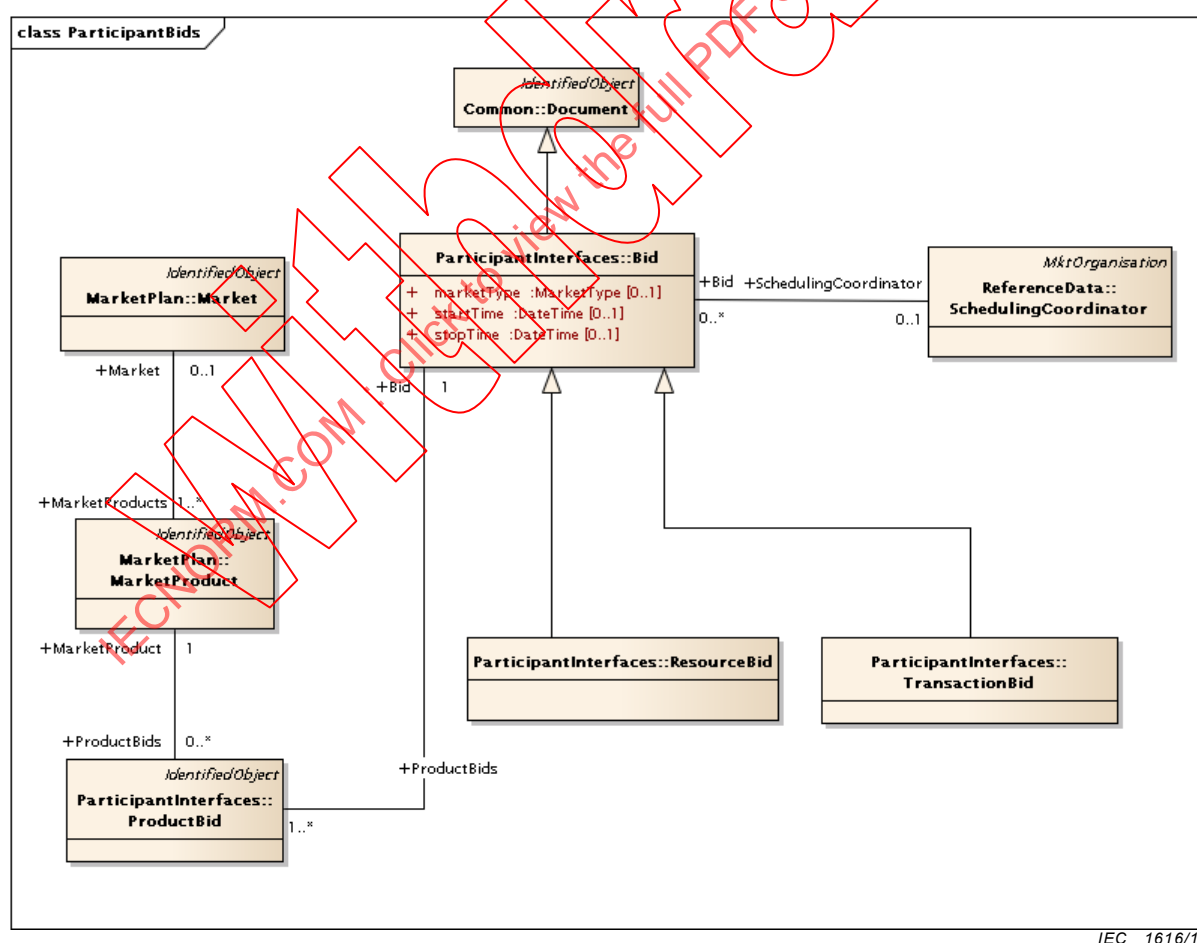


Figure 13 – Définition de l'offre pour le marché de l'électricité de type américain

La Figure 14 donne des détails supplémentaires sur les enchères/offres.

La classe 'Bid' est associée à la classe 'ProductBid', qui est elle-même associée à la classe 'BidPriceSchedule'. La classe 'BidPriceSchedule' définit des programmes d'offre pour autoriser une offre de produit à utiliser des courbes de prix d'offre spécifiques sur plusieurs intervalles de temps. Cela simplifie la modélisation des offres qui sont effectuées sur des périodes couvrant plusieurs intervalles. Le programme d'offre est l'ensemble d'intervalles consécutifs pour lequel l'offre est valide.

Une offre peut également être un programme individuel indiquant que le participant du marché aimerait exploiter les ressources d'après un programme spécifique (par exemple, un programme minimum). L'opérateur du marché détermine si les ressources peuvent fonctionner avec le programme individuel envoyé tout en satisfaisant aux critères de fiabilité du système. Ces programmes individuels sont établis aux prix marginaux locaux (LMP, *Locational Marginal Prices*) déterminés pendant l'ajustement du marché. La classe 'Bid' est associée à la classe 'ProductBid', qui est associée à la classe 'BidSelfSchedule' pour prendre en charge la modélisation des programmes individuels. La classe 'BidSelfSchedule' est associée à la classe 'ContractRight', qui peut être utilisée pour modéliser l'utilisation de contrats existants afin de prendre en charge les programmes individuels.

Ce modèle prend également en charge les offres dont une partie est classée comme programme individuel et l'autre partie comme offre ordinaire.

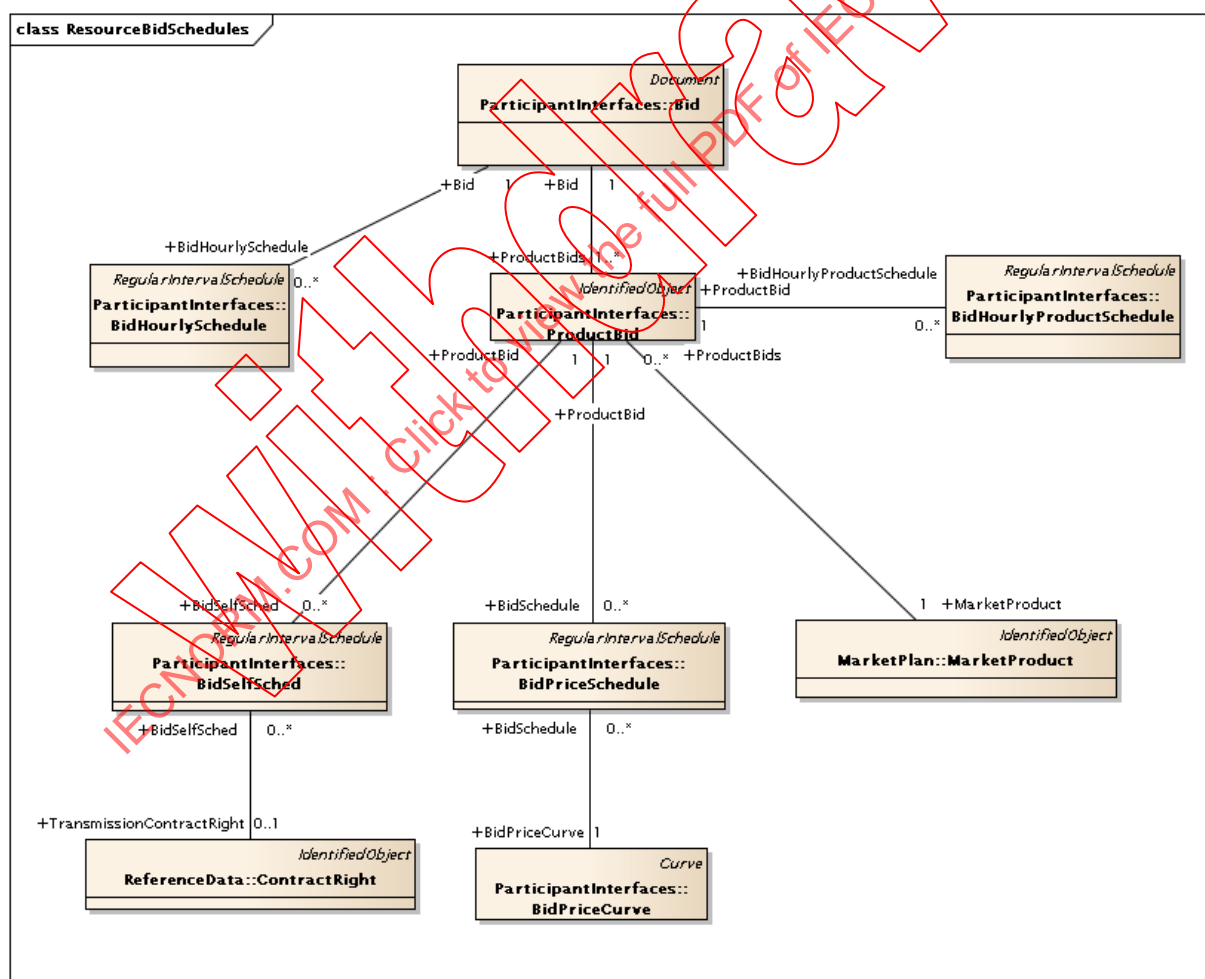
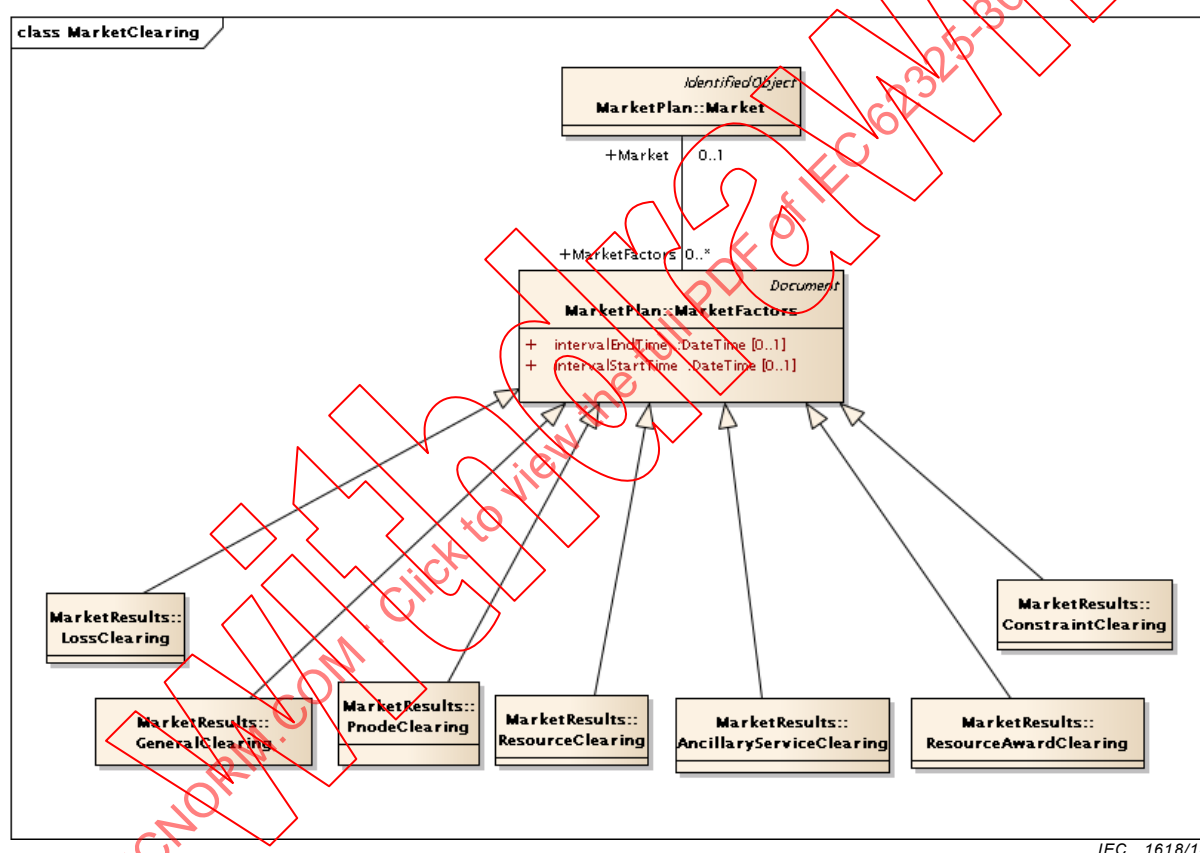


Figure 14 – Définitions des programmes d'offre des ressources pour le marché de l'électricité de type américain



#### 4.4.3.6 Résultats d'équilibre du marché

La Figure 15 présente les principales classes utilisées pour communiquer les résultats du processus d'ajustement d'un marché de l'électricité de type américain. La classe 'Market' est utilisée pour modéliser le type de marché (J-1, temps réel ou intrajournalier). La classe 'MarketFactors' est utilisée pour modéliser l'horizon temporel du marché. La classe 'LossClearing' est utilisée pour modéliser les pertes électriques pendant l'horizon du marché. La classe 'GeneralClearing' est utilisée pour modéliser l'identité de l'intervalle du marché. La classe 'PnodeClearing' et ses associations sont utilisées pour modéliser les prix d'équilibre (LMP, prix marginaux locaux) du processus. La classe 'ResourceClearing' est utilisée pour modéliser les résultats d'équilibre du marché en fonction des ressources. La classe 'AncillaryServiceClearing' est utilisée pour modéliser les résultats de l'équilibre des services auxiliaires en fonction des régions du marché. La classe 'ResourceAwardClearing' est utilisée pour modéliser d'autres informations sur l'équilibre des ressources. La classe 'ConstraintClearing' est utilisée pour modéliser l'échange de données selon des contraintes avec obligation dans la solution optimale d'équilibre du marché.



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Figure 15 – Compensation du marché de l'électricité de type américain

## 4.5 Conseils de modélisation

### 4.5.1 Modélisation pour changements

La Partie 301 de l'IEC 62325 et de l'IEC 61970, et la Partie 11 de l'IEC 61968 définissent le CIM.

### 4.5.2 Processus pour les amendements au CIM

Il peut être souhaitable d'amender le CIM pour réviser le modèle ou pour étendre le CIM afin de modéliser des éléments supplémentaires d'un système électrique. Le processus recommandé pour ces amendements est le suivant:

- a) Préparer un ou plusieurs cas d'utilisation (Use Case) décrivant les changements souhaités. Il convient que cela inclue les changements proposés aux diagrammes de classe concernés avec illustration des classes, attributs et associations nouveaux ou révisés.
- b) Le ou les cas d'utilisation sont ensuite examinés par le groupe de travail approprié, qui va décider s'il convient que les changements demandés soient traités en tant que révisions de la norme CIM courante ou s'il convient qu'ils soient traités comme des amendements privés sans nécessiter de changement pour la norme.
- c) Les propositions d'amendements acceptées par le groupe de travail seront ajoutées à la liste des sujets majeurs et le moment venu, une nouvelle version du modèle CIM sera préparée et une mise à jour de la spécification CIM appropriée sera faite.

#### **4.5.3 Changements apportés au modèle UML du CIM**

Du point de vue de la modélisation, lorsque le CIM est étendu, l'approche doit partir du modèle UML de CIM existant. Les extensions peuvent être ajoutées de plusieurs façons disponibles avec UML, mais dans tous les cas, la bonne approche doit examiner le modèle courant et de déterminer la meilleure extension à partir des diagrammes de classe existants. Les extensions peuvent prendre l'une des formes suivantes, de la plus simple à la plus complexe:

- ajouter des attributs supplémentaires à des classes préexistantes;
- ajouter des associations supplémentaires entre deux classes préexistantes;
- ajouter de nouvelles classes constituant des spécialisations de classes préexistantes;
- ajouter de nouvelles classes à l'aide d'associations avec des classes préexistantes.

L'objectif principal est de réutiliser au maximum le CIM. Du point de vue des paquetages, il convient que les extensions soient faites aux paquetages existants chaque fois que cela est possible. Si les extensions comprennent un nouveau domaine d'application, il convient d'envisager de créer un nouveau paquetage pour les additions, mais en créant toujours les nécessaires associations au paquetage préexistant, en gardant à l'esprit que bien qu'un nouveau paquetage soit créé, le CIM continue d'être un seul modèle.

#### **4.5.4 Changements apportés aux documents normatifs du CIM**

D'un point de vue documentaire, lorsque le CIM est étendu, une décision doit être prise quant à la question de savoir si les changements constituent des mises à jour de documents normatifs sur le CIM ou si une nouvelle spécification partie 3xx est exigée. Dans les deux cas, les extensions deviendront une partie de la norme IEC sur le CIM.

#### **4.5.5 Profils CIM**

Une mise en œuvre du CIM peut ne pas inclure toutes les classes, attributs et associations de la spécification CIM et être tout de même conforme à la norme CIM. Des profils peuvent être définis pour spécifier quels éléments doivent être inclus (à savoir les éléments obligatoires) pour une utilisation particulière du CIM, ainsi que ceux qui sont facultatifs. Ces profils sont définis dans les Parties 35X et 45X des séries de normes et doivent respecter les règles de modélisation de l'IEC 62325-450.

Dans l'IEC 62325-450, la définition des profils CIM suit un cadre de modélisation en couche qui va du CIM jusqu'à la spécification des messages en fonction des concepts CIM, à travers la définition de plusieurs modèles contextuels régionaux et de leurs documents contextualisés ultérieurs pour l'échange d'informations.

Une analyse complète des règles associées aux profils de la série IEC 62325 est présentée dans le document IEC 62325-450. Se reporter à ce document pour obtenir une explication et une description complètes de ces règles.

## 4.6 Outils de modélisation

Le modèle UML du CIM complet existe sous la forme d'un fichier de projet Enterprise Architect et peut être visualisé avec cet outil, y compris les diagrammes de classe et les descriptions des classes, des attributs, des types et des relations. La visualisation du CIM de cette façon offre une interface de navigation graphique qui permet de visualiser toutes les données de spécification du CIM par simple pointer-cliquer sur le diagramme de classe dans chaque paquetage. Une visionneuse gratuite est disponible auprès de Sparx Systems.

Idéalement, le modèle d'information du CIM est indépendant de tout outil UML spécifique, bien que l'expérience ait montré que les échanges entre des outils différents sont souvent loin d'être parfaits. En attendant que l'interopérabilité des outils devienne réalité, les futurs changements apportés à la spécification du CIM, débouchant sur de nouvelles versions de la présente norme, seront incorporés en premier lieu dans la description du projet Enterprise Architect pour garantir une source unique pour les données de modèle CIM.

## 5 Modèle détaillé

### 5.1 Vue générale

Le modèle d'information commun (CIM) représente une vue logique complète des informations d'un système des opérations du marché. Cette définition inclut les classes et les attributs publics, ainsi que leurs relations. Le Paragraphe 5.2 décrit comment l'Article 6 est structuré. L'Article 6 est automatiquement généré à partir du modèle CIM.

### 5.2 Contexte

Le CIM est fractionné en sous-paquetages. Les classes au sein des paquetages sont énumérées alphabétiquement. Les attributs natifs d'une classe sont énumérés en premier, suivis des attributs hérités, dans l'ordre de profondeur d'héritage, puis du nom d'attribut. Les associations natives sont énumérées en premier pour chaque classe, suivies, dans l'ordre de profondeur d'héritage, des associations héritées, suivies, dans l'ordre alphabétique, du nom de classe, suivi, dans l'ordre alphabétique, du nom d'extrémité d'association. Les associations sont décrites selon le rôle de chaque classe participant à l'association. Les extrémités d'association sont répertoriées pour chaque classe à chaque extrémité d'une association.

Pour chaque paquetage, le modèle d'information de chaque classe est entièrement décrit dans des tableaux d'attributs et d'extrémités d'association. Les informations relatives aux attributs et extrémités d'association concernant les attributs natifs et hérités sont énumérées comme indiqué dans les Tableaux 1 et 2. Pour chaque attribut ou extrémité d'association hérités, la colonne "description" contiendra le texte indiquant que les attributs sont hérités d'une classe spécifique. La colonne "description" des attributs et extrémités d'association natifs contient la description réelle.

**Tableau 1 – Documentation d'attribut**

| nom     | type        | description                                                      |
|---------|-------------|------------------------------------------------------------------|
| native1 | Float       | Un attribut natif virgule flottante de la classe est décrit ici. |
| native2 | ActivePower | Documentation pour un autre attribut natif du type ActivePower.  |
| Name    | Float       | Hérité de la classe IdentifiedObject                             |

Comme indiqué dans le Tableau 1, dans un tableau attributs, un attribut est dans certains cas une constante; l'expression "(const)" est alors ajoutée dans la colonne "nom" du tableau attributs. Dans de tels cas, l'attribut a normalement une valeur initiale qui est précédée du signal "égal" et accolée au nom d'attribut.

**Tableau 2 – Documentation des extrémités d'association**

| [mult à partir de] | [mult vers] nom       | type           | description                                                                                             |
|--------------------|-----------------------|----------------|---------------------------------------------------------------------------------------------------------|
| [0..*]             | [0..1] PSRType        | PSRType        | PSRType (classification personnalisée) pour cette PowerSystemResource.                                  |
| [0..1]             | [0..*] Measurements   | Measurement    | Les Measurements qui sont incluses dans la hiérarchie de dénomination où le PSR est l'élément conteneur |
| [1..1]             | [0..*] OperatingShare | OperatingShare | Le lien à n'importe quel nombre d'objets de quote-part d'opérateur.                                     |
| [0..*]             | [0..*] PsrLists       | PsrList        |                                                                                                         |
| [1..1]             | [0..1] OutageSchedule | OutageSchedule | Une ressource de système électrique peut avoir un programme d'indisponibilité.                          |
| [0..*]             | [0..*] ReportingGroup | ReportingGroup | Groupes de reporting auxquels appartient cette PSR.                                                     |
| [0..1]             | [0..*] DiagramObjects | DiagramObject  | Hérité de: IdentifiedObject                                                                             |
| [1..1]             | [0..*] Names          | Name           | Hérité de: IdentifiedObject                                                                             |

Comme indiqué dans le Tableau 2, dans un tableau extrémités d'association, la première colonne décrit la multiplicité à l'autre extrémité de l'association (c'est-à-dire, la multiplicité de la classe pour laquelle des extrémités d'association sont décrites). La multiplicité de l'extrémité d'association elle-même est incluse entre crochets. Le nom de l'extrémité d'association est répertorié en texte en clair. La classe à l'autre extrémité de l'association est énumérée dans la colonne "type". Une multiplicité zéro indique une association facultative. Une multiplicité "\*" indique que n'importe quel nombre est admis. Par exemple, une multiplicité [1..\*] indique qu'une plage allant de 1 à n'importe quel nombre supérieur est admise.

Lorsqu'une classe est énumération (c'est-à-dire une énumération), le tableau attributs est remplacé par le tableau enums comme indiqué dans le Tableau 3, car les libellés énumération n'ont pas de type. Il n'existe pas de libellés d'énumération hérités pour une classe d'énumération.

**Tableau 3 – Documentation des Enums**

| libellé | description                                                         |
|---------|---------------------------------------------------------------------|
| native1 | Il s'agit de la première valeur enumeration native.                 |
| native2 | Il s'agit de la deuxième valeur enumeration native.                 |
| native3 | Il n'y a typiquement pas d'attributs hérités pour les énumérations. |

## 6 Paquetage supérieur IEC 62325

### 6.1 Généralités

Les sous-paquetages IEC 62325 du CIM sont développés, normalisés et maintenus par l'IEC.

La Figure 16 montre le diagramme de classe Main.

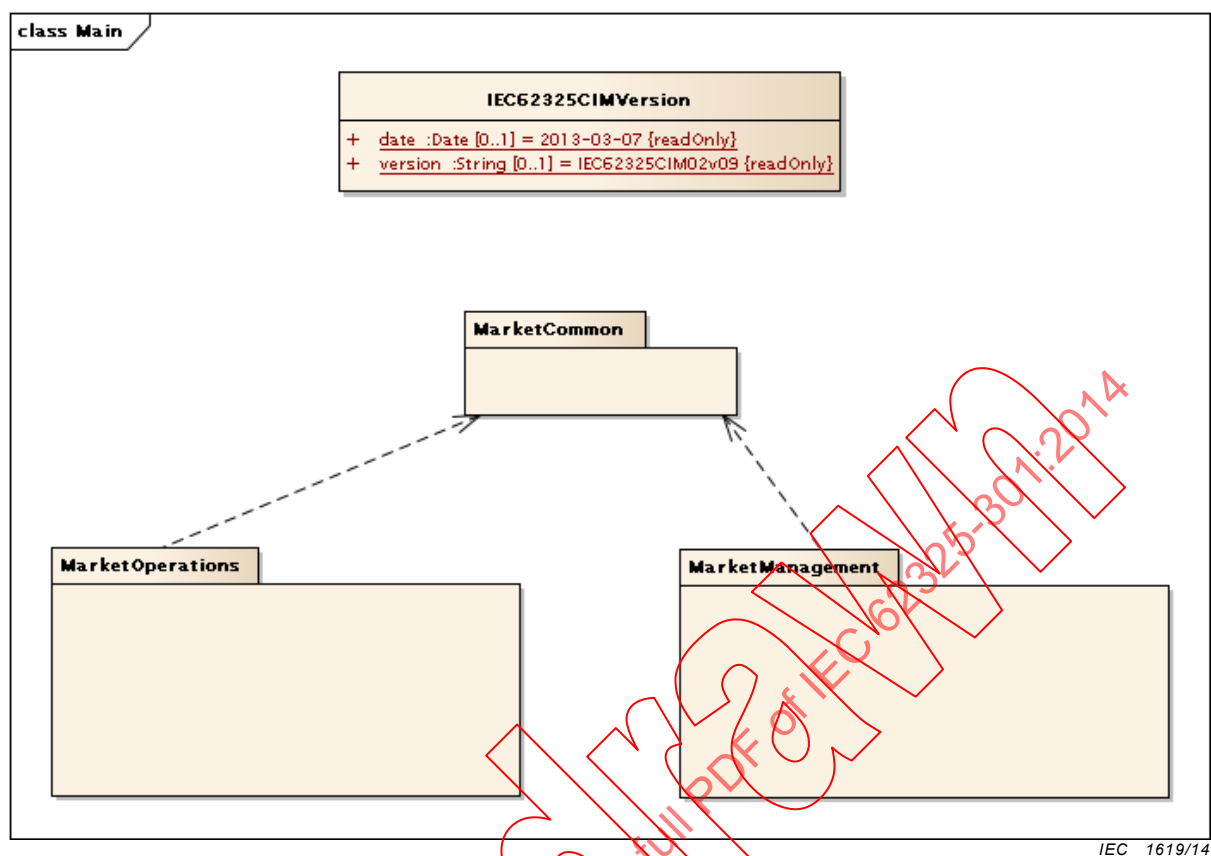


**Figure 16 – Diagramme de classe IEC 62325::Main**

Ce diagramme montre tous les paquets IEC 62325 et leurs dépendances logiques.

## 6.2 Classe racine IEC 62325CIMVersion

Numéro de version de l'IEC 62325 attribué à ce modèle UML.

Le Tableau 4 montre tous les attributs de IEC 62325CIMVersion.

**Tableau 4 – Attributs de IEC 62325::IEC 62325CIMVersion**

| nom                               | type   | description                                                                                                                                     |
|-----------------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| date=2013-03-07 (const)           | Date   | La forme est AAAA-MM-JJ; par exemple, le 5 janvier 2009 est 2009-01-05.                                                                         |
| version=IEC 62325CIM02v09 (const) | String | La forme est IEC 62325CIMXXvYY où XX est la version principale du paquetage du CIM et YY la version secondaire. Par exemple, IEC 62325CIM10v03. |

## 6.3 Paquetage MarketCommon

### 6.3.1 Généralités

Ce paquetage contient les objets communs partagés par les paquetages MarketManagement et MarketOperations.

La Figure 17 montre le diagramme de classe MarketCommon.

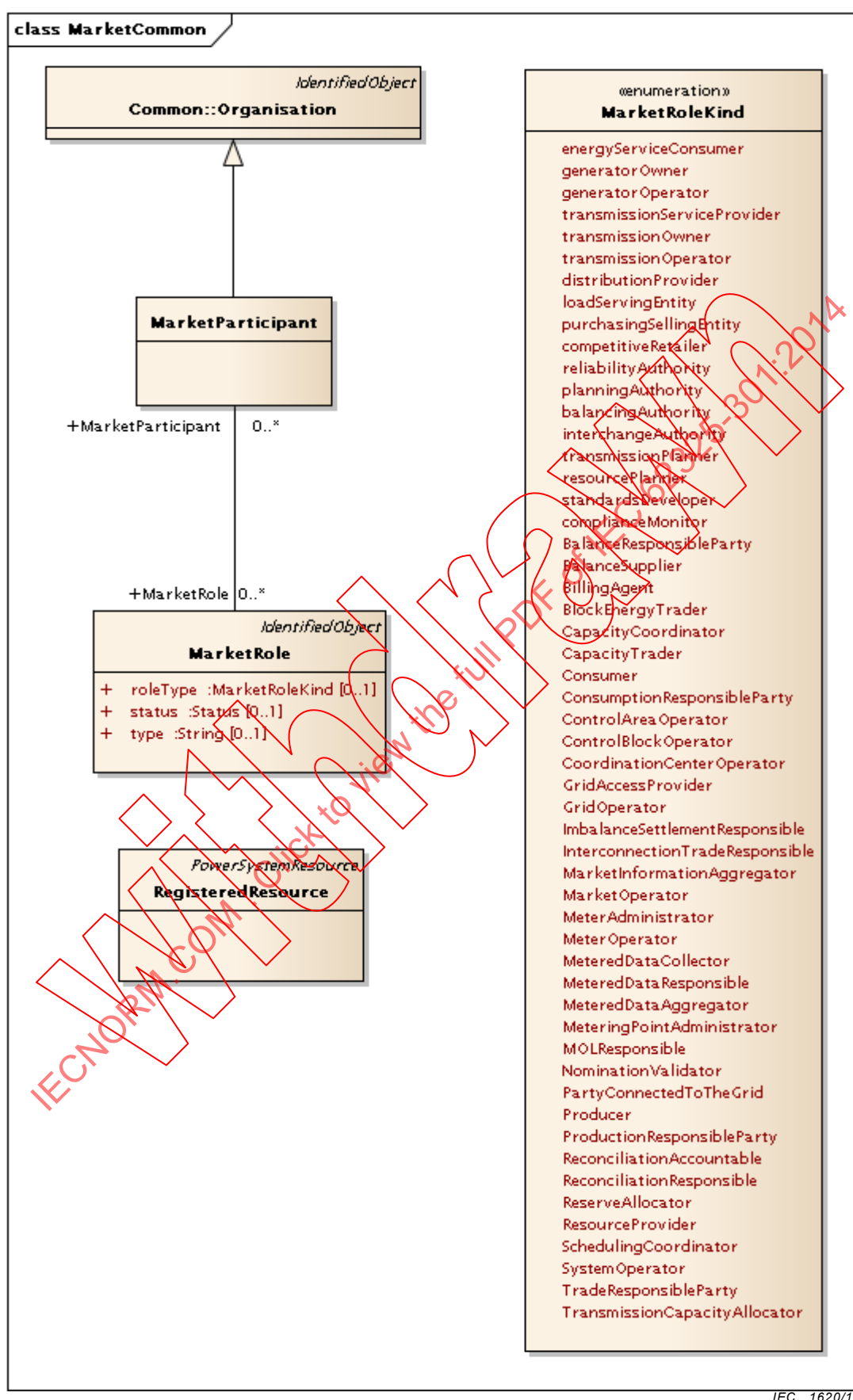


Figure 17 – Diagramme de classe MarketCommon::MarketCommon

Ce sont les classes communes utilisées par les paquetages MarketManagement et MarketOperations.

### 6.3.2 MarketParticipant

Identification d'une partie agissant dans un processus métier du marché de l'électricité. Cette classe est utilisée pour identifier les organisations qui peuvent participer à la gestion et/ou aux opérations du marché.

Le Tableau 5 montre tous les attributs de MarketParticipant.

**Tableau 5 – Attributs de MarketCommon::MarketParticipant**

| nom               | type              | description                 |
|-------------------|-------------------|-----------------------------|
| streetAddress     | StreetAddress     | Hérité de: Organisation     |
| postalAddress     | PostalAddress     | Hérité de: Organisation     |
| phone1            | TelephoneNumber   | Hérité de: Organisation     |
| phone2            | TelephoneNumber   | Hérité de: Organisation     |
| electronicAddress | ElectronicAddress | Hérité de: Organisation     |
| aliasName         | String            | Hérité de: IdentifiedObject |
| mRID              | String            | Hérité de: IdentifiedObject |
| name              | String            | Hérité de: IdentifiedObject |

Le Tableau 6 montre toutes les extrémités d'association de MarketParticipant avec d'autres classes.

**Tableau 6 – Extrémités d'association de MarketCommon::MarketParticipant avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type             | description                 |
|--------------------|-----------------------|------------------|-----------------------------|
| [0..*]             | [0..*] MarketDocument | MarketDocument   |                             |
| [0..*]             | [0..*] MarketRole     | MarketRole       |                             |
| [0..*]             | [0..*] TimeSeries     | TimeSeries       |                             |
| [0..1]             | [0..*] Bid            | Bid              |                             |
| [0..1]             | [0..*] Roles          | OrganisationRole | Hérité de: Organisation     |
| [0..1]             | [0..*] DiagramObjects | DiagramObject    | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names          | Name             | Hérité de: IdentifiedObject |

### 6.3.3 MarketRole

Comportement externe joué par une partie du marché de l'électricité.

Le Tableau 7 montre tous les attributs de MarketRole.

**Tableau 7 – Attributs de MarketCommon::MarketRole**

| nom       | type           | description                                                                                                                                                                                                         |
|-----------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| roleType  | MarketRoleKind | Défini à l'aide d'une liste énumérée de types de rôle du marché à utiliser lorsqu'une liste prédéfinie de type est souhaitée.                                                                                       |
| status    | Status         | Statut du rôle du marché.                                                                                                                                                                                           |
| type      | String         | Le type de rôles du marché que les parties peuvent jouer dans certains domaines du marché de l'électricité. Les types sont souples; ils utilisent le type de données String pour la libre entrée des types de rôle. |
| aliasName | String         | Hérité de: IdentifiedObject                                                                                                                                                                                         |
| mRID      | String         | Hérité de: IdentifiedObject                                                                                                                                                                                         |
| name      | String         | Hérité de: IdentifiedObject                                                                                                                                                                                         |

Le Tableau 8 montre toutes les extrémités d'association de MarketRole avec d'autres classes.

**Tableau 8 – Extrémités d'association de MarketCommon::MarketRole avec d'autres classes**

| [mult à partir de] | [mult vers] nom          | type              | description                 |
|--------------------|--------------------------|-------------------|-----------------------------|
| [0..*]             | [0..*] MarketParticipant | MarketParticipant |                             |
| [0..1]             | [0..*] DiagramObjects    | DiagramObject     | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names             | Name              | Hérité de: IdentifiedObject |

#### 6.3.4 Enumération MarketRoleKind

Type de rôle du marché qu'une organisation peut avoir.

Le Tableau 9 montre tous les libellés de MarketRoleKind.



**Tableau 9 – Libellés de MarketCommon::MarketRoleKind**

| libellé                     | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| energyServiceConsumer       | Consommateur d'un service d'énergie.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| generatorOwner              | Propriétaire commercial de générateurs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| generatorOperator           | Opérateur commercial de générateurs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| transmissionServiceProvider | Fournisseur de service de transport.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| transmissionOwner           | Propriétaire de transport.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| transmissionOperator        | Gestionnaire de réseau.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| distributionProvider        | Prestataire de distribution.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| loadServingEntity           | Société d'approvisionnement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| purchasingSellingEntity     | Société d'achat-vente.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| competitiveRetailer         | Revendeur concurrent.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| reliabilityAuthority        | Autorité de fiabilité.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| planningAuthority           | Autorité de planification.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| balancingAuthority          | Autorité responsable du maintien de l'équilibre.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| interchangeAuthority        | Autorité responsable des échanges.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| transmissionPlanner         | Responsable de la planification du transport.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| resourcePlanner             | Responsable de la planification des ressources.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| standardsDeveloper          | Normalisateur.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| complianceMonitor           | Contrôleur de conformité.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| BalanceResponsibleParty     | <p>Entité titulaire d'un contrat garantissant la sécurité financière et identifiant la responsabilité d'équilibre avec le responsable du règlement du déséquilibre de la zone d'équilibre du marché, qui l'autorise à agir sur le marché. C'est le seul rôle qui autorise une entité à attribuer de l'énergie au niveau du marché de gros.</p> <p>Informations complémentaires:</p> <p>Le sens du mot "équilibre" dans ce contexte signifie que la quantité contractée à fournir ou à consommer doit être égale à la quantité réellement fournie ou consommée. Equivalent de la «Program responsible party» (Entité responsable du programme) aux Pays-Bas. Equivalent du "Balance Gross Manager" en Allemagne. Equivalent de "market agent" (l'agent de marché) en Espagne.</p> |
| BalanceSupplier             | <p>Entité qui commercialise la différence entre la consommation d'énergie mesurée réelle et l'énergie achetée par l'entité raccordée au réseau dans le cadre de contrats d'énergie fermes. En outre, le BalanceSupplier commercialise la différence entre le contrat d'énergie ferme (de l'entité raccordée au réseau) et la production mesurée.</p> <p>Informations complémentaires:</p> <p>Il n'y a qu'un seul BalanceSupplier pour chaque AccountingPoint (point de comptabilité)</p>                                                                                                                                                                                                                                                                                         |
| BillingAgent                | Entité responsable de la facturation à l'entité concernée.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| BlockEnergyTrader           | Entité qui vend ou achète de l'énergie sur une base ferme (un volume fixé selon la période du marché).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| CapacityCoordinator         | Entité agissant au nom des opérateurs du système engagés, responsable de l'établissement d'une capacité offerte ( <i>Offered Capacity</i> ) d'une capacité de transfert nette (NTC, <i>Net Transfer Capacity</i> ) et/ou d'une capacité de transfert disponible (ATC, <i>Available Transfer Capacity</i> ) coordonnées entre plusieurs zones d'équilibre du marché.                                                                                                                                                                                                                                                                                                                                                                                                              |
| CapacityTrader              | <p>Entité ayant un contrat pour participer au marché de capacité (<i>Capacity Market</i>) afin d'acquérir de la capacité via un allocateur de capacité de transport (<i>Transmission Capacity Allocator</i>).</p> <p>La capacité peut être acquise au nom d'un responsable d'échange d'interconnexion (<i>Interconnection Trade Responsible</i>) ou elle peut être acquise pour être vendue sur des marchés secondaires.</p>                                                                                                                                                                                                                                                                                                                                                     |

| libellé                         | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Consumer                        | Entité qui consomme de l'électricité.<br>Informations complémentaires:<br>C'est un type d'entité raccordée au réseau.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| ConsumptionResponsibleParty     | Entité qui peut être rendue juridiquement et financièrement responsable de tout déséquilibre entre l'énergie attribuée et consommée pour tous les points comptables associés ( <i>Accounting Points</i> ).<br>Informations complémentaires:<br>C'est un type de Balance Responsible Party (entité responsable d'équilibre).                                                                                                                                                                                                                                                                     |
| ControlAreaOperator             | Responsable:<br>1. De la coordination des programmes d'échange entre ses zones d'équilibre du marché et des échanges entre ses zones de réglage associées.<br>2. De la commande de la fréquence de charge de sa zone.<br>3. De la coordination de la correction des écarts de temps.                                                                                                                                                                                                                                                                                                            |
| ControlBlockOperator            | Responsable:<br>1. De la coordination des échanges entre ses blocs de contrôle associés et de l'organisation de la coordination des programmes d'échange entre ses Zones de réglage associées.<br>2. Du contrôle de la fréquence de charge dans son bloc et du fait que ses Zones de réglage respectent leurs obligations en termes de contrôle de fréquence de charge et d'écart de temps.<br>3. De l'organisation du règlement et/ou de la compensation entre ses Zones de réglage.                                                                                                           |
| CoordinationCenterOperator      | Responsable:<br>1. De la coordination des programmes d'échange entre ses blocs de contrôle ( <i>Control Blocks</i> ) associés et des échanges entre ses zones de centre de coordination associées.<br>2. Du respect des obligations de contrôle de fréquence de charge par les blocs de contrôle.<br>3. Du calcul de l'écart de temps en collaboration avec les centres de coordination associés.<br>4. De la mise en œuvre du règlement et/ou de la compensation entre ses blocs de contrôle, et par rapport aux autres centres de coordination de zones ( <i>Coordination Center Zones</i> ). |
| GridAccessProvider              | Entité responsable de la fourniture d'un accès au réseau à l'entité raccordée au réseau, via un point comptable ( <i>Accounting Point</i> ), et de son utilisation pour la consommation ou la production d'énergie.                                                                                                                                                                                                                                                                                                                                                                             |
| GridOperator                    | Entité qui exploite un ou plusieurs réseaux.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| ImbalanceSettlementResponsible  | Entité responsable du règlement de la différence entre les quantités contractées et les quantités réalisées de produits énergétiques pour les entités responsables de l'équilibre dans une zone d'équilibre du marché.<br>Note:<br>Le ImbalanceSettlementResponsible (responsable du règlement des écarts) n'est pas chargé de la facturation. Il peut déléguer cette responsabilité à un participant dont le rôle est plus générique, tel que l'agent de recouvrement.                                                                                                                         |
| InterconnectionTradeResponsible | Entité qui est un Responsable d'équilibre ou qui dépend de l'une d'entre elles. Elle est reconnue par le validateur de désignation ( <i>Nomination Attributor</i> ) pour l'attribution de la capacité déjà attribuée.<br>Informations complémentaires:<br>C'est un type de (Balance Responsible Party (responsable d'équilibre)).                                                                                                                                                                                                                                                               |

| libellé                     | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MarketInformationAggregator | <p>MarketInformationAggregator (Agrégateur des informations du marché): entité qui fournit des informations sur le marché qui ont été compilées à partir des chiffres donnés par les différents acteurs du marché. Ces informations peuvent également être publiées ou diffusées à des fins d'utilisation générale.</p> <p>Note:</p> <p>L'agrégateur des informations du marché peut recevoir des informations de n'importe quel participant du marché qui peuvent s'avérer utiles à des fins de publication ou de diffusion.</p> |
| MarketOperator              | Echange d'énergie commercial unique pour la livraison réelle d'énergie, qui reçoit les offres des entités responsables de l'équilibre qui ont un contrat à offrir. Le Market Operator (opérateur du marché) détermine le prix de l'énergie pour la zone d'équilibre du marché après avoir respecté les contraintes techniques de l'opérateur du système. Il peut également définir le prix du recollement dans une zone du réseau de comptage.                                                                                    |
| MeterAdministrator          | Entité responsable de la conservation d'une base de données des compteurs.                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| MeterOperator               | Entité responsable de l'installation, de la maintenance, des essais, de la certification et de la mise hors service des compteurs physiques.                                                                                                                                                                                                                                                                                                                                                                                      |
| MeteredDataCollector        | Entité responsable du relevé de compteur et du contrôle de qualité associé.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| MeteredDataResponsible      | Entité responsable de l'établissement et de la validation des données de comptage en fonction des données du collecteur de données de comptage. ( <i>Metered Data Collector</i> ) L'entité est responsable de l'historique des données de comptage pour un point de comptage ( <i>Metering Point</i> ).                                                                                                                                                                                                                           |
| MeteredDataAggregator       | Entité responsable de l'établissement et de la qualification des données de comptage communiquées par le responsable des données de comptage ( <i>MeteredDataResponsible</i> ). Ces données sont agrégées selon un ensemble de règles du marché définies.                                                                                                                                                                                                                                                                         |
| MeteringPointAdministrator  | Entité responsable de l'enregistrement des entités liées aux points de comptage dans la zone du réseau de comptage ( <i>Metering Grid Area</i> ). Elle est également responsable de la mise à jour des spécifications techniques du point de comptage ainsi que de la création et du retrait des points de comptage.                                                                                                                                                                                                              |
| MOLResponsible              | Responsable de la gestion des offres disponibles pour tous les opérateurs de système d'acquisition (Acquiring System Operateur) afin d'établir l'ordre de la capacité de réserve qui peut être activé.                                                                                                                                                                                                                                                                                                                            |
| NominationValidator         | Responsable de l'attribution de la capacité dans les limites autorisées et de la confirmation de la validité de toutes les attributions aux entités concernées. Il informe le responsable d'échange d'interconnexion de la capacité maximale qui peut être attribuée. Selon les règles du marché pour une interconnexion donnée, les opérateurs du système correspondants peuvent désigner un Nomination Validateur (validateur de désignation).                                                                                  |
| PartyConnectedToTheGrid     | Entité qui s'engage par un contrat à consommer ou produire de l'électricité à un point comptable.                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Producer                    | <p>Entité qui produit de l'électricité.</p> <p>Informations complémentaires:</p> <p>C'est un type d'entité raccordée au réseau.</p>                                                                                                                                                                                                                                                                                                                                                                                               |
| ProductionResponsibleParty  | <p>Entité qui peut être rendue juridiquement et financièrement responsable de tout déséquilibre entre l'énergie attribuée et produite pour tous les points comptables associés.</p> <p>Informations complémentaires:</p> <p>C'est un type de Balance Responsible Party (responsable d'équilibre.)</p>                                                                                                                                                                                                                             |
| ReconciliationAccountable   | Entité financièrement responsable du volume rapproché des produits énergétiques pour un point comptable profilé.                                                                                                                                                                                                                                                                                                                                                                                                                  |
| ReconciliationResponsible   | <p>Entité responsable du rapprochement, dans la zone du réseau de comptage, entre les volumes utilisés dans le processus de règlement du déséquilibre pour les points comptables profilés et les quantités réellement décomptées.</p> <p>Note:</p> <p>Le responsable du rapprochement peut déléguer la responsabilité de facturation à un participant dont le rôle est plus générique, tel que l'agent de recouvrement (<i>Billing Agent</i>).</p>                                                                                |

| libellé                       | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ReserveAllocator              | Informe le marché des exigences de réserve, reçoit des offres par rapport aux exigences et qui sont conformes aux critères de préqualification, détermine les offres satisfaisant aux exigences et attribue les offres.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ResourceProvider              | Rôle qui gère un objet de ressource et qui fournit les programmes associés à cet objet.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| SchedulingCoordinator         | Partie responsable des informations de programmation et de leur échange au nom de l'entité responsable d'équilibre. Par exemple, sur le marché polonais, un SchedulingCoordinator est responsable de l'échange d'informations sur la programmation et le règlement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| SystemOperator                | Entité responsable de l'exploitation stable du système électrique<br>(y compris de l'organisation de l'équilibre physique) via un réseau de transport dans une zone géographique. L'opérateur du système déterminera également et sera responsable de la capacité et des échanges transfrontaliers. S'il y a lieu, il peut réduire la capacité attribuée afin de garantir la stabilité d'exploitation. Comme indiqué ci-dessus, le transport correspond au "transport de l'électricité sur le réseau très haute tension ou haute tension et livraison aux clients finaux ou aux distributeurs. L'opération de transport inclut également les tâches d'exploitation du système concernant la gestion des flux d'énergie, la fiabilité du système et la disponibilité de tous les services du système nécessaires" (définition tirée du glossaire de "l'Operation Handbook" de l'ENTSO-E RGCE).<br><br>NOTE D'autres obligations peuvent être imposées par des règles locales du marché. |
| TradeResponsibleParty         | Entité qui peut être rendue juridiquement et financièrement responsable de tout déséquilibre entre l'énergie attribuée et consommée pour tous les points comptables associés.<br><br>Note:<br><br><u>Un échange d'énergie sans responsabilités privilégiées agit comme un Trade Responsible Party</u><br><br>Informations complémentaires<br><br>C'est un type d'entité Balance Responsible Party.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| TransmissionCapacityAllocator | Gère l'attribution de la capacité de transport dans une zone de capacité attribuée.<br><br>Pour des enchères explicites:<br><br>L'allocateur de capacité de transport gère, au nom des opérateurs du système, l'attribution de la capacité de transport disponible dans une zone de capacité attribuée. Il offre la capacité de transport disponible au marché, attribue la capacité de transport disponible aux négociants de capacité individuelle ( <i>Capacity Traders</i> ) et calcule le montant de facturation des capacités déjà attribuées pour les négociants de capacité.                                                                                                                                                                                                                                                                                                                                                                                                   |

### 6.3.5 RegisteredResource

Ressource enregistrée via le système d'enregistrement des participants du marché. Par exemple: unité de génération, charge, générateur ou charge non physique.

Le Tableau 10 montre tous les attributs de RegisteredResource.

**Tableau 10 – Attributs de MarketCommon::RegisteredResource**

| nom                  | type     | description                                                                       |
|----------------------|----------|-----------------------------------------------------------------------------------|
| ACAFlag              | YesNo    | Indique que cette ressource est associée à une zone de contrôle adjacente.        |
| ASSPOptimizationFlag | YesNo    | Indique que cette ressource participe au processus d'optimisation par défaut.     |
| commercialOpDate     | DateTime | Date d'exploitation commerciale de la ressource                                   |
| contingencyAvailFlag | YesNo    | Disponibilité de la réserve d'exploitation contingente (Yes/No). La ressource est |

| nom                     | type     | description                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         |          | disponible pour participer avec la capacité dans la répartition de la contingence.                                                                                                                                                                                                                                                                                                                                                     |
| dispatchFlag            | YesNo    | Indicateur de répartition: indique si la ressource est répartissable (Y/N)<br>Déplacé vers la classe RegisteredResource pour la répartition de la charge participante.                                                                                                                                                                                                                                                                 |
| ECAFlag                 | YesNo    | Indique que cette ressource est associée à une zone de contrôle embarqué.                                                                                                                                                                                                                                                                                                                                                              |
| endEffectiveDate        | DateTime | Date de fin effective                                                                                                                                                                                                                                                                                                                                                                                                                  |
| flexibleOfferFlag       | YesNo    | Indicateur d'offre flexible (Y/N)                                                                                                                                                                                                                                                                                                                                                                                                      |
| hourlyPredispatch       | YesNo    | Indique une répartition obligatoire avant le début de l'heure d'exploitation. Uniquement pertinent sur le marché en temps réel. S'applique aux ressources de génération, d'interconnexion et de charge participante. Valeur (Y/N).                                                                                                                                                                                                     |
| isAggregatedRes         | YesNo    | Indicateur spécifiant si une ressource est une ressource agrégée.                                                                                                                                                                                                                                                                                                                                                                      |
| lastModified            | DateTime | Indique la date et l'heure à laquelle cet élément a été modifié/versionné pour la dernière fois.                                                                                                                                                                                                                                                                                                                                       |
| LMPMFlag                | YesNo    | Indicateur LMPM: indique si la ressource est soumise à l'essai LMPM (Yes/No).                                                                                                                                                                                                                                                                                                                                                          |
| marketParticipationFlag | YesNo    | Indicateur de participation au marché: indique si la ressource participe au marché (Y/N).                                                                                                                                                                                                                                                                                                                                              |
| maxBaseSelfSchedQty     | Float    | Quantité de base maximale à programmation automatique                                                                                                                                                                                                                                                                                                                                                                                  |
| maxOnTime               | Float    | Temps d'exploitation maximal après démarrage                                                                                                                                                                                                                                                                                                                                                                                           |
| minDispatchTime         | Hours    | nombre minimal d'heures consécutives pendant lesquelles une ressource doit être répartie en cas d'acceptation de la soumission                                                                                                                                                                                                                                                                                                         |
| minOffTime              | Float    | Temps d'extinction minimal après arrêt                                                                                                                                                                                                                                                                                                                                                                                                 |
| minOnTime               | Float    | Temps d'exploitation minimal après démarrage                                                                                                                                                                                                                                                                                                                                                                                           |
| mustOfferFlag           | YesNo    | Indicateur d'offre obligatoire: indique si l'unité est soumise aux provisions d'offre obligatoire (Y/N).                                                                                                                                                                                                                                                                                                                               |
| nonMarket               | YesNo    | Indicateur spécifiant que la ressource ne participe pas aux opérations du marché.                                                                                                                                                                                                                                                                                                                                                      |
| pointOfDeliveryFlag     | YesNo    | Indique que la ressource enregistrée est une ressource Point de livraison (YES), ce qui implique qu'il existe un facteur de perte POD.                                                                                                                                                                                                                                                                                                 |
| priceSetFlagDA          | YesNo    | Indicateur de définition du prix: indique si une ressource est capable de définir le prix d'équilibre sur le marché (Y) pour le marché DA et, si ce n'est pas le cas, indique si la ressource doit soumettre des soumissions pour l'énergie à 0 \$ (S) ou non (N).<br><br>A l'origine, il était dans la classe RegisteredGenerator mais a été déplacé dans la classe RegisteredResource pour la répartition de la charge participante. |
| priceSetFlagRT          | YesNo    | Indicateur de définition du prix: indique si une ressource est capable de définir le prix d'équilibre sur le marché (Y) pour le marché RT et, si ce n'est pas le cas, indique si la ressource doit soumettre des soumissions pour l'énergie à 0 \$ (S) ou non (N).<br><br>A l'origine, il était dans la classe RegisteredGenerator mais a été déplacé dans la classe RegisteredResource pour la répartition de la charge participante. |

| nom                  | type                       | description                                                                         |
|----------------------|----------------------------|-------------------------------------------------------------------------------------|
| registrationStatus   | ResourceRegistrationStatus | Statut d'enregistrement de la ressource: actif, suspendu, planifié ou hors service. |
| resourceAdequacyFlag | YesNo                      | Indique que cette ressource participe à la fonction d'adéquation de ressource.      |
| SMPMFlag             | YesNo                      | Indicateur SMPM: indique si la ressource est soumise à l'essai SMPM (Yes/No).       |
| startEffectiveDate   | DateTime                   | Date de début effective                                                             |
| aliasName            | String                     | Hérité de: IdentifiedObject                                                         |
| mRID                 | String                     | Hérité de: IdentifiedObject                                                         |
| nom                  | String                     | Hérité de: IdentifiedObject                                                         |

Le Tableau 11 montre toutes les extrémités d'association de RegisteredResource avec d'autres classes.

**Tableau 11 – Extrémités d'association de MarketCommon:  
RegisteredResource avec d'autres classes**

| [mult à partir de] | [mult vers] nom                              | type                                  | description                                                                                                                                                                                                                                                 |
|--------------------|----------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [0..1]             | [0..*] SubstitutionResourceList              | SubstitutionResourceList              |                                                                                                                                                                                                                                                             |
| [0..*]             | [0..*] SubControlArea                        | SubControlArea                        |                                                                                                                                                                                                                                                             |
| [1..1]             | [0..*] ResourceAncillaryServiceQualification | ResourceAncillaryServiceQualification | Les RegisteredResources sont qualifiés pour les types de services auxiliaires de ressource (qui incluent les types de produit du marché ainsi que d'autres types, tels que BlackStart) en étant associés à la classe ResourceAncillaryServiceQualification. |
| [0..*]             | [0..*] ResourceCapacity                      | ResourceCapacity                      |                                                                                                                                                                                                                                                             |
| [0..*]             | [0..*] InterTie                              | SchedulingPoint                       |                                                                                                                                                                                                                                                             |
| [1..1]             | [0..*] OrgResOwnership                       | OrgResOwnership                       |                                                                                                                                                                                                                                                             |
| [1..1]             | [0..*] FormerReference                       | FormerReference                       |                                                                                                                                                                                                                                                             |
| [0..*]             | [0..*] ForbiddenRegion                       | ForbiddenRegion                       |                                                                                                                                                                                                                                                             |
| [0..1]             | [0..*] ContractDistributionFactor            | ContractDistributionFactor            |                                                                                                                                                                                                                                                             |
| [0..*]             | [0..1] AggregateNode                         | AggregateNode                         |                                                                                                                                                                                                                                                             |
| [0..*]             | [0..1] AdjacentCaset                         | AdjacentCaset                         |                                                                                                                                                                                                                                                             |
| [0..*]             | [0..*] RampRateCurve                         | RampRateCurve                         |                                                                                                                                                                                                                                                             |
| [1..1]             | [0..*] LoadFollowingInst                     | LoadFollowingInst                     |                                                                                                                                                                                                                                                             |
| [1..1]             | [0..*] DispatchInstReply                     | DispatchInstReply                     |                                                                                                                                                                                                                                                             |
| [0..1]             | [0..*] ResourceLoadFollowingInst             | ResourceLoadFollowingInst             |                                                                                                                                                                                                                                                             |
| [0..1]             | [0..*] ResourceDispatchResults               | ResourceDispatchResults               |                                                                                                                                                                                                                                                             |
| [0..1]             | [0..*] RUCAwardInstruction                   | RUCAwardInstruction                   |                                                                                                                                                                                                                                                             |
| [0..1]             | [0..*] RMROperatorInput                      | RMROperatorInput                      |                                                                                                                                                                                                                                                             |
| [0..1]             | [0..*] MPMResourceStatus                     | MPMResourceStatus                     |                                                                                                                                                                                                                                                             |
| [0..1]             | [0..*] DopInstruction                        | DopInstruction                        |                                                                                                                                                                                                                                                             |
| [1..1]             | [0..*] Commitments                           | Commitments                           |                                                                                                                                                                                                                                                             |

| [mult à partir de] | [mult vers] nom                        | type                            | description                                                                                                                        |
|--------------------|----------------------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| [1..1]             | [0..*] IntermittentResourceEligibility | IntermittentResourceEligibility |                                                                                                                                    |
| [0..1]             | [0..*] ExpectedEnergyValues            | ExpectedEnergyValues            |                                                                                                                                    |
| [0..1]             | [0..*] AllocationResultValues          | AllocationResultValues          |                                                                                                                                    |
| [0..*]             | [0..1] MktOrganisation                 | MktOrganisation                 |                                                                                                                                    |
| [0..*]             | [0..1] MktConnectivityNode             | MktConnectivityNode             |                                                                                                                                    |
| [0..*]             | [0..*] TimeSeries                      | TimeSeries                      |                                                                                                                                    |
| [1..1]             | [0..1] ResourceVerifiableCosts         | ResourceVerifiableCosts         |                                                                                                                                    |
| [0..*]             | [0..1] Pnode                           | Pnode                           | Une ressource enregistrée injecte de l'alimentation dans un ou plusieurs nœuds de connectivité relatifs à un nœud de tarification. |
| [0..*]             | [0..*] MPMTestThreshold                | MPMTestThreshold                |                                                                                                                                    |
| [0..*]             | [0..1] HostControlArea                 | HostControlArea                 |                                                                                                                                    |
| [0..*]             | [0..*] ControlAreaDesignation          | ControlAreaDesignation          |                                                                                                                                    |
| [0..1]             | [0..*] ResourceAwardInstruction        | ResourceAwardInstruction        |                                                                                                                                    |
| [0..1]             | [0..*] LoadFollowingOperatorInput      | LoadFollowingOperatorInput      |                                                                                                                                    |
| [1..1]             | [0..*] Instructions                    | Instructions                    |                                                                                                                                    |
| [0..1]             | [0..*] ExPostResourceResults           | ExPostResourceResults           |                                                                                                                                    |
| [0..1]             | [0..*] DotInstruction                  | DotInstruction                  |                                                                                                                                    |
| [1..1]             | [0..1] DefaultBid                      | DefaultBid                      |                                                                                                                                    |
| [0..*]             | [0..*] EnergyMarkets                   | EnergyMarket                    |                                                                                                                                    |
| [0..*]             | [0..1] PSRType                         | PSRType                         | Hérité de: PowerSystemResource                                                                                                     |
| [0..1]             | [0..*] Measurements                    | Mesure                          | Hérité de: PowerSystemResource                                                                                                     |
| [1..1]             | [0..*] OperatingShare                  | OperatingShare                  | Hérité de: PowerSystemResource                                                                                                     |
| [0..*]             | [0..*] PsrLists                        | PsrList                         | Hérité de: PowerSystemResource                                                                                                     |
| [1..1]             | [0..1] OutageSchedule                  | OutageSchedule                  | Hérité de: PowerSystemResource                                                                                                     |
| [0..*]             | [0..*] ReportingGroup                  | ReportingGroup                  | Hérité de: PowerSystemResource                                                                                                     |
| [0..1]             | [0..*] DiagramObjects                  | DiagramObject                   | Hérité de: IdentifiedObject                                                                                                        |
| [1..1]             | [0..*] Names                           | Nom                             | Hérité de: IdentifiedObject                                                                                                        |

## 6.4 Paquetage MarketManagement

### 6.4.1 Généralités

Ce paquetage contient toutes les principales extensions de marché du CIM exigées pour les systèmes de gestion de marché.

La Figure 18 montre le diagramme de paquetages externalDependencies.



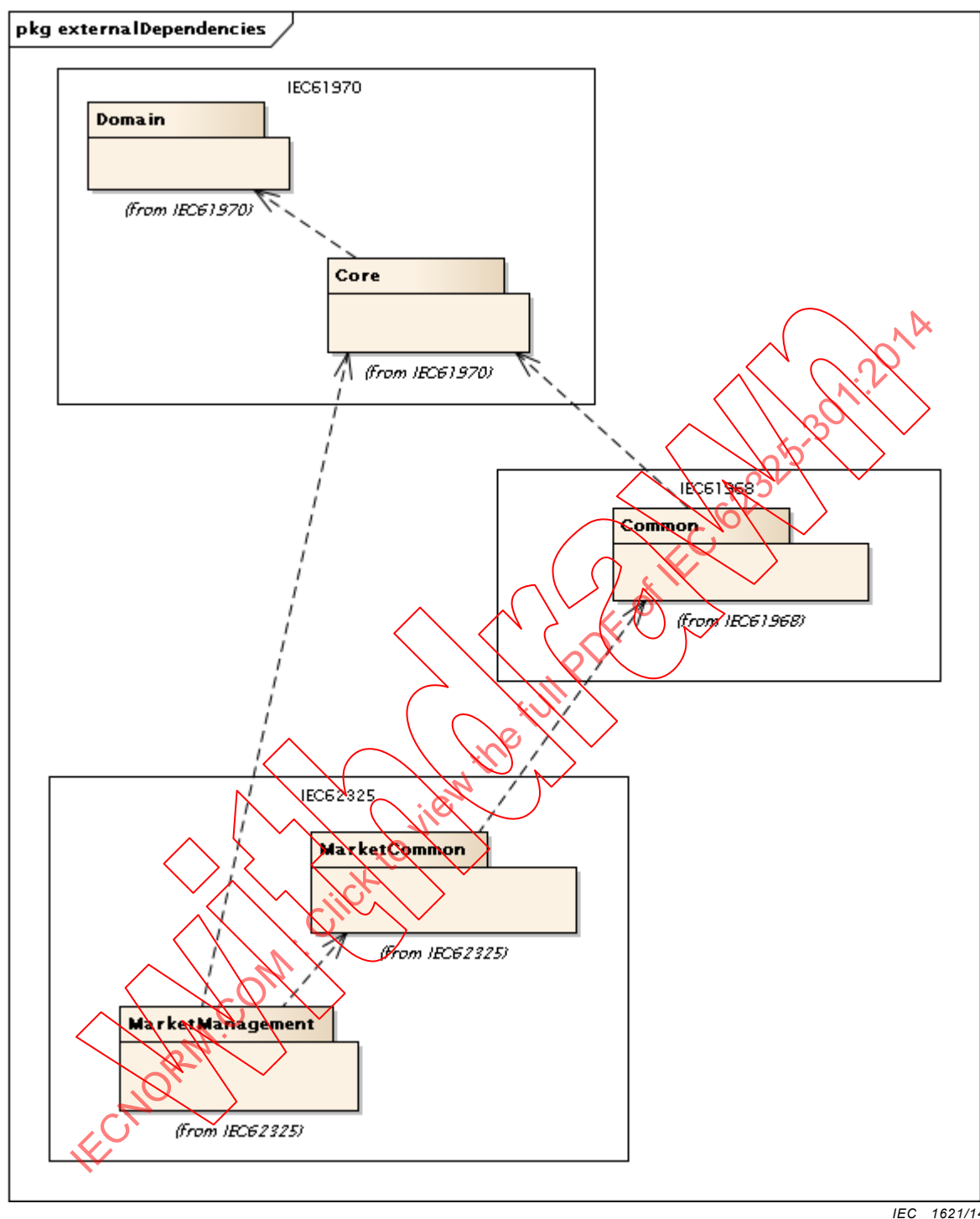


**Figure 18 – Diagramme du paquetage MarketManagement::externalDependencies**

Dépendances externes de la gestion de marché.

La Figure 19 montre le diagramme de classe Inheritance.



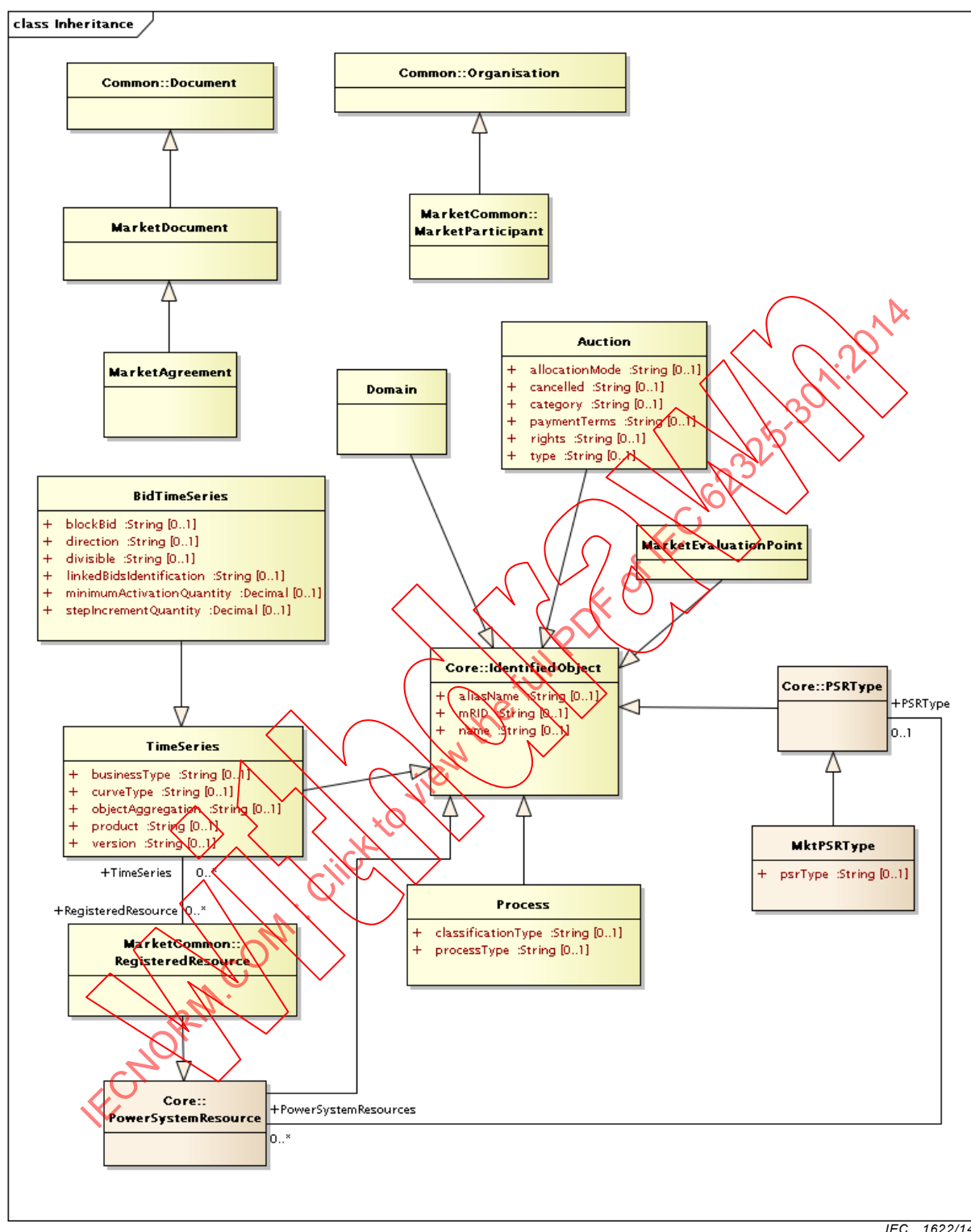


Figure 19 – Diagramme de classe MarketManagement::Inheritance

Structure des héritages de la gestion de marché.

La Figure 20 montre le diagramme de classe MarketManagementOverview.

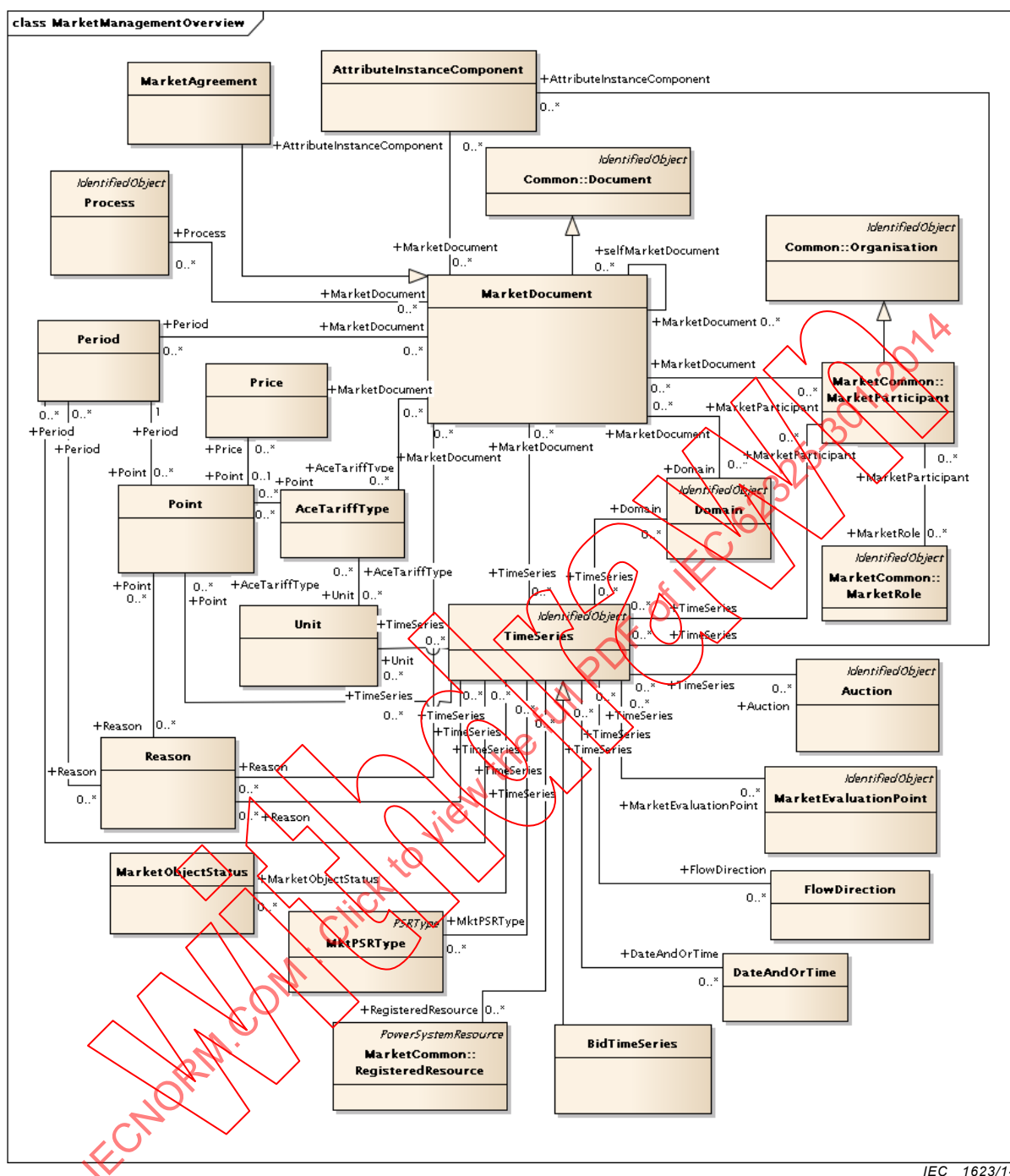


Figure 20 – Diagramme de classe MarketManagement::MarketManagementOverview

Cette figure décrit toutes les classes utilisées pour la définition des profils de gestion de marché.

On peut voir toutes les dépendances avec d'autres concepts communs du CIM dans les systèmes de gestion d'énergie et les systèmes de gestion de la distribution.

#### 6.4.2 Classe racine AceTariffType

Le type de tarif des erreurs de Zone de réglage (ACE, *Area Control Error*) qui est appliqué ou utilisé.

Le Tableau 12 montre tous les attributs de AceTariffType.

**Tableau 12 – Attributs de MarketManagement::AceTariffType**

| nom  | type   | description                  |
|------|--------|------------------------------|
| type | String | Le type codé d'un tarif ACE. |

Le Tableau 13 montre toutes les extrémités d'association de AceTariffType avec d'autres classes.

**Tableau 13 – Extrémités d'association de MarketManagement::AceTariffType avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type           | description |
|--------------------|-----------------------|----------------|-------------|
| [0..*]             | [0..*] Unit           | Unit           |             |
| [0..*]             | [0..*] MarketDocument | MarketDocument |             |
| [0..*]             | [0..*] Point          | Point          |             |

#### 6.4.3 Classe racine AttributeInstanceComponent

Classe utilisée pour fournir des informations sur un attribut.

Le Tableau 14 montre tous les attributs de AttributeInstanceComponent.

**Tableau 14 – Attributs de MarketManagement::AttributeInstanceComponent**

| nom            | type    | description                                                     |
|----------------|---------|-----------------------------------------------------------------|
| attribute      | String  | Identification du nom formel de l'attribut.                     |
| attributeValue | String  | Valeur d'instance de l'attribut.                                |
| position       | Integer | Valeur séquentielle représentant un numéro de séquence relatif. |

Le Tableau 15 montre toutes les extrémités d'association de AttributeInstanceComponent avec d'autres classes.

**Tableau 15 – Extrémités d'association de MarketManagement::AttributeInstanceComponent avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type           | description |
|--------------------|-----------------------|----------------|-------------|
| [0..*]             | [0..*] TimeSeries     | TimeSeries     |             |
| [0..*]             | [0..*] MarketDocument | MarketDocument |             |

#### 6.4.4 Vente aux enchères

Classe fournissant l'identification et le type d'une vente aux enchères.

Le Tableau 16 montre tous les attributs de Auction.

**Tableau 16 – Attributs de MarketManagement::Auction**

| nom            | type   | description                                                                             |
|----------------|--------|-----------------------------------------------------------------------------------------|
| allocationMode | String | Identification de la méthode d'attribution dans une vente aux enchères.                 |
| cancelled      | String | Indicateur spécifiant que la vente aux enchères a été annulée.                          |
| category       | String | Catégorie de produit d'une vente aux enchères.                                          |
| paymentTerms   | String | Conditions régissant la détermination du prix d'offre.                                  |
| rights         | String | Droits d'utilisation de la capacité de transport acquise lors d'une vente aux enchères. |
| type           | String | Type de vente aux enchères (ex. implicite, explicite...).                               |
| aliasName      | String | Hérité de: IdentifiedObject                                                             |
| mRID           | String | Hérité de: IdentifiedObject                                                             |
| name           | String | Hérité de: IdentifiedObject                                                             |

Le Tableau 17 montre toutes les extrémités d'association de Auction avec d'autres classes.

**Tableau 17 – Extrémités d'association de MarketManagement::Auction avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type          | description                 |
|--------------------|-----------------------|---------------|-----------------------------|
| [0..*]             | [0..*] TimeSeries     | TimeSeries    |                             |
| [0..1]             | [0..*] DiagramObjects | DiagramObject | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names          | Name          | Hérité de: IdentifiedObject |

#### 6.4.5 BidTimeSeries

Spécification formelle de caractéristiques spécifiques relatives à une offre.

Le Tableau 18 montre tous les attributs de BidTimeSeries.

**Tableau 18 – Attributs de MarketManagement::BidTimeSeries**

| nom                       | type    | description                                                                                                                  |
|---------------------------|---------|------------------------------------------------------------------------------------------------------------------------------|
| blockBid                  | String  | Indique que les valeurs de la période sont considérées comme un ensemble. Elles ne peuvent être ni changées, ni subdivisées. |
| direction                 | String  | Identification codée du flux de l'énergie.                                                                                   |
| divisible                 | String  | Indique si chaque élément de l'offre peut être accepté en partie ou non.                                                     |
| linkedBidsIdentification  | String  | Identification unique associée à toutes les offres liées.                                                                    |
| minimumActivationQuantity | Decimal | Quantité minimale d'énergie qui peut être activée à un intervalle de temps donné.                                            |
| stepIncrementQuantity     | Decimal | Incrément minimal qui peut s'appliquer à une augmentation lors d'une demande d'activation.                                   |
| businessType              | String  | Hérité de: TimeSeries                                                                                                        |
| curveType                 | String  | Hérité de: TimeSeries                                                                                                        |
| objectAggregation         | String  | Hérité de: TimeSeries                                                                                                        |
| product                   | String  | Hérité de: TimeSeries                                                                                                        |
| version                   | String  | Hérité de: TimeSeries                                                                                                        |
| aliasName                 | String  | Hérité de: IdentifiedObject                                                                                                  |
| mRID                      | String  | Hérité de: IdentifiedObject                                                                                                  |
| name                      | String  | Hérité de: IdentifiedObject                                                                                                  |

Le Tableau 19 montre toutes les extrémités d'association de BidTimeSeries avec d'autres classes.

**Tableau 19 – Extrémités d'association de MarketManagement::BidTimeSeries avec d'autres classes**

| [mult à partir de] | [mult vers] nom                   | type                       | description           |
|--------------------|-----------------------------------|----------------------------|-----------------------|
| [0..*]             | [0..*] MarketParticipant          | MarketParticipant          | Hérité de: TimeSeries |
| [0..*]             | [0..*] DateAndOrTime              | DateAndOrTime              | Hérité de: TimeSeries |
| [0..*]             | [0..*] Domain                     | Domain                     | Hérité de: TimeSeries |
| [0..*]             | [0..*] FlowDirection              | FlowDirection              | Hérité de: TimeSeries |
| [0..*]             | [0..*] MarketDocument             | MarketDocument             | Hérité de: TimeSeries |
| [0..*]             | [0..*] MarketEvaluationPoint      | MarketEvaluationPoint      | Hérité de: TimeSeries |
| [0..*]             | [0..*] Period                     | Period                     | Hérité de: TimeSeries |
| [0..*]             | [0..*] Reason                     | Reason                     | Hérité de: TimeSeries |
| [0..*]             | [0..*] RegisteredResource         | RegisteredResource         | Hérité de: TimeSeries |
| [0..*]             | [0..*] AttributeInstanceComponent | AttributeInstanceComponent | Hérité de: TimeSeries |

| [mult à partir de] | [mult vers] nom           | type               | description                 |
|--------------------|---------------------------|--------------------|-----------------------------|
| [0..*]             | [0..*] Auction            | Auction            | Hérité de: TimeSeries       |
| [0..*]             | [0..*] MarketObjectStatus | MarketObjectStatus | Hérité de: TimeSeries       |
| [0..*]             | [0..*] MktPSRType         | MktPSRType         | Hérité de: TimeSeries       |
| [0..*]             | [0..*] Point              | Point              | Hérité de: TimeSeries       |
| [0..*]             | [0..*] Unit               | Unit               | Hérité de: TimeSeries       |
| [0..1]             | [0..*] DiagramObjects     | DiagramObject      | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names              | Name               | Hérité de: IdentifiedObject |

#### 6.4.6 Classe racine DateAndOrTime

La date et/ou l'heure.

Le Tableau 20 montre tous les attributs de DateAndOrTime.

**Tableau 20 – Attributs de MarketManagement::DateAndOrTime**

| nom  | type | description                                                        |
|------|------|--------------------------------------------------------------------|
| date | Date | Date sous la forme "aaaa-mm-jj", qui est conforme à l'ISO 8601     |
| time | Time | Heure sous la forme "hh:mm:ss.sssZ", qui est conforme à l'ISO 8601 |

Le Tableau 21 montre toutes les extrémités d'association de DateAndOrTime avec d'autres classes.

**Tableau 21 – Extrémités d'association de MarketManagement::DateAndOrTime avec d'autres classes**

| [mult à partir de] | [mult vers] nom   | type       | description |
|--------------------|-------------------|------------|-------------|
| [0..*]             | [0..*] TimeSeries | TimeSeries |             |

#### 6.4.7 Domain

Domaine d'activité défini dans le marché de l'énergie.

Le Tableau 22 montre tous les attributs de Domain.

**Tableau 22 – Attributs de MarketManagement::Domain**

| nom       | type   | description                 |
|-----------|--------|-----------------------------|
| aliasName | String | Hérité de: IdentifiedObject |
| mRID      | String | Hérité de: IdentifiedObject |
| name      | String | Hérité de: IdentifiedObject |

Le Tableau 23 montre toutes les extrémités d'association de Domain avec d'autres classes.

**Tableau 23 – Extrémités d'association de MarketManagement::  
Domain avec d'autres classes**

| [mult<br>à<br>partir<br>de] | [mult vers] nom       | type           | description                 |
|-----------------------------|-----------------------|----------------|-----------------------------|
| [0..*]                      | [0..*] MarketDocument | MarketDocument |                             |
| [0..*]                      | [0..*] TimeSeries     | TimeSeries     |                             |
| [0..1]                      | [0..*] DiagramObjects | DiagramObject  | Hérité de: IdentifiedObject |
| [1..1]                      | [0..*] Names          | Name           | Hérité de: IdentifiedObject |

#### 6.4.8 Classe racine FlowDirection

Identification codée du sens du flux de l'énergie.

Le Tableau 24 montre tous les attributs de FlowDirection.

**Tableau 24 – Attributs de MarketManagement::FlowDirection**

| nom       | type   | description                                        |
|-----------|--------|----------------------------------------------------|
| direction | String | Identification codée du sens du flux de l'énergie. |

Le Tableau 25 montre toutes les extrémités d'association de FlowDirection avec d'autres classes.

**Tableau 25 – Extrémités d'association de MarketManagement::  
FlowDirection avec d'autres classes**

| [mult<br>from] | [mult vers] nom   | type       | description |
|----------------|-------------------|------------|-------------|
| [0..*]         | [0..*] TimeSeries | TimeSeries |             |

#### 6.4.9 MarketAgreement

Identification ou finalement contenu d'un accord entre au moins deux entités.

Le Tableau 26 montre tous les attributs de MarketAgreement.

**Tableau 26 – Attributs de MarketManagement::MarketAgreement**

| nom                  | type              | description                 |
|----------------------|-------------------|-----------------------------|
| type                 | String            | Hérité de: Document         |
| createdDateTime      | DateTime          | Hérité de: Document         |
| lastModifiedDateTime | DateTime          | Hérité de: Document         |
| revisionNumber       | String            | Hérité de: Document         |
| electronicAddress    | ElectronicAddress | Hérité de: Document         |
| subject              | String            | Hérité de: Document         |
| title                | String            | Hérité de: Document         |
| docStatus            | Status            | Hérité de: Document         |
| status               | Status            | Hérité de: Document         |
| aliasName            | String            | Hérité de: IdentifiedObject |
| mRID                 | String            | Hérité de: IdentifiedObject |
| name                 | String            | Hérité de: IdentifiedObject |

Le Tableau 27 montre toutes les extrémités d'association de MarketAgreement avec d'autres classes.

**Tableau 27 – Extrémités d'association de MarketManagement::MarketAgreement avec d'autres classes**

| [mult à partir de] | [mult vers] nom                   | type                       | description                 |
|--------------------|-----------------------------------|----------------------------|-----------------------------|
| [0..*]             | [0..*] AttributeInstanceComponent | AttributeInstanceComponent | Hérité de: MarketDocument   |
| [0..*]             | [0..*] Domain                     | Domain                     | Hérité de: MarketDocument   |
| [0..*]             | [0..*] Period                     | Period                     | Hérité de: MarketDocument   |
| [0..*]             | [0..*] selfMarketDocument         | MarketDocument             | Hérité de: MarketDocument   |
| [0..*]             | [0..*] MarketParticipant          | MarketParticipant          | Hérité de: MarketDocument   |
| [0..*]             | [0..*] AceTariffType              | AceTariffType              | Hérité de: MarketDocument   |
| [0..*]             | [0..*] Reason                     | Reason                     | Hérité de: MarketDocument   |
| [0..*]             | [0..*] TimeSeries                 | TimeSeries                 | Hérité de: MarketDocument   |
| [0..*]             | [0..*] Process                    | Process                    | Hérité de: MarketDocument   |
| [0..*]             | [0..*] MarketDocument             | MarketDocument             | Hérité de: MarketDocument   |
| [0..1]             | [0..*] ConfigurationEvents        | ConfigurationEvent         | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects             | DiagramObject              | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                      | Name                       | Hérité de: IdentifiedObject |

#### 6.4.10 MarketDocument

Document électronique contenant les informations nécessaires pour satisfaire à un ensemble d'exigences de processus métier.

Le Tableau 28 montre tous les attributs de MarketDocument.



**Tableau 28 – Attributs de MarketManagement::MarketDocument**

| nom                  | type              | description                 |
|----------------------|-------------------|-----------------------------|
| type                 | String            | Hérité de: Document         |
| createdDateTime      | DateTime          | Hérité de: Document         |
| lastModifiedDateTime | DateTime          | Hérité de: Document         |
| revisionNumber       | String            | Hérité de: Document         |
| electronicAddress    | ElectronicAddress | Hérité de: Document         |
| subject              | String            | Hérité de: Document         |
| title                | String            | Hérité de: Document         |
| docStatus            | Status            | Hérité de: Document         |
| status               | Status            | Hérité de: Document         |
| aliasName            | String            | Hérité de: IdentifiedObject |
| mRID                 | String            | Hérité de: IdentifiedObject |
| name                 | String            | Hérité de: IdentifiedObject |

Le Tableau 29 montre toutes les extrémités d'association de MarketDocument avec d'autres classes.

**Tableau 29 – Extrémités d'association de MarketManagement::MarketDocument avec d'autres classes**

| [mult à partir de] | [mult vers] nom                   | type                       | description                 |
|--------------------|-----------------------------------|----------------------------|-----------------------------|
| [0..*]             | [0..*] AttributeInstanceComponent | AttributeInstanceComponent |                             |
| [0..*]             | [0..*] Domain                     | Domain                     |                             |
| [0..*]             | [0..*] Period                     | Period                     |                             |
| [0..*]             | [0..*] selfMarketDocument         | MarketDocument             |                             |
| [0..*]             | [0..*] MarketParticipant          | MarketParticipant          |                             |
| [0..*]             | [0..*] AceTariffType              | AceTariffType              |                             |
| [0..*]             | [0..*] Reason                     | Reason                     |                             |
| [0..*]             | [0..*] TimeSeries                 | TimeSeries                 |                             |
| [0..*]             | [0..*] Process                    | Process                    |                             |
| [0..*]             | [0..*] MarketDocument             | MarketDocument             |                             |
| [0..1]             | [0..*] ConfigurationEvents        | ConfigurationEvent         | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects             | DiagramObject              | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                      | Name                       | Hérité de: IdentifiedObject |

#### 6.4.11 MarketEvaluationPoint

Identification d'une entité dans laquelle les produits énergétiques sont mesurés ou calculés.

Le Tableau 30 montre tous les attributs de MarketEvaluationPoint.

**Tableau 30 – Attributs de MarketManagement::MarketEvaluationPoint**

| nom       | type   | description                 |
|-----------|--------|-----------------------------|
| aliasName | String | Hérité de: IdentifiedObject |
| mRID      | String | Hérité de: IdentifiedObject |
| name      | String | Hérité de: IdentifiedObject |

Le Tableau 31 montre toutes les extrémités d'association de MarketEvaluationPoint avec d'autres classes.

**Tableau 31 – Extrémités d'association de MarketManagement::MarketEvaluationPoint avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type          | description                 |
|--------------------|-----------------------|---------------|-----------------------------|
| [0..*]             | [0..*] TimeSeries     | TimeSeries    |                             |
| [0..1]             | [0..*] DiagramObjects | DiagramObject | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names          | Name          | Hérité de: IdentifiedObject |

#### 6.4.12 Classe racine MarketObjectStatus

Condition ou position d'un objet par rapport à son statut.

Le Tableau 32 montre tous les attributs de MarketObjectStatus.

**Tableau 32 – Attributs de MarketManagement::MarketObjectStatus**

| nom    | type   | description                                                      |
|--------|--------|------------------------------------------------------------------|
| status | String | Condition ou position codée d'un objet par rapport à son statut. |

Le Tableau 33 montre toutes les extrémités d'association de MarketObjectStatus avec d'autres classes.

**Tableau 33 – Extrémités d'association de MarketManagement::MarketObjectStatus avec d'autres classes**

| [mult à partir de] | [mult vers] nom   | type       | description |
|--------------------|-------------------|------------|-------------|
| [0..*]             | [0..*] TimeSeries | TimeSeries |             |

#### 6.4.13 MktPSRType

Type de ressource du système électrique.

Le Tableau 34 montre tous les attributs de MktPSRType.

**Tableau 34 – Attributs de MarketManagement::MktPSRType**

| nom       | type   | description                                   |
|-----------|--------|-----------------------------------------------|
| psrType   | String | Type codé de ressource du système électrique. |
| aliasName | String | Hérité de: IdentifiedObject                   |
| mRID      | String | Hérité de: IdentifiedObject                   |
| name      | String | Hérité de: IdentifiedObject                   |

Le Tableau 35 montre toutes les extrémités d'association de MktPSRType avec d'autres classes.

**Tableau 35 – Extrémités d'association de MarketManagement::MktPSRType avec d'autres classes**

| [mult à partir de] | [mult vers] nom             | type                | description                 |
|--------------------|-----------------------------|---------------------|-----------------------------|
| [0..*]             | [0..*] TimeSeries           | TimeSeries          |                             |
| [0..1]             | [0..*] PowerSystemResources | PowerSystemResource | Hérité de: PSRType          |
| [0..1]             | [0..*] DiagramObjects       | DiagramObject       | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                | Name                | Hérité de: IdentifiedObject |

#### 6.4.14 Classe racine Period

Identification d'un intervalle de temps qui peut avoir une résolution donnée.

Le Tableau 36 montre tous les attributs de Period.

**Tableau 36 – Attributs de MarketManagement::Period**

| nom          | type             | description                                                                     |
|--------------|------------------|---------------------------------------------------------------------------------|
| resolution   | Duration         | Nombre d'unités de temps qui composent une étape individuelle dans une période. |
| timeInterval | DateTimeInterval | Date et heure de début et de fin d'un intervalle donné.                         |

Le Tableau 37 montre toutes les extrémités d'association de Period avec d'autres classes.

**Tableau 37 – Extrémités d'association de MarketManagement::Period avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type           | description |
|--------------------|-----------------------|----------------|-------------|
| [0..*]             | [0..*] Reason         | Reason         |             |
| [0..*]             | [0..*] MarketDocument | MarketDocument |             |
| [1..1]             | [0..*] Point          | Point          |             |
| [0..*]             | [0..*] TimeSeries     | TimeSeries     |             |

#### 6.4.15 Classe racine Point

Identification d'un ensemble de valeurs traitées dans un intervalle de temps spécifique.

Le Tableau 38 montre tous les attributs de Point.

**Tableau 38 – Attributs de MarketManagement::Point**

| nom               | type    | description                                                                              |
|-------------------|---------|------------------------------------------------------------------------------------------|
| position          | Integer | Valeur séquentielle représentant la position relative dans un intervalle de temps donné. |
| quantity          | Decimal | Quantité principale identifiée à un point.                                               |
| secondaryQuantity | Decimal | Quantité secondaire identifiée à un point.                                               |

Le Tableau 39 montre toutes les extrémités d'association de Point avec d'autres classes.

**Tableau 39 – Extrémités d'association de MarketManagement::Point avec d'autres classes**

| [mult à partir de] | [mult vers] nom      | type          | description |
|--------------------|----------------------|---------------|-------------|
| [0..*]             | [0..*] AceTariffType | AceTariffType |             |
| [0..*]             | [1..1] Period        | Period        |             |
| [0..*]             | [1..1] TimeSeries    | TimeSeries    |             |
| [0..1]             | [0..*] Price         | Price         |             |
| [0..*]             | [0..*] Reason        | Reason        |             |

#### 6.4.16 Classe racine Price

Coût correspondant à une mesure spécifique et exprimé dans une devise.

Le Tableau 40 montre tous les attributs de Price.

**Tableau 40 – Attributs de MarketManagement::Price**

| nom       | type    | description                                                                                                                             |
|-----------|---------|-----------------------------------------------------------------------------------------------------------------------------------------|
| amount    | Decimal | Nombre d'unités monétaires spécifié dans une unité monétaire.                                                                           |
| category  | String  | Catégorie de prix à utiliser pour calculer un prix. La catégorie de prix est définie par accord mutuel entre les opérateurs du système. |
| direction | String  | Le sens indique si un opérateur du système paie les entités du marché ou inversement.                                                   |

Le Tableau 41 montre toutes les extrémités d'association de Price avec d'autres classes.

**Tableau 41 – Extrémités d'association de MarketManagement::  
Price avec d'autres classes**

| [mult à partir de] | [mult vers] nom | type  | description |
|--------------------|-----------------|-------|-------------|
| [0..*]             | [0..1] Point    | Point |             |

#### 6.4.17 Process

Spécification formelle d'un ensemble d'opérations commerciales ayant le même objectif.

Le Tableau 42 montre tous les attributs de Process.

**Tableau 42 – Attributs de MarketManagement::Process**

| nom                | type   | description                                                                                                                                     |
|--------------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| classificationType | String | Mécanisme de classification utilisé pour regrouper un ensemble d'objets dans un processus métier. Le regroupement peut être détaillé ou résumé. |
| processType        | String | Type de processus métier.                                                                                                                       |
| aliasName          | String | Hérité de: IdentifiedObject                                                                                                                     |
| mRID               | String | Hérité de: IdentifiedObject                                                                                                                     |
| name               | String | Hérité de: IdentifiedObject                                                                                                                     |

Le Tableau 43 montre toutes les extrémités d'association de Process avec d'autres classes.

**Tableau 43 – Extrémités d'association de MarketManagement::  
Process avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type           | description                 |
|--------------------|-----------------------|----------------|-----------------------------|
| [0..*]             | [0..*] MarketDocument | MarketDocument |                             |
| [0..1]             | [0..*] DiagramObjects | DiagramObject  | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names          | Name           | Hérité de: IdentifiedObject |

#### 6.4.18 Classe racine Reason

Motivation d'un acte.

Le Tableau 44 montre tous les attributs de Reason.

**Tableau 44 – Attributs de MarketManagement::Reason**

| nom  | type   | description                                           |
|------|--------|-------------------------------------------------------|
| code | String | Motivation d'un acte sous forme codée.                |
| text | String | Explication textuelle correspondant au code de cause. |

Le Tableau 45 montre toutes les extrémités d'association de Reason avec d'autres classes.

**Tableau 45 – Extrémités d'association de MarketManagement::Reason avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type           | description |
|--------------------|-----------------------|----------------|-------------|
| [0..*]             | [0..*] MarketDocument | MarketDocument |             |
| [0..*]             | [0..*] Point          | Point          |             |
| [0..*]             | [0..*] Period         | Period         |             |
| [0..*]             | [0..*] TimeSeries     | TimeSeries     |             |

#### 6.4.19 TimeSeries

Série Chronologique, ensemble de mesures chronologiques ordinaires ou de valeurs quantitatives d'un phénomène individuel ou collectif prises à des périodes/instants successifs, et souvent, équidistants.

Le Tableau 46 montre tous les attributs de TimeSeries

**Tableau 46 – Attributs de MarketManagement::TimeSeries**

| nom               | type   | description                                                                                                                                    |
|-------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------|
| businessType      | String | Identification de la nature de la série chronologique.                                                                                         |
| curveType         | String | Représentation codée du type de courbe décrit.                                                                                                 |
| objectAggregation | String | Identification de l'objet qui est le dominateur commun utilisé pour agréger une série chronologique.                                           |
| product           | String | Type de produit, tel que la puissance, l'énergie, la puissance réactive, la capacité de transport, qui fait l'objet de la série chronologique. |
| version           | String | Version de la série chronologique.                                                                                                             |
| aliasName         | String | Hérité de: IdentifiedObject                                                                                                                    |
| mRID              | String | Hérité de: IdentifiedObject                                                                                                                    |
| name              | String | Hérité de: IdentifiedObject                                                                                                                    |

Le Tableau 47 montre toutes les extrémités d'association de TimeSeries avec d'autres classes.

**Tableau 47 – Extrémités d'association de MarketManagement::TimeSeries avec d'autres classes**

| [mult à partir de] | [mult vers] nom                   | type                       | description                 |
|--------------------|-----------------------------------|----------------------------|-----------------------------|
| [0..*]             | [0..*] MarketParticipant          | MarketParticipant          |                             |
| [0..*]             | [0..*] DateAndOrTime              | DateAndOrTime              |                             |
| [0..*]             | [0..*] Domain                     | Domain                     |                             |
| [0..*]             | [0..*] FlowDirection              | FlowDirection              |                             |
| [0..*]             | [0..*] MarketDocument             | MarketDocument             |                             |
| [0..*]             | [0..*] MarketEvaluationPoint      | MarketEvaluationPoint      |                             |
| [0..*]             | [0..*] Period                     | Period                     |                             |
| [0..*]             | [0..*] Reason                     | Reason                     |                             |
| [0..*]             | [0..*] RegisteredResource         | RegisteredResource         |                             |
| [0..*]             | [0..*] AttributeInstanceComponent | AttributeInstanceComponent |                             |
| [0..*]             | [0..*] Auction                    | Auction                    |                             |
| [0..*]             | [0..*] MarketObjectStatus         | MarketObjectStatus         |                             |
| [0..*]             | [0..*] MktPSRType                 | MktPSRType                 |                             |
| [0..*]             | [0..*] Point                      | Point                      |                             |
| [0..*]             | [0..*] Unit                       | Unit                       |                             |
| [0..1]             | [0..*] DiagramObjects             | DiagramObject              | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                      | Name                       | Hérité de: IdentifiedObject |

#### 6.4.20 Classe racine Unit

Identification du nom de l'unité pour les grandeurs de série chronologique.

Le Tableau 48 montre tous les attributs de Unit.

**Tableau 48 – Attributs de MarketManagement::Unit**

| nom  | type   | description                      |
|------|--------|----------------------------------|
| name | String | Représentation codée de l'unité. |

Le Tableau 49 montre toutes les extrémités d'association de Unit avec d'autres classes.

**Tableau 49 – Extrémités d'association de MarketManagement::Unit avec d'autres classes**

| [mult à partir de] | [mult vers] nom      | type          | description |
|--------------------|----------------------|---------------|-------------|
| [0..*]             | [0..*] TimeSeries    | TimeSeries    |             |
| [0..*]             | [0..*] AceTariffType | AceTariffType |             |

## 6.5 Paquetage MarketOperations

### 6.5.1 Généralités

Ce paquetage contient toutes les principales extensions de marché du CIM exigées pour les systèmes des opérations du marché.

La Figure 21 montre le diagramme de classe Main.

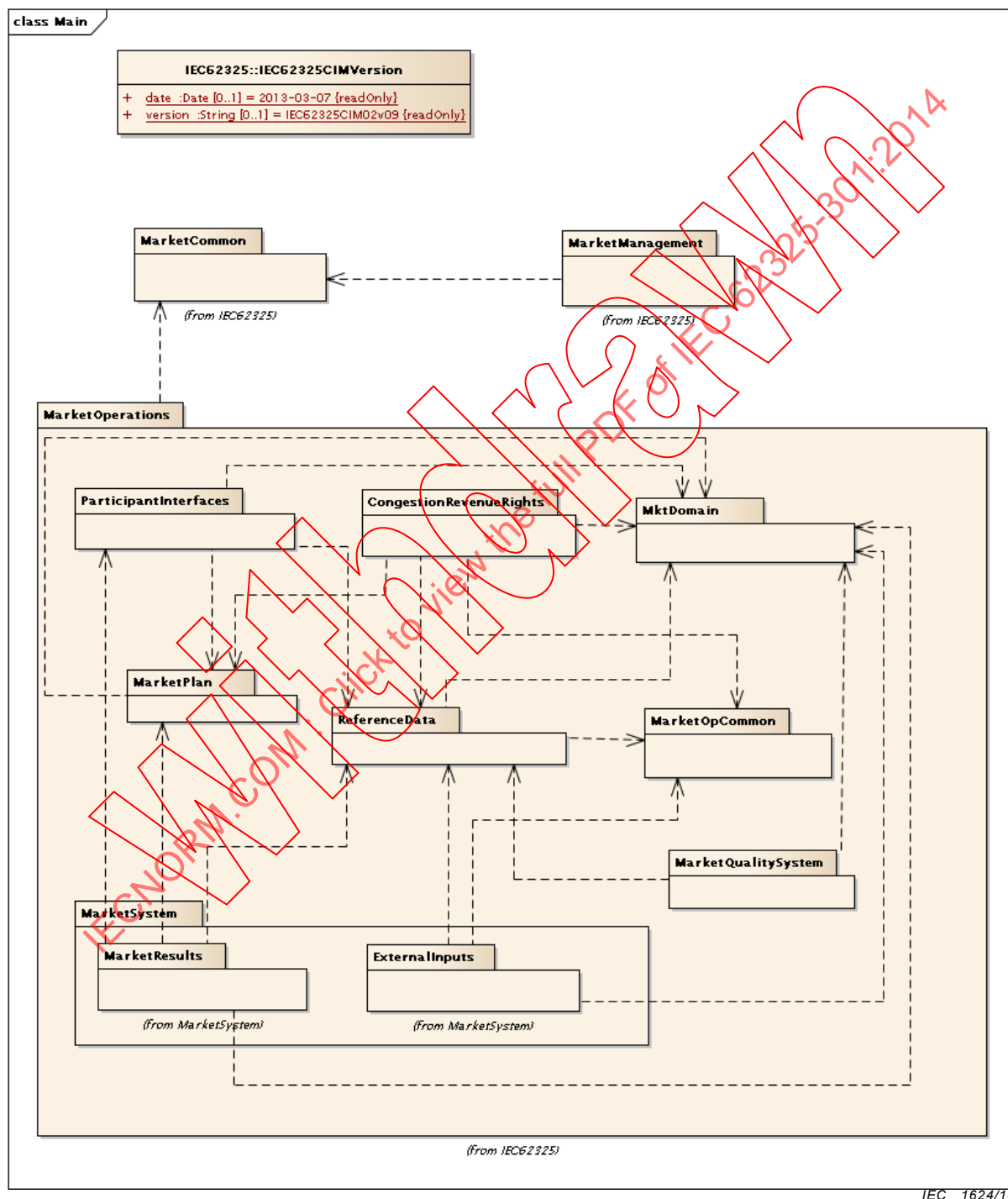


Figure 21 – Diagramme de classe MarketOperations::Main

La Figure 22 montre le diagramme de paquets MarketOperations.



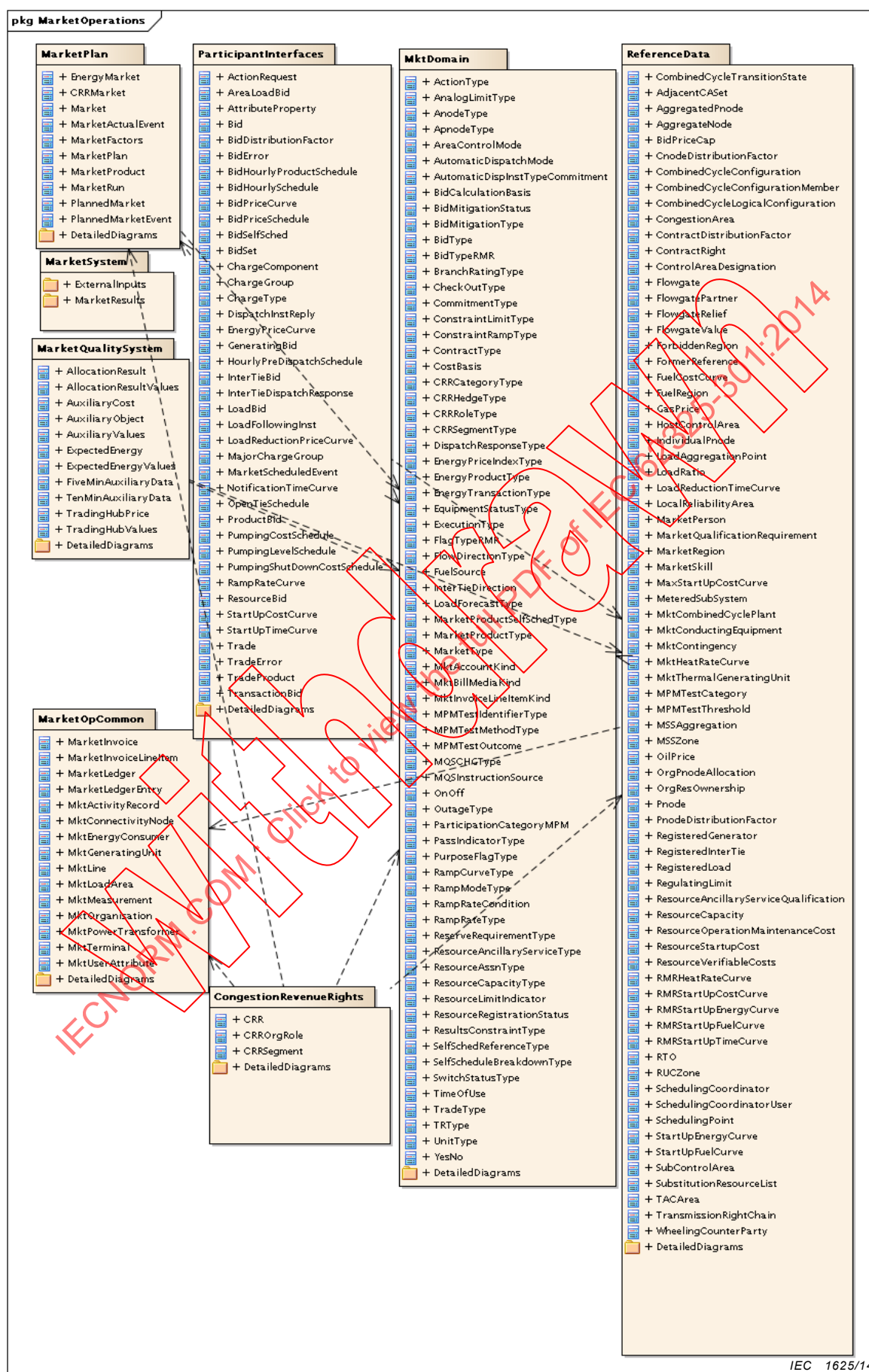


Figure 22 – Diagramme du paquetage MarketOperations::MarketOperations

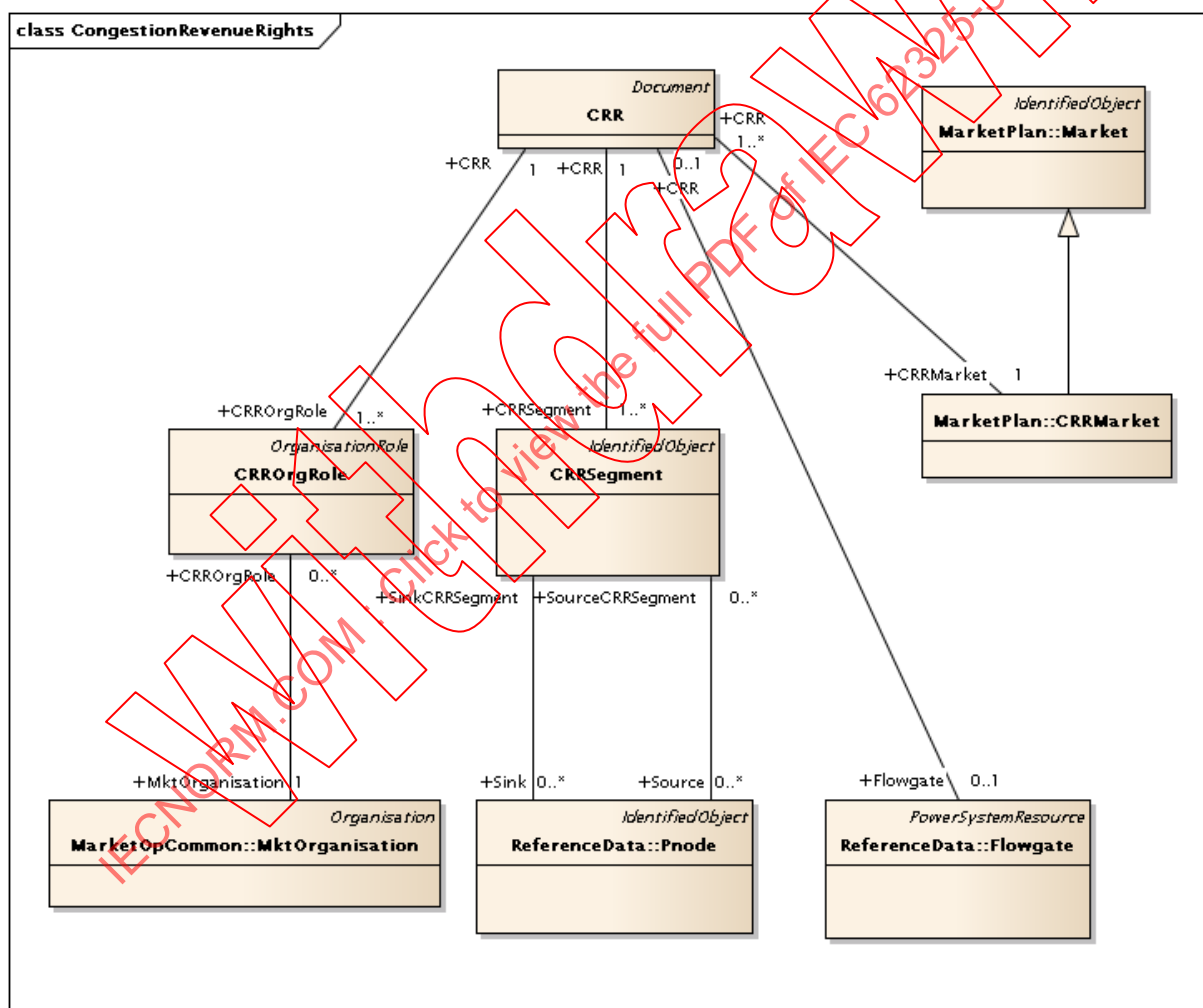
Ce paquetage contient toutes les principales extensions de marché du CIM exigées pour les systèmes des opérations du marché.

## 6.5.2 Paquetage CongestionRevenueRights

### 6.5.2.1 Généralités

Les frais de congestion sont une charge importante et très volatile qui concerne aujourd'hui de nombreux participants dans les marchés de l'énergie électrique basés sur les prix marginaux locaux (LMP). Pour cette raison, les ISO offrent des droits à rente de congestion (CRR, *Congestion Revenue Rights*), également appelées droits de transport financiers ou contrats de congestion de transport. Ce sont des instruments financiers qui permettent aux participants du marché de se couvrir des frais de congestion lors de la programmation des transactions de production, de charge et d'énergie bilatérales.

La Figure 23 montre le diagramme de classe CongestionRevenueRights.



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Figure 23 – Diagramme de classe CongestionRevenueRights::  
CongestionRevenueRights

Un droit à revenu de congestion (CRR) est un instrument financier qui permet à son détenteur de recevoir un versement de CRR lorsque la congestion s'effectue de la source vers la source de CRR et de la source de CRR vers le puits de CRR. Les classes illustrées sont utilisées pour modéliser les données de CRR. La classe CRRSegment contient des informations sur les segments de CRR. La classe MktOrganization contient des informations sur l'entité qui

détient la CRR. Les associations de CRRSegment vers ReferenceData montrent la source et le puits Pnodes.

### 6.5.2.2 CRR

Classe de droit à revenu de congestion (CRR) héritée de la classe Document.

Une CRR est un concept financier qui est utilisé pour se couvrir des frais de congestion.

La CRR est généralement réglée selon les prix marginaux locaux (LMP) qui sont calculés dans le marché à J-1. Ces LMP sont définis par les programmes/offres des ressources à J-1. Les CRR ne couvriront pas les pertes marginales. Si le composant de congestion du LMP au puits est supérieur à celui à la source, le propriétaire de la CRR peut recevoir une partie des revenus de congestion. Si le composant de congestion au puits est inférieur à celui à la source, alors le propriétaire de CRR sous forme d'obligations sera facturé, tandis que le propriétaire de CRR sous forme d'options ne le sera pas.

Le Tableau 50 montre tous les attributs de CRR.

**Tableau 50 – Attributs de CongestionRevenueRights::CRR**

| nom                  | type              | description                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cRRcategory          | CRRCategoryType   | Catégorie de CRR définie sur "PTP" ( <i>point-to-point</i> ) pour une CRR point à point ou sur "NSR" ( <i>Network Service Right</i> ) pour un droit de service réseau. Si la catégorie de CRR est "PTP", les champs ID source et ID puits sont exigés. Si la catégorie de CRR est "NSR", un champ (ID source ou ID puits) doit être défini sur zéro et l'autre ne doit pas être défini sur zéro. Cependant, la catégorie "NSR" comprendra au moins trois enregistrements. |
| cRRtype              | CRRSegmentType    | Type de CRR, dans les définitions types possibles du système de CRR (ex. "LSE", "ETC").                                                                                                                                                                                                                                                                                                                                                                                   |
| hedgeType            | CRRHedgeType      | Type d'opérateur en couverture Obligation ou Option                                                                                                                                                                                                                                                                                                                                                                                                                       |
| timeOfUse            | TimeOfUse         | Indicateur des heures d'utilisation de la CRR – heures de pointe (ON), heures creuses (OFF) ou 24h/24 (24HR).                                                                                                                                                                                                                                                                                                                                                             |
| tradeSliceID         | String            | Segment de la CRR décrit dans l'enregistrement actuel                                                                                                                                                                                                                                                                                                                                                                                                                     |
| type                 | String            | Hérité de: Document                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| createdDateTime      | DateTime          | Hérité de: Document                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| lastModifiedDateTime | DateTime          | Hérité de: Document                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| revisionNumber       | String            | Hérité de: Document                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| electronicAddress    | ElectronicAddress | Hérité de: Document                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| subject              | String            | Hérité de: Document                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| title                | String            | Hérité de: Document                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| docStatus            | Status            | Hérité de: Document                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| status               | Status            | Hérité de: Document                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| aliasName            | String            | Hérité de: IdentifiedObject                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| mRID                 | String            | Hérité de: IdentifiedObject                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| name                 | String            | Hérité de: IdentifiedObject                                                                                                                                                                                                                                                                                                                                                                                                                                               |

Le Tableau 51 montre toutes les extrémités d'association de la CRR avec d'autres classes.

**Tableau 51 – Extrémités d'association de CongestionRevenueRights::CRR avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type               | description                 |
|--------------------|----------------------------|--------------------|-----------------------------|
| [0..1]             | [0..1] Flowgate            | Flowgate           |                             |
| [1..*]             | [1..1] CRRMarket           | CRRMarket          |                             |
| [1..1]             | [1..*] CRRSegment          | CRRSegment         |                             |
| [1..1]             | [1..*] CRROrgRole          | CRROrgRole         |                             |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject      | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name               | Hérité de: IdentifiedObject |

### 6.5.2.3 CRROrgRole

Identifie comment une organisation peut participer avec un droit à revenu de congestion définie (CRR).

Le Tableau 52 montre tous les attributs de CRROrgRole.

**Tableau 52 – Attributs de CongestionRevenueRights::CRROrgRole**

| nom       | type        | description                                                               |
|-----------|-------------|---------------------------------------------------------------------------|
| kind      | CRRRoleType | Type de rôle de l'organisation quant aux droits à revenu de congestion.   |
| status    | Status      | Statut du rôle de l'organisation quant aux droits à revenu de congestion. |
| aliasName | String      | Hérité de: IdentifiedObject                                               |
| mRID      | String      | Hérité de: IdentifiedObject                                               |
| name      | String      | Hérité de: IdentifiedObject                                               |

Le Tableau 53 montre toutes les extrémités d'association de CRROrgRole avec d'autres classes.

**Tableau 53 – Extrémités d'association de CongestionRevenueRights::CRROrgRole avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type               | description                 |
|--------------------|----------------------------|--------------------|-----------------------------|
| [1..*]             | [1..1] CRR                 | CRR                |                             |
| [0..*]             | [1..1] MktOrganisation     | MktOrganisation    |                             |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent | Hérité de: OrganisationRole |
| [0..*]             | [0..1] Organisation        | Organisation       | Hérité de: OrganisationRole |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject      | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name               | Hérité de: IdentifiedObject |

### 6.5.2.4 CRRSegment

CRRSegment représente un segment de la CRR dans une trame temps particulière.

La classe de segment contient le type, la quantité, le type d'opérateur en couverture, l'indicateur des heures d'utilisation et la période de segment de la CRR.

Le Tableau 54 montre tous les attributs de CRRSegment.

**Tableau 54 – Attributs de CongestionRevenueRights::CRRSegment**

| nom           | type     | description                                    |
|---------------|----------|------------------------------------------------|
| amount        | Money    | Quantité de dollars = quantité x clearingPrice |
| clearingPrice | Money    | Prix d'équilibre d'une CRR                     |
| endDateTime   | DateTime | Date et heure de fin de segment                |
| quantity      | Float    | Quantité de MW associée à la CRR               |
| startDateTime | DateTime | Date et heure de début de segment              |
| aliasName     | String   | Hérité de: IdentifiedObject                    |
| mRID          | String   | Hérité de: IdentifiedObject                    |
| name          | String   | Hérité de: IdentifiedObject                    |

Le Tableau 55 montre toutes les extrémités d'association de CRRSegment avec d'autres classes.

**Tableau 55 – Extrémités d'association de CongestionRevenueRights::CRRSegment avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type          | description                 |
|--------------------|-----------------------|---------------|-----------------------------|
| [1..*]             | [1..1] CRR            | CRR           |                             |
| [0..*]             | [0..*] Source         | Pnode         |                             |
| [0..*]             | [0..*] Sink           | Pnode         |                             |
| [0..1]             | [0..*] DiagramObjects | DiagramObject | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names          | Name          | Hérité de: IdentifiedObject |

### 6.5.3 Paquetage MarketOpCommon

#### 6.5.3.1 Généralités

Ce paquetage contient les objets communs partagés par les paquetages MarketOperations.

#### 6.5.3.2 Classe racine MarketInvoice

Ensemble des éléments de ligne d'une facture. Toutes les factures comportent une échéance, un montant à régler et des informations (client, banques, etc.) à obtenir grâce à des associations. L'ensemble de la facture est fondé sur des éléments de ligne individuels, qui chacun contiennent des montants et des descriptions pour des services ou produits spécifiques.

Le Tableau 56 montre tous les attributs de MarketInvoice.

**Tableau 56 – Attributs de MarketOpCommon::MarketInvoice**

| nom                 | type             | description                                                                                                                                                                                                                                                                                        |
|---------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| amount              | Money            | Montant total à régler sur cette facture basé sur les éléments de ligne et les ajustements applicables.                                                                                                                                                                                            |
| billMediaKind       | MktBillMediaKind | Type de support utilisé pour fournir les CustomerBillingInfo.                                                                                                                                                                                                                                      |
| dueDate             | Date             | Date calculée à partir de laquelle le montant de la facture est dû.                                                                                                                                                                                                                                |
| kind                | MktAccountKind   | Type de facture ("vente" par défaut).                                                                                                                                                                                                                                                              |
| mailedDate          | Date             | Date à laquelle le relevé de facturation/la facture client a été imprimé/envoyé par courrier.                                                                                                                                                                                                      |
| proForma            | Boolean          | True si le paiement doit être réglé par le client pour accepter un ErpQuote particulier (avec la conception associée) et lancer le travail, au moment où il convient de générer automatiquement un ErpInvoice associé. EprPayment.subjectStatus satisfait aux conditions spécifiées dans ErpQuote. |
| referenceNumber     | String           | Numéro de facture référencé par cette facture.                                                                                                                                                                                                                                                     |
| transactionDateTime | DateTime         | Date et heure d'émission de la facture.                                                                                                                                                                                                                                                            |
| transferType        | String           | Type de transfert de facture.                                                                                                                                                                                                                                                                      |

Le Tableau 57 montre toutes les extrémités d'association de MarketInvoice avec d'autres classes.

**Tableau 57 – Extrémités d'association de MarketOpCommon::MarketInvoice avec d'autres classes**

| [mult à partir de] | [mult vers] nom               | type                  | description |
|--------------------|-------------------------------|-----------------------|-------------|
| [0..*]             | [1..*] MajorChargeGroup       | MajorChargeGroup      |             |
| [1..1]             | [0..*] MarketInvoiceLineItems | MarketInvoiceLineItem |             |

### 6.5.3.3 Classe racine MarketInvoiceLineItem

Elément de ligne individuel sur une facture.

Le Tableau 58 montre tous les attributs de MarketInvoiceLineItem.

**Tableau 58 – Attributs de MarketOpCommon::MarketInvoiceLineItem**

| nom            | type                   | description                                                                         |
|----------------|------------------------|-------------------------------------------------------------------------------------|
| billPeriod     | DateTimeInterval       | Période de facturation de l'élément de ligne.                                       |
| glAccount      | String                 | Le code de facturation du grand livre général doit être une combinaison valide.     |
| glDateTime     | DateTime               | Les éléments de ligne de date et d'heure seront publiés sur le grand livre général. |
| kind           | MktInvoiceLineItemKind | Type d'élément de ligne.                                                            |
| lineAmount     | Float                  | Montant dû pour cet élément de ligne.                                               |
| lineNumber     | String                 | Numéro d'élément de ligne sur le relevé de facturation.                             |
| lineVersion    | String                 | Numéro de version de la facture.                                                    |
| netAmount      | Float                  | Montant net des frais de l'élément de ligne.                                        |
| previousAmount | Float                  | Montant précédent des frais de l'élément de ligne.                                  |

Le Tableau 59 montre toutes les extrémités d'association de MarketInvoiceLineItem avec d'autres classes.

**Tableau 59 – Extrémités d'association de MarketOpCommon::MarketInvoiceLineItem avec d'autres classes**

| [mult à partir de] | [mult vers] nom                        | type                  | description |
|--------------------|----------------------------------------|-----------------------|-------------|
| [0..*]             | [1..1] MarketInvoice                   | MarketInvoice         |             |
| [0..*]             | [0..*] Settlement                      | Settlement            |             |
| [0..*]             | [0..1] ContainerMarketInvoiceLineItem  | MarketInvoiceLineItem |             |
| [0..1]             | [0..*] ComponentMarketInvoiceLineItems | MarketInvoiceLineItem |             |

#### 6.5.3.4 Classe racine MarketLedger

Dans les transactions de comptabilité, un grand livre est un registre contenant les comptes sur lesquels des débits et des crédits sont publiés depuis des journaux, dans lesquels des transactions sont enregistrées au préalable. Les entrées du journal sont régulièrement publiées sur le grand livre. Le grand livre réel contient les montants réels des comptes d'une société ou d'un service. Les montants réels peuvent être générés dans une application source, puis chargés dans un grand livre spécifique appartenant au grand livre général ou à l'application budgétaire d'une entreprise.

Le Tableau 60 montre toutes les extrémités d'association de MarketLedger avec d'autres classes.

**Tableau 60 – Extrémités d'association de MarketOpCommon::MarketLedger avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type              | description |
|--------------------|----------------------------|-------------------|-------------|
| [1..1]             | [0..*] MarketLedgerEntries | MarketLedgerEntry |             |

### 6.5.3.5 Classe racine MarketLedgerEntry

Détails d'une entrée individuelle dans un grand livre provenant d'un journal à la date attribuée.

Le Tableau 61 montre tous les attributs de MarketLedgerEntry.

**Tableau 61 – Attributs de MarketOpCommon::MarketLedgerEntry**

| nom                 | type           | description                                                             |
|---------------------|----------------|-------------------------------------------------------------------------|
| accountID           | String         | Identifiant de compte de cette entrée.                                  |
| accountKind         | MktAccountKind | Type de compte de cette entrée.                                         |
| amount              | Money          | Montant du débit/credit de ce compte.                                   |
| postedDateTime      | DateTime       | Date et heure auxquelles cette entrée a été publiée sur le grand livre. |
| status              | Status         | Statut de l'entrée du grand livre.                                      |
| transactionDateTime | DateTime       | Date et heure de l'enregistrement de l'entrée du journal.               |

Le Tableau 62 montre toutes les extrémités d'association de MarketLedgerEntry avec d'autres classes.

**Tableau 62 – Extrémités d'association de MarketOpCommon::MarketLedgerEntry avec d'autres classes**

| [mult à partir de] | [mult vers] nom     | type         | description |
|--------------------|---------------------|--------------|-------------|
| [0..*]             | [0..*] Settlement   | Settlement   |             |
| [0..*]             | [1..1] MarketLedger | MarketLedger |             |

### 6.5.3.6 MktActivityRecord

Sous-classe de IEC 61968: Common:ActivityRecord

Le Tableau 63 montre tous les attributs de MktActivityRecord.



**Tableau 63 – Attributs de MarketOpCommon::MktActivityRecord**

| nom             | type     | description                 |
|-----------------|----------|-----------------------------|
| createdDateTime | DateTime | Hérité de: ActivityRecord   |
| type            | String   | Hérité de: ActivityRecord   |
| severity        | String   | Hérité de: ActivityRecord   |
| reason          | String   | Hérité de: ActivityRecord   |
| status          | Status   | Hérité de: ActivityRecord   |
| aliasName       | String   | Hérité de: IdentifiedObject |
| mRID            | String   | Hérité de: IdentifiedObject |
| name            | String   | Hérité de: IdentifiedObject |

Le Tableau 64 montre toutes les extrémités d'association de MktActivityRecord avec d'autres classes.

**Tableau 64 – Extrémités d'association de MarketOpCommon::MktActivityRecord avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type          | description                 |
|--------------------|-----------------------|---------------|-----------------------------|
| [0..*]             | [0..*] MarketFactors  | MarketFactors |                             |
| [0..*]             | [0..*] Assets         | Asset         | Hérité de: ActivityRecord   |
| [0..1]             | [0..*] DiagramObjects | DiagramObject | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names          | Name          | Hérité de: IdentifiedObject |

### 6.5.3.7 MktConnectivityNode

Sous-classe de IEC 61970:Topology:ConnectivityNode

Le Tableau 65 montre tous les attributs de MktConnectivityNode.

**Tableau 65 – Attributs de MarketOpCommon::MktConnectivityNode**

| nom                | type     | description                 |
|--------------------|----------|-----------------------------|
| endEffectiveDate   | DateTime | Date de fin effective       |
| startEffectiveDate | DateTime | Date de début effective     |
| aliasName          | String   | Hérité de: IdentifiedObject |
| mRID               | String   | Hérité de: IdentifiedObject |
| name               | String   | Hérité de: IdentifiedObject |

Le Tableau 66 montre toutes les extrémités d'association de MktConnectivityNode avec d'autres classes.

**Tableau 66 – Extrémités d'association de MarketOpCommon::MktConnectivityNode avec d'autres classes**

| [mult à partir de] | [mult vers] nom                  | type                      | description                 |
|--------------------|----------------------------------|---------------------------|-----------------------------|
| [0..1]             | [0..*] RegisteredResource        | RegisteredResource        |                             |
| [1..1]             | [0..*] NodeConstraintTerm        | NodeConstraintTerm        |                             |
| [0..*]             | [1..1] RTO                       | RTO                       |                             |
| [1..1]             | [0..1] SysLoadDistribuFactor     | SysLoadDistributionFactor |                             |
| [1..1]             | [0..*] LossPenaltyFactor         | LossSensitivity           |                             |
| [1..1]             | [0..*] CnodeDistributionFactor   | CnodeDistributionFactor   |                             |
| [1..1]             | [0..1] IndividualPnode           | IndividualPnode           |                             |
| [0..*]             | [1..1] ConnectivityNodeContainer | ConnectivityNodeContainer | Hérité de: ConnectivityNode |
| [0..*]             | [0..1] TopologicalNode           | TopologicalNode           | Hérité de: ConnectivityNode |
| [0..1]             | [0..*] Terminals                 | Terminal                  | Hérité de: ConnectivityNode |
| [0..1]             | [0..*] DiagramObjects            | DiagramObject             | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                     | Name                      | Hérité de: IdentifiedObject |

### 6.5.3.8 MktEnergyConsumer

Sous-classe de IEC 61970:Wires:EnergyConsumer

Le Tableau 67 montre tous les attributs de MktEnergyConsumer.

**Tableau 67 – Attributs de MarketOpCommon::MktEnergyConsumer**

| nom               | type                     | description                 |
|-------------------|--------------------------|-----------------------------|
| customerCount     | Integer                  | Hérité de: EnergyConsumer   |
| grounded          | WindingConnection        | Hérité de: EnergyConsumer   |
| pfixed            | ActivePower              | Hérité de: EnergyConsumer   |
| pfixedPct         | PerCent                  | Hérité de: EnergyConsumer   |
| phaseConnection   | PhaseShuntConnectionKind | Hérité de: EnergyConsumer   |
| qfixed            | ReactivePower            | Hérité de: EnergyConsumer   |
| qfixedPct         | PerCent                  | Hérité de: EnergyConsumer   |
| aggregate         | Boolean                  | Hérité de: Equipment        |
| normallyInService | Boolean                  | Hérité de: Equipment        |
| aliasName         | String                   | Hérité de: IdentifiedObject |
| mRID              | String                   | Hérité de: IdentifiedObject |
| name              | String                   | Hérité de: IdentifiedObject |

Le Tableau 68 montre toutes les extrémités d'association de MktEnergyConsumer avec d'autres classes.

**Tableau 68 – Extrémités d'association de MarketOpCommon::  
MktEnergyConsumer avec d'autres classes**

| [mult à partir de] | [mult vers] nom             | type                       | description                    |
|--------------------|-----------------------------|----------------------------|--------------------------------|
| [1..1]             | [0..*] EnergyConsumerData   | EnergyConsumerData         |                                |
| [0..*]             | [0..1] RegisteredLoad       | RegisteredLoad             |                                |
| [0..*]             | [0..1] LoadResponse         | LoadResponseCharacteristic | Hérité de: EnergyConsumer      |
| [1..1]             | [0..*] EnergyConsumerPhase  | EnergyConsumerPhase        | Hérité de: EnergyConsumer      |
| [1..*]             | [0..1] PowerCutZone         | PowerCutZone               | Hérité de: EnergyConsumer      |
| [0..*]             | [0..1] BaseVoltage          | BaseVoltage                | Hérité de: ConductingEquipment |
| [1..1]             | [0..*] Terminals            | Terminal                   | Hérité de: ConductingEquipment |
| [0..*]             | [0..*] ProtectionEquipments | ProtectionEquipment        | Hérité de: ConductingEquipment |
| [1..1]             | [0..*] ClearanceTags        | ClearanceTag               | Hérité de: ConductingEquipment |
| [1..1]             | [0..1] SvStatus             | SvStatus                   | Hérité de: ConductingEquipment |
| [0..*]             | [0..1] EquipmentContainer   | EquipmentContainer         | Hérité de: Equipment           |
| [1..1]             | [0..*] ContingencyEquipment | ContingencyEquipment       | Hérité de: Equipment           |
| [0..1]             | [0..*] OperationalLimitSet  | OperationalLimitSet        | Hérité de: Equipment           |
| [0..*]             | [0..1] PSRType              | PSRType                    | Hérité de: PowerSystemResource |
| [0..1]             | [0..*] Measurements         | Measurement                | Hérité de: PowerSystemResource |
| [1..1]             | [0..*] OperatingShare       | OperatingShare             | Hérité de: PowerSystemResource |
| [0..*]             | [0..*] PsrLists             | PsrList                    | Hérité de: PowerSystemResource |
| [1..1]             | [0..1] OutageSchedule       | OutageSchedule             | Hérité de: PowerSystemResource |
| [0..*]             | [0..*] ReportingGroup       | ReportingGroup             | Hérité de: PowerSystemResource |
| [0..1]             | [0..*] DiagramObjects       | DiagramObject              | Hérité de: IdentifiedObject    |
| [1..1]             | [0..*] Names                | Name                       | Hérité de: IdentifiedObject    |

#### 6.5.3.9 MktGeneratingUnit

Sous-classe de IEC 61970:Production:GeneratingUnit

Le Tableau 69 montre tous les attributs de MktGeneratingUnit.

**Tableau 69 – Attributs de MarketOpCommon::MktGeneratingUnit**

| nom                             | type                   | description               |
|---------------------------------|------------------------|---------------------------|
| allocSpinResP                   | ActivePower            | Hérité de: GeneratingUnit |
| autoCntrlMarginP                | ActivePower            | Hérité de: GeneratingUnit |
| baseP                           | ActivePower            | Hérité de: GeneratingUnit |
| controlDeadband                 | ActivePower            | Hérité de: GeneratingUnit |
| controlPulseHigh                | Seconds                | Hérité de: GeneratingUnit |
| controlPulseLow                 | Seconds                | Hérité de: GeneratingUnit |
| controlResponseRate             | ActivePowerChangeRate  | Hérité de: GeneratingUnit |
| dispReserveFlag                 | Boolean                | Hérité de: GeneratingUnit |
| efficiency                      | PU                     | Hérité de: GeneratingUnit |
| energyMinP                      | HeatRate               | Hérité de: GeneratingUnit |
| fastStartFlag                   | Boolean                | Hérité de: GeneratingUnit |
| fuelPriority                    | Integer                | Hérité de: GeneratingUnit |
| genControlMode                  | GeneratorControlMode   | Hérité de: GeneratingUnit |
| genControlSource                | GeneratorControlSource | Hérité de: GeneratingUnit |
| genOperatingMode                | GeneratorOperatingMode | Hérité de: GeneratingUnit |
| governorMPL                     | PU                     | Hérité de: GeneratingUnit |
| governorSCD                     | PerCent                | Hérité de: GeneratingUnit |
| highControlLimit                | ActivePower            | Hérité de: GeneratingUnit |
| initialP                        | ActivePower            | Hérité de: GeneratingUnit |
| longPF                          | Float                  | Hérité de: GeneratingUnit |
| lowControlLimit                 | ActivePower            | Hérité de: GeneratingUnit |
| lowerRampRate                   | ActivePowerChangeRate  | Hérité de: GeneratingUnit |
| maxEconomicP                    | ActivePower            | Hérité de: GeneratingUnit |
| maximumAllowableSpinningReserve | ActivePower            | Hérité de: GeneratingUnit |
| maxOperatingP                   | ActivePower            | Hérité de: GeneratingUnit |
| minEconomicP                    | ActivePower            | Hérité de: GeneratingUnit |
| minimumOffTime                  | Seconds                | Hérité de: GeneratingUnit |
| minOperatingP                   | ActivePower            | Hérité de: GeneratingUnit |
| modelDetail                     | Classification         | Hérité de: GeneratingUnit |
| nominalP                        | ActivePower            | Hérité de: GeneratingUnit |
| normalPF                        | Float                  | Hérité de: GeneratingUnit |
| penaltyFactor                   | Float                  | Hérité de: GeneratingUnit |
| raiseRampRate                   | ActivePowerChangeRate  | Hérité de: GeneratingUnit |
| ratedGrossMaxP                  | ActivePower            | Hérité de: GeneratingUnit |
| ratedGrossMinP                  | ActivePower            | Hérité de: GeneratingUnit |
| ratedNetMaxP                    | ActivePower            | Hérité de: GeneratingUnit |
| shortPF                         | Float                  | Hérité de: GeneratingUnit |
| spinReserveRamp                 | ActivePowerChangeRate  | Hérité de: GeneratingUnit |
| startupCost                     | Money                  | Hérité de: GeneratingUnit |
| startupTime                     | Seconds                | Hérité de: GeneratingUnit |
| stepChange                      | ActivePower            | Hérité de: GeneratingUnit |
| tieLinePF                       | Float                  | Hérité de: GeneratingUnit |

| nom               | type    | description                 |
|-------------------|---------|-----------------------------|
| variableCost      | Money   | Hérité de: GeneratingUnit   |
| aggregate         | Boolean | Hérité de: Equipment        |
| normallyInService | Boolean | Hérité de: Equipment        |
| aliasName         | String  | Hérité de: IdentifiedObject |
| mRID              | String  | Hérité de: IdentifiedObject |
| name              | String  | Hérité de: IdentifiedObject |

Le Tableau 70 montre toutes les extrémités d'association de MktGeneratingUnit avec d'autres classes.

**Tableau 70 – Extrémités d'association de MarketOpCommon:  
MktGeneratingUnit avec d'autres classes**

| [mult à partir de] | [mult vers] nom                    | type                        | description                    |
|--------------------|------------------------------------|-----------------------------|--------------------------------|
| [0..*]             | [0..1] RegisteredGenerator         | RegisteredGenerator         |                                |
| [1..1]             | [0..*] GeneratingUnitDynamicValues | GeneratingUnitDynamicValues |                                |
| [0..1]             | [1..*] SynchronousMachines         | SynchronousMachine          | Hérité de: GeneratingUnit      |
| [1..1]             | [0..1] GenUnitOpSchedule           | GenUnitOpSchedule           | Hérité de: GeneratingUnit      |
| [1..1]             | [0..*] GrossToNetActivePowerCurves | GrossToNetActivePowerCurves | Hérité de: GeneratingUnit      |
| [1..1]             | [0..*] GenUnitOpCostCurves         | GenUnitOpCostCurve          | Hérité de: GeneratingUnit      |
| [1..1]             | [0..*] ControlAreaGeneratingUnit   | ControlAreaGeneratingUnit   | Hérité de: GeneratingUnit      |
| [0..*]             | [0..1] EquipmentContainer          | EquipmentContainer          | Hérité de: Equipment           |
| [1..1]             | [0..*] ContingencyEquipment        | ContingencyEquipment        | Hérité de: Equipment           |
| [0..1]             | [0..*] OperationalLimitSet         | OperationalLimitSet         | Hérité de: Equipment           |
| [0..*]             | [0..1] PSRType                     | PSRType                     | Hérité de: PowerSystemResource |
| [0..1]             | [0..*] Measurements                | Measurement                 | Hérité de: PowerSystemResource |
| [1..1]             | [0..*] OperatingShare              | OperatingShare              | Hérité de: PowerSystemResource |
| [0..*]             | [0..*] PsrLists                    | PsrList                     | Hérité de: PowerSystemResource |
| [1..1]             | [0..1] OutageSchedule              | OutageSchedule              | Hérité de: PowerSystemResource |
| [0..*]             | [0..*] ReportingGroup              | ReportingGroup              | Hérité de: PowerSystemResource |
| [0..1]             | [0..*] DiagramObjects              | DiagramObject               | Hérité de: IdentifiedObject    |
| [1..1]             | [0..*] Names                       | Name                        | Hérité de: IdentifiedObject    |

#### 6.5.3.10 MktLine

Sous-classe de IEC 61970:Wires:Line

Le Tableau 71 montre tous les attributs de MktLine.

**Tableau 71 – Attributs de MarketOpCommon::MktLine**

| nom       | type   | description                 |
|-----------|--------|-----------------------------|
| aliasName | String | Hérité de: IdentifiedObject |
| mRID      | String | Hérité de: IdentifiedObject |
| name      | String | Hérité de: IdentifiedObject |

Le Tableau 72 montre toutes les extrémités d'association de MktLine avec d'autres classes.

**Tableau 72 – Extrémités d'association de MarketOpCommon::MktLine avec d'autres classes**

| [mult à partir de] | [mult vers] nom          | type                  | description                          |
|--------------------|--------------------------|-----------------------|--------------------------------------|
| [0..*]             | [0..*] Flowgate          | Flowgate              |                                      |
| [0..*]             | [0..1] Region            | SubGeographicalRegion | Hérité de: Line                      |
| [0..1]             | [0..*] Equipments        | Equipment             | Hérité de: EquipmentContainer        |
| [1..1]             | [0..*] ConnectivityNodes | ConnectivityNode      | Hérité de: ConnectivityNodeContainer |
| [0..1]             | [0..*] TopologicalNode   | TopologicalNode       | Hérité de: ConnectivityNodeContainer |
| [0..*]             | [0..1] PSRType           | PSRType               | Hérité de: PowerSystemResource       |
| [0..1]             | [0..*] Measurements      | Measurement           | Hérité de: PowerSystemResource       |
| [1..1]             | [0..*] OperatingShare    | OperatingShare        | Hérité de: PowerSystemResource       |
| [0..*]             | [0..*] PsrLists          | PsrList               | Hérité de: PowerSystemResource       |
| [1..1]             | [0..1] OutageSchedule    | OutageSchedule        | Hérité de: PowerSystemResource       |
| [0..*]             | [0..*] ReportingGroup    | ReportingGroup        | Hérité de: PowerSystemResource       |
| [0..1]             | [0..*] DiagramObjects    | DiagramObject         | Hérité de: IdentifiedObject          |
| [1..1]             | [0..*] Names             | Name                  | Hérité de: IdentifiedObject          |

#### 6.5.3.11 MktLoadArea

Sous-classe de IEC 61970:LoadModel: LoadArea

Le Tableau 73 montre tous les attributs de MktLoadArea.

**Tableau 73 – Attributs de MarketOpCommon::MktLoadArea**

| nom       | type   | description                 |
|-----------|--------|-----------------------------|
| aliasName | String | Hérité de: IdentifiedObject |
| mRID      | String | Hérité de: IdentifiedObject |
| name      | String | Hérité de: IdentifiedObject |

Le Tableau 74 montre toutes les extrémités d'association de MktLoadArea avec d'autres classes.

**Tableau 74 – Extrémités d'association de MarketOpCommon::MktLoadArea avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type           | description                 |
|--------------------|-----------------------|----------------|-----------------------------|
| [1..1]             | [0..*] RegisteredLoad | RegisteredLoad |                             |
| [0..1]             | [0..*] AreaLoadCurve  | AreaLoadCurve  |                             |
| [1..1]             | [1..*] SubLoadAreas   | SubLoadArea    | Hérité de: LoadArea         |
| [0..1]             | [0..1] ControlArea    | ControlArea    | Hérité de: EnergyArea       |
| [0..1]             | [0..*] DiagramObjects | DiagramObject  | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names          | Name           | Hérité de: IdentifiedObject |

### 6.5.3.12 MktMeasurement

Sous-classe de IEC 61970:Meas:Measurement

Le Tableau 75 montre tous les attributs de MktMeasurement.

**Tableau 75 – Attributs de MarketOpCommon::MktMeasurement**

| nom             | type           | description                 |
|-----------------|----------------|-----------------------------|
| measurementType | String         | Hérité de: Measurement      |
| phases          | PhaseCode      | Hérité de: Measurement      |
| unitMultiplier  | UnitMultiplier | Hérité de: Measurement      |
| unitSymbol      | UnitSymbol     | Hérité de: Measurement      |
| aliasName       | String         | Hérité de: IdentifiedObject |
| mRID            | String         | Hérité de: IdentifiedObject |
| name            | String         | Hérité de: IdentifiedObject |

Le Tableau 76 montre toutes les extrémités d'association de MktMeasurement avec d'autres classes.

**Tableau 76 – Extrémités d'association de MarketOpCommon::MktMeasurement avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type                | description                 |
|--------------------|----------------------------|---------------------|-----------------------------|
| [0..*]             | [0..1] Pnode               | Pnode               |                             |
| [0..*]             | [0..1] Terminal            | Terminal            | Hérité de: Measurement      |
| [0..*]             | [0..1] PowerSystemResource | PowerSystemResource | Hérité de: Measurement      |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject       | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name                | Hérité de: IdentifiedObject |

### 6.5.3.13 MktOrganisation

Sous-classe de IEC 61968:Core2:TopLevel:Organisation

Le Tableau 77 montre tous les attributs de MktOrganisation.

**Tableau 77 – Attributs de MarketOpCommon::MktOrganisation**

| nom                      | type              | description                                                                                          |
|--------------------------|-------------------|------------------------------------------------------------------------------------------------------|
| creditFlag               | YesNo             | Indicateur de solvabilité (Y, N)                                                                     |
| creditStartEffectiveDate | DateTime          | Date à laquelle l'organisation devient solvable.                                                     |
| endEffectiveDate         | DateTime          | Date de fin effective                                                                                |
| lastModified             | DateTime          | Indication de la date et de l'heure de la dernière modification des informations sur l'organisation. |
| organisationID           | Integer           | ID (interne) organisation                                                                            |
| qualificationStatus      | String            | Statut de qualification de l'organisation: Qualifié, Non Qualifié ou Disqualifié                     |
| startEffectiveDate       | DateTime          | Date de début effective                                                                              |
| streetAddress            | StreetAddress     | Hérité de: Organisation                                                                              |
| postalAddress            | PostalAddress     | Hérité de: Organisation                                                                              |
| phone1                   | TelephoneNumber   | Hérité de: Organisation                                                                              |
| phone2                   | TelephoneNumber   | Hérité de: Organisation                                                                              |
| electronicAddress        | ElectronicAddress | Hérité de: Organisation                                                                              |
| aliasName                | String            | Hérité de: IdentifiedObject                                                                          |
| mRID                     | String            | Hérité de: IdentifiedObject                                                                          |
| name                     | String            | Hérité de: IdentifiedObject                                                                          |

Le Tableau 78 montre toutes les extrémités d'association de MktOrganisation avec d'autres classes.

**Tableau 78 – Extrémités d'association de MarketOpCommon::MktOrganisation avec d'autres classes**

| [mult à partir de] | [mult vers] nom              | type                  | description                 |
|--------------------|------------------------------|-----------------------|-----------------------------|
| [1..1]             | [0..*] CRRORole              | CRRORole              |                             |
| [0..*]             | [0..*] MarketPerson          | MarketPerson          |                             |
| [0..1]             | [0..*] RegisteredResource    | RegisteredResource    |                             |
| [1..1]             | [0..*] OrgResOwnership       | OrgResOwnership       |                             |
| [1..1]             | [0..*] OrgPnodeAllocation    | OrgPnodeAllocation    |                             |
| [1..1]             | [0..*] SchedulingCoordinator | SchedulingCoordinator |                             |
| [0..1]             | [0..*] Roles                 | OrganisationRole      | Hérité de: Organisation     |
| [0..1]             | [0..*] DiagramObjects        | DiagramObject         | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                 | Name                  | Hérité de: IdentifiedObject |

#### 6.5.3.14 MktPowerTransformer

Sous-classe de IEC 61970:Wires:PowerTransformer

Le Tableau 79 montre tous les attributs de MktPowerTransformer.



**Tableau 79 – Attributs de MarketOpCommon::MktPowerTransformer**

| nom               | type    | description                 |
|-------------------|---------|-----------------------------|
| vectorGroup       | String  | Hérité de: PowerTransformer |
| aggregate         | Boolean | Hérité de: Equipment        |
| normallyInService | Boolean | Hérité de: Equipment        |
| aliasName         | String  | Hérité de: IdentifiedObject |
| mRID              | String  | Hérité de: IdentifiedObject |
| name              | String  | Hérité de: IdentifiedObject |

Le Tableau 80 montre toutes les extrémités d'association de MktPowerTransformer avec d'autres classes.

**Tableau 80 – Extrémités d'association de MarketOpCommon::MktPowerTransformer avec d'autres classes**

| [mult à partir de] | [mult vers] nom             | type                 | description                    |
|--------------------|-----------------------------|----------------------|--------------------------------|
| [0..*]             | [0..*] Flowgate             | Flowgate             |                                |
| [0..*]             | [0..1] EndBFlow             | BranchEndFlow        |                                |
| [0..*]             | [0..1] EndAFlow             | BranchEndFlow        |                                |
| [0..1]             | [0..*] PowerTransformerEnd  | PowerTransformerEnd  | Hérité de: PowerTransformer    |
| [0..1]             | [0..*] TransformerTanks     | TransformerTank      | Hérité de: PowerTransformer    |
| [0..*]             | [0..1] BaseVoltage          | BaseVoltage          | Hérité de: ConductingEquipment |
| [1..1]             | [0..*] Terminals            | Terminal             | Hérité de: ConductingEquipment |
| [0..*]             | [0..*] ProtectionEquipments | ProtectionEquipment  | Hérité de: ConductingEquipment |
| [1..1]             | [0..*] ClearanceTags        | ClearanceTag         | Hérité de: ConductingEquipment |
| [1..1]             | [0..1] SvStatus             | SvStatus             | Hérité de: ConductingEquipment |
| [0..*]             | [0..1] EquipmentContainer   | EquipmentContainer   | Hérité de: Equipment           |
| [1..1]             | [0..*] ContingencyEquipment | ContingencyEquipment | Hérité de: Equipment           |
| [0..1]             | [0..*] OperationalLimitSet  | OperationalLimitSet  | Hérité de: Equipment           |
| [0..*]             | [0..1] PSRType              | PSRType              | Hérité de: PowerSystemResource |
| [0..1]             | [0..*] Measurements         | Measurement          | Hérité de: PowerSystemResource |
| [1..1]             | [0..*] OperatingShare       | OperatingShare       | Hérité de: PowerSystemResource |
| [0..*]             | [0..*] PsrLists             | PsrList              | Hérité de: PowerSystemResource |
| [1..1]             | [0..1] OutageSchedule       | OutageSchedule       | Hérité de: PowerSystemResource |
| [0..*]             | [0..*] ReportingGroup       | ReportingGroup       | Hérité de: PowerSystemResource |
| [0..1]             | [0..*] DiagramObjects       | DiagramObject        | Hérité de: IdentifiedObject    |
| [1..1]             | [0..*] Names                | Name                 | Hérité de: IdentifiedObject    |

### 6.5.3.15 MktTerminal

Sous-classe de IEC 61970:Core:Terminal

Le Tableau 81 montre tous les attributs de MktTerminal.

**Tableau 81 – Attributs de MarketOpCommon::MktTerminal**

| nom                | type      | description                                                           |
|--------------------|-----------|-----------------------------------------------------------------------|
| startEffectiveDate | DateTime  | Date/heure de début de l'admissibilité de l'élément pour le Flowgate. |
| endEffectiveDate   | DateTime  | Date/heure de fin de l'admissibilité de l'élément pour le Flowgate.   |
| connected          | Boolean   | Hérité de: Terminal                                                   |
| phases             | PhaseCode | Hérité de: Terminal                                                   |
| sequenceNumber     | Integer   | Hérité de: Terminal                                                   |
| aliasName          | String    | Hérité de: IdentifiedObject                                           |
| mRID               | String    | Hérité de: IdentifiedObject                                           |
| name               | String    | Hérité de: IdentifiedObject                                           |

Le Tableau 82 montre toutes les extrémités d'association de MktTerminal avec d'autres classes.

**Tableau 82 – Extrémités d'association de MarketOpCommon::MktTerminal avec d'autres classes**

| [mult à partir de] | [mult vers] nom                 | type                   | description                 |
|--------------------|---------------------------------|------------------------|-----------------------------|
| [0..*]             | [0..1] Flowgate                 | Flowgate               |                             |
| [1..1]             | [0..*] TerminalConstraintTerm   | TerminalConstraintTerm |                             |
| [0..*]             | [1..1] ConductingEquipment      | ConductingEquipment    | Hérité de: Terminal         |
| [0..*]             | [0..1] ConnectivityNode         | ConnectivityNode       | Hérité de: Terminal         |
| [0..1]             | [0..*] RegulatingControl        | RegulatingControl      | Hérité de: Terminal         |
| [0..*]             | [0..1] TopologicalNode          | TopologicalNode        | Hérité de: Terminal         |
| [1..*]             | [0..1] BusNameMarker            | BusNameMarker          | Hérité de: Terminal         |
| [1..1]             | [0..*] BranchGroupTerminal      | BranchGroupTerminal    | Hérité de: Terminal         |
| [0..1]             | [0..*] Measurements             | Measurement            | Hérité de: Terminal         |
| [1..1]             | [0..2] TieFlow                  | TieFlow                | Hérité de: Terminal         |
| [0..1]             | [0..*] OperationalLimitSet      | OperationalLimitSet    | Hérité de: Terminal         |
| [1..1]             | [0..*] HasSecond_MutualCoupling | MutualCoupling         | Hérité de: Terminal         |
| [1..1]             | [0..*] HasFirst_MutualCoupling  | MutualCoupling         | Hérité de: Terminal         |
| [1..1]             | [0..1] SvPowerFlow              | SvPowerFlow            | Hérité de: Terminal         |
| [1..1]             | [0..*] AuxiliaryEquipment       | AuxiliaryEquipment     | Hérité de: Terminal         |
| [0..1]             | [0..*] TransformerEnd           | TransformerEnd         | Hérité de: Terminal         |
| [0..1]             | [0..*] DiagramObjects           | DiagramObject          | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                    | Name                   | Hérité de: IdentifiedObject |

#### 6.5.3.16 MktUserAttribute

Sous-classe de IEC 61968:Domain2:UserAttribute

Le Tableau 83 montre tous les attributs de MktUserAttribute.

**Tableau 83 – Attributs de MarketOpCommon::MktUserAttribute**

| nom            | type           | description              |
|----------------|----------------|--------------------------|
| sequenceNumber | Integer        | Hérité de: UserAttribute |
| name           | String         | Hérité de: UserAttribute |
| value          | StringQuantity | Hérité de: UserAttribute |

Le Tableau 84 montre toutes les extrémités d'association de MktUserAttribute avec d'autres classes.

**Tableau 84 – Extrémités d'association de MarketOpCommon::MktUserAttribute avec d'autres classes**

| [mult à partir de] | [mult vers] nom                | type                    | description              |
|--------------------|--------------------------------|-------------------------|--------------------------|
| [0..*]             | [0..*] ChargeType              | ChargeType              |                          |
| [0..*]             | [0..*] MarketStatementLineItem | MarketStatementLineItem |                          |
| [0..*]             | [0..*] PassThroughBill         | PassThroughBill         |                          |
| [0..*]             | [0..*] ChargeGroup             | ChargeGroup             |                          |
| [1..1]             | [0..*] AttributeProperty       | AttributeProperty       |                          |
| [0..*]             | [0..*] BillDeterminant         | BillDeterminant         |                          |
| [0..*]             | [0..1] Transaction             | Transaction             | Hérité de: UserAttribute |

## 6.5.4 Paquetage MarketPlan

### 6.5.4.1 Généralités

Définitions du plan du marché pour les marchés planifiés, les événements de marché planifié, les processus de marché réels et les événements de marché réels.

La Figure 24 montre le diagramme de classe MarketPlan.

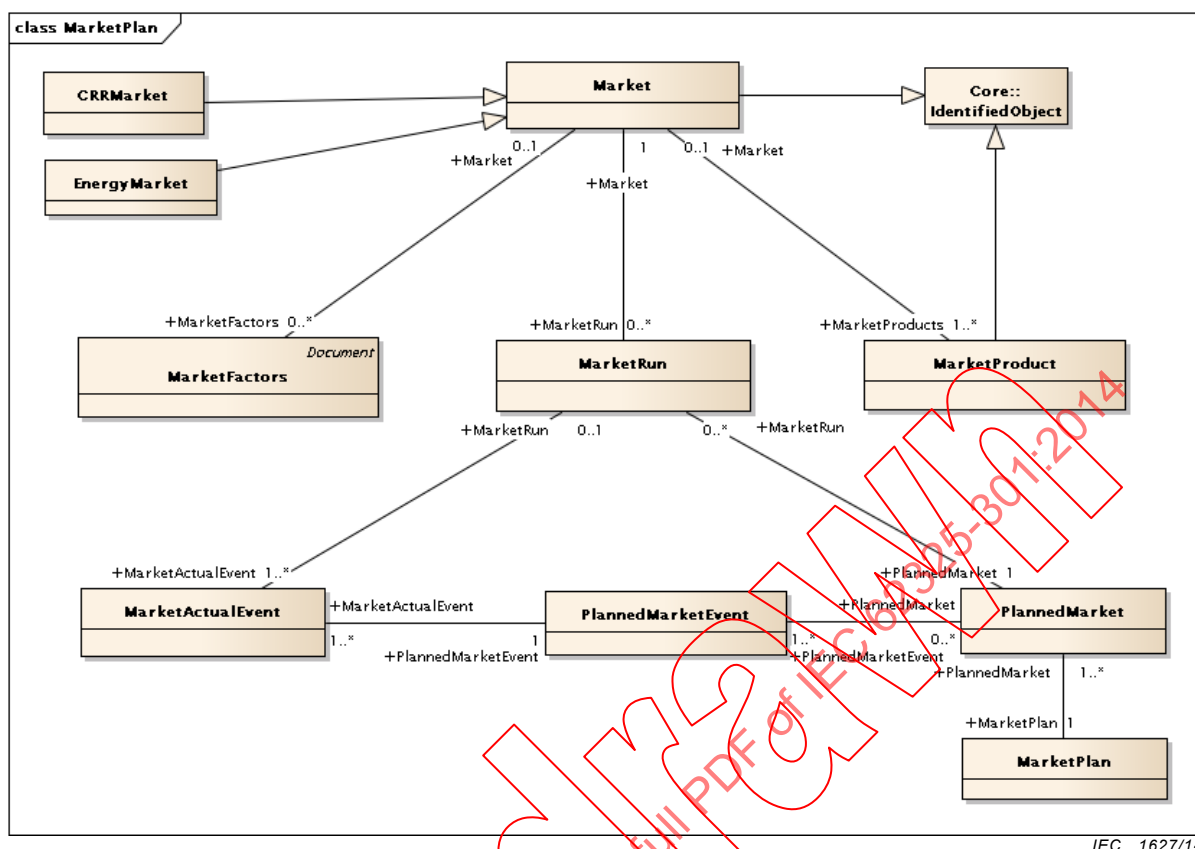


Figure 24 – Diagramme de classe MarketPlan::MarketPlan

Les classes principales illustrées sont utilisées pour identifier une instance d'une solution d'équilibre du marché. La classe Market permet d'identifier si l'instance est un marché J-1 (DAM), heure d'avant (intrajournalier) ou temps réel (RTM). La classe MarketFactors décrit un intervalle de marché comme la date/heure de début et de fin du marché. La classe MarketProduct indique le produit du marché, tel que le service énergétique ou auxiliaire. La classe PlannedMarket décrit les heures de début et de fin du marché. Les relations entre les classes sont également représentées.

#### 6.5.4.2 CRRMarket

Modèle décrivant le marché de vente aux enchères des droits à revenu de congestion.

Le Tableau 85 montre tous les attributs de CRRMarket.

**Tableau 85 – Attributs de MarketPlan::CRRMarket**

| nom                | type     | description                                                                     |
|--------------------|----------|---------------------------------------------------------------------------------|
| labelID            | String   | labelID – un ID pour un ensemble d'apnodes/pnodes utilisé dans un marché de CRR |
| actualEnd          | DateTime | Hérité de: Market                                                               |
| actualStart        | DateTime | Hérité de: Market                                                               |
| dst                | Boolean  | Hérité de: Market                                                               |
| end                | DateTime | Hérité de: Market                                                               |
| localTimeZone      | String   | Hérité de: Market                                                               |
| start              | DateTime | Hérité de: Market                                                               |
| status             | String   | Hérité de: Market                                                               |
| timeIntervalLength | Float    | Hérité de: Market                                                               |
| tradingDay         | DateTime | Hérité de: Market                                                               |
| tradingPeriod      | String   | Hérité de: Market                                                               |
| aliasName          | String   | Hérité de: IdentifiedObject                                                     |
| mRID               | String   | Hérité de: IdentifiedObject                                                     |
| name               | String   | Hérité de: IdentifiedObject                                                     |

Le Tableau 86 montre toutes les extrémités d'association de CRRMarket avec d'autres classes.

**Tableau 86 – Extrémités d'association de MarketPlan::CRRMarket avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type          | description                 |
|--------------------|-----------------------|---------------|-----------------------------|
| [1..1]             | [1..*] CRR            | CRR           |                             |
| [0..1]             | [0..*] MarketFactors  | MarketFactors | Hérité de: Market           |
| [0..1]             | [1..*] MarketProducts | MarketProduct | Hérité de: Market           |
| [1..1]             | [0..*] MarketRun      | MarketRun     | Hérité de: Market           |
| [0..1]             | [0..*] DiagramObjects | DiagramObject | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names          | Name          | Hérité de: IdentifiedObject |

#### 6.5.4.3 EnergyMarket

Marché énergétique et auxiliaire (ex. énergie, réserve tournante, réserve non tournante) avec une description des paramètres de réglage des opérations du marché.

Le Tableau 87 montre tous les attributs de EnergyMarket.

**Tableau 87 – Attributs de MarketPlan::EnergyMarket**

| nom                | type     | description                 |
|--------------------|----------|-----------------------------|
| actualEnd          | DateTime | Hérité de: Market           |
| actualStart        | DateTime | Hérité de: Market           |
| dst                | Boolean  | Hérité de: Market           |
| end                | DateTime | Hérité de: Market           |
| localTimeZone      | String   | Hérité de: Market           |
| start              | DateTime | Hérité de: Market           |
| status             | String   | Hérité de: Market           |
| timeIntervalLength | Float    | Hérité de: Market           |
| tradingDay         | DateTime | Hérité de: Market           |
| tradingPeriod      | String   | Hérité de: Market           |
| aliasName          | String   | Hérité de: IdentifiedObject |
| mRID               | String   | Hérité de: IdentifiedObject |
| name               | String   | Hérité de: IdentifiedObject |

Le Tableau 88 montre toutes les extrémités d'association de EnergyMarket avec d'autres classes.

**Tableau 88 – Extrémités d'association de MarketPlan::EnergyMarket avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type               | description                 |
|--------------------|----------------------------|--------------------|-----------------------------|
| [0..*]             | [0..*] RegisteredResources | RegisteredResource |                             |
| [0..*]             | [0..1] RTO                 | RTO                |                             |
| [0..1]             | [0..*] Settlements         | Settlement         |                             |
| [1..1]             | [0..1] MarketResults       | MarketResults      |                             |
| [1..1]             | [0..*] Bids                | Bid                |                             |
| [0..1]             | [0..*] MarketFactors       | MarketFactors      | Hérité de: Market           |
| [0..1]             | [1..*] MarketProducts      | MarketProduct      | Hérité de: Market           |
| [1..1]             | [0..*] MarketRun           | MarketRun          | Hérité de: Market           |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject      | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name               | Hérité de: IdentifiedObject |

#### 6.5.4.4 Market

Marché (à J-1 ou temps réel, par ex.) avec une description des paramètres de contrôle des opérations du marché.

Le Tableau 89 montre tous les attributs de Market.

**Tableau 89 – Attributs de MarketPlan::Market**

| nom                | type     | description                                                                                                                               |
|--------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------|
| actualEnd          | DateTime | Heure de fin du marché – fin du marché réelle                                                                                             |
| actualStart        | DateTime | Heure de début du marché – début du marché réel                                                                                           |
| dst                | Boolean  | True si l'heure d'économie d'énergie (DST, <i>Daylight Savings Time</i> ) est appliquée.                                                  |
| end                | DateTime | Heure de fin du marché.                                                                                                                   |
| localTimeZone      | String   | Fuseau horaire local.                                                                                                                     |
| start              | DateTime | Heure de début du marché.                                                                                                                 |
| status             | String   | Statut du marché<br>"OPEN" (OUVERT), "CLOSED" (FERME), "CLEARED" (EQUILIBRE),<br>"BLOCKED" (BLOQUE)                                       |
| timeIntervalLength | Float    | Longueur de l'intervalle de temps entre les transactions                                                                                  |
| tradingDay         | DateTime | Date de transaction sur le marché                                                                                                         |
| tradingPeriod      | String   | Période d'échange décrivant le marché. Pour un marché de l'énergie:<br>Jour<br>Heure<br>Pour un marché de CRR:<br>Année<br>Mois<br>Saison |
| aliasName          | String   | Hérité de: IdentifiedObject                                                                                                               |
| mRID               | String   | Hérité de: IdentifiedObject                                                                                                               |
| name               | String   | Hérité de: IdentifiedObject                                                                                                               |

Le Tableau 90 montre toutes les extrémités d'association de Market avec d'autres classes.

**Tableau 90 – Extrémités d'association de MarketPlan::Market avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type          | description                 |
|--------------------|-----------------------|---------------|-----------------------------|
| [0..1]             | [0..*] MarketFactors  | MarketFactors |                             |
| [0..1]             | [1..*] MarketProducts | MarketProduct |                             |
| [1..1]             | [0..*] MarketRun      | MarketRun     |                             |
| [0..1]             | [0..*] DiagramObjects | DiagramObject | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names          | Name          | Hérité de: IdentifiedObject |

#### 6.5.4.5 Classe racine MarketActualEvent

Cette classe représente l'instance réelle d'un événement.

Le Tableau 91 montre tous les attributs de MarketActualEvent.

**Tableau 91 – Attributs de MarketPlan::MarketActualEvent**

| nom         | type     | description                    |
|-------------|----------|--------------------------------|
| description | String   | Description de l'événement.    |
| eventID     | String   | ID événement réel.             |
| eventTime   | DateTime | Heure de début de l'événement. |

Le Tableau 92 montre toutes les extrémités d'association de MarketActualEvent avec d'autres classes.

**Tableau 92 – Extrémités d'association de MarketPlan::MarketActualEvent avec d'autres classes**

| [mult à partir de] | [mult vers] nom           | type               | description                                                                                                                                                                                                                    |
|--------------------|---------------------------|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1..*]             | [0..1] MarketRun          | MarketRun          | Processus de marché déclenché par cet événement réel. Par exemple, le processus DA est déclenché par l'événement de l'ouverture de d'un appel d'offres réel et se termine par l'événement de clôture d'un appel d'offres réel. |
| [1..*]             | [1..1] PlannedMarketEvent | PlannedMarketEvent | Événement planifié exécuté par cet événement réel.                                                                                                                                                                             |

#### 6.5.4.6 MarketFactors

Agrégation des informations du marché relatives à un intervalle de temps spécifique.

Le Tableau 93 montre tous les attributs de MarketFactors.

**Tableau 93 – Attributs de MarketPlan::MarketFactors**

| nom                  | type              | description                                                          |
|----------------------|-------------------|----------------------------------------------------------------------|
| intervalEndTime      | DateTime          | Fin de l'intervalle de temps pour lequel une exigence est définie.   |
| intervalStartTime    | DateTime          | Début de l'intervalle de temps pour lequel une exigence est définie. |
| type                 | String            | Hérité de: Document                                                  |
| createdDateTime      | DateTime          | Hérité de: Document                                                  |
| lastModifiedDateTime | DateTime          | Hérité de: Document                                                  |
| revisionNumber       | String            | Hérité de: Document                                                  |
| electronicAddress    | ElectronicAddress | Hérité de: Document                                                  |
| subject              | String            | Hérité de: Document                                                  |
| title                | String            | Hérité de: Document                                                  |
| docStatus            | Status            | Hérité de: Document                                                  |
| status               | Status            | Hérité de: Document                                                  |
| aliasName            | String            | Hérité de: IdentifiedObject                                          |
| mRID                 | String            | Hérité de: IdentifiedObject                                          |
| name                 | String            | Hérité de: IdentifiedObject                                          |



Le Tableau 94 montre toutes les extrémités d'association de MarketFactors avec d'autres classes.

**Tableau 94 – Extrémités d'association de MarketPlan::MarketFactors avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type               | description                 |
|--------------------|----------------------------|--------------------|-----------------------------|
| [0..*]             | [0..*] MktActivityRecord   | MktActivityRecord  |                             |
| [0..*]             | [0..1] Market              | Market             |                             |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject      | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name               | Hérité de: IdentifiedObject |

#### 6.5.4.7 Classe racine MarketPlan

Cette classe identifie un ensemble de marchés planifiés. Elle est le conteneur de ces marchés.

Le Tableau 95 montre tous les attributs de MarketPlan.

**Tableau 95 – Attributs de MarketPlan::MarketPlan**

| nom          | type     | description                        |
|--------------|----------|------------------------------------|
| description  | String   | Description du marché planifié.    |
| marketPlanID | String   | Identifiant du marché planifié.    |
| name         | String   | Nom du marché planifié.            |
| tradingDay   | DateTime | Jour d'échange du marché planifié. |

Le Tableau 96 montre toutes les extrémités d'association de MarketPlan avec d'autres classes.

**Tableau 96 – Extrémités d'association de MarketPlan::MarketPlan avec d'autres classes**

| [mult à partir de] | [mult vers] nom      | type          | description                                               |
|--------------------|----------------------|---------------|-----------------------------------------------------------|
| [1..1]             | [1..*] PlannedMarket | PlannedMarket | Un plan de marché comprend plusieurs marchés (DA, HA, RT) |

#### 6.5.4.8 MarketProduct

Produit commercialisé par un RTO (ex. énergie, réserve tournante de 10 min). Des exemples de produits de services auxiliaires sont: régulation à la hausse, régulation à la baisse, réserve tournante, réserve non tournante, réserve d'exploitation.

Le Tableau 97 montre tous les attributs de MarketProduct.

**Tableau 97 – Attributs de MarketPlan::MarketProduct**

| nom               | type              | description                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| marketProductType | MarketProductType | Exemples de type de produit du marché:<br>EN ( <i>Energy</i> , Energie)<br>RU ( <i>Regulation Up</i> , Régulation à la hausse)<br>RD ( <i>Regulation Dn</i> , Régulation à la baisse)<br>SR ( <i>Spinning Reserve</i> , Réserve tournante)<br>NR ( <i>Non-Spinning Reserve</i> , Réserve non tournante)<br>RC (RUC, <i>Residual Unit Commitment</i> – Gestion de la production résiduelle) |
| rampInterval      | Float             | Intervalle de temps de rampe pour le type de produit du marché spécifié par l'attribut marketProductType. Par exemple, si marketProductType = EN (énumération MarketProductType), alors rampInterval est l'intervalle de temps de rampe de Energy.                                                                                                                                         |
| aliasName         | String            | Hérité de: IdentifiedObject                                                                                                                                                                                                                                                                                                                                                                |
| mRID              | String            | Hérité de: IdentifiedObject                                                                                                                                                                                                                                                                                                                                                                |
| name              | String            | Hérité de: IdentifiedObject                                                                                                                                                                                                                                                                                                                                                                |

Le Tableau 98 montre toutes les extrémités d'association de MarketProduct avec d'autres classes.

**Tableau 98 – Extrémités d'association de MarketPlan::MarketProduct avec d'autres classes**

| [mult à partir de] | [mult vers] nom                 | type                     | description                 |
|--------------------|---------------------------------|--------------------------|-----------------------------|
| [1..*]             | [0..1] Market                   | Market                   |                             |
| [1..1]             | [0..*] ProductBids              | ProductBid               |                             |
| [1..1]             | [0..*] ResourceAwardInstruction | ResourceAwardInstruction |                             |
| [0..1]             | [0..*] BidError                 | BidError                 |                             |
| [0..1]             | [0..*] BidPriceCap              | BidPriceCap              |                             |
| [0..1]             | [0..1] MarketRegionResults      | MarketRegionResults      |                             |
| [0..1]             | [0..*] DiagramObjects           | DiagramObject            | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                    | Name                     | Hérité de: IdentifiedObject |

#### 6.5.4.9 Classe racine MarketRun

Cette classe représente une instance réelle d'un marché planifié. Par exemple, un marché à J-1 s'ouvre avec l'ouverture d'un appel d'offres (Bid Submission) et se termine par la clôture de cet appel d'offres. Le processus de marché représente l'ensemble du processus. MarketRuns peut être défini pour les marchés, tels que Day Ahead Market (marché à J-1), Real Time Market (marché en temps réel), Hour Ahead Market (marché de l'heure d'avant) et Week Ahead Market (marché de la semaine d'avant)...

Le Tableau 99 montre tous les attributs de MarketRun.

**Tableau 99 – Attributs de MarketPlan::MarketRun**

| nom                  | type          | description                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| executionType        | ExecutionType | Type d'exécution: J-1, intrajournalier, pré-répartition en temps réel, répartition en temps réel                                                                                                                                                                                                                                                                            |
| marketApprovalTime   | DateTime      | Heure approuvée de la répartition. Identifie l'heure à laquelle le répartiteur approuve un cas de répartition d'unités en temps réel spécifique.                                                                                                                                                                                                                            |
| marketApprovedStatus | Boolean       | Défini sur True lorsque le plan est approuvé par une autorité. Celui-ci devient le plan officiel du marché à J-1. Identifie le cas approuvé du marché pour l'intervalle de temps spécifié.                                                                                                                                                                                  |
| marketEndTime        | DateTime      | Heure de fin définie comme la fin du marché: heure de fin du marché.                                                                                                                                                                                                                                                                                                        |
| marketID             | String        | Identification qui définit les attributs du marché. Dans les conditions actuelles: Type de marché: DA, RTM, Date d'opération: 1/25/04, Heure d'opération: 1-25                                                                                                                                                                                                              |
| marketRunID          | String        | Identifiant unique qui distingue les différents processus d'un même ID marché. De manière spécifique, si le marché est réouvert, puis refermé et complètement relancé, le premier et le deuxième ensemble de résultats produits auront le même ID marché, mais n'auront pas les mêmes ID processus de marché puisque les différents processus correspondent au même marché. |
| marketStartTime      | DateTime      | Heure de début définie comme le début du marché: heure de début du marché.                                                                                                                                                                                                                                                                                                  |
| marketType           | MarketType    | Type de marché: marché à J-1 ou marché en temps réel.                                                                                                                                                                                                                                                                                                                       |
| reportedState        | String        | Etat des activités de processus de marché telles que rapportées par les systèmes de marché aux services de définition du marché.                                                                                                                                                                                                                                            |
| runState             | String        | Etat contrôlé par le service de définition du marché.<br>Exemples de valeurs possibles: Open (Ouvert), Close (Fermé)...                                                                                                                                                                                                                                                     |

Le Tableau 100 montre toutes les extrémités d'association de MarketRun avec d'autres classes.

**Tableau 100 – Extrémités d'association de MarketPlan::MarketRun avec d'autres classes**

| [mult à partir de] | [mult vers] nom          | type              | description                                                                                              |
|--------------------|--------------------------|-------------------|----------------------------------------------------------------------------------------------------------|
| [0..*]             | [1..1] Market            | Market            |                                                                                                          |
| [0..1]             | [1..*] MarketActualEvent | MarketActualEvent | Tous les événements réels qui déclenchent ce processus de marché.                                        |
| [0..*]             | [1..1] PlannedMarket     | PlannedMarket     | Un marché planifié peut avoir plusieurs processus de marché, car il peut présenter un nouveau processus. |

#### 6.5.4.10 Classe racine PlannedMarket

Modélise un marché planifié. Par exemple, un marché DA/HA/RT planifié.

Le Tableau 101 montre tous les attributs de PlannedMarket.

**Tableau 101 – Attributs de MarketPlan::PlannedMarket**

| nom             | type       | description                                                                                                                                                     |
|-----------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| marketEndTime   | DateTime   | Heure de fin du marché.                                                                                                                                         |
| marketID        | String     | Identification qui définit les attributs du marché. Dans les conditions actuelles: Type de marché: DA, RTM, Date d'opération: 1/25/04, Heure d'opération: 1-25. |
| marketStartTime | DateTime   | Heure de début du marché.                                                                                                                                       |
| marketType      | MarketType | Type de marché.                                                                                                                                                 |

Le Tableau 102 montre toutes les extrémités d'association de PlannedMarket avec d'autres classes.

**Tableau 102 – Extrémités d'association de MarketPlan::PlannedMarket avec d'autres classes**

| [mult à partir de] | [mult vers] nom           | type               | description                                                                                              |
|--------------------|---------------------------|--------------------|----------------------------------------------------------------------------------------------------------|
| [1..1]             | [0..*] MarketRun          | MarketRun          | Un marché planifié peut avoir plusieurs processus de marché, car il peut présenter un nouveau processus. |
| [0..*]             | [1..*] PlannedMarketEvent | PlannedMarketEvent | Un marché planifié doit avoir un ensemble d'événements planifiés.                                        |
| [1..*]             | [1..1] MarketPlan         | MarketPlan         | Un plan de marché comprend plusieurs marchés (DA, HA, RT)                                                |

#### 6.5.4.11 Classe racine PlannedMarketEvent

Cette classe représente des événements planifiés. Elle est utilisée pour modéliser les différents événements planifiés dans un marché (heure de fermeture, temps de compensation, etc.)

Le Tableau 103 montre tous les attributs de PlannedMarketEvent.

**Tableau 103 – Attributs de MarketPlan::PlannedMarketEvent**

| nom            | type    | description                                                                                                                                                              |
|----------------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| description    | String  | Description de l'événement planifié.                                                                                                                                     |
| eventType      | String  | Type d'événement planifié.                                                                                                                                               |
| plannedEventID | String  | Identifiant de l'événement planifié.                                                                                                                                     |
| plannedTime    | Integer | C'est un temps relatif pour que cet attribut puisse être utilisé par plusieurs marchés planifiés. Par exemple, la soumission des offres s'effectue tous les jours à 10h. |

Le Tableau 104 montre toutes les extrémités d'association de PlannedMarketEvent avec d'autres classes.

**Tableau 104 – Extrémités d'association de MarketPlan::  
PlannedMarketEvent avec d'autres classes**

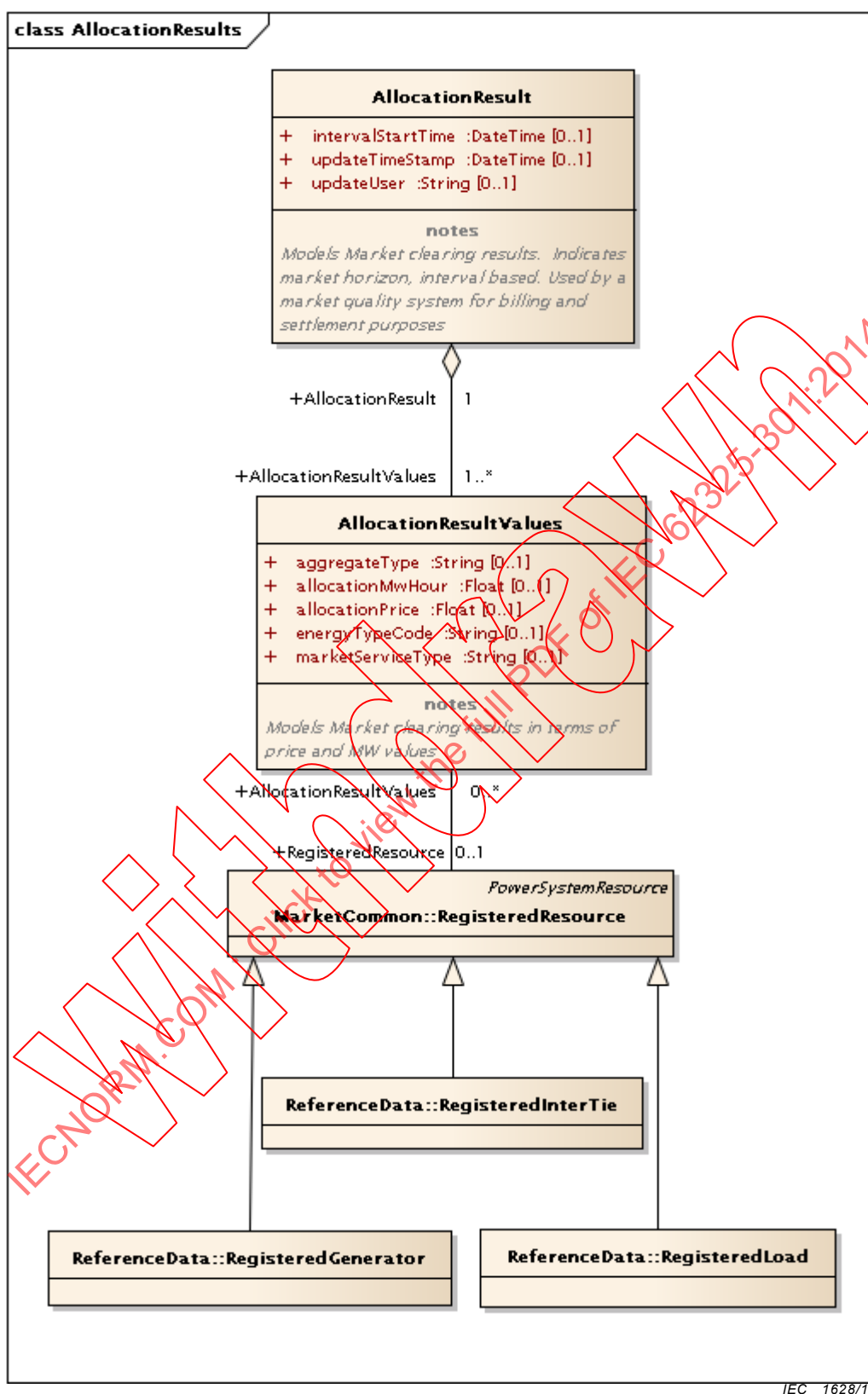
| [mult<br>à<br>partir<br>de] | [mult vers] nom          | type              | description                                                       |
|-----------------------------|--------------------------|-------------------|-------------------------------------------------------------------|
| [1..1]                      | [1..*] MarketActualEvent | MarketActualEvent | Tous les événements réels qui exécutent cet événement planifié.   |
| [1..*]                      | [0..*] PlannedMarket     | PlannedMarket     | Un marché planifié doit avoir un ensemble d'événements planifiés. |

## 6.5.5 Paquetage MarketQualitySystem

### 6.5.5.1 Généralités

Comptabilité, calcul et corrections des données de compteur post-commercialisation pour réduire les erreurs et les litiges relatifs à la facturation. Réduit la validation, la vérification et la correction manuelles des données de transaction qui pourraient influencer sur les règlements du marché. Nouvelle publication des résultats du marché après correction des données concernées.

La Figure 25 montre le diagramme de classe AllocationResults.



Légende

| Anglais                 | Français                 |
|-------------------------|--------------------------|
| Class AllocationResults | Classe AllocationResults |

| Anglais                                                                                                                                                | Français                                                                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Notes<br>Models Market clearing results. Indicates market horizon, interval based. Used by a market quality system for billing and settlement purposes | Notes<br>Modélise les résultats d'équilibre du marché. Indique l'horizon du marché sur la base d'intervalles. Utilisée par un système de qualité du marché à des fins de facturation et de règlement |
| Notes<br>Models Market clearing results in terms of price and MW values                                                                                | Notes<br>Modélise les résultats d'équilibre du marché en termes de prix et de MW                                                                                                                     |

**Figure 25 – Diagramme de classe MarketQualitySystem::AllocationResults**

Cette figure montre les principales classes associées au système de qualité du marché (MQS, *Market Quality System*) qui est généralement utilisé pour effectuer des analyses avant la facturation et le règlement. Elle décrit les résultats envoyés au MQS. Les principales classes incluent AllocationResult qui définit l'horizon du marché. Les résultats attribués sont décrits dans les classes AllocationResultsValues et RegisteredResource, ainsi que dans les sous-classes pour les générateurs, les interconnexions et les charges.

#### 6.5.5.2 Classe racine AllocationResult

Modélise les résultats d'équilibre du marché. Indique l'horizon du marché sur la base d'intervalles. Utilisée par un système de qualité du marché à des fins de facturation et de règlement.

Le Tableau 105 montre tous les attributs de AllocationResult.

**Tableau 105 – Attributs de MarketQualitySystem::AllocationResult**

| nom               | type     | description |
|-------------------|----------|-------------|
| intervalStartTime | DateTime |             |
| updateUser        | String   |             |
| updateTimeStamp   | DateTime |             |

Le Tableau 106 montre toutes les extrémités d'association de AllocationResult avec d'autres classes.

**Tableau 106 – Extrémités d'association de MarketQualitySystem::AllocationResult avec d'autres classes**

| [mult à partir de] | [mult vers] nom               | type                   | description |
|--------------------|-------------------------------|------------------------|-------------|
| [1..1]             | [1..*] AllocationResultValues | AllocationResultValues |             |

#### 6.5.5.3 Classe racine AllocationResultValues

Modélise les résultats d'équilibre du marché en termes de prix et de MW.

Le Tableau 107 montre tous les attributs de AllocationResultValues.

**Tableau 107 – Attributs de MarketQualitySystem::AllocationResultValues**

| nom               | type   | description                                                                                                                                                                                                                                                                                                     |
|-------------------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| aggregateType     | String | "1" – "Detail",<br>"2" – "Aggregate by Market service type", auquel cas le champ "AllocationEnergyType" ne sera pas renseigné;<br>"3" – "Aggregate by "AllocationEnergyType", auquel cas "MarketServiceType" ne sera pas renseigné.                                                                             |
| allocationMwHour  | Float  |                                                                                                                                                                                                                                                                                                                 |
| allocationPrice   | Float  |                                                                                                                                                                                                                                                                                                                 |
| energyTypeCode    | String |                                                                                                                                                                                                                                                                                                                 |
| marketServiceType | String | Il convient de choisir entre:<br>ME – Market Energy (capacité d'énergie du marché);<br>SR – Spinning Reserve (capacité de réserve tournante);<br>NR – Non-Spinning Reserve (capacité de réserve non tournante);<br>DAC – Day Ahead Capacity (capacité à J-1);<br>DEC – Derate Capacity (capacité de réduction). |

Le Tableau 108 montre toutes les extrémités d'association de AllocationResultValues avec d'autres classes.

**Tableau 108 – Extrémités d'association de MarketQualitySystem::AllocationResultValues avec d'autres classes**

| [mult à partir de] | [mult vers] nom           | type               | description |
|--------------------|---------------------------|--------------------|-------------|
| [0..*]             | [0..1] RegisteredResource | RegisteredResource |             |
| [1..*]             | [1..1] AllocationResult   | AllocationResult   |             |

#### 6.5.5.4 Classe racine AuxiliaryCost

Modélise les résultats d'équilibre du marché pour les coûts auxiliaires.

Le Tableau 109 montre tous les attributs de AuxiliaryCost.

**Tableau 109 – Attributs de MarketQualitySystem::AuxiliaryCost**

| nom               | type       | description |
|-------------------|------------|-------------|
| intervalStartTime | DateTime   |             |
| marketType        | MarketType |             |
| updateTimeStamp   | DateTime   |             |
| updateUser        | String     |             |

Le Tableau 110 montre toutes les extrémités d'association de AuxiliaryCost avec d'autres classes.



**Tableau 110 – Extrémités d'association de MarketQualitySystem::AuxiliaryCost avec d'autres classes**

| [mult à partir de] | [mult vers] nom        | type            | description |
|--------------------|------------------------|-----------------|-------------|
| [1..1]             | [1..*] AuxiliaryValues | AuxiliaryValues |             |

#### 6.5.5.5 Classe racine AuxiliaryObject

Modélise les valeurs auxiliaires.

Le Tableau 111 montre toutes les extrémités d'association de AuxiliaryObject avec d'autres classes.

**Tableau 111 – Extrémités d'association de MarketQualitySystem::AuxiliaryObject avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type                | description |
|--------------------|----------------------------|---------------------|-------------|
| [0..*]             | [0..1] RegisteredLoad      | RegisteredLoad      |             |
| [0..*]             | [0..1] RegisteredGenerator | RegisteredGenerator |             |

#### 6.5.5.6 AuxiliaryValues

Modélise les valeurs auxiliaires.

Le Tableau 112 montre tous les attributs de AuxiliaryValues.

**Tableau 112 – Attributs de MarketQualitySystem::AuxiliaryValues**

| nom                        | type  | description |
|----------------------------|-------|-------------|
| minExpostCapacity          | Float |             |
| maxExpostCapacity          | Float |             |
| availUndispatchedQ         | Float |             |
| incrementalORAvail         | Float |             |
| startUpCost                | Float |             |
| startUpCostEligibilityFlag | YesNo |             |
| noLoadCost                 | Float |             |
| noLoadCostEligibilityFlag  | YesNo |             |

Le Tableau 113 montre toutes les extrémités d'association de AuxiliaryValues avec d'autres classes.

**Tableau 113 – Extrémités d'association de MarketQualitySystem::AuxiliaryValues avec d'autres classes**

| [mult à partir de] | [mult vers] nom             | type                 | description                |
|--------------------|-----------------------------|----------------------|----------------------------|
| [1..*]             | [1..1] AuxillaryCost        | AuxiliaryCost        |                            |
| [1..*]             | [1..1] TenMinAuxillaryData  | TenMinAuxiliaryData  |                            |
| [1..*]             | [1..1] FiveMinAuxillaryData | FiveMinAuxiliaryData |                            |
| [0..*]             | [0..1] RegisteredLoad       | RegisteredLoad       | Hérité de: AuxiliaryObject |
| [0..*]             | [0..1] RegisteredGenerator  | RegisteredGenerator  | Hérité de: AuxiliaryObject |

#### 6.5.5.7 Classe racine ExpectedEnergy

Modélise l'énergie prévue à partir de l'ajustement du marché sur la base d'intervalles.

Le Tableau 114 montre tous les attributs de ExpectedEnergy.

**Tableau 114 – Attributs de MarketQualitySystem::ExpectedEnergy**

| nom               | type     | description |
|-------------------|----------|-------------|
| intervalStartTime | DateTime |             |
| updateUser        | String   |             |
| updateTimeStamp   | DateTime |             |

Le Tableau 115 montre toutes les extrémités d'association de ExpectedEnergy avec d'autres classes.

**Tableau 115 – Extrémités d'association de MarketQualitySystem::ExpectedEnergy avec d'autres classes**

| [mult à partir de] | [mult vers] nom             | type                 | description |
|--------------------|-----------------------------|----------------------|-------------|
| [1..1]             | [1..*] ExpectedEnergyValues | ExpectedEnergyValues |             |

#### 6.5.5.8 Classe racine ExpectedEnergyValues

Modélise l'énergie prévue à partir de l'ajustement du marché.

Le Tableau 116 montre tous les attributs de ExpectedEnergyValues.

**Tableau 116 – Attributs de MarketQualitySystem::ExpectedEnergyValues**

| nom            | type   | description |
|----------------|--------|-------------|
| energyTypeCode | String |             |
| expectedMwh    | Float  |             |

Le Tableau 117 montre toutes les extrémités d'association de ExpectedEnergyValues avec d'autres classes.

**Tableau 117 – Extrémités d'association de MarketQualitySystem::ExpectedEnergyValues avec d'autres classes**

| [mult à partir de] | [mult vers] nom           | type               | description |
|--------------------|---------------------------|--------------------|-------------|
| [0..*]             | [0..1] RegisteredResource | RegisteredResource |             |
| [1..*]             | [1..1] ExpectedEnergy     | ExpectedEnergy     |             |

#### 6.5.5.9 Classe racine FiveMinAuxiliaryData

Modélise des données auxiliaires de 5 min.

Le Tableau 118 montre tous les attributs de FiveMinAuxiliaryData.

**Tableau 118 – Attributs de MarketQualitySystem::FiveMinAuxiliaryData**

| nom               | type     | description |
|-------------------|----------|-------------|
| intervalStartTime | DateTime |             |
| updateUser        | String   |             |
| updateTimeStamp   | DateTime |             |

Le Tableau 119 montre toutes les extrémités d'association de FiveMinAuxiliaryData avec d'autres classes.

**Tableau 119 – Extrémités d'association de MarketQualitySystem::FiveMinAuxiliaryData avec d'autres classes**

| [mult à partir de] | [mult vers] nom        | type            | description |
|--------------------|------------------------|-----------------|-------------|
| [1..1]             | [1..*] AuxiliaryValues | AuxiliaryValues |             |

#### 6.5.5.10 Classe racine TenMinAuxiliaryData

Modélise des données auxiliaires de 10 min.

Le Tableau 120 montre tous les attributs de TenMinAuxiliaryData.

**Tableau 120 – Attributs de MarketQualitySystem::TenMinAuxiliaryData**

| nom               | type     | description |
|-------------------|----------|-------------|
| intervalStartTime | DateTime |             |
| updateUser        | String   |             |
| updateTimeStamp   | DateTime |             |

Le Tableau 121 montre toutes les extrémités d'association de TenMinAuxiliaryData avec d'autres classes.

**Tableau 121 – Extrémités d'association de MarketQualitySystem::TenMinAuxiliaryData avec d'autres classes**

| [mult à partir de] | [mult vers] nom      | type            | description |
|--------------------|----------------------|-----------------|-------------|
| [1..1]             | [1..*] AuxillaryData | AuxiliaryValues |             |

#### 6.5.5.11 Classe racine TradingHubPrice

Modélise les prix sur les plates-formes de négociation sur la base d'intervalles.

Le Tableau 122 montre tous les attributs de TradingHubPrice.

**Tableau 122 – Attributs de MarketQualitySystem::TradingHubPrice**

| nom               | type       | description |
|-------------------|------------|-------------|
| intervalStartTime | DateTime   |             |
| marketType        | MarketType |             |
| updateUser        | String     |             |
| updateTimeStamp   | DateTime   |             |

Le Tableau 123 montre toutes les extrémités d'association de TradingHubPrice avec d'autres classes.

**Tableau 123 – Extrémités d'association de MarketQualitySystem::TradingHubPrice avec d'autres classes**

| [mult à partir de] | [mult vers] nom         | type             | description |
|--------------------|-------------------------|------------------|-------------|
| [1..1]             | [1..*] TradingHubValues | TradingHubValues |             |

#### 6.5.5.12 Classe racine TradingHubValues

Modélise les prix sur les plates-formes de négociation.

Le Tableau 124 montre tous les attributs de TradingHubValues.

**Tableau 124 – Attributs de MarketQualitySystem::TradingHubValues**

| nom   | type  | description                                                                                                            |
|-------|-------|------------------------------------------------------------------------------------------------------------------------|
| price | Float | Utilise le type de marché. Pour DA, le prix est calculé sur une base horaire. Pour RTM, le prix est défini pour 5 min. |

Le Tableau 125 montre toutes les extrémités d'association de TradingHubValues avec d'autres classes.

**Tableau 125 – Extrémités d'association de MarketQualitySystem::TradingHubValues avec d'autres classes**

| [mult à partir de] | [mult vers] nom        | type            | description |
|--------------------|------------------------|-----------------|-------------|
| [0..*]             | [1..1] AggregatedPnode | AggregatedPnode |             |
| [1..*]             | [1..1] TradingHubPrice | TradingHubPrice |             |

## **6.5.6 Paquetage MarketSystem**

### **6.5.6.1 Généralités**

Résultats du marché et entrées externes consommées par les marchés.

### **6.5.6.2 Paquetage ExternalInputs**

#### **6.5.6.2.1 Généralités**

Entre dans le système de marché depuis les sources externes.

La Figure 26 montre le diagramme de classe ASRequirements.

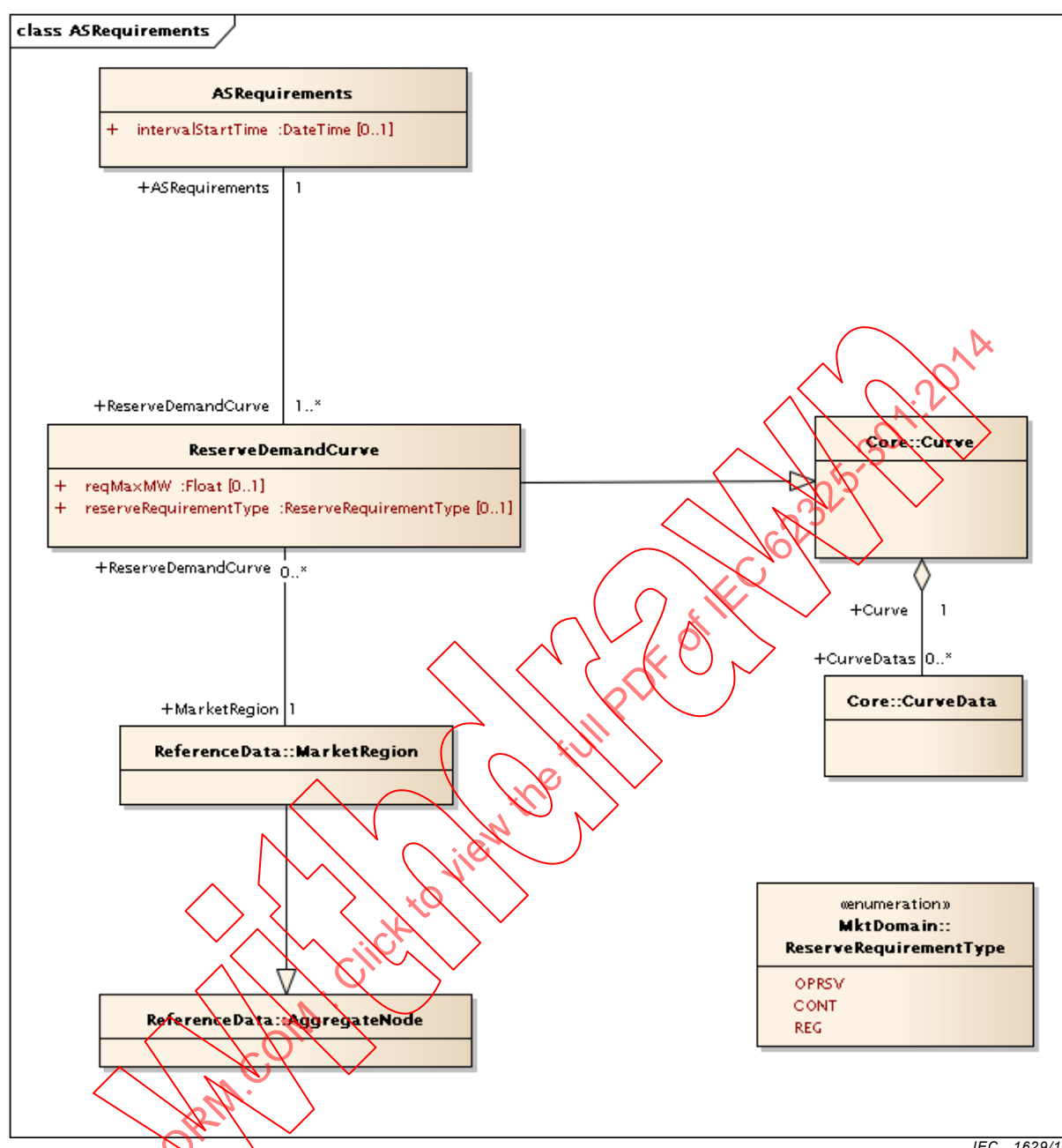


Figure 26 – Diagramme de classe ExternalInputs::ASRequirements

Cette figure modélise les exigences des services auxiliaires. La classe ASRequirements est utilisée pour décrire l'intervalle pour lequel l'AncillaryService (service auxiliaire) est exigé et pour indiquer les quantités de services auxiliaires exigées. L'association à MarketRegion modélise les exigences régionales des services auxiliaires. La classe MarketProduct est utilisée pour décrire la classe particulière de service auxiliaire.

La Figure 27 montre le diagramme de classe DefaultBids.

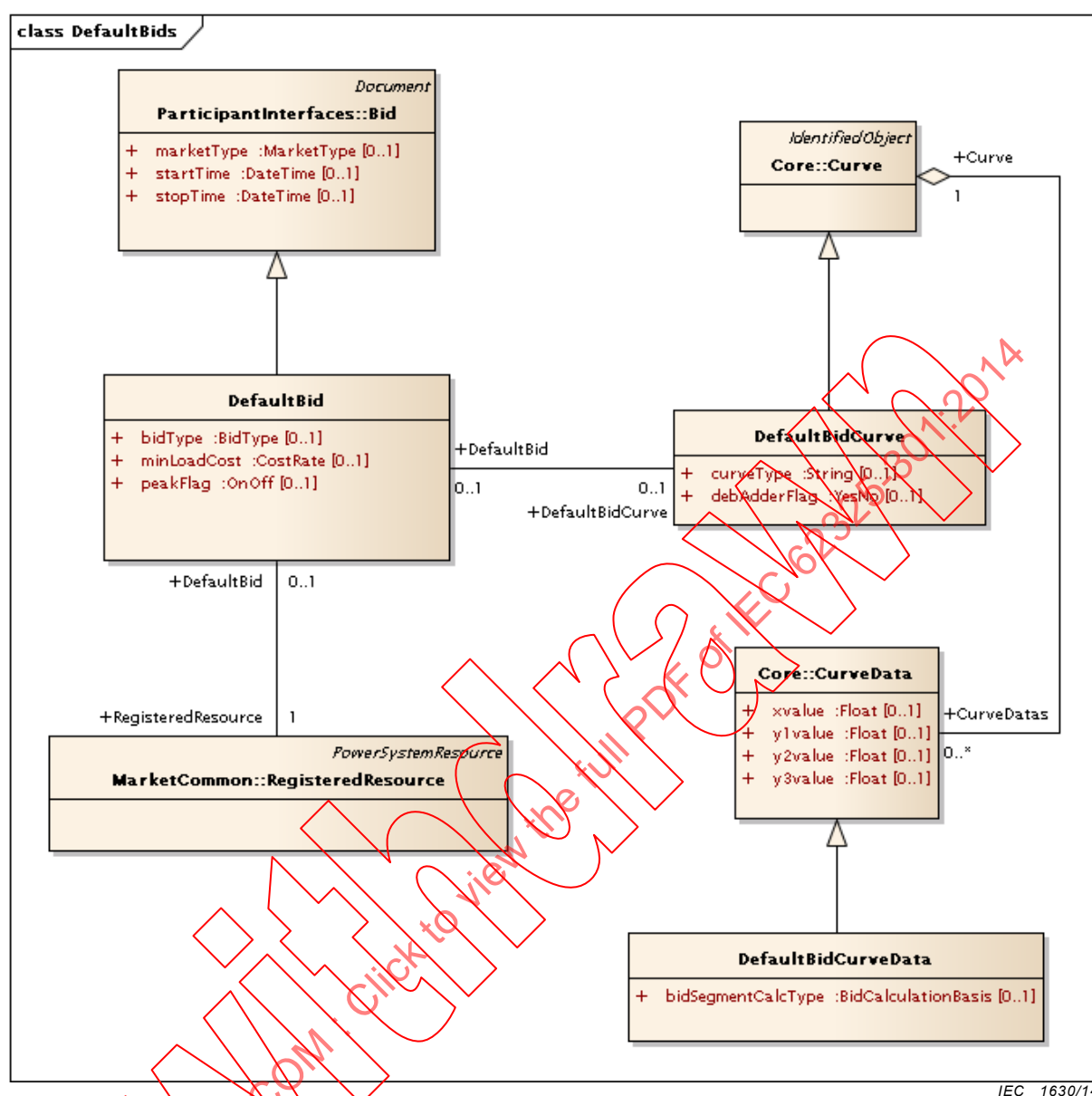
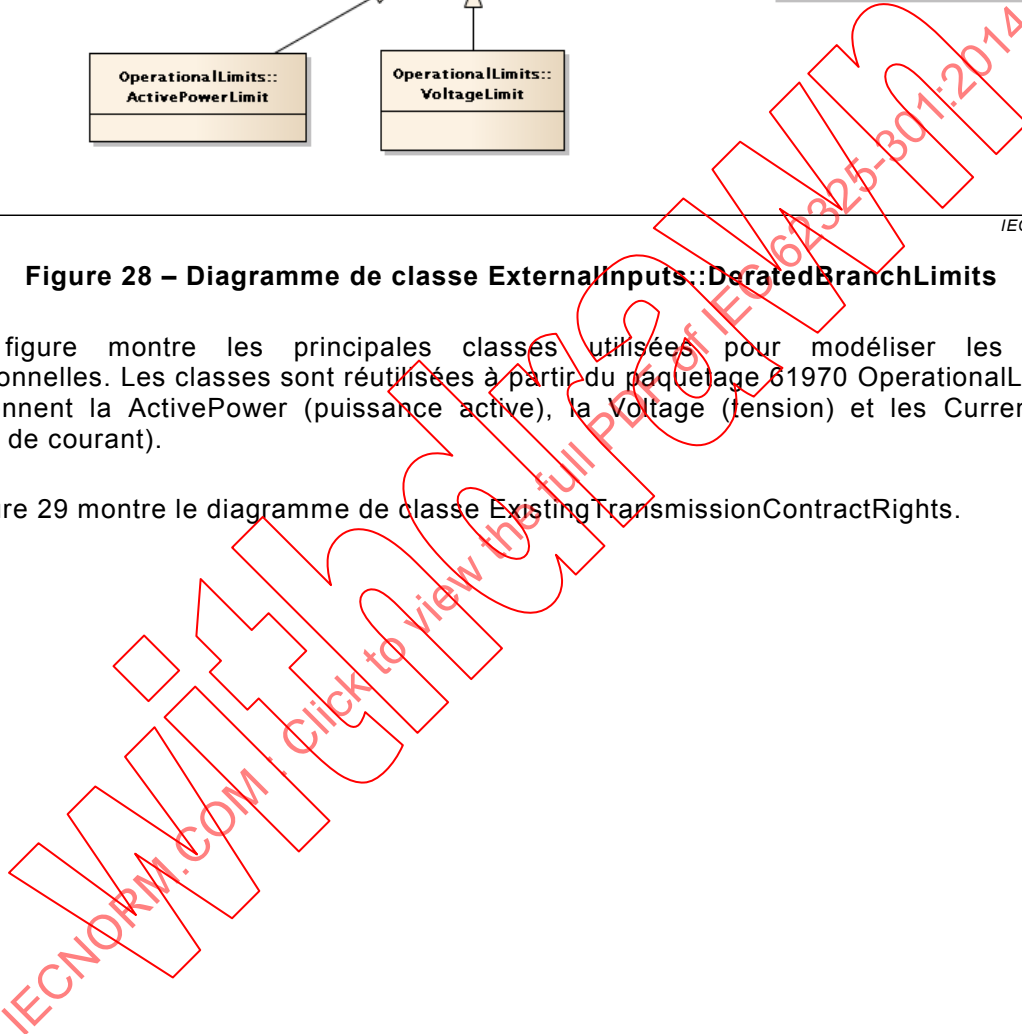


Figure 27 – Diagramme de classe ExternalInputs::DefaultBids

L'atténuation de l'emprise sur le marché (Market Power Mitigation) est un processus qui permet de détecter la tentative d'un participant d'exercer un pouvoir de marché. La détection est suivie de mesures correctives. Il s'agit par exemple de remplacer l'offre d'origine par une offre par défaut. Cette figure montre les classes utilisées pour modéliser une offre par défaut: Curve et Curve Data (du paquetage principal 61970), ainsi que la classe générique DefaultBid qui peut être utilisée pour décrire davantage les méthodes de mesures correctives spécifiques du marché. Trois méthodes types sont utilisées: LMP, coût basé sur l'indice du gaz ou négociation hors marché.

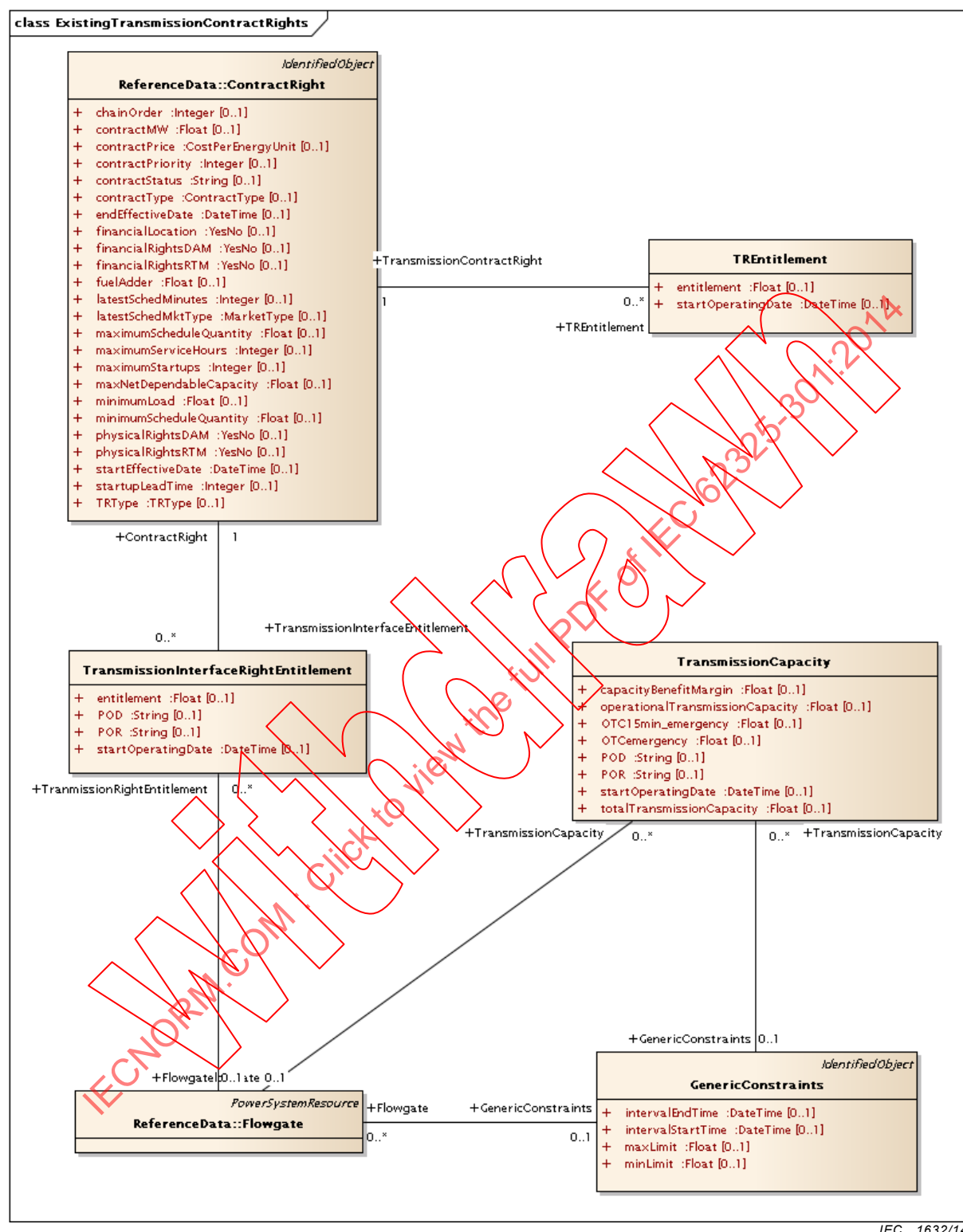
La Figure 28 montre le diagramme de classe DeratedBranchLimits.



Cette figure montre les principales classes utilisées pour modéliser les limites opérationnelles. Les classes sont réutilisées à partir du paquetage 61970 OperationalLimits et comprennent la ActivePower (puissance active), la Voltage (tension) et les CurrentLimits (limites de courant).

La Figure 29 montre le diagramme de classe ExistingTransmissionContractRights.





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**Figure 29 – Diagramme de classe ExternalInputs::ExistingTransmissionContractRights**

Lors du démarrage et de l'évolution des marchés LMP, il s'est avéré nécessaire de prendre en compte les droits de transport existants dans la solution du marché. Cette figure montre les principales classes utilisées pour modéliser ces droits existants. La classe ContractRight inclut des informations sur les droits spécifiques qui sont contractés en termes de puissance active et d'autres informations contractuelles. TransmissionInterfaceRightEntitlement décrit les aspects physiques du droit dans les points de livraison et de réception associés de la puissance active.

La Figure 30 montre le diagramme de classe IntermittentResourceSchedules.

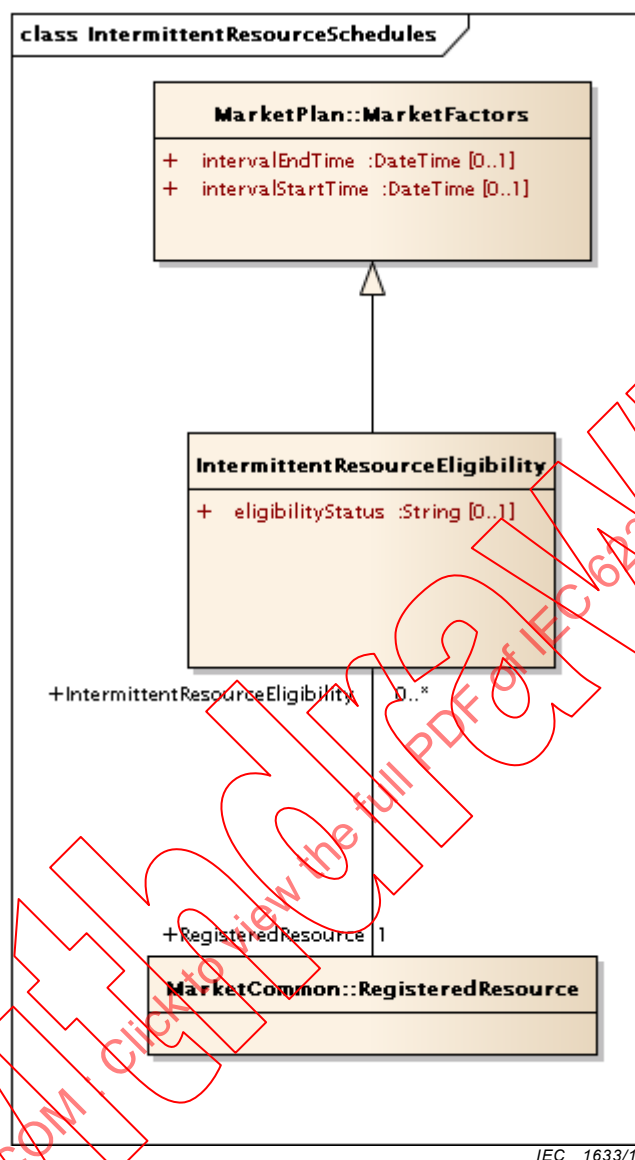


**Figure 30 – Diagramme de classe ExternalInputs::IntermittentResourceSchedules**

Cette figure montre les classes principales utilisées pour modéliser les ressources (variables) intermittentes. Elle est habituellement utilisée pour modéliser les énergies renouvelables, telles que l'énergie éolienne. La classe IntermittentResourceEligibility permet d'indiquer si les ressources peuvent participer en tant que ressources renouvelables régies par un régime générique de ressources renouvelables.

La Figure 31 montre le diagramme de classe LoadForecast.

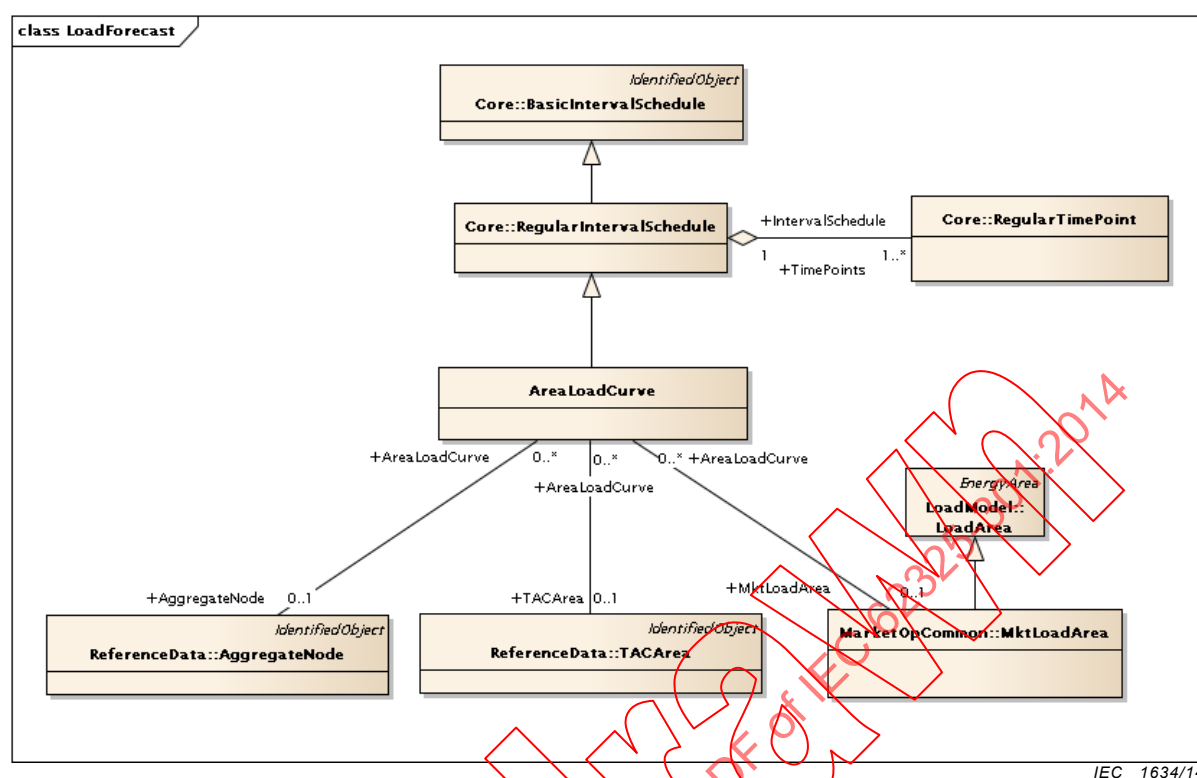


Figure 31 – Diagramme de classe ExternalInputs::LoadForecast

Cette figure montre les classes utilisées pour modéliser la prévision de charge dans l'horizon temporel du marché. Le modèle réutilisé est classé dans le paquetage Core 61970 et ajoute des modèles spécifiques aux marchés.

La Figure 32 montre le diagramme de classe OutageOrDeratedEquipment.

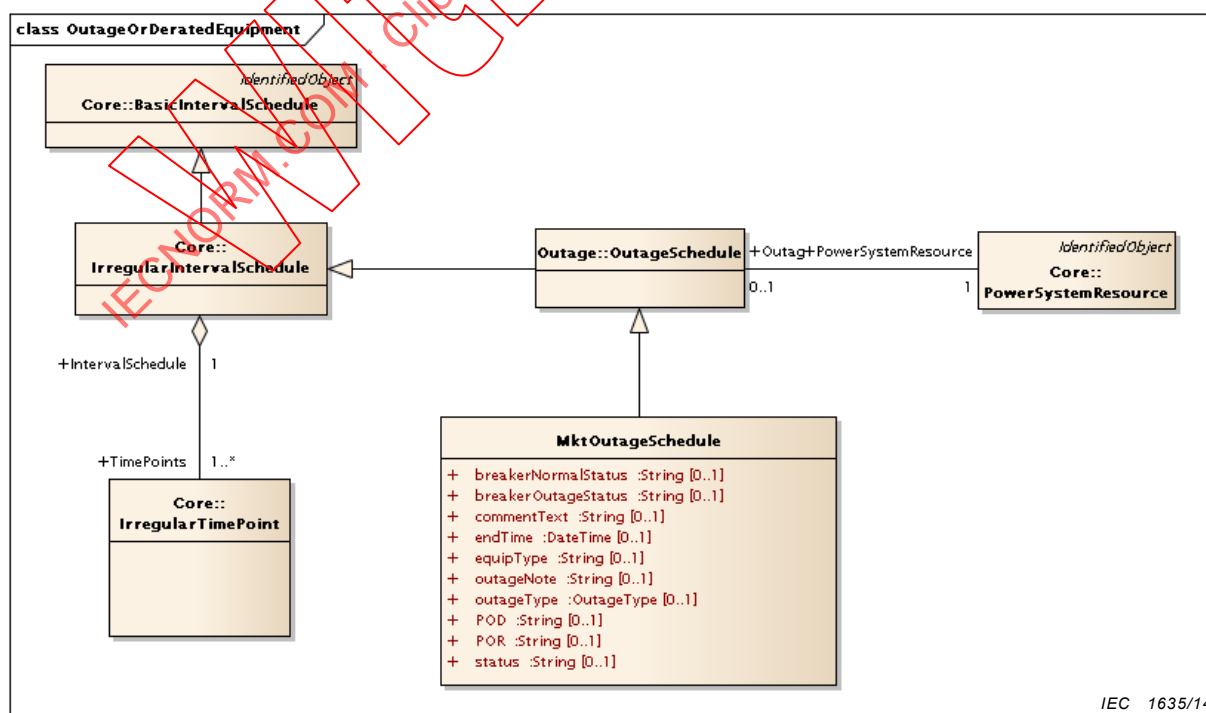
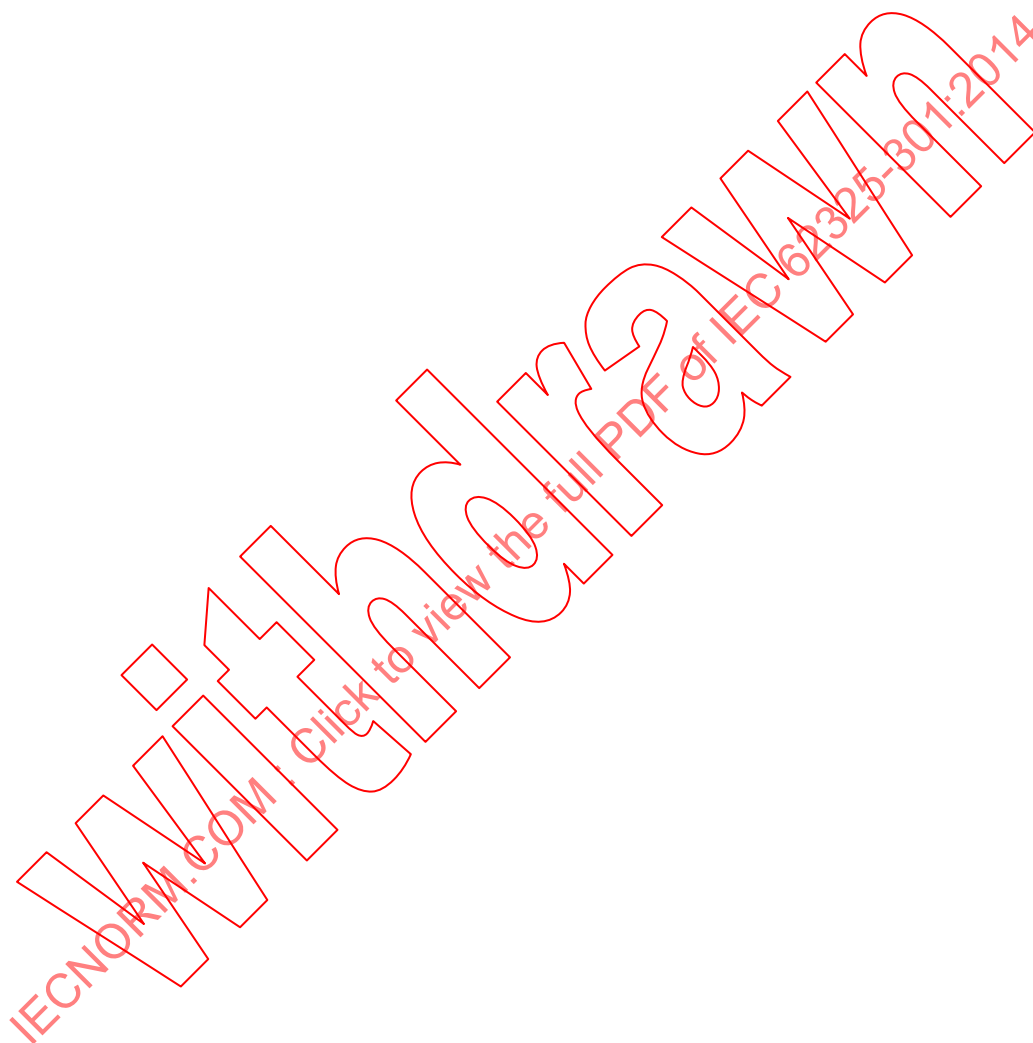


Figure 32 – Diagramme de classe ExternalInputs::OutageOrDeratedEquipment

Cette figure montre les classes et les relations utilisées pour modéliser les indisponibilités programmées. Plusieurs classes sont réutilisées depuis les paquetages 61970. La classe MktOutageSchedule inclut des attributs supplémentaires pour modéliser les réductions des équipements et les indisponibilités dans leur intégralité.

La Figure 33 montre le diagramme de classe Telemetry.



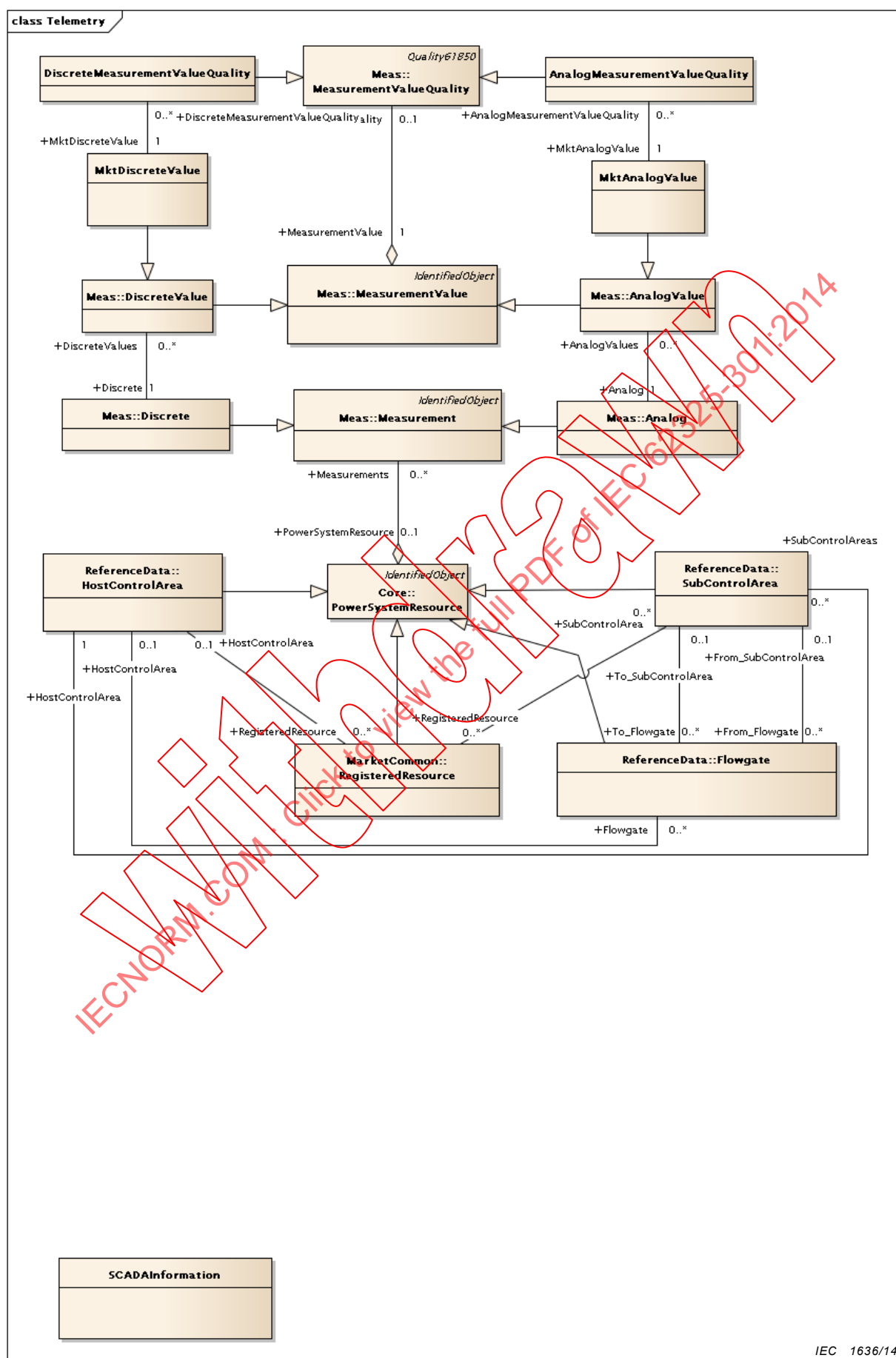


Figure 33 – Diagramme de classe ExternalInputs::Telemetry

Cette figure montre les classes permettant de modéliser la télémétrie qui peut être utilisée (en cas de défaillance ou d'indisponibilité d'une solution d'estimateur d'état) pour lancer un processus de marché en temps réel. La figure montre les classes du paquetage 61970 et d'autres classes RegisteredResource et Flowgate spécifiques au marché, ainsi que leurs relations avec les classes des paquetages 61970.

#### 6.5.6.2.2 AnalogMeasurementValueQuality

Indicateurs de qualité de mesure des valeurs Analog (c'est-à-dire analogiques).

Le Tableau 126 montre tous les attributs de AnalogMeasurementValueQuality.

**Tableau 126 – Attributs de ExternalInputs::AnalogMeasurementValueQuality**

| nom               | type     | description                                 |
|-------------------|----------|---------------------------------------------|
| scadaQualityCode  | String   | Code de qualité d'une valeur Analog donnée. |
| badReference      | Boolean  | Hérité de: Quality61850                     |
| estimatorReplaced | Boolean  | Hérité de: Quality61850                     |
| failure           | Boolean  | Hérité de: Quality61850                     |
| oldData           | Boolean  | Hérité de: Quality61850                     |
| operatorBlocked   | Boolean  | Hérité de: Quality61850                     |
| oscillatory       | Boolean  | Hérité de: Quality61850                     |
| outOfRange        | Boolean  | Hérité de: Quality61850                     |
| overflow          | Boolean  | Hérité de: Quality61850                     |
| source            | Source   | Hérité de: Quality61850                     |
| suspect           | Boolean  | Hérité de: Quality61850                     |
| test              | Boolean  | Hérité de: Quality61850                     |
| validity          | Validity | Hérité de: Quality61850                     |

Le Tableau 127 montre toutes les extrémités d'association de AnalogMeasurementValueQuality avec d'autres classes.

**Tableau 127 – Extrémités d'association de ExternalInputs::AnalogMeasurementValueQuality avec d'autres classes**

| [mult à partir de] | [mult vers] nom         | type             | description                        |
|--------------------|-------------------------|------------------|------------------------------------|
| [0..*]             | [1..1] MktAnalogValue   | MktAnalogValue   |                                    |
| [0..1]             | [1..1] MeasurementValue | MeasurementValue | Hérité de: MeasurementValueQuality |

#### 6.5.6.2.3 AreaLoadCurve

Définition de courbe de charge de zone.

Le Tableau 128 montre tous les attributs de AreaLoadCurve.

**Tableau 128 – Attributs de ExternalInputs::AreaLoadCurve**

| nom              | type             | description                          |
|------------------|------------------|--------------------------------------|
| forecastType     | LoadForecastType | Type de zone de prévision de charge. |
| endTime          | DateTime         | Hérité de: RegularIntervalSchedule   |
| timeStep         | Seconds          | Hérité de: RegularIntervalSchedule   |
| startTime        | DateTime         | Hérité de: BasicIntervalSchedule     |
| value1Unit       | UnitSymbol       | Hérité de: BasicIntervalSchedule     |
| value1Multiplier | UnitMultiplier   | Hérité de: BasicIntervalSchedule     |
| value2Unit       | UnitSymbol       | Hérité de: BasicIntervalSchedule     |
| value2Multiplier | UnitMultiplier   | Hérité de: BasicIntervalSchedule     |
| aliasName        | String           | Hérité de: IdentifiedObject          |
| mRID             | String           | Hérité de: IdentifiedObject          |
| name             | String           | Hérité de: IdentifiedObject          |

Le Tableau 129 montre toutes les extrémités d'association de AreaLoadCurve avec d'autres classes.

**Tableau 129 – Extrémités d'association de ExternalInputs::AreaLoadCurve avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type             | description                        |
|--------------------|-----------------------|------------------|------------------------------------|
| [0..*]             | [0..1] MktLoadArea    | MktLoadArea      |                                    |
| [0..*]             | [0..1] AggregateNode  | AggregateNode    |                                    |
| [0..*]             | [0..1] TACArea        | TACArea          |                                    |
| [1..1]             | [1..*] TimePoints     | RegularTimePoint | Hérité de: RegularIntervalSchedule |
| [0..1]             | [0..*] DiagramObjects | DiagramObject    | Hérité de: IdentifiedObject        |
| [1..1]             | [0..*] Names          | Name             | Hérité de: IdentifiedObject        |

#### 6.5.6.2.4 Classe racine ASRequirements

Modélise les exigences des services auxiliaires. Décrit l'intervalle pour lequel l'exigence est applicable.

Le Tableau 130 montre tous les attributs de ASRequirements.

**Tableau 130 – Attributs de ExternalInputs::ASRequirements**

| nom               | type     | description                                                          |
|-------------------|----------|----------------------------------------------------------------------|
| intervalStartTime | DateTime | Début de l'intervalle de temps pour lequel une exigence est définie. |

Le Tableau 131 montre toutes les extrémités d'association de ASRequirements avec d'autres classes.

**Tableau 131 – Extrémités d'association de ExternalInputs::ASRequirements avec d'autres classes**

| [mult à partir de] | [mult vers] nom           | type               | description |
|--------------------|---------------------------|--------------------|-------------|
| [1..1]             | [1..*] ReserveDemandCurve | ReserveDemandCurve |             |

#### 6.5.6.2.5 BaseCaseConstraintLimit

Valeur maximale en MW ou MVA pouvant varier dans le temps et limite minimale facultative en MW ou MVA (Y1 et Y2, respectivement) attribuées à un scénario de base d'analyse de contingence. Utiliser CurveSchedule XAxisUnits pour indiquer des MW ou des MVA. A utiliser uniquement si BaseCaseConstraintLimit diffère de DefaultConstraintLimit.

Le Tableau 132 montre tous les attributs de BaseCaseConstraintLimit.

**Tableau 132 – Attributs de ExternalInputs::BaseCaseConstraintLimit**

| nom          | type           | description                 |
|--------------|----------------|-----------------------------|
| curveStyle   | CurveStyle     | Hérité de: Curve            |
| xMultiplier  | UnitMultiplier | Hérité de: Curve            |
| xUnit        | UnitSymbol     | Hérité de: Curve            |
| y1Multiplier | UnitMultiplier | Hérité de: Curve            |
| y1Unit       | UnitSymbol     | Hérité de: Curve            |
| y2Multiplier | UnitMultiplier | Hérité de: Curve            |
| y2Unit       | UnitSymbol     | Hérité de: Curve            |
| y3Multiplier | UnitMultiplier | Hérité de: Curve            |
| y3Unit       | UnitSymbol     | Hérité de: Curve            |
| aliasName    | String         | Hérité de: IdentifiedObject |
| mRID         | String         | Hérité de: IdentifiedObject |
| name         | String         | Hérité de: IdentifiedObject |

Le Tableau 133 montre toutes les extrémités d'association de BaseCaseConstraintLimit avec d'autres classes.

**Tableau 133 – Extrémités d'association de ExternalInputs::BaseCaseConstraintLimit avec d'autres classes**

| [mult à partir de] | [mult vers] nom              | type                  | description                 |
|--------------------|------------------------------|-----------------------|-----------------------------|
| [0..1]             | [1..1] SecurityConstraintSum | SecurityConstraintSum |                             |
| [1..1]             | [0..*] CurveDatas            | CurveData             | Hérité de: Curve            |
| [0..1]             | [0..*] DiagramObjects        | DiagramObject         | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                 | Name                  | Hérité de: IdentifiedObject |

#### 6.5.6.2.6 Classe racine BranchEndFlow

Flux et valeurs dynamiques associés à l'extrémité d'une branche.



Le Tableau 134 montre tous les attributs de BranchEndFlow.

**Tableau 134 – Attributs de ExternalInputs::BranchEndFlow**

| nom             | type  | description                                                                                                                                                                    |
|-----------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| mwFlow          | Float | Le flux de MW sur la branche<br>Utilisation de l'attribut: flux de puissance active au niveau de l'appareil, du transformateur, du déphaseur en série ou de l'extrémité ligne  |
| mVARFlow        | Float | Le flux MVAR sur la branche<br>Utilisation de l'attribut: flux de puissance réactive au niveau de l'appareil, du transformateur, du déphaseur en série ou de l'extrémité ligne |
| normalRating    | Float | La valeur assignée normale de la branche                                                                                                                                       |
| longTermRating  | Float | La valeur assignée à long terme de la branche                                                                                                                                  |
| shortTermRating | Float | La valeur assignée à court terme de la branche                                                                                                                                 |
| loadDumpRating  | Float | La valeur assignée de perte de charge de la branche                                                                                                                            |

Le Tableau 135 montre toutes les extrémités d'association de BranchEndFlow avec d'autres classes.

**Tableau 135 – Extrémités d'association de ExternalInputs::BranchEndFlow avec d'autres classes**

| [mult à partir de] | [mult vers] nom                     | type                 | description |
|--------------------|-------------------------------------|----------------------|-------------|
| [0..1]             | [0..*] MktPowerTransformerEndBFlow  | MktPowerTransformer  |             |
| [0..1]             | [0..*] MktPowerTransformerEndAFlow  | MktPowerTransformer  |             |
| [0..1]             | [0..*] MktACLineSegmentEndAFlow     | MktACLineSegment     |             |
| [0..1]             | [0..*] MktSeriesCompensatorEndBFlow | MktSeriesCompensator |             |
| [0..1]             | [0..*] MktACLineSegmentEndBFlow     | MktACLineSegment     |             |
| [0..1]             | [0..*] MktSeriesCompensatorEndAFlow | MktSeriesCompensator |             |

#### 6.5.6.2.7 ConstraintTerm

Une condition de contrainte est un élément d'une contrainte linéaire.

Le Tableau 136 montre tous les attributs de ConstraintTerm.

**Tableau 136 – Attributs de ExternalInputs::ConstraintTerm**

| nom       | type   | description                                                                                                   |
|-----------|--------|---------------------------------------------------------------------------------------------------------------|
| factor    | String |                                                                                                               |
| function  | String | La fonction est une valeur énumérée qui peut être "active", "réactive" ou "VA" pour indiquer le type de flux. |
| aliasName | String | Hérité de: IdentifiedObject                                                                                   |
| mRID      | String | Hérité de: IdentifiedObject                                                                                   |
| name      | String | Hérité de: IdentifiedObject                                                                                   |

Le Tableau 137 montre toutes les extrémités d'association de ConstraintTerm avec d'autres classes.

**Tableau 137 – Extrémités d'association de ExternalInputs::ConstraintTerm avec d'autres classes**

| [mult à partir de] | [mult vers] nom              | type                  | description                 |
|--------------------|------------------------------|-----------------------|-----------------------------|
| [0..*]             | [1..1] SecurityConstraintSum | SecurityConstraintSum |                             |
| [0..1]             | [0..*] DiagramObjects        | DiagramObject         | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                 | Name                  | Hérité de: IdentifiedObject |

#### 6.5.6.2.8 ContingencyConstraintLimit

Valeur maximale en MW ou MVA pouvant varier dans le temps et limite minimale facultative en MW ou MVA (Y1 et Y2, respectivement) attribuées à une contrainte pour une contingence spécifique. Utiliser CurveSchedule XAxisUnits pour indiquer des MW ou des MVA.

Le Tableau 138 montre tous les attributs de ContingencyConstraintLimit.

**Tableau 138 – Attributs de ExternalInputs::ContingencyConstraintLimit**

| nom          | type           | description                 |
|--------------|----------------|-----------------------------|
| curveStyle   | CurveStyle     | Hérité de: Curve            |
| xMultiplier  | UnitMultiplier | Hérité de: Curve            |
| xUnit        | UnitSymbol     | Hérité de: Curve            |
| y1Multiplier | UnitMultiplier | Hérité de: Curve            |
| y1Unit       | UnitSymbol     | Hérité de: Curve            |
| y2Multiplier | UnitMultiplier | Hérité de: Curve            |
| y2Unit       | UnitSymbol     | Hérité de: Curve            |
| y3Multiplier | UnitMultiplier | Hérité de: Curve            |
| y3Unit       | UnitSymbol     | Hérité de: Curve            |
| aliasName    | String         | Hérité de: IdentifiedObject |
| mRID         | String         | Hérité de: IdentifiedObject |
| name         | String         | Hérité de: IdentifiedObject |

Le Tableau 139 montre toutes les extrémités d'association de ContingencyConstraintLimit avec d'autres classes.

**Tableau 139 – Extrémités d'association de ExternalInputs::ContingencyConstraintLimit avec d'autres classes**

| [mult à partir de] | [mult vers] nom              | type                  | description                 |
|--------------------|------------------------------|-----------------------|-----------------------------|
| [0..*]             | [1..1] SecurityConstraintSum | SecurityConstraintSum |                             |
| [1..1]             | [1..1] MWLimitSchedules      | MWLimitSchedule       |                             |
| [0..*]             | [1..1] MktContingency        | MktContingency        |                             |
| [1..1]             | [0..*] CurveDatas            | CurveData             | Hérité de: Curve            |
| [0..1]             | [0..*] DiagramObjects        | DiagramObject         | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                 | Name                  | Hérité de: IdentifiedObject |

#### 6.5.6.2.9 Classe racine ControlAreaSolutionData

Echange et pertes du pool de solution d'estimateur d'état

Le Tableau 140 montre tous les attributs de ControlAreaSolutionData.

**Tableau 140 – Attributs de ExternalInputs::ControlAreaSolutionData**

| nom               | type  | description                                                                                     |
|-------------------|-------|-------------------------------------------------------------------------------------------------|
| solvedLosses      | Float | MW de pertes de pool<br>Utilisation de l'attribut: les pertes de puissance active du pool en MW |
| solvedInterchange | Float | Echange en MW du pool<br>Utilisation de l'attribut: l'échange de puissance active du pool       |

Le Tableau 141 montre toutes les extrémités d'association de ControlAreaSolutionData avec d'autres classes.

**Tableau 141 – Extrémités d'association de ExternalInputs::ControlAreaSolutionData avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type           | description |
|--------------------|-----------------------|----------------|-------------|
| [0..*]             | [0..1] MktControlArea | MktControlArea |             |

#### 6.5.6.2.10 DefaultBid

DefaultBid (offre par défaut) est une classe générique regroupant Default Energy Bid, Default Startup Bid et Default Minimum Load Bid:

Default Energy Bid

Une DefaultEnergyBid (offre d'énergie par défaut) est une fonction en escalier croissante composée au maximum de 10 segments d'offre évaluée ou de 10 paires (\$/MW, MW). Il existe trois méthodes pour déterminer la DefaultEnergyBid.:

- selon les coûts: dérivée de la consommation de chaleur ou du coût moyen multiplié par l'indice de prix du gaz plus 10 %.
- selon les LMP: une moyenne pondérée des LMP au cours des 90 derniers jours
- négocié: un montant négocié avec l'entité indépendante désignée.

Default Startup Bid:

Un DSUB (*Default Startup Bid*) doit être calculé pour chaque unité RMR en fonction du StartUpCost(coût de démarrage) indiqué dans le fichier principal et dans le GPI et l'EPI applicables.

Default Minimum Load Bid:

Un DMLB (*Default Minimum Load Bid*) doit être calculé pour chaque unité RMR en fonction du Minimum Load Cost (coût de charge minimal) indiqué dans le fichier principal et dans le GPI applicable.

Le Tableau 142 montre tous les attributs de DefaultBid.

**Tableau 142 – Attributs de ExternalInputs::DefaultBid**

| nom                  | type              | description                                                                                         |
|----------------------|-------------------|-----------------------------------------------------------------------------------------------------|
| bidType              | BidType           | Type d'offre par défaut tel que Default Energy Bid, Default Minimum Load Bid et Default Startup Bid |
| minLoadCost          | CostRate          | Coût de charge minimal en \$/h                                                                      |
| peakFlag             | OnOff             | heures de pointe, heures creuses ou toutes les heures                                               |
| startTime            | DateTime          | Hérité de: Bid                                                                                      |
| stopTime             | DateTime          | Hérité de: Bid                                                                                      |
| marketType           | MarketType        | Hérité de: Bid                                                                                      |
| type                 | String            | Hérité de: Document                                                                                 |
| createdDateTime      | DateTime          | Hérité de: Document                                                                                 |
| lastModifiedDateTime | DateTime          | Hérité de: Document                                                                                 |
| revisionNumber       | String            | Hérité de: Document                                                                                 |
| electronicAddress    | ElectronicAddress | Hérité de: Document                                                                                 |
| subject              | String            | Hérité de: Document                                                                                 |
| title                | String            | Hérité de: Document                                                                                 |
| docStatus            | Status            | Hérité de: Document                                                                                 |
| status               | Status            | Hérité de: Document                                                                                 |
| aliasName            | String            | Hérité de: IdentifiedObject                                                                         |
| mRID                 | String            | Hérité de: IdentifiedObject                                                                         |
| name                 | String            | Hérité de: IdentifiedObject                                                                         |

Le Tableau 143 montre toutes les extrémités d'association de DefaultBid avec d'autres classes.

**Tableau 143 – Extrémités d'association de ExternalInputs::  
DefaultBid avec d'autres classes**

| [mult<br>à<br>partir<br>de] | [mult vers] nom              | type                  | description                 |
|-----------------------------|------------------------------|-----------------------|-----------------------------|
| [0..1]                      | [1..1] RegisteredResource    | RegisteredResource    |                             |
| [0..1]                      | [0..1] DefaultBidCurve       | DefaultBidCurve       |                             |
| [0..*]                      | [0..1] MarketParticipant     | MarketParticipant     | Hérité de: Bid              |
| [0..*]                      | [1..1] EnergyMarket          | EnergyMarket          | Hérité de: Bid              |
| [0..1]                      | [0..*] ChargeProfiles        | ChargeProfile         | Hérité de: Bid              |
| [1..1]                      | [0..*] MitigatedBidSegment   | MitigatedBidSegment   | Hérité de: Bid              |
| [0..*]                      | [0..1] SchedulingCoordinator | SchedulingCoordinator | Hérité de: Bid              |
| [0..1]                      | [0..*] MitigatedBid          | MitigatedBid          | Hérité de: Bid              |
| [0..1]                      | [0..*] RMRDetermination      | RMRDetermination      | Hérité de: Bid              |
| [0..*]                      | [1..1] ActionRequest         | ActionRequest         | Hérité de: Bid              |
| [1..1]                      | [1..*] ProductBids           | ProductBid            | Hérité de: Bid              |
| [1..1]                      | [0..*] BidHourlySchedule     | BidHourlySchedule     | Hérité de: Bid              |
| [0..1]                      | [0..*] ConfigurationEvents   | ConfigurationEvent    | Hérité de: Document         |
| [0..1]                      | [0..*] DiagramObjects        | DiagramObject         | Hérité de: IdentifiedObject |
| [1..1]                      | [0..*] Names                 | Name                  | Hérité de: IdentifiedObject |

#### 6.5.6.2.11 DefaultBidCurve

Courbe d'offre par défaut pour la courbe d'offre d'énergie par défaut et pour les courbes de démarrage par défaut (coût et temps)

Le Tableau 144 montre tous les attributs de DefaultBidCurve.

**Tableau 144 – Attributs de ExternalInputs::DefaultBidCurve**

| nom          | type           | description                                                                                                                                |
|--------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| curveType    | String         | Pour indiquer un type utilisé pour une courbe d'offre d'énergie par défaut, tel qu'un type basé sur les LMP, les coûts ou la consultation. |
| debAdderFlag | YesNo          | Indicateur d'additionneur d'offre d'énergie par défaut                                                                                     |
| curveStyle   | CurveStyle     | Hérité de: Curve                                                                                                                           |
| xMultiplier  | UnitMultiplier | Hérité de: Curve                                                                                                                           |
| xUnit        | UnitSymbol     | Hérité de: Curve                                                                                                                           |
| y1Multiplier | UnitMultiplier | Hérité de: Curve                                                                                                                           |
| y1Unit       | UnitSymbol     | Hérité de: Curve                                                                                                                           |
| y2Multiplier | UnitMultiplier | Hérité de: Curve                                                                                                                           |
| y2Unit       | UnitSymbol     | Hérité de: Curve                                                                                                                           |
| y3Multiplier | UnitMultiplier | Hérité de: Curve                                                                                                                           |
| y3Unit       | UnitSymbol     | Hérité de: Curve                                                                                                                           |
| aliasName    | String         | Hérité de: IdentifiedObject                                                                                                                |
| mRID         | String         | Hérité de: IdentifiedObject                                                                                                                |
| name         | String         | Hérité de: IdentifiedObject                                                                                                                |

Le Tableau 145 montre toutes les extrémités d'association de DefaultBidCurve avec d'autres classes.

**Tableau 145 – Extrémités d'association de ExternalInputs::DefaultBidCurve avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type          | description                 |
|--------------------|-----------------------|---------------|-----------------------------|
| [0..1]             | [0..1] DefaultBid     | DefaultBid    |                             |
| [1..1]             | [0..*] CurveDatas     | CurveData     | Hérité de: Curve            |
| [0..1]             | [0..*] DiagramObjects | DiagramObject | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names          | Name          | Hérité de: IdentifiedObject |

#### 6.5.6.2.12 DefaultBidCurveData

Données de courbe pour la courbe d'offre par défaut et pour la courbe de coût de démarrage.

Le Tableau 146 montre tous les attributs de DefaultBidCurveData.

**Tableau 146 – Attributs de ExternalInputs::DefaultBidCurveData**

| nom                | type                | description                                                                          |
|--------------------|---------------------|--------------------------------------------------------------------------------------|
| bidSegmentCalcType | BidCalculationBasis | Type de base de calcul utilisé pour définir la courbe de segment d'offre par défaut. |
| xvalue             | Float               | Hérité de: CurveData                                                                 |
| y1value            | Float               | Hérité de: CurveData                                                                 |
| y2value            | Float               | Hérité de: CurveData                                                                 |
| y3value            | Float               | Hérité de: CurveData                                                                 |

Le Tableau 147 montre toutes les extrémités d'association de DefaultBidCurveData avec d'autres classes.

**Tableau 147 – Extrémités d'association de ExternalInputs::DefaultBidCurveData avec d'autres classes**

| [mult à partir de] | [mult vers] nom | type  | description          |
|--------------------|-----------------|-------|----------------------|
| [0..*]             | [1..1] Curve    | Curve | Hérité de: CurveData |

#### 6.5.6.2.13 DefaultConstraintLimit

Valeur maximale en MW ou MVA pouvant varier dans le temps et limite minimale facultative en MW ou MVA (Y1 et Y2, respectivement) attribuées à une valeur par défaut si aucune limite de contrainte spécifique n'est indiquée pour une analyse de contingence. Utiliser CurveSchedule XAxisUnits pour indiquer des MW ou des MVA.

Le Tableau 148 montre tous les attributs de DefaultConstraintLimit.

**Tableau 148 – Attributs de ExternalInputs::DefaultConstraintLimit**

| nom          | type           | description                 |
|--------------|----------------|-----------------------------|
| curveStyle   | CurveStyle     | Hérité de: Curve            |
| xMultiplier  | UnitMultiplier | Hérité de: Curve            |
| xUnit        | UnitSymbol     | Hérité de: Curve            |
| y1Multiplier | UnitMultiplier | Hérité de: Curve            |
| y1Unit       | UnitSymbol     | Hérité de: Curve            |
| y2Multiplier | UnitMultiplier | Hérité de: Curve            |
| y2Unit       | UnitSymbol     | Hérité de: Curve            |
| y3Multiplier | UnitMultiplier | Hérité de: Curve            |
| y3Unit       | UnitSymbol     | Hérité de: Curve            |
| aliasName    | String         | Hérité de: IdentifiedObject |
| mRID         | String         | Hérité de: IdentifiedObject |
| name         | String         | Hérité de: IdentifiedObject |

Le Tableau 149 montre toutes les extrémités d'association de DefaultConstraintLimit avec d'autres classes.

**Tableau 149 – Extrémités d'association de ExternalInputs::DefaultConstraintLimit avec d'autres classes**

| [mult à partir de] | [mult vers] nom              | type                  | description                 |
|--------------------|------------------------------|-----------------------|-----------------------------|
| [0..1]             | [1..1] SecurityConstraintSum | SecurityConstraintSum |                             |
| [1..1]             | [0..*] CurveDatas            | CurveData             | Hérité de: Curve            |
| [0..1]             | [0..*] DiagramObjects        | DiagramObject         | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                 | Name                  | Hérité de: IdentifiedObject |

#### 6.5.6.2.14 DiscreteMeasurementValueQuality

Indicateurs de qualité de mesure des valeurs Discrete (c'est-à-dire discrètes).

Le Tableau 150 montre tous les attributs de DiscreteMeasurementValueQuality.

**Tableau 150 – Attributs de ExternalInputs::DiscreteMeasurementValueQuality**

| nom                          | type     | description                                                                                                          |
|------------------------------|----------|----------------------------------------------------------------------------------------------------------------------|
| manualReplaceIndicator       | Boolean  | Indicateur de remplacement manuel du commutateur. Indicateur précisant que le commutateur est à remplacement manuel. |
| removeFromOperationIndicator | Boolean  | Indicateur de mise hors service. Indicateur précisant que le commutateur a été mis hors service.                     |
| badReference                 | Boolean  | Hérité de: Quality61850                                                                                              |
| estimatorReplaced            | Boolean  | Hérité de: Quality61850                                                                                              |
| failure                      | Boolean  | Hérité de: Quality61850                                                                                              |
| oldData                      | Boolean  | Hérité de: Quality61850                                                                                              |
| operatorBlocked              | Boolean  | Hérité de: Quality61850                                                                                              |
| oscillatory                  | Boolean  | Hérité de: Quality61850                                                                                              |
| outOfRange                   | Boolean  | Hérité de: Quality61850                                                                                              |
| overFlow                     | Boolean  | Hérité de: Quality61850                                                                                              |
| source                       | Source   | Hérité de: Quality61850                                                                                              |
| suspect                      | Boolean  | Hérité de: Quality61850                                                                                              |
| test                         | Boolean  | Hérité de: Quality61850                                                                                              |
| validity                     | Validity | Hérité de: Quality61850                                                                                              |

Le Tableau 151 montre toutes les extrémités d'association de DiscreteMeasurementValueQuality avec d'autres classes.



**Tableau 151 – Extrémités d'association de ExternalInputs::DiscreteMeasurementValueQuality avec d'autres classes**

| [mult à partir de] | [mult vers] nom         | type             | description                        |
|--------------------|-------------------------|------------------|------------------------------------|
| [0..*]             | [1..1] MktDiscreteValue | MktDiscreteValue |                                    |
| [0..1]             | [1..1] MeasurementValue | MeasurementValue | Hérité de: MeasurementValueQuality |

#### 6.5.6.2.15 Classe racine DistributionFactorSet

Classe principale regroupant tous les facteurs de distribution d'un marché.

Elle est calculée tous les jours pour les facteurs DA et toutes les heures pour les facteurs RT.

Le Tableau 152 montre tous les attributs de DistributionFactorSet.

**Tableau 152 – Attributs de ExternalInputs::DistributionFactorSet**

| nom               | type       | description                                                          |
|-------------------|------------|----------------------------------------------------------------------|
| intervalStartTime | DateTime   | Début de l'intervalle de temps pour lequel une exigence est définie. |
| intervalEndTime   | DateTime   | Fin de l'intervalle de temps pour lequel une exigence est définie.   |
| marketType        | MarketType |                                                                      |

Le Tableau 153 montre toutes les extrémités d'association de DistributionFactorSet avec d'autres classes.

**Tableau 153 – Extrémités d'association de ExternalInputs::DistributionFactorSet avec d'autres classes**

| [mult à partir de] | [mult vers] nom               | type                      | description |
|--------------------|-------------------------------|---------------------------|-------------|
| [0..*]             | [0..*] GenDistributionFactor  | GenDistributionFactor     |             |
| [0..*]             | [0..*] SysLoadDistribuFactor  | SysLoadDistributionFactor |             |
| [0..*]             | [0..*] LoadDistributionFactor | LoadDistributionFactor    |             |

#### 6.5.6.2.16 Classe racine EnergyConsumerData

Optimal Power Flow ou State Estimator Load Data pour le simulateur de formation des exploitants (OTS, *Operator Training Simulator*). Utilisée pour les utilisateurs RealTime, Study et Maintenance.

Le Tableau 154 montre tous les attributs de EnergyConsumerData.

**Tableau 154 – Attributs de ExternalInputs::EnergyConsumerData**

| nom      | type  | description                                                                                           |
|----------|-------|-------------------------------------------------------------------------------------------------------|
| loadMVAR | Float | La charge MVAR<br>Utilisation de l'attribut: La consommation de puissance réactive de la charge en MW |
| loadMW   | Float | La consommation de puissance active de la charge en MW                                                |

Le Tableau 155 montre toutes les extrémités d'association de EnergyConsumerData avec d'autres classes.

**Tableau 155 – Extrémités d'association de ExternalInputs::EnergyConsumerData avec d'autres classes**

| [mult à partir de] | [mult vers] nom          | type              | description |
|--------------------|--------------------------|-------------------|-------------|
| [0..*]             | [1..1] MktEnergyConsumer | MktEnergyConsumer |             |

#### 6.5.6.2.17 EnergyPriceIndex

Un EnergyPriceIndex (indice du prix de l'énergie) pour chaque ressource est valide pour une période (ex. quotidienne) identifiée par une heure de démarrage de période valide et par une heure de fin de période valide. L'indice du prix de l'énergie est exprimé en \$/MWh.

Le Tableau 156 montre tous les attributs de EnergyPriceIndex.

**Tableau 156 – Attributs de ExternalInputs::EnergyPriceIndex**

| nom                  | type                 | description                 |
|----------------------|----------------------|-----------------------------|
| lastModified         | DateTime             | Mise à jour de l'heure      |
| startEffectiveDate   | DateTime             | Date de début effective     |
| endEffectiveDate     | DateTime             | Date de fin effective       |
| energyPriceIndex     | Float                | Indice du prix de l'énergie |
| energyPriceIndexType | EnergyPriceIndexType | Type d'EPI (gros ou détail) |
| aliasName            | String               | Hérité de: IdentifiedObject |
| mRID                 | String               | Hérité de: IdentifiedObject |
| name                 | String               | Hérité de: IdentifiedObject |

Le Tableau 157 montre toutes les extrémités d'association de EnergyPriceIndex avec d'autres classes.

**Tableau 157 – Extrémités d'association de ExternalInputs::EnergyPriceIndex avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type                | description                 |
|--------------------|----------------------------|---------------------|-----------------------------|
| [1..1]             | [1..1] RegisteredGenerator | RegisteredGenerator |                             |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject       | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name                | Hérité de: IdentifiedObject |

#### 6.5.6.2.18 EnergyProfile

Indique l'heure de début, l'heure d'arrêt et le niveau d'EnergyTransaction.

Le Tableau 158 montre tous les attributs de EnergyProfile.

**Tableau 158 – Attributs de ExternalInputs::EnergyProfile**

| nom       | type   | description                 |
|-----------|--------|-----------------------------|
| aliasName | String | Hérité de: IdentifiedObject |
| mRID      | String | Hérité de: IdentifiedObject |
| name      | String | Hérité de: IdentifiedObject |

Le Tableau 159 montre toutes les extrémités d'association de EnergyProfile avec d'autres classes.

**Tableau 159 – Extrémités d'association de ExternalInputs::EnergyProfile avec d'autres classes**

| [mult à partir de] | [mult vers] nom          | type              | description                                             |
|--------------------|--------------------------|-------------------|---------------------------------------------------------|
| [1..*]             | [1..1] TransactionBid    | TransactionBid    |                                                         |
| [1..*]             | [1..1] EnergyTransaction | EnergyTransaction | EnergyTransaction doit avoir au moins un EnergyProfile. |
| [0..*]             | [0..*] ProfileDatas      | ProfileData       | Hérité de: Profile                                      |
| [0..1]             | [0..*] DiagramObjects    | DiagramObject     | Hérité de: IdentifiedObject                             |
| [1..1]             | [0..*] Names             | Name              | Hérité de: IdentifiedObject                             |

#### 6.5.6.2.19 EnergyTransaction

Indique le programme des transferts d'énergie entre les zones d'échange qui sont nécessaires pour réaliser la transaction d'échange associée.

Le Tableau 160 montre tous les attributs de EnergyTransaction.

**Tableau 160 – Attributs de ExternalInputs::EnergyTransaction**

| nom                  | type                  | description                                                                                                                                                        |
|----------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| capacityBacked       | Boolean               | Indicateur de capacité d'échange. Lorsque l'indicateur est défini sur True, cela signifie qu'une transaction est suivie par la fourniture de la capacité demandée. |
| congestChargeMax     | Money                 | Frais de congestion maximum en unités monétaires.                                                                                                                  |
| deliveryPointP       | ActivePower           | Puissance active au point de livraison.                                                                                                                            |
| energyMin            | ActivePower           | Puissance active minimale d'une transaction si elle est commandable.                                                                                               |
| firmInterchangeFlag  | Boolean               | L'indicateur d'échange ferme précise si cette transaction d'énergie peut être modifiée sans conséquences financières éventuelles.                                  |
| payCongestion        | Boolean               | Indicateur de congestion Willing to Pay (Disposé à payer)                                                                                                          |
| reason               | String                | Raison de la transaction d'énergie.                                                                                                                                |
| receiptPointP        | ActivePower           | Puissance active au point de réception.                                                                                                                            |
| state                | EnergyTransactionType | { Approve   Deny   Study }                                                                                                                                         |
| type                 | String                | Hérité de: Document                                                                                                                                                |
| createdDateTime      | DateTime              | Hérité de: Document                                                                                                                                                |
| lastModifiedDateTime | DateTime              | Hérité de: Document                                                                                                                                                |
| revisionNumber       | String                | Hérité de: Document                                                                                                                                                |
| electronicAddress    | ElectronicAddress     | Hérité de: Document                                                                                                                                                |
| subject              | String                | Hérité de: Document                                                                                                                                                |
| title                | String                | Hérité de: Document                                                                                                                                                |
| docStatus            | Status                | Hérité de: Document                                                                                                                                                |
| status               | Status                | Hérité de: Document                                                                                                                                                |
| aliasName            | String                | Hérité de: IdentifiedObject                                                                                                                                        |
| mRID                 | String                | Hérité de: IdentifiedObject                                                                                                                                        |
| name                 | String                | Hérité de: IdentifiedObject                                                                                                                                        |

Le Tableau 161 montre toutes les extrémités d'association de EnergyTransaction avec d'autres classes.

**Tableau 161 – Extrémités d'association de ExternalInputs::EnergyTransaction avec d'autres classes**

| [mult à partir de] | [mult vers] nom                | type                    | description                                             |
|--------------------|--------------------------------|-------------------------|---------------------------------------------------------|
| [0..*]             | [0..*] EnergyPriceCurves       | EnergyPriceCurve        |                                                         |
| [1..1]             | [1..*] EnergyProfiles          | EnergyProfile           | EnergyTransaction doit avoir au moins un EnergyProfile. |
| [0..*]             | [1..1] Export_SubControlArea   | SubControlArea          | L'énergie est transférée entre les zones d'échange      |
| [0..1]             | [0..1] TransmissionReservation | TransmissionReservation |                                                         |
| [0..*]             | [1..1] Import_SubControlArea   | SubControlArea          | L'énergie est transférée entre les zones d'échange      |
| [0..1]             | [0..*] ConfigurationEvents     | ConfigurationEvent      | Hérité de: Document                                     |
| [0..1]             | [0..*] DiagramObjects          | DiagramObject           | Hérité de: IdentifiedObject                             |
| [1..1]             | [0..*] Names                   | Name                    | Hérité de: IdentifiedObject                             |

#### 6.5.6.2.20 Classe racine GenDistributionFactor

Cette classe modélise les facteurs de distribution de production. Elle doit être utilisée avec AggregatedPnode et IndividualPnode pour montrer la distribution de chaque partie individuelle.

Le Tableau 162 montre tous les attributs de GenDistributionFactor.

**Tableau 162 – Attributs de ExternalInputs::GenDistributionFactor**

| nom    | type  | description                                                                                          |
|--------|-------|------------------------------------------------------------------------------------------------------|
| factor | Float | Utilisé pour calculer la "participation" de production d'un Pnode individuel dans un AggregatePnode. |

Le Tableau 163 montre toutes les extrémités d'association de GenDistributionFactor avec d'autres classes.

**Tableau 163 – Extrémités d'association de ExternalInputs::GenDistributionFactor avec d'autres classes**

| [mult à partir de] | [mult vers] nom              | type                  | description |
|--------------------|------------------------------|-----------------------|-------------|
| [0..*]             | [0..*] DistributionFactorSet | DistributionFactorSet |             |
| [1..*]             | [0..1] AggregatedPnode       | AggregatedPnode       |             |
| [0..1]             | [0..1] IndividualPnode       | IndividualPnode       |             |

#### 6.5.6.2.21 Classe racine GeneratingUnitDynamicValues

Optimal Power Flow ou State Estimator Unit Data pour le simulateur de formation des exploitants (OTS). Utilisée pour les utilisateurs RealTime, Study et Maintenance.

Le Tableau 164 montre tous les attributs de GeneratingUnitDynamicValues.

**Tableau 164 – Attributs de ExternalInputs::GeneratingUnitDynamicValues**

| nom         | type  | description                                                                       |
|-------------|-------|-----------------------------------------------------------------------------------|
| lossFactor  | Float | Facteur de perte                                                                  |
| maximumMW   | Float | La production de puissance active maximale de l'unité en MW                       |
| minimumMW   | Float | La production de puissance active minimale de l'unité en MW                       |
| mVAR        | Float | Production de puissance réactive de l'unité en MVAR                               |
| mw          | Float | Production de puissance active de l'unité en MW                                   |
| sensitivity | Float | Facteur de sensibilité de l'unité. Les facteurs de distribution (DFAX) de l'unité |

Le Tableau 165 montre toutes les extrémités d'association de GeneratingUnitDynamicValues avec d'autres classes.

**Tableau 165 – Extrémités d'association de ExternalInputs::GeneratingUnitDynamicValues avec d'autres classes**

| [mult à partir de] | [mult vers] nom          | type              | description |
|--------------------|--------------------------|-------------------|-------------|
| [0..*]             | [1..1] MktGeneratingUnit | MktGeneratingUnit |             |
| [0..*]             | [0..1] Flowgate          | Flowgate          |             |

#### 6.5.6.2.22 GenericConstraints

Les contraintes génériques peuvent représenter des zones sécurisées, un profil de tension, une stabilité transitoire et des limites de chute de tension.

Les contraintes génériques peuvent avoir l'une des formes suivantes:

- a) Limites thermiques en MW
- b) contrainte type de flux de ligne de groupe

Le Tableau 166 montre tous les attributs de GenericConstraints.

**Tableau 166 – Attributs de ExternalInputs::GenericConstraints**

| nom               | type     | description                    |
|-------------------|----------|--------------------------------|
| intervalEndTime   | DateTime | Heure de fin de l'intervalle   |
| intervalStartTime | DateTime | Heure de début de l'intervalle |
| maxLimit          | Float    | Limite maximale (MW)           |
| minLimit          | Float    | Limite minimale (MW)           |
| aliasName         | String   | Hérité de: IdentifiedObject    |
| mRID              | String   | Hérité de: IdentifiedObject    |
| name              | String   | Hérité de: IdentifiedObject    |

Le Tableau 167 montre toutes les extrémités d'association de GenericConstraints avec d'autres classes.

**Tableau 167 – Extrémités d'association de ExternalInputs::GenericConstraints avec d'autres classes**

| [mult à partir de] | [mult vers] nom             | type                 | description                 |
|--------------------|-----------------------------|----------------------|-----------------------------|
| [0..1]             | [0..*] Flowgate             | Flowgate             |                             |
| [0..1]             | [0..*] TransmissionCapacity | TransmissionCapacity |                             |
| [0..1]             | [0..*] DiagramObjects       | DiagramObject        | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                | Name                 | Hérité de: IdentifiedObject |

#### 6.5.6.2.23 Classe racine InterchangeETCData

Données de contrat de transport existant pour un programme d'échange

Le Tableau 168 montre tous les attributs de InterchangeETCData.

**Tableau 168 – Attributs de ExternalInputs::InterchangeETCData**

| nom            | type   | description                                                    |
|----------------|--------|----------------------------------------------------------------|
| contractNumber | String | Numéro de contrat de transport existant                        |
| usageMW        | Float  | Valeur en MW de l'utilisation du contrat de transport existant |

Le Tableau 169 montre toutes les extrémités d'association de InterchangeETCData avec d'autres classes.

**Tableau 169 – Extrémités d'association de ExternalInputs::InterchangeETCData avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type                | description |
|--------------------|----------------------------|---------------------|-------------|
| [0..*]             | [0..1] InterchangeSchedule | InterchangeSchedule |             |

#### 6.5.6.2.24 InterchangeSchedule

Classe de programme d'échange pour stocker des informations sur les programmes d'échange de type import/export, énergie, etc.

Le Tableau 170 montre tous les attributs de InterchangeSchedule.

**Tableau 170 – Attributs de ExternalInputs::InterchangeSchedule**

| nom             | type              | description                                                                                      |
|-----------------|-------------------|--------------------------------------------------------------------------------------------------|
| checkOutType    | CheckOutType      | Pour indiquer un type de vérification tel que la capacité ajustée ou la capacité de répartition. |
| directionType   | InterTieDirection | Import ou export.                                                                                |
| energyType      | MarketProductType | Type de produit énergétique.                                                                     |
| intervalLength  | Integer           | Longueur de l'intervalle.                                                                        |
| marketType      | MarketType        | Type de marché.                                                                                  |
| operatingDate   | DateTime          | Date/heure d'exploitation.                                                                       |
| outOfMarketType | Boolean           | Pour indiquer un programme hors marché (OOM, <i>Out-Of-Market</i> ).                             |
| scheduleType    | EnergyProductType | Type de programme.                                                                               |
| wcrlID          | String            | ID compteur-ressource de transit (exigé lorsque Type de programme = Transit).                    |
| curveStyle      | CurveStyle        | Hérité de: Curve                                                                                 |
| xMultiplier     | UnitMultiplier    | Hérité de: Curve                                                                                 |
| xUnit           | UnitSymbol        | Hérité de: Curve                                                                                 |
| y1Multiplier    | UnitMultiplier    | Hérité de: Curve                                                                                 |
| y1Unit          | UnitSymbol        | Hérité de: Curve                                                                                 |
| y2Multiplier    | UnitMultiplier    | Hérité de: Curve                                                                                 |
| y2Unit          | UnitSymbol        | Hérité de: Curve                                                                                 |
| y3Multiplier    | UnitMultiplier    | Hérité de: Curve                                                                                 |
| y3Unit          | UnitSymbol        | Hérité de: Curve                                                                                 |
| aliasName       | String            | Hérité de: IdentifiedObject                                                                      |
| mRID            | String            | Hérité de: IdentifiedObject                                                                      |
| name            | String            | Hérité de: IdentifiedObject                                                                      |

Le Tableau 171 montre toutes les extrémités d'association de InterchangeSchedule avec d'autres classes.

**Tableau 171 – Extrémités d'association de ExternalInputs::InterchangeSchedule avec d'autres classes**

| [mult à partir de] | [mult vers] nom           | type               | description                 |
|--------------------|---------------------------|--------------------|-----------------------------|
| [0..1]             | [0..*] InterchangeETCData | InterchangeETCData |                             |
| [0..*]             | [0..1] InterTie           | SchedulingPoint    |                             |
| [0..*]             | [0..1] RegisteredInterTie | RegisteredInterTie |                             |
| [1..1]             | [0..*] CurveDatas         | CurveData          | Hérité de: Curve            |
| [0..1]             | [0..*] DiagramObjects     | DiagramObject      | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names              | Name               | Hérité de: IdentifiedObject |

#### 6.5.6.2.25 IntermittentResourceEligibility

Indique si l'unité peut être considérée comme une ressource renouvelable variable intermittente



Le Tableau 172 montre tous les attributs de IntermittentResourceEligibility.

**Tableau 172 – Attributs de ExternalInputs::IntermittentResourceEligibility**

| nom                  | type              | description                                                                         |
|----------------------|-------------------|-------------------------------------------------------------------------------------|
| eligibilityStatus    | String            | Indique si une ressource peut être admise dans le programme PIRP à une heure donnée |
| intervalEndTime      | DateTime          | Hérité de: MarketFactors                                                            |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors                                                            |
| type                 | String            | Hérité de: Document                                                                 |
| createdDateTime      | DateTime          | Hérité de: Document                                                                 |
| lastModifiedDateTime | DateTime          | Hérité de: Document                                                                 |
| revisionNumber       | String            | Hérité de: Document                                                                 |
| electronicAddress    | ElectronicAddress | Hérité de: Document                                                                 |
| subject              | String            | Hérité de: Document                                                                 |
| title                | String            | Hérité de: Document                                                                 |
| docStatus            | Status            | Hérité de: Document                                                                 |
| status               | Status            | Hérité de: Document                                                                 |
| aliasName            | String            | Hérité de: IdentifiedObject                                                         |
| mRID                 | String            | Hérité de: IdentifiedObject                                                         |
| name                 | String            | Hérité de: IdentifiedObject                                                         |

Le Tableau 173 montre toutes les extrémités d'association de IntermittentResourceEligibility avec d'autres classes.

**Tableau 173 – Extrémités d'association de ExternalInputs::IntermittentResourceEligibility avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type               | description                 |
|--------------------|----------------------------|--------------------|-----------------------------|
| [0..*]             | [1..1] RegisteredResource  | RegisteredResource |                             |
| [0..*]             | [0..*] MktActivityRecord   | MktActivityRecord  | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market              | Market             | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject      | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name               | Hérité de: IdentifiedObject |

#### 6.5.6.2.26 Classe racine LoadDistributionFactor

Cette classe modélise les facteurs de distribution de charge. Il convient de l'utiliser de l'une des manières suivantes:

Utilisation avec AggregatedPnode et IndividualPnode pour montrer la distribution de chaque partie individuelle

OU

Utilisation avec Mkt\_EnergyConsumer pour représenter la distribution actuelle MW/Mvar dans son groupe de charge parent.

Le Tableau 174 montre tous les attributs de LoadDistributionFactor.

**Tableau 174 – Attributs de ExternalInputs::LoadDistributionFactor**

| nom         | type  | description                                                                 |
|-------------|-------|-----------------------------------------------------------------------------|
| pDistFactor | Float | Facteur de distribution de charge (MW) de puissance réelle                  |
| qDistFactor | Float | Facteur de distribution de charge (MVA <sub>r</sub> ) de puissance réactive |

Le Tableau 175 montre toutes les extrémités d'association de LoadDistributionFactor avec d'autres classes.

**Tableau 175 – Extrémités d'association de ExternalInputs::LoadDistributionFactor avec d'autres classes**

| [mult à partir de] | [mult vers] nom              | type                  | description |
|--------------------|------------------------------|-----------------------|-------------|
| [0..*]             | [0..*] DistributionFactorSet | DistributionFactorSet |             |
| [0..1]             | [0..1] IndividualPnode       | IndividualPnode       |             |
| [1..*]             | [0..1] AggregatedPnode       | AggregatedPnode       |             |

#### 6.5.6.2.27 LossSensitivity

Sensibilité de perte appliquée à ConnectivityNode pour un intervalle de temps donné.

Le Tableau 176 montre tous les attributs de LossSensitivity.

**Tableau 176 – Attributs de ExternalInputs::LossSensitivity**

| nom                  | type              | description                                                                                                                                                                                                                                                                              |
|----------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| lossFactor           | Float             | Facteur de pénalité de perte.<br>Défini de la manière suivante: $1 / (1 - \text{perte de transport différentielle})$ ; la perte de transport différentielle est exprimée en valeur plus/moins. Les facteurs de pénalité ( <i>penalty factors</i> ) types sont compris entre (0,9 à 1,1). |
| intervalEndTime      | DateTime          | Hérité de: MarketFactors                                                                                                                                                                                                                                                                 |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors                                                                                                                                                                                                                                                                 |
| type                 | String            | Hérité de: Document                                                                                                                                                                                                                                                                      |
| createdDateTime      | DateTime          | Hérité de: Document                                                                                                                                                                                                                                                                      |
| lastModifiedDateTime | DateTime          | Hérité de: Document                                                                                                                                                                                                                                                                      |
| revisionNumber       | String            | Hérité de: Document                                                                                                                                                                                                                                                                      |
| electronicAddress    | ElectronicAddress | Hérité de: Document                                                                                                                                                                                                                                                                      |
| subject              | String            | Hérité de: Document                                                                                                                                                                                                                                                                      |
| title                | String            | Hérité de: Document                                                                                                                                                                                                                                                                      |
| docStatus            | Status            | Hérité de: Document                                                                                                                                                                                                                                                                      |
| status               | Status            | Hérité de: Document                                                                                                                                                                                                                                                                      |
| aliasName            | String            | Hérité de: IdentifiedObject                                                                                                                                                                                                                                                              |
| mRID                 | String            | Hérité de: IdentifiedObject                                                                                                                                                                                                                                                              |
| name                 | String            | Hérité de: IdentifiedObject                                                                                                                                                                                                                                                              |

Le Tableau 177 montre toutes les extrémités d'association de LossSensitivity avec d'autres classes.

**Tableau 177 – Extrémités d'association de ExternalInputs::LossSensitivity avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type                | description                 |
|--------------------|----------------------------|---------------------|-----------------------------|
| [0..*]             | [1..1] MktConnectivityNode | MktConnectivityNode |                             |
| [0..*]             | [0..*] MktActivityRecord   | MktActivityRecord   | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market              | Market              | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent  | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject       | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name                | Hérité de: IdentifiedObject |

#### 6.5.6.2.28 MktACLineSegment

Sous-classe de IEC 61970:Wires:ACLineSegment

Le Tableau 178 montre tous les attributs de MktACLineSegment.

**Tableau 178 – Attributs de ExternalInputs::MktACLineSegment**

| nom               | type        | description                 |
|-------------------|-------------|-----------------------------|
| b0ch              | Susceptance | Hérité de: ACLineSegment    |
| bch               | Susceptance | Hérité de: ACLineSegment    |
| g0ch              | Conductance | Hérité de: ACLineSegment    |
| gch               | Conductance | Hérité de: ACLineSegment    |
| r                 | Resistance  | Hérité de: ACLineSegment    |
| r0                | Resistance  | Hérité de: ACLineSegment    |
| x                 | Reactance   | Hérité de: ACLineSegment    |
| x0                | Reactance   | Hérité de: ACLineSegment    |
| length            | Length      | Hérité de: Conductor        |
| aggregate         | Boolean     | Hérité de: Equipment        |
| normallyInService | Boolean     | Hérité de: Equipment        |
| aliasName         | String      | Hérité de: IdentifiedObject |
| mRID              | String      | Hérité de: IdentifiedObject |
| name              | String      | Hérité de: IdentifiedObject |

Le Tableau 179 montre toutes les extrémités d'association de MktACLineSegment avec d'autres classes.

**Tableau 179 – Extrémités d'association de ExternalInputs::  
MktACLineSegment avec d'autres classes**

| [mult à partir de] | [mult vers] nom             | type                 | description                    |
|--------------------|-----------------------------|----------------------|--------------------------------|
| [0..*]             | [0..1] EndAFlow             | BranchEndFlow        |                                |
| [0..*]             | [0..1] EndBFlow             | BranchEndFlow        |                                |
| [1..1]             | [0..*] Clamp                | Clamp                | Hérité de: ACLineSegment       |
| [0..*]             | [0..1] PerLengthImpedance   | PerLengthImpedance   | Hérité de: ACLineSegment       |
| [1..1]             | [0..*] Cut                  | Cut                  | Hérité de: ACLineSegment       |
| [1..1]             | [0..*] ACLineSegmentPhases  | ACLineSegmentPhase   | Hérité de: ACLineSegment       |
| [0..*]             | [0..1] BaseVoltage          | BaseVoltage          | Hérité de: ConductingEquipment |
| [1..1]             | [0..*] Terminals            | Terminal             | Hérité de: ConductingEquipment |
| [0..*]             | [0..*] ProtectionEquipments | ProtectionEquipment  | Hérité de: ConductingEquipment |
| [1..1]             | [0..*] ClearanceTags        | ClearanceTag         | Hérité de: ConductingEquipment |
| [1..1]             | [0..1] SvStatus             | SvStatus             | Hérité de: ConductingEquipment |
| [0..*]             | [0..1] EquipmentContainer   | EquipmentContainer   | Hérité de: Equipment           |
| [1..1]             | [0..*] ContingencyEquipment | ContingencyEquipment | Hérité de: Equipment           |
| [0..1]             | [0..*] OperationalLimitSet  | OperationalLimitSet  | Hérité de: Equipment           |
| [0..*]             | [0..1] PSRType              | PSRType              | Hérité de: PowerSystemResource |
| [0..1]             | [0..*] Measurements         | Measurement          | Hérité de: PowerSystemResource |
| [1..1]             | [0..*] OperatingShare       | OperatingShare       | Hérité de: PowerSystemResource |
| [0..*]             | [0..*] PsrLists             | PsrList              | Hérité de: PowerSystemResource |
| [1..1]             | [0..1] OutageSchedule       | OutageSchedule       | Hérité de: PowerSystemResource |
| [0..*]             | [0..*] ReportingGroup       | ReportingGroup       | Hérité de: PowerSystemResource |
| [0..1]             | [0..*] DiagramObjects       | DiagramObject        | Hérité de: IdentifiedObject    |
| [1..1]             | [0..*] Names                | Name                 | Hérité de: IdentifiedObject    |

#### 6.5.6.2.29 MktAnalogLimit

Sous-classe de IEC 61970.Meas:AnalogLimit

Le Tableau 180 montre tous les attributs de MktAnalogLimit.

**Tableau 180 – Attributs de ExternalInputs::MktAnalogLimit**

| nom           | type            | description                                                                                                                                                    |
|---------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| exceededLimit | Boolean         | True si les limites sont dépassées                                                                                                                             |
| limitType     | AnalogLimitType | Le type de limite que la valeur représente<br>Types de limite de branche:<br>Court terme<br>Moyen terme<br>Long terme<br>Limites de tension:<br>Haute<br>Basse |
| value         | Float           | Hérité de: AnalogLimit                                                                                                                                         |
| aliasName     | String          | Hérité de: IdentifiedObject                                                                                                                                    |
| mRID          | String          | Hérité de: IdentifiedObject                                                                                                                                    |
| name          | String          | Hérité de: IdentifiedObject                                                                                                                                    |

Le Tableau 181 montre toutes les extrémités d'association de MktAnalogLimit avec d'autres classes.

**Tableau 181 – Extrémités d'association de ExternalInputs::MktAnalogLimit avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type           | description                 |
|--------------------|-----------------------|----------------|-----------------------------|
| [0..*]             | [1..1] LimitSet       | AnalogLimitSet | Hérité de: AnalogLimit      |
| [0..1]             | [0..*] DiagramObjects | DiagramObject  | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names          | Name           | Hérité de: IdentifiedObject |

#### 6.5.6.2.30 MktAnalogLimitSet

Sous-classe de IEC 61970:Meas:AnalogLimitSet

Le Tableau 182 montre tous les attributs de MktAnalogLimitSet.

**Tableau 182 – Attributs de ExternalInputs::MktAnalogLimitSet**

| nom                | type    | description                                |
|--------------------|---------|--------------------------------------------|
| ratingSet          | Integer | Nombres de l'ensemble de valeurs assignées |
| isPercentageLimits | Boolean | Hérité de: LimitSet                        |
| aliasName          | String  | Hérité de: IdentifiedObject                |
| mRID               | String  | Hérité de: IdentifiedObject                |
| name               | String  | Hérité de: IdentifiedObject                |

Le Tableau 183 montre toutes les extrémités d'association de MktAnalogLimitSet avec d'autres classes.

**Tableau 183 – Extrémités d'association de ExternalInputs::MktAnalogLimitSet avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type          | description                 |
|--------------------|-----------------------|---------------|-----------------------------|
| [1..1]             | [0..*] Limits         | AnalogLimit   | Hérité de: AnalogLimitSet   |
| [0..*]             | [0..*] Measurements   | Analog        | Hérité de: AnalogLimitSet   |
| [0..1]             | [0..*] DiagramObjects | DiagramObject | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names          | Name          | Hérité de: IdentifiedObject |

### 6.5.6.2.31 MktAnalogValue

Sous-classe de IEC 61970:Meas:AnalogValue

Le Tableau 184 montre tous les attributs de MktAnalogValue.

**Tableau 184 – Attributs de ExternalInputs::MktAnalogValue**

| nom            | type     | description                 |
|----------------|----------|-----------------------------|
| value          | Float    | Hérité de: AnalogValue      |
| timeStamp      | DateTime | Hérité de: MeasurementValue |
| sensorAccuracy | PerCent  | Hérité de: MeasurementValue |
| aliasName      | String   | Hérité de: IdentifiedObject |
| mRID           | String   | Hérité de: IdentifiedObject |
| name           | String   | Hérité de: IdentifiedObject |

Le Tableau 185 montre toutes les extrémités d'association de MktAnalogValue avec d'autres classes.

**Tableau 185 – Extrémités d'association de ExternalInputs::MktAnalogValue avec d'autres classes**

| [mult à partir de] | [mult vers] nom                      | type                          | description                 |
|--------------------|--------------------------------------|-------------------------------|-----------------------------|
| [1..1]             | [0..*] AnalogMeasurementValueQuality | AnalogMeasurementValueQuality |                             |
| [0..*]             | [1..1] Analog                        | Analog                        | Hérité de: AnalogValue      |
| [1..1]             | [0..*] AltGeneratingUnit             | AltGeneratingUnitMeas         | Hérité de: AnalogValue      |
| [1..1]             | [0..*] AltTieMeas                    | AltTieMeas                    | Hérité de: AnalogValue      |
| [1..1]             | [0..1] RemoteSource                  | RemoteSource                  | Hérité de: MeasurementValue |
| [1..1]             | [0..1] MeasurementValueQuality       | MeasurementValueQuality       | Hérité de: MeasurementValue |
| [0..*]             | [1..1] MeasurementValueSource        | MeasurementValueSource        | Hérité de: MeasurementValue |
| [0..1]             | [0..*] DiagramObjects                | DiagramObject                 | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                         | Name                          | Hérité de: IdentifiedObject |

### 6.5.6.2.32 MktControlArea

Sous-classe de marché de IEC 61970:ControlArea

Le Tableau 186 montre tous les attributs de MktControlArea.

**Tableau 186 – Attributs de ExternalInputs::MktControlArea**

| nom            | type                | description                 |
|----------------|---------------------|-----------------------------|
| netInterchange | ActivePower         | Hérité de: ControlArea      |
| pTolerance     | ActivePower         | Hérité de: ControlArea      |
| type           | ControlAreaTypeKind | Hérité de: ControlArea      |
| aliasName      | String              | Hérité de: IdentifiedObject |
| mRID           | String              | Hérité de: IdentifiedObject |
| name           | String              | Hérité de: IdentifiedObject |

Le Tableau 187 montre toutes les extrémités d'association de MktControlArea avec d'autres classes.

**Tableau 187 – Extrémités d'association de ExternalInputs::MktControlArea avec d'autres classes**

| [mult à partir de] | [mult vers] nom                  | type                      | description                    |
|--------------------|----------------------------------|---------------------------|--------------------------------|
| [0..1]             | [0..*] ControlAreaSolutionData   | ControlAreaSolutionData   |                                |
| [0..1]             | [0..1] EnergyArea                | EnergyArea                | Hérité de: ControlArea         |
| [1..1]             | [0..*] ControlAreaGeneratingUnit | ControlAreaGeneratingUnit | Hérité de: ControlArea         |
| [1..1]             | [0..*] TieFlow                   | TieFlow                   | Hérité de: ControlArea         |
| [0..*]             | [0..1] PSRType                   | PSRType                   | Hérité de: PowerSystemResource |
| [0..1]             | [0..*] Measurements              | Measurement               | Hérité de: PowerSystemResource |
| [1..1]             | [0..*] OperatingShare            | OperatingShare            | Hérité de: PowerSystemResource |
| [0..*]             | [0..*] PsrLists                  | PsrList                   | Hérité de: PowerSystemResource |
| [1..1]             | [0..1] OutageSchedule            | OutageSchedule            | Hérité de: PowerSystemResource |
| [0..*]             | [0..*] ReportingGroup            | ReportingGroup            | Hérité de: PowerSystemResource |
| [0..1]             | [0..*] DiagramObjects            | DiagramObject             | Hérité de: IdentifiedObject    |
| [1..1]             | [0..*] Names                     | Name                      | Hérité de: IdentifiedObject    |

### 6.5.6.2.33 MktDiscreteValue

Sous-classe de IEC 61970:Meas:DiscreteValue

Le Tableau 188 montre tous les attributs de MktDiscreteValue.



**Tableau 188 – Attributs de ExternalInputs::MktDiscreteValue**

| nom            | type     | description                 |
|----------------|----------|-----------------------------|
| value          | Integer  | Hérité de: DiscreteValue    |
| timeStamp      | DateTime | Hérité de: MeasurementValue |
| sensorAccuracy | PerCent  | Hérité de: MeasurementValue |
| aliasName      | String   | Hérité de: IdentifiedObject |
| mRID           | String   | Hérité de: IdentifiedObject |
| name           | String   | Hérité de: IdentifiedObject |

Le Tableau 189 montre toutes les extrémités d'association de MktDiscreteValue avec d'autres classes.

**Tableau 189 – Extrémités d'association de ExternalInputs::MktDiscreteValue avec d'autres classes**

| [mult à partir de] | [mult vers] nom                        | type                            | description                 |
|--------------------|----------------------------------------|---------------------------------|-----------------------------|
| [1..1]             | [0..*] DiscreteMeasurementValueQuality | DiscreteMeasurementValueQuality |                             |
| [0..*]             | [1..1] Discrete                        | Discrete                        | Hérité de: DiscreteValue    |
| [1..1]             | [0..1] RemoteSource                    | RemoteSource                    | Hérité de: MeasurementValue |
| [1..1]             | [0..1] MeasurementValueQuality         | MeasurementValueQuality         | Hérité de: MeasurementValue |
| [0..*]             | [1..1] MeasurementValueSource          | MeasurementValueSource          | Hérité de: MeasurementValue |
| [0..1]             | [0..*] DiagramObjects                  | DiagramObject                   | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                           | Name                            | Hérité de: IdentifiedObject |

#### 6.5.6.2.34 MktOperationalLimitType

Sous-classe de la classe IEC 61970:OperationalLimits:OperationalLimitType

Le Tableau 190 montre tous les attributs de MktOperationalLimitType.

**Tableau 190 – Attributs de ExternalInputs::MktOperationalLimitType**

| nom                | type                          | description                                                                                                                                      |
|--------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| limitType          | BranchRatingType              | Types de limite: Normal (Normale), Emergency (Urgence), Short Term Emergency (Urgence à court terme), Long Term Emergency (Urgence à long terme) |
| acceptableDuration | Seconds                       | Hérité de: OperationalLimitType                                                                                                                  |
| direction          | OperationalLimitDirectionKind | Hérité de: OperationalLimitType                                                                                                                  |
| aliasName          | String                        | Hérité de: IdentifiedObject                                                                                                                      |
| mRID               | String                        | Hérité de: IdentifiedObject                                                                                                                      |
| name               | String                        | Hérité de: IdentifiedObject                                                                                                                      |

Le Tableau 191 montre toutes les extrémités d'association de MktOperationalLimitType avec d'autres classes.

**Tableau 191 – Extrémités d'association de ExternalInputs::  
MktOperationalLimitType avec d'autres classes**

| [mult<br>à<br>partir<br>de] | [mult vers] nom         | type             | description                     |
|-----------------------------|-------------------------|------------------|---------------------------------|
| [0..1]                      | [0..*] OperationalLimit | OperationalLimit | Hérité de: OperationalLimitType |
| [0..1]                      | [0..*] DiagramObjects   | DiagramObject    | Hérité de: IdentifiedObject     |
| [1..1]                      | [0..*] Names            | Name             | Hérité de: IdentifiedObject     |

#### 6.5.6.2.35 MktOutageSchedule

Sous-classe de IEC 61970:Core:Outage:OutageSchedule.

Attributs supplémentaires ajoutés pour représenter les programmes d'indisponibilité et de valeur assignée/réduction de l'équipement nécessaires aux opérations du marché (*Market Operations*). L'attribut OutageType est utilisé pour permettre de distinguer les deux types.

Le Tableau 192 montre tous les attributs de MktOutageSchedule.

**Tableau 192 – Attributs de ExternalInputs::MktOutageSchedule**

| nom                 | type           | description                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| breakerNormalStatus | String         | Applicable uniquement au CB/DSC.<br>Valeurs possibles: {'O','C'} indiquant le statut du disjoncteur Open (Ouvert)/Close (Fermé).                                                                                                                                                                                                                                                            |
| breakerOutageStatus | String         | Applicable uniquement au CB/DSC.<br>Valeurs possibles: {'O','C'} indiquant le statut du disjoncteur Open (Ouvert)/Close (Fermé).                                                                                                                                                                                                                                                            |
| commentText         | String         | Commentaires spéciaux soumis par l'ingénieur de fiabilité sur le ticket pouvant influencer sur les Markets (marchés).                                                                                                                                                                                                                                                                       |
| endTime             | DateTime       | Heure de fin d'indisponibilité.                                                                                                                                                                                                                                                                                                                                                             |
| equipType           | String         | Type d'équipement<br><ul style="list-style-type: none"> <li>- unité</li> <li>- charge</li> <li>- compensateur de VAR statique</li> <li>- ligne</li> <li>- appareil en série</li> <li>- transformateur à deux enroulements</li> <li>- transformateur à trois enroulements</li> <li>- shunt de régulation</li> <li>- shunt fixe (condensateur)</li> <li>- disjoncteur/sectionneur.</li> </ul> |
| outageNote          | String         | Note d'indisponibilité.                                                                                                                                                                                                                                                                                                                                                                     |
| outageType          | OutageType     | Type d'indisponibilité: IN (disponible), OUT (indisponible), DERATE (réduit).                                                                                                                                                                                                                                                                                                               |
| POD                 | String         | Point de livraison.                                                                                                                                                                                                                                                                                                                                                                         |
| POR                 | String         | Point de réception.                                                                                                                                                                                                                                                                                                                                                                         |
| status              | String         | Status<br>"Active" – sysdate entre la date de démarrage planifiée et la date de fin planifiée<br>"Apprv" – approbation d'une indisponibilité par le Central Market (marché central)<br>"Accpt" – acceptation d'une indisponibilité par le Central Market (marché central).                                                                                                                  |
| startTime           | DateTime       | Hérité de: BasicIntervalSchedule                                                                                                                                                                                                                                                                                                                                                            |
| value1Unit          | UnitSymbol     | Hérité de: BasicIntervalSchedule                                                                                                                                                                                                                                                                                                                                                            |
| value1Multiplier    | UnitMultiplier | Hérité de: BasicIntervalSchedule                                                                                                                                                                                                                                                                                                                                                            |
| value2Unit          | UnitSymbol     | Hérité de: BasicIntervalSchedule                                                                                                                                                                                                                                                                                                                                                            |
| value2Multiplier    | UnitMultiplier | Hérité de: BasicIntervalSchedule                                                                                                                                                                                                                                                                                                                                                            |
| aliasName           | String         | Hérité de: IdentifiedObject                                                                                                                                                                                                                                                                                                                                                                 |
| mRID                | String         | Hérité de: IdentifiedObject                                                                                                                                                                                                                                                                                                                                                                 |
| name                | String         | Hérité de: IdentifiedObject                                                                                                                                                                                                                                                                                                                                                                 |

Le Tableau 193 montre toutes les extrémités d'association de MktOutageSchedule avec d'autres classes.

**Tableau 193 – Extrémités d'association de ExternalInputs::MktOutageSchedule avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type                | description                          |
|--------------------|----------------------------|---------------------|--------------------------------------|
| [0..1]             | [1..1] PowerSystemResource | PowerSystemResource | Hérité de: OutageSchedule            |
| [0..1]             | [0..*] SwitchingOperations | SwitchingOperation  | Hérité de: OutageSchedule            |
| [1..1]             | [1..*] TimePoints          | IrregularTimePoint  | Hérité de: IrregularIntervalSchedule |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject       | Hérité de: IdentifiedObject          |
| [1..1]             | [0..*] Names               | Name                | Hérité de: IdentifiedObject          |

#### 6.5.6.2.36 MktSeriesCompensator

Sous-classe de IEC 61970:Wires:SeriesCompensator

Le Tableau 194 montre tous les attributs de MktSeriesCompensator

**Tableau 194 – Attributs de ExternalInputs::MktSeriesCompensator**

| nom               | type       | description                  |
|-------------------|------------|------------------------------|
| r                 | Resistance | Hérité de: SeriesCompensator |
| r0                | Resistance | Hérité de: SeriesCompensator |
| x                 | Reactance  | Hérité de: SeriesCompensator |
| x0                | Reactance  | Hérité de: SeriesCompensator |
| aggregate         | Boolean    | Hérité de: Equipment         |
| normallyInService | Boolean    | Hérité de: Equipment         |
| aliasName         | String     | Hérité de: IdentifiedObject  |
| mRID              | String     | Hérité de: IdentifiedObject  |
| name              | String     | Hérité de: IdentifiedObject  |

Le Tableau 195 montre toutes les extrémités d'association de MktSeriesCompensator avec d'autres classes.

**Tableau 195 – Extrémités d'association de ExternalInputs::MktSeriesCompensator avec d'autres classes**

| [mult à partir de] | [mult vers] nom             | type                 | description                    |
|--------------------|-----------------------------|----------------------|--------------------------------|
| [0..*]             | [0..1] EndBFlow             | BranchEndFlow        |                                |
| [0..*]             | [0..1] EndAFlow             | BranchEndFlow        |                                |
| [0..*]             | [0..1] BaseVoltage          | BaseVoltage          | Hérité de: ConductingEquipment |
| [1..1]             | [0..*] Terminals            | Terminal             | Hérité de: ConductingEquipment |
| [0..*]             | [0..*] ProtectionEquipments | ProtectionEquipment  | Hérité de: ConductingEquipment |
| [1..1]             | [0..*] ClearanceTags        | ClearanceTag         | Hérité de: ConductingEquipment |
| [1..1]             | [0..1] SvStatus             | SvStatus             | Hérité de: ConductingEquipment |
| [0..*]             | [0..1] EquipmentContainer   | EquipmentContainer   | Hérité de: Equipment           |
| [1..1]             | [0..*] ContingencyEquipment | ContingencyEquipment | Hérité de: Equipment           |
| [0..1]             | [0..*] OperationalLimitSet  | OperationalLimitSet  | Hérité de: Equipment           |
| [0..*]             | [0..1] PSRType              | PSRType              | Hérité de: PowerSystemResource |
| [0..1]             | [0..*] Measurements         | Measurement          | Hérité de: PowerSystemResource |
| [1..1]             | [0..*] OperatingShare       | OperatingShare       | Hérité de: PowerSystemResource |
| [0..*]             | [0..*] PsrLists             | PsrList              | Hérité de: PowerSystemResource |
| [1..1]             | [0..1] OutageSchedule       | OutageSchedule       | Hérité de: PowerSystemResource |
| [0..*]             | [0..*] ReportingGroup       | ReportingGroup       | Hérité de: PowerSystemResource |
| [0..1]             | [0..*] DiagramObjects       | DiagramObject        | Hérité de: IdentifiedObject    |
| [1..1]             | [0..*] Names                | Name                 | Hérité de: IdentifiedObject    |

**6.5.6.2.37 MktShuntCompensator**

Sous-classe de IEC 61970:Wires.ShuntCompensator

Le Tableau 196 montre tous les attributs de MktShuntCompensator.

**Tableau 196 – Attributs de ExternalInputs::MktShuntCompensator**

| nom                | type                     | description                 |
|--------------------|--------------------------|-----------------------------|
| aVRDelay           | Seconds                  | Hérité de: ShuntCompensator |
| b0PerSection       | Susceptance              | Hérité de: ShuntCompensator |
| bPerSection        | Susceptance              | Hérité de: ShuntCompensator |
| g0PerSection       | Conductance              | Hérité de: ShuntCompensator |
| gPerSection        | Conductance              | Hérité de: ShuntCompensator |
| grounded           | WindingConnection        | Hérité de: ShuntCompensator |
| maximumSections    | Integer                  | Hérité de: ShuntCompensator |
| nomU               | Voltage                  | Hérité de: ShuntCompensator |
| normalSections     | Integer                  | Hérité de: ShuntCompensator |
| phaseConnection    | PhaseShuntConnectionKind | Hérité de: ShuntCompensator |
| switchOnCount      | Integer                  | Hérité de: ShuntCompensator |
| switchOnDate       | DateTime                 | Hérité de: ShuntCompensator |
| voltageSensitivity | VoltagePerReactivePower  | Hérité de: ShuntCompensator |
| aggregate          | Boolean                  | Hérité de: Equipment        |
| normallyInService  | Boolean                  | Hérité de: Equipment        |
| aliasName          | String                   | Hérité de: IdentifiedObject |
| mRID               | String                   | Hérité de: IdentifiedObject |
| name               | String                   | Hérité de: IdentifiedObject |

Le Tableau 197 montre toutes les extrémités d'association de MktShuntCompensator avec d'autres classes.

**Tableau 197 – Extrémités d'association de ExternalInputs::  
MktShuntCompensator avec d'autres classes**

| [mult à partir de] | [mult vers] nom                    | type                        | description                    |
|--------------------|------------------------------------|-----------------------------|--------------------------------|
| [1..1]             | [0..*] ShuntCompensatorDynamicData | ShuntCompensatorDynamicData |                                |
| [1..1]             | [0..*] ShuntCompensatorPhase       | ShuntCompensatorPhase       | Hérité de: ShuntCompensator    |
| [1..1]             | [0..1] SvShuntCompensatorSections  | SvShuntCompensatorSections  | Hérité de: ShuntCompensator    |
| [0..*]             | [0..1] RegulatingControl           | RegulatingControl           | Hérité de: RegulatingCondEq    |
| [0..1]             | [1..*] Controls                    | Control                     | Hérité de: RegulatingCondEq    |
| [0..*]             | [0..1] BaseVoltage                 | BaseVoltage                 | Hérité de: ConductingEquipment |
| [1..1]             | [0..*] Terminals                   | Terminal                    | Hérité de: ConductingEquipment |
| [0..*]             | [0..*] ProtectionEquipments        | ProtectionEquipment         | Hérité de: ConductingEquipment |
| [1..1]             | [0..*] ClearanceTags               | ClearanceTag                | Hérité de: ConductingEquipment |
| [1..1]             | [0..1] SvStatus                    | SvStatus                    | Hérité de: ConductingEquipment |
| [0..*]             | [0..1] EquipmentContainer          | EquipmentContainer          | Hérité de: Equipment           |
| [1..1]             | [0..*] ContingencyEquipment        | ContingencyEquipment        | Hérité de: Equipment           |
| [0..1]             | [0..*] OperationalLimitSet         | OperationalLimitSet         | Hérité de: Equipment           |
| [0..*]             | [0..1] PSRType                     | PSRType                     | Hérité de: PowerSystemResource |
| [0..1]             | [0..*] Measurements                | Measurement                 | Hérité de: PowerSystemResource |
| [1..1]             | [0..*] OperatingShare              | OperatingShare              | Hérité de: PowerSystemResource |
| [0..*]             | [0..*] PsrLists                    | PsrList                     | Hérité de: PowerSystemResource |
| [1..1]             | [0..1] OutageSchedule              | OutageSchedule              | Hérité de: PowerSystemResource |
| [0..*]             | [0..*] ReportingGroup              | ReportingGroup              | Hérité de: PowerSystemResource |
| [0..1]             | [0..*] DiagramObjects              | DiagramObject               | Hérité de: IdentifiedObject    |
| [1..1]             | [0..*] Names                       | Name                        | Hérité de: IdentifiedObject    |

#### 6.5.6.2.38 MktSwitch

Sous-classe de IEC 61970:Wires:Switch

Le Tableau 198 montre tous les attributs de MktSwitch.

**Tableau 198 – Attributs de ExternalInputs::MktSwitch**

| nom               | type        | description                 |
|-------------------|-------------|-----------------------------|
| normalOpen        | Boolean     | Hérité de: Switch           |
| ratedCurrent      | CurrentFlow | Hérité de: Switch           |
| switchOnCount     | Integer     | Hérité de: Switch           |
| switchOnDate      | DateTime    | Hérité de: Switch           |
| retained          | Boolean     | Hérité de: Switch           |
| aggregate         | Boolean     | Hérité de: Equipment        |
| normallyInService | Boolean     | Hérité de: Equipment        |
| aliasName         | String      | Hérité de: IdentifiedObject |
| mRID              | String      | Hérité de: IdentifiedObject |
| name              | String      | Hérité de: IdentifiedObject |

Le Tableau 199 montre toutes les extrémités d'association de MktSwitch avec d'autres classes.

**Tableau 199 – Extrémités d'association de ExternalInputs::MktSwitch avec d'autres classes**

| [mult à partir de] | [mult vers] nom             | type                 | description                    |
|--------------------|-----------------------------|----------------------|--------------------------------|
| [1..1]             | [0..*] SwitchStatus         | SwitchStatus         |                                |
| [1..1]             | [0..*] SwitchSchedules      | SwitchSchedule       | Hérité de: Switch              |
| [1..1]             | [0..*] SwitchPhase          | SwitchPhase          | Hérité de: Switch              |
| [0..*]             | [0..1] CompositeSwitch      | CompositeSwitch      | Hérité de: Switch              |
| [0..*]             | [0..*] SwitchingOperations  | SwitchingOperation   | Hérité de: Switch              |
| [0..*]             | [0..1] BaseVoltage          | BaseVoltage          | Hérité de: ConductingEquipment |
| [1..1]             | [0..*] Terminals            | Terminal             | Hérité de: ConductingEquipment |
| [0..*]             | [0..*] ProtectionEquipments | ProtectionEquipment  | Hérité de: ConductingEquipment |
| [1..1]             | [0..*] ClearanceTags        | ClearanceTag         | Hérité de: ConductingEquipment |
| [1..1]             | [0..1] SvStatus             | SvStatus             | Hérité de: ConductingEquipment |
| [0..*]             | [0..1] EquipmentContainer   | EquipmentContainer   | Hérité de: Equipment           |
| [1..1]             | [0..*] ContingencyEquipment | ContingencyEquipment | Hérité de: Equipment           |
| [0..1]             | [0..*] OperationalLimitSet  | OperationalLimitSet  | Hérité de: Equipment           |
| [0..*]             | [0..1] PSRType              | PSRType              | Hérité de: PowerSystemResource |
| [0..1]             | [0..*] Measurements         | Measurement          | Hérité de: PowerSystemResource |
| [1..1]             | [0..*] OperatingShare       | OperatingShare       | Hérité de: PowerSystemResource |
| [0..*]             | [0..*] PsrLists             | PsrList              | Hérité de: PowerSystemResource |
| [1..1]             | [0..1] OutageSchedule       | OutageSchedule       | Hérité de: PowerSystemResource |
| [0..*]             | [0..*] ReportingGroup       | ReportingGroup       | Hérité de: PowerSystemResource |
| [0..1]             | [0..*] DiagramObjects       | DiagramObject        | Hérité de: IdentifiedObject    |
| [1..1]             | [0..*] Names                | Name                 | Hérité de: IdentifiedObject    |



### 6.5.6.2.39 MktTapChanger

Sous-classe de IEC 61970:Wires:TapChanger

Le Tableau 200 montre tous les attributs de MktTapChanger.

**Tableau 200 – Attributs de ExternalInputs::MktTapChanger**

| nom              | type    | description                 |
|------------------|---------|-----------------------------|
| highStep         | Integer | Hérité de: TapChanger       |
| initialDelay     | Seconds | Hérité de: TapChanger       |
| lowStep          | Integer | Hérité de: TapChanger       |
| ltcFlag          | Boolean | Hérité de: TapChanger       |
| neutralStep      | Integer | Hérité de: TapChanger       |
| neutralU         | Voltage | Hérité de: TapChanger       |
| normalStep       | Integer | Hérité de: TapChanger       |
| regulationStatus | Boolean | Hérité de: TapChanger       |
| subsequentDelay  | Seconds | Hérité de: TapChanger       |
| aliasName        | String  | Hérité de: IdentifiedObject |
| mRID             | String  | Hérité de: IdentifiedObject |
| name             | String  | Hérité de: IdentifiedObject |

Le Tableau 201 montre toutes les extrémités d'association de MktTapChanger avec d'autres classes.

**Tableau 201 – Extrémités d'association de ExternalInputs::  
MktTapChanger avec d'autres classes**

| [mult à partir de] | [mult vers] nom              | type                  | description                    |
|--------------------|------------------------------|-----------------------|--------------------------------|
| [1..1]             | [0..*] TapChangerDynamicData | TapChangerDynamicData |                                |
| [0..*]             | [0..1] TapChangerControl     | TapChangerControl     | Hérité de: TapChanger          |
| [1..1]             | [0..1] SvTapStep             | SvTapStep             | Hérité de: TapChanger          |
| [1..1]             | [0..*] TapSchedules          | TapSchedule           | Hérité de: TapChanger          |
| [0..*]             | [0..1] PSRType               | PSRType               | Hérité de: PowerSystemResource |
| [0..1]             | [0..*] Measurements          | Measurement           | Hérité de: PowerSystemResource |
| [1..1]             | [0..*] OperatingShare        | OperatingShare        | Hérité de: PowerSystemResource |
| [0..*]             | [0..*] PsrLists              | PsrList               | Hérité de: PowerSystemResource |
| [1..1]             | [0..1] OutageSchedule        | OutageSchedule        | Hérité de: PowerSystemResource |
| [0..*]             | [0..*] ReportingGroup        | ReportingGroup        | Hérité de: PowerSystemResource |
| [0..1]             | [0..*] DiagramObjects        | DiagramObject         | Hérité de: IdentifiedObject    |
| [1..1]             | [0..*] Names                 | Name                  | Hérité de: IdentifiedObject    |

### 6.5.6.2.40 Classe racine MWLimitSchedule

MW maximum et MW minimum facultatif (Y1 et Y2, respectivement)

Le Tableau 202 montre toutes les extrémités d'association de MWLimitSchedule avec d'autres classes.

**Tableau 202 – Extrémités d'association de ExternalInputs::MWLimitSchedule avec d'autres classes**

| [mult à partir de] | [mult vers] nom                | type                       | description |
|--------------------|--------------------------------|----------------------------|-------------|
| [1..1]             | [1..1] SecurityConstraintLimit | ContingencyConstraintLimit |             |

#### 6.5.6.2.41 NodeConstraintTerm

A utiliser uniquement pour limiter une quantité qui ne peut pas être associée à une borne. Par exemple, une unité de production enregistrée qui n'est pas connectée électriquement au réseau.

Le Tableau 203 montre tous les attributs de NodeConstraintTerm.

**Tableau 203 – Attributs de ExternalInputs::NodeConstraintTerm**

| nom       | type   | description                 |
|-----------|--------|-----------------------------|
| factor    | String | Hérité de: ConstraintTerm   |
| function  | String | Hérité de: ConstraintTerm   |
| aliasName | String | Hérité de: IdentifiedObject |
| mRID      | String | Hérité de: IdentifiedObject |
| name      | String | Hérité de: IdentifiedObject |

Le Tableau 204 montre toutes les extrémités d'association de NodeConstraintTerm avec d'autres classes.

**Tableau 204 – Extrémités d'association de ExternalInputs::NodeConstraintTerm avec d'autres classes**

| [mult à partir de] | [mult vers] nom              | type                  | description                 |
|--------------------|------------------------------|-----------------------|-----------------------------|
| [0..*]             | [1..1] MktConnectivityNode   | MktConnectivityNode   |                             |
| [0..*]             | [1..1] SecurityConstraintSum | SecurityConstraintSum | Hérité de: ConstraintTerm   |
| [0..1]             | [0..*] DiagramObjects        | DiagramObject         | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                 | Name                  | Hérité de: IdentifiedObject |

#### 6.5.6.2.42 Profile

Un profil est un type de courbe plus simple.

Le Tableau 205 montre tous les attributs de Profile.

**Tableau 205 – Attributs de ExternalInputs::Profile**

| nom       | type   | description                 |
|-----------|--------|-----------------------------|
| aliasName | String | Hérité de: IdentifiedObject |
| mRID      | String | Hérité de: IdentifiedObject |
| name      | String | Hérité de: IdentifiedObject |

Le Tableau 206 montre toutes les extrémités d'association de Profile avec d'autres classes.

**Tableau 206 – Extrémités d'association de ExternalInputs::Profile avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type          | description                                               |
|--------------------|-----------------------|---------------|-----------------------------------------------------------|
| [0..*]             | [0..*] ProfileDatas   | ProfileData   | Un profil a des données de profil qui lui sont associées. |
| [0..1]             | [0..*] DiagramObjects | DiagramObject | Hérité de: IdentifiedObject                               |
| [1..1]             | [0..*] Names          | Name          | Hérité de: IdentifiedObject                               |

#### 6.5.6.2.43 Classe racine ProfileData

Données de profil.

Le Tableau 207 montre tous les attributs de ProfileData.

**Tableau 207 – Attributs de ExternalInputs::ProfileData**

| nom            | type        | description                                                               |
|----------------|-------------|---------------------------------------------------------------------------|
| bidPrice       | Float       | Prix d'offre associé au contrat                                           |
| capacityLevel  | ActivePower | Niveau de capacité du profil, en MW.                                      |
| energyLevel    | RealEnergy  | Niveau d'énergie du profil, en MWh.                                       |
| minimumLevel   | Float       | Valeur minimale du contrat en MW                                          |
| sequenceNumber | Integer     | Séquence pour numéroter les éléments du profil. { supérieur ou égal à 1 } |
| startDateTime  | DateTime    | Date/heure de début pour ce profil.                                       |
| stopDateTime   | DateTime    | Date/heure de fin pour ce profil.                                         |

Le Tableau 208 montre toutes les extrémités d'association de ProfileData avec d'autres classes.

**Tableau 208 – Extrémités d'association de ExternalInputs::ProfileData avec d'autres classes**

| [mult à partir de] | [mult vers] nom | type    | description                                               |
|--------------------|-----------------|---------|-----------------------------------------------------------|
| [0..*]             | [0..*] Profile  | Profile | Un profil a des données de profil qui lui sont associées. |

#### 6.5.6.2.44 ReserveDemandCurve

Courbe de demande de réserve. Modélise les quantités maximales de réserve exigées par Market Region (région de marché) et modélise une courbe de demande de réserve pour les quantités minimales de réserve. ReserveDemandCurve est une relation entre le prix de réserve d'exploitation de l'unité en \$/MWh (axe Y) et les réserves de l'unité en MW (axe X).

Le Tableau 209 montre tous les attributs de ReserveDemandCurve.

**Tableau 209 – Attributs de ExternalInputs::ReserveDemandCurve**

| nom                    | type                   | description                                                                                                                               |
|------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| reqMaxMW               | Float                  | Limite maximale de l'exigence régionale                                                                                                   |
| reserveRequirementType | ReserveRequirementType | Type d'exigences de réserve auquel s'appliquent la limite max et la courbe. Par exemple, réserve d'exploitation, régulation, contingence. |
| curveStyle             | CurveStyle             | Hérité de: Curve                                                                                                                          |
| xMultiplier            | UnitMultiplier         | Hérité de: Curve                                                                                                                          |
| xUnit                  | UnitSymbol             | Hérité de: Curve                                                                                                                          |
| y1Multiplier           | UnitMultiplier         | Hérité de: Curve                                                                                                                          |
| y1Unit                 | UnitSymbol             | Hérité de: Curve                                                                                                                          |
| y2Multiplier           | UnitMultiplier         | Hérité de: Curve                                                                                                                          |
| y2Unit                 | UnitSymbol             | Hérité de: Curve                                                                                                                          |
| y3Multiplier           | UnitMultiplier         | Hérité de: Curve                                                                                                                          |
| y3Unit                 | UnitSymbol             | Hérité de: Curve                                                                                                                          |
| aliasName              | String                 | Hérité de: IdentifiedObject                                                                                                               |
| mRID                   | String                 | Hérité de: IdentifiedObject                                                                                                               |
| name                   | String                 | Hérité de: IdentifiedObject                                                                                                               |

Le Tableau 210 montre toutes les extrémités d'association de ReserveDemandCurve avec d'autres classes.

**Tableau 210 – Extrémités d'association de ExternalInputs::ReserveDemandCurve avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type           | description                 |
|--------------------|-----------------------|----------------|-----------------------------|
| [1..*]             | [1..1] ASRequirements | ASRequirements |                             |
| [0..*]             | [1..1] MarketRegion   | MarketRegion   |                             |
| [1..1]             | [0..*] CurveDatas     | CurveData      | Hérité de: Curve            |
| [0..1]             | [0..*] DiagramObjects | DiagramObject  | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names          | Name           | Hérité de: IdentifiedObject |

#### 6.5.6.2.45 Classe racine SCADAInformation

Contient des informations de mise à jour indiquées par SCADA

Le Tableau 211 montre tous les attributs de SCADAInformation.

**Tableau 211 – Attributs de ExternalInputs::SCADAInformation**

| nom       | type     | description                             |
|-----------|----------|-----------------------------------------|
| timeStamp | DateTime | heure de mise à jour indiquée par SCADA |

**6.5.6.2.46 SecurityConstraints**

Ces contraintes sont typiques pour les gestionnaires des réseaux de transport régionaux (RTO). Elles incluent des contraintes de transport et de groupe de production identifiées dans le scénario de base et dans les scénarios de contingence critique.

Le Tableau 212 montre tous les attributs de SecurityConstraints.

**Tableau 212 – Attributs de ExternalInputs::SecurityConstraints**

| nom       | type        | description                                                                                               |
|-----------|-------------|-----------------------------------------------------------------------------------------------------------|
| minMW     | ActivePower | Limite minimale en MW (uniquement pour les contraintes de transport).                                     |
| maxMW     | ActivePower | Limite maximale en MW                                                                                     |
| actualMW  | ActivePower | Flux d'une branche réelle ou d'un groupe de branches en MW (uniquement pour les contraintes de transport) |
| aliasName | String      | Hérité de: IdentifiedObject                                                                               |
| mRID      | String      | Hérité de: IdentifiedObject                                                                               |
| name      | String      | Hérité de: IdentifiedObject                                                                               |

Le Tableau 213 montre toutes les extrémités d'association de SecurityConstraints avec d'autres classes.

**Tableau 213 – Extrémités d'association de ExternalInputs::SecurityConstraints avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type          | description                 |
|--------------------|-----------------------|---------------|-----------------------------|
| [0..*]             | [0..1] RTO            | RTO           |                             |
| [0..*]             | [0..1] GeneratingBid  | GeneratingBid |                             |
| [0..1]             | [0..1] Flowgate       | Flowgate      |                             |
| [0..1]             | [0..*] DiagramObjects | DiagramObject | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names          | Name          | Hérité de: IdentifiedObject |

**6.5.6.2.47 SecurityConstraintSum**

Généralement fournies par les systèmes des RTO, les contraintes identifiées dans le scénario de base et dans les scénarios de contingence critique doivent être transférées.

Une contrainte a N ( $\geq 1$ ) conditions de contraintes. Une condition est représentée par une instance de TerminalConstraintTerm.

L'expression de la contrainte est la suivante:

$$\text{minValue} \leq c1 \cdot x1 + c2 \cdot x2 + \dots cn \cdot xn + k \leq \text{maxValue}$$

où:

- cn est ConstraintTerm.factor
- xn est le flux de la borne

Le flux de l'équipement associé est positif pour NodeConstraintTerm de ConnectivityNode

k est SecurityConstraintsLinear.resourceMW

Les unités de k sont censées être les mêmes que les unités des flux, xn. Les constantes cn n'ont pas de dimension.

Avec ces conventions, cn et k sont positives pour une contrainte type telle que: "la somme pondérée de production doit être inférieure à la limite". En outre, les cn sont toutes égales à 1.0 pour un scénario tel que "le flux de l'interface doit être inférieur à la limite", en partant du principe que les bornes sont choisies sur le côté importation de l'interface

Le Tableau 214 montre tous les attributs de SecurityConstraintSum.

**Tableau 214 – Attributs de ExternalInputs::SecurityConstraintSum**

| nom                  | type              | description                 |
|----------------------|-------------------|-----------------------------|
| intervalEndTime      | DateTime          | Hérité de: MarketFactors    |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors    |
| type                 | String            | Hérité de: Document         |
| createdDateTime      | DateTime          | Hérité de: Document         |
| lastModifiedDateTime | DateTime          | Hérité de: Document         |
| revisionNumber       | String            | Hérité de: Document         |
| electronicAddress    | ElectronicAddress | Hérité de: Document         |
| subject              | String            | Hérité de: Document         |
| title                | String            | Hérité de: Document         |
| docStatus            | Status            | Hérité de: Document         |
| status               | Status            | Hérité de: Document         |
| aliasName            | String            | Hérité de: IdentifiedObject |
| mRID                 | String            | Hérité de: IdentifiedObject |
| name                 | String            | Hérité de: IdentifiedObject |

Le Tableau 215 montre toutes les extrémités d'association de SecurityConstraintSum avec d'autres classes.

**Tableau 215 – Extrémités d'association de ExternalInputs::SecurityConstraintSum avec d'autres classes**

| [mult à partir de] | [mult vers] nom                    | type                       | description                 |
|--------------------|------------------------------------|----------------------------|-----------------------------|
| [1..1]             | [0..*] ConstraintTerms             | ConstraintTerm             |                             |
| [0..*]             | [0..1] RTO                         | RTO                        |                             |
| [1..1]             | [0..1] BaseCaseConstraintLimit     | BaseCaseConstraintLimit    |                             |
| [1..1]             | [0..*] ContingencyConstraintLimits | ContingencyConstraintLimit |                             |
| [1..1]             | [0..1] DefaultConstraintLimit      | DefaultConstraintLimit     |                             |
| [0..*]             | [0..*] MktActivityRecord           | MktActivityRecord          | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market                      | Market                     | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents         | ConfigurationEvent         | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects              | DiagramObject              | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                       | Name                       | Hérité de: IdentifiedObject |

#### 6.5.6.2.48 ServicePoint

Les points terminaux définis d'une voie de transport (jusqu'au niveau de distribution ou du client – production ou consommation, ou les deux). Les points de service sont définis du point de vue du service de transport. Chaque point de service est contenu dans (ou à la limite de) la zone d'échange. Un point de service est la source ou la destination d'une transaction.

Le Tableau 216 montre tous les attributs de ServicePoint.

**Tableau 216 – Attributs de ExternalInputs::ServicePoint**

| nom       | type   | description                 |
|-----------|--------|-----------------------------|
| aliasName | String | Hérité de: IdentifiedObject |
| mRID      | String | Hérité de: IdentifiedObject |
| name      | String | Hérité de: IdentifiedObject |

Le Tableau 217 montre toutes les extrémités d'association de ServicePoint avec d'autres classes.

**Tableau 217 – Extrémités d'association de ExternalInputs::ServicePoint avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type                    | description                                                                |
|--------------------|----------------------------|-------------------------|----------------------------------------------------------------------------|
| [0..1]             | [0..*] SourceReservation   | TransmissionReservation |                                                                            |
| [1..1]             | [0..*] PORTransmissionPath | TransmissionPath        | Une voie de transmission a un point de service appelé "point de réception" |
| [0..1]             | [0..*] SinkReservation     | TransmissionReservation |                                                                            |
| [1..1]             | [0..*] PODTransmissionPath | TransmissionPath        | Une voie de transmission a un point de service "point de livraison"        |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject           | Hérité de: IdentifiedObject                                                |
| [1..1]             | [0..*] Names               | Name                    | Hérité de: IdentifiedObject                                                |

#### 6.5.6.2.49 Classe racine ShuntCompensatorDynamicData

Optimal Power Flow ou State Estimator Filter Bank Data pour le simulateur de formation des exploitants (OTS, *Operator Training Simulator*). Utilisée pour les utilisateurs RealTime, Study et Maintenance.

Le Tableau 218 montre tous les attributs de ShuntCompensatorDynamicData.

**Tableau 218 – Attributs de ExternalInputs::ShuntCompensatorDynamicData**

| nom                     | type    | description                                                                                                      |
|-------------------------|---------|------------------------------------------------------------------------------------------------------------------|
| mVARInjection           | Float   | L'injection de puissance réactive du banc de filtres dans la solution NA ou production de puissance réactive VCS |
| connectionStatus        | Integer | Le statut courant du condensateur de régulation de tension 1 = Connecté 0 = Déconnecté                           |
| desiredVoltage          | Float   | La tension souhaitée du condensateur de régulation de tension                                                    |
| voltageRegulationStatus | Boolean | Indicateur spécifiant si la régulation de tension agit en tant que régulateur; True = Oui, False = Non           |
| stepPosition            | Integer | Position d'un pas de condensateur de régulation de tension                                                       |

Le Tableau 219 montre toutes les extrémités d'association de ShuntCompensatorDynamicData avec d'autres classes.

**Tableau 219 – Extrémités d'association de ExternalInputs::ShuntCompensatorDynamicData avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type                | description |
|--------------------|----------------------------|---------------------|-------------|
| [0..*]             | [1..1] MktShuntCompensator | MktShuntCompensator |             |

#### 6.5.6.2.50 Classe racine SwitchStatus

Optimal Power Flow ou State Estimator Circuit Breaker Status.

Le Tableau 220 montre tous les attributs de SwitchStatus.



**Tableau 220 – Attributs de ExternalInputs::SwitchStatus**

| nom          | type             | description                                                                             |
|--------------|------------------|-----------------------------------------------------------------------------------------|
| switchStatus | SwitchStatusType | Statut du disjoncteur (fermé ou ouvert) du calcul de répartition ( <i>power flow</i> ). |

Le Tableau 221 montre toutes les extrémités d'association de SwitchStatus avec d'autres classes.

**Tableau 221 – Extrémités d'association de ExternalInputs::SwitchStatus avec d'autres classes**

| [mult à partir de] | [mult vers] nom  | type      | description |
|--------------------|------------------|-----------|-------------|
| [0..*]             | [1..1] MktSwitch | MktSwitch |             |

#### 6.5.6.2.51 Classe racine SysLoadDistributionFactor

Cette classe modélise les facteurs de distribution du système. Elle doit être utilisée avec HostControlArea et ConnectivityNode pour montrer la distribution de chaque partie individuelle.

Le Tableau 222 montre tous les attributs de SysLoadDistributionFactor.

**Tableau 222 – Attributs de ExternalInputs::SysLoadDistributionFactor**

| nom    | type  | description                                                                                                   |
|--------|-------|---------------------------------------------------------------------------------------------------------------|
| factor | Float | Utilisé pour calculer la "participation" de charge d'un nœud de connectivité dans une zone de régulation hôte |

Le Tableau 223 montre toutes les extrémités d'association de SysLoadDistributionFactor avec d'autres classes.

**Tableau 223 – Extrémités d'association de ExternalInputs::SysLoadDistributionFactor avec d'autres classes**

| [mult à partir de] | [mult vers] nom              | type                  | description |
|--------------------|------------------------------|-----------------------|-------------|
| [0..1]             | [1..1] MktConnectivityNode   | MktConnectivityNode   |             |
| [0..*]             | [0..*] DistributionFactorSet | DistributionFactorSet |             |
| [0..*]             | [1..1] HostControlArea       | HostControlArea       |             |

#### 6.5.6.2.52 Classe racine TapChangerDynamicData

Optimal Power Flow ou State Estimator Phase Shifter Data. Utilisée pour les utilisateurs RealTime, Study et Maintenance. Mesures du déphaseur de solution SE du dernier processus de SE

Le Tableau 224 montre tous les attributs de TapChangerDynamicData.

**Tableau 224 – Attributs de ExternalInputs::TapChangerDynamicData**

| nom                     | type    | description                                                                                                                               |
|-------------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------|
| tapPosition             | Float   | Position de la prise du déphaseur, position supérieure de la prise du transformateur ou position inférieure de la prise du transformateur |
| desiredVoltage          | Float   | La tension souhaitée du LTC (changeur de prise en charge)                                                                                 |
| voltageRegulationStatus | Boolean | Indicateur spécifiant si le transformateur LTC agit en tant que régulateur; True = Oui, False = Non                                       |
| angleRegulationStatus   | Boolean | True signifie que le déphaseur régule.                                                                                                    |
| desiredMW               | Float   | Quantité de MW souhaitée pour le déphaseur. Le point de consigne de régulation de la puissance active du déphaseur                        |
| solvedAngle             | Float   | Angle du déphaseur. Le déphasage angulaire résolu du déphaseur                                                                            |
| minimumAngle            | Float   | Le déphasage angulaire minimal du déphaseur                                                                                               |
| maximumAngle            | Float   | Le déphasage angulaire maximal du déphaseur                                                                                               |

Le Tableau 225 montre toutes les extrémités d'association de TapChangerDynamicData avec d'autres classes.

**Tableau 225 – Extrémités d'association de ExternalInputs::TapChangerDynamicData avec d'autres classes**

| [mult à partir de] | [mult vers] nom      | type          | description |
|--------------------|----------------------|---------------|-------------|
| [0..*]             | [1..1] MktTapChanger | MktTapChanger |             |

#### 6.5.6.2.53 TerminalConstraintTerm

Une condition de contrainte associée à une borne spécifique sur un équipement physique.

Le Tableau 226 montre tous les attributs de TerminalConstraintTerm.

**Tableau 226 – Attributs de ExternalInputs::TerminalConstraintTerm**

| nom       | type   | description                 |
|-----------|--------|-----------------------------|
| factor    | String | Hérité de: ConstraintTerm   |
| function  | String | Hérité de: ConstraintTerm   |
| aliasName | String | Hérité de: IdentifiedObject |
| mRID      | String | Hérité de: IdentifiedObject |
| name      | String | Hérité de: IdentifiedObject |

Le Tableau 227 montre toutes les extrémités d'association de TerminalConstraintTerm avec d'autres classes.

**Tableau 227 – Extrémités d'association de ExternalInputs::TerminalConstraintTerm avec d'autres classes**

| [mult à partir de] | [mult vers] nom              | type                  | description                 |
|--------------------|------------------------------|-----------------------|-----------------------------|
| [0..*]             | [1..1] MktTerminal           | MktTerminal           |                             |
| [0..*]             | [1..1] SecurityConstraintSum | SecurityConstraintSum | Hérité de: ConstraintTerm   |
| [0..1]             | [0..*] DiagramObjects        | DiagramObject         | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                 | Name                  | Hérité de: IdentifiedObject |

#### 6.5.6.2.54 TransferInterface

Une interface de transfert est composée de branches telles que les lignes de transmission et les transformateurs.

Le Tableau 228 montre tous les attributs de TransferInterface.

**Tableau 228 – Attributs de ExternalInputs::TransferInterface**

| nom       | type   | description                 |
|-----------|--------|-----------------------------|
| aliasName | String | Hérité de: IdentifiedObject |
| mRID      | String | Hérité de: IdentifiedObject |
| name      | String | Hérité de: IdentifiedObject |

Le Tableau 229 montre toutes les extrémités d'association de TransferInterface avec d'autres classes.

**Tableau 229 – Extrémités d'association de ExternalInputs::TransferInterface avec d'autres classes**

| [mult à partir de] | [mult vers] nom                  | type                      | description                 |
|--------------------|----------------------------------|---------------------------|-----------------------------|
| [1..1]             | [1..1] TransferInterfaceSolution | TransferInterfaceSolution |                             |
| [0..*]             | [0..1] HostControlArea           | HostControlArea           |                             |
| [0..1]             | [0..*] DiagramObjects            | DiagramObject             | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                     | Name                      | Hérité de: IdentifiedObject |

#### 6.5.6.2.55 Classe racine TransferInterfaceSolution

Définitions d'interface TNA de OPF pour VSA

Le Tableau 230 montre tous les attributs de TransferInterfaceSolution.

**Tableau 230 – Attributs de ExternalInputs::TransferInterfaceSolution**

| nom             | type  | description                                                                                                                                                    |
|-----------------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| interfaceMargin | Float | La marge de l'interface                                                                                                                                        |
| transferLimit   | Float | Interface de transfert + Limite<br>Utilisation de l'attribut: la valeur absolue du flux maximum sur l'interface de transfert. C'est une valeur positive en MW. |
| postTransferMW  | Float | MW post-transfert pour une étape                                                                                                                               |

Le Tableau 231 montre toutes les extrémités d'association de TransferInterfaceSolution avec d'autres classes.

**Tableau 231 – Extrémités d'association de ExternalInputs::TransferInterfaceSolution avec d'autres classes**

| [mult à partir de] | [mult vers] nom          | type              | description |
|--------------------|--------------------------|-------------------|-------------|
| [1..1]             | [1..1] TransferInterface | TransferInterface |             |
| [0..1]             | [0..1] MktContingencyA   | MktContingency    |             |
| [0..1]             | [0..1] MktContingencyB   | MktContingency    |             |

#### 6.5.6.2.56 Classe racine TransmissionCapacity

Cette classe modélise la capacité de transport (une interface de transport ou une paire POR/POD) comprenant la capacité de transfert totale (TTC, *Total Transfer Capacity*), la capacité de transfert opérationnelle (OTC, *Operating Transfer Capacity*) et la marge bénéficiaire de capacité (CBM, *Capacity Benefit Margin*).

Le Tableau 232 montre tous les attributs de TransmissionCapacity.

**Tableau 232 – Attributs de ExternalInputs::TransmissionCapacity**

| nom                             | type     | description                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| capacityBenefitMargin           | Float    | La marge bénéficiaire de capacité (CBM) est utilisée par les marchés ( <i>Markets</i> ) pour calculer les limites de l'interface de transport. Ce nombre pourrait être déterminé manuellement ou selon une procédure. La CBM est définie par interface de transport (groupe de branches).                                                                                                               |
| operationalTransmissionCapacity | Float    | La capacité de transport opérationnelle (OTC) est la capacité de transport dans les conditions opérationnelles pendant une période de temps déterminée, comprenant les effets de réduction et les paramètres actuels de contrôle des opérations. Les OTC des interfaces de transport (groupe de branches) sont toujours fournies quelles que soient les conditions d'indisponibilité ou de commutation. |
| OTC15min_emergency              | Float    | Le seuil d'urgence de 15 min de la capacité de transport opérationnelle (OTC).                                                                                                                                                                                                                                                                                                                          |
| OTCemergency                    | Float    | Le seuil d'urgence de la capacité de transport opérationnelle (OTC).                                                                                                                                                                                                                                                                                                                                    |
| POD                             | String   | point de livraison                                                                                                                                                                                                                                                                                                                                                                                      |
| POR                             | String   | point de réception                                                                                                                                                                                                                                                                                                                                                                                      |
| startOperatingDate              | DateTime | Date et heure d'exploitation lorsque le droit s'applique                                                                                                                                                                                                                                                                                                                                                |
| totalTransmissionCapacity       | Float    | Capacité de transport totale                                                                                                                                                                                                                                                                                                                                                                            |

Le Tableau 233 montre toutes les extrémités d'association de TransmissionCapacity avec d'autres classes.

**Tableau 233 – Extrémités d'association de ExternalInputs::TransmissionCapacity avec d'autres classes**

| [mult à partir de] | [mult vers] nom           | type               | description |
|--------------------|---------------------------|--------------------|-------------|
| [0..*]             | [0..1] GenericConstraints | GenericConstraints |             |
| [0..*]             | [0..1] Flowgate           | Flowgate           |             |

#### 6.5.6.2.57 Classe racine TransmissionInterfaceRightEntitlement

Elle est officiellement appelée le droit ETC/TOR du groupe de branches avec CVR en guise de ETC. Elle est utilisée pour représenter les droits. Elle pourrait également être utilisée pour représenter le droit TR d'un POR/POD.

Le Tableau 234 montre tous les attributs de TransmissionInterfaceRightEntitlement.

**Tableau 234 – Attributs de ExternalInputs::TransmissionInterfaceRightEntitlement**

| nom                | type     | description                                              |
|--------------------|----------|----------------------------------------------------------|
| entitlement        | Float    | le droit                                                 |
| POD                | String   | point de livraison                                       |
| POR                | String   | point de réception                                       |
| startOperatingDate | DateTime | Date et heure d'exploitation lorsque le droit s'applique |

Le Tableau 235 montre toutes les extrémités d'association de TransmissionInterfaceRightEntitlement avec d'autres classes.

**Tableau 235 – Extrémités d'association de ExternalInputs::TransmissionInterfaceRightEntitlement avec d'autres classes**

| [mult à partir de] | [mult vers] nom      | type          | description |
|--------------------|----------------------|---------------|-------------|
| [0..*]             | [1..1] ContractRight | ContractRight |             |
| [0..*]             | [0..1] Flowgate      | Flowgate      |             |

#### 6.5.6.2.58 TransmissionPath

Une connexion, un lien ou une ligne électrique composé d'un ou de plusieurs éléments de transport parallèles entre deux zones des systèmes électriques interconnectés ou d'une partie d'entre eux. TransmissionCorridor et TransmissionRightOfWay font partie des aspects juridiques. TransmissionPath fait référence aux segments entre les ServicePoints d'un TransmissionProvider.

Le Tableau 236 montre tous les attributs de TransmissionPath.

**Tableau 236 – Attributs de ExternalInputs::TransmissionPath**

| nom                     | type        | description                                                                                                   |
|-------------------------|-------------|---------------------------------------------------------------------------------------------------------------|
| availTransferCapability | ActivePower | La capacité de transport disponible d'une voie de transmission pour la direction de référence.                |
| parallelPathFlag        | Boolean     | Indicateur précisant si la voie de transmission est également une "voie parallèle" d'interconnexion désignée. |
| totalTransferCapability | ActivePower | La capacité de transport totale d'une voie de transmission dans la direction de référence.                    |
| aliasName               | String      | Hérité de: IdentifiedObject                                                                                   |
| mRID                    | String      | Hérité de: IdentifiedObject                                                                                   |
| name                    | String      | Hérité de: IdentifiedObject                                                                                   |

Le Tableau 237 montre toutes les extrémités d'association de TransmissionPath avec d'autres classes.

**Tableau 237 – Extrémités d'association de ExternalInputs::  
TransmissionPath avec d'autres classes**

| [mult à partir de] | [mult vers] nom                   | type                    | description                                                                |
|--------------------|-----------------------------------|-------------------------|----------------------------------------------------------------------------|
| [1..1]             | [0..*]<br>TransmissionReservation | TransmissionReservation |                                                                            |
| [0..*]             | [1..1] PointOfReceipt             | ServicePoint            | Une voie de transmission a un point de service appelé "point de réception" |
| [0..*]             | [1..1] DeliveryPoint              | ServicePoint            | Une voie de transmission a un point de service "point de livraison"        |
| [0..1]             | [0..*] DiagramObjects             | DiagramObject           | Hérité de: IdentifiedObject                                                |
| [1..1]             | [0..*] Names                      | Name                    | Hérité de: IdentifiedObject                                                |

#### 6.5.6.2.59 Classe racine TransmissionReservation

Une réservation de transport est obtenue du système OASIS pour réserver le transport pour une période de temps, une voie de transmission et un produit de transport donnés.

Le Tableau 238 montre toutes les extrémités d'association de TransmissionReservation avec d'autres classes.

**Tableau 238 – Extrémités d'association de ExternalInputs::  
TransmissionReservation avec d'autres classes**

| [mult à partir de] | [mult vers] nom          | type              | description |
|--------------------|--------------------------|-------------------|-------------|
| [0..1]             | [0..1] EnergyTransaction | EnergyTransaction |             |
| [0..1]             | [0..1] TransactionBid    | TransactionBid    |             |
| [0..*]             | [0..1] Source            | ServicePoint      |             |
| [0..*]             | [0..1] Sink              | ServicePoint      |             |
| [0..*]             | [1..1] TransmissionPath  | TransmissionPath  |             |

#### 6.5.6.2.60 Classe racine TREntitlement

Un Transmission Right (TR) (droit de transport) peut être une chaîne de TR ou un TR individuel.

Lorsqu'un droit de transport n'est pas une chaîne, il est officiellement le droit ETC/TOR de chaque contrat ETC/TOR avec CVR (*Converted Rights*) comme ETC. Il s'agit de la somme de tous les droits sur toutes les interfaces de transport liées pour un même TR.

Lorsque TR est une chaîne, son droit est le minimum de tous les droits pour les TR individuels de la chaîne.

Le Tableau 239 montre tous les attributs de TREntitlement.

**Tableau 239 – Attributs de ExternalInputs::TREntitlement**

| nom                | type     | description                                              |
|--------------------|----------|----------------------------------------------------------|
| entitlement        | Float    | Le droit                                                 |
| startOperatingDate | DateTime | Date et heure d'exploitation lorsque le droit s'applique |

Le Tableau 240 montre toutes les extrémités d'association de TREntitlement avec d'autres classes.

**Tableau 240 – Extrémités d'association de ExternalInputs::TREntitlement avec d'autres classes**

| [mult à partir de] | [mult vers] nom                     | type          | description |
|--------------------|-------------------------------------|---------------|-------------|
| [0..*]             | [1..1]<br>TransmissionContractRight | ContractRight |             |

#### 6.5.6.2.61 UnitInitialConditions

Statut de ressource à la fin d'une période d'équilibre donnée.

Le Tableau 241 montre tous les attributs de UnitInitialConditions.



**Tableau 241 – Attributs de ExternalInputs::UnitInitialConditions**

| nom              | type        | description                                                                                                                                                          |
|------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cumEnergy        | RealEnergy  | Production d'énergie cumulée sur une période d'échange.                                                                                                              |
| cumStatusChanges | Integer     | Nombre cumulé de changements de statut de la ressource.                                                                                                              |
| numberOfStartups | Integer     | Nombre de démarrages par jour d'exploitation ( <i>Operating Day</i> ) jusqu'à la fin de l'heure précédente.                                                          |
| onlineStatus     | Boolean     | "True" si le GeneratingUnit est actuellement en ligne                                                                                                                |
| resourceMW       | ActivePower | Sortie en MW de ressource à la fin de la période d'équilibre précédente.                                                                                             |
| resourceStatus   | Integer     | Statut de ressource à la fin de la période d'équilibre précédente.<br>0 – hors ligne<br>1 – production en ligne<br>2 – en cours d'arrêt<br>3 – en cours de démarrage |
| statusDate       | DateTime    | Heure et date de resourceStatus                                                                                                                                      |
| timeInStatus     | Float       | Heure dans les intervalles d'échange de marché à laquelle la ressource revêt un statut à la fin de la période d'équilibre précédente.                                |
| timeInterval     | DateTime    | Intervalle de temps                                                                                                                                                  |
| aliasName        | String      | Hérité de: IdentifiedObject                                                                                                                                          |
| mRID             | String      | Hérité de: IdentifiedObject                                                                                                                                          |
| name             | String      | Hérité de: IdentifiedObject                                                                                                                                          |

Le Tableau 242 montre toutes les extrémités d'association de UnitInitialConditions avec d'autres classes.

**Tableau 242 – Extrémités d'association de ExternalInputs::UnitInitialConditions avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type                | description                 |
|--------------------|-----------------------|---------------------|-----------------------------|
| [0..*]             | [0..1] GeneratingUnit | RegisteredGenerator |                             |
| [0..1]             | [0..*] DiagramObjects | DiagramObject       | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names          | Name                | Hérité de: IdentifiedObject |

### 6.5.6.3 Paquetage MarketResults

#### 6.5.6.3.1 Généralités

Résultats de l'exécution d'un marché.

La Figure 34 montre le diagramme de classe Instructions.

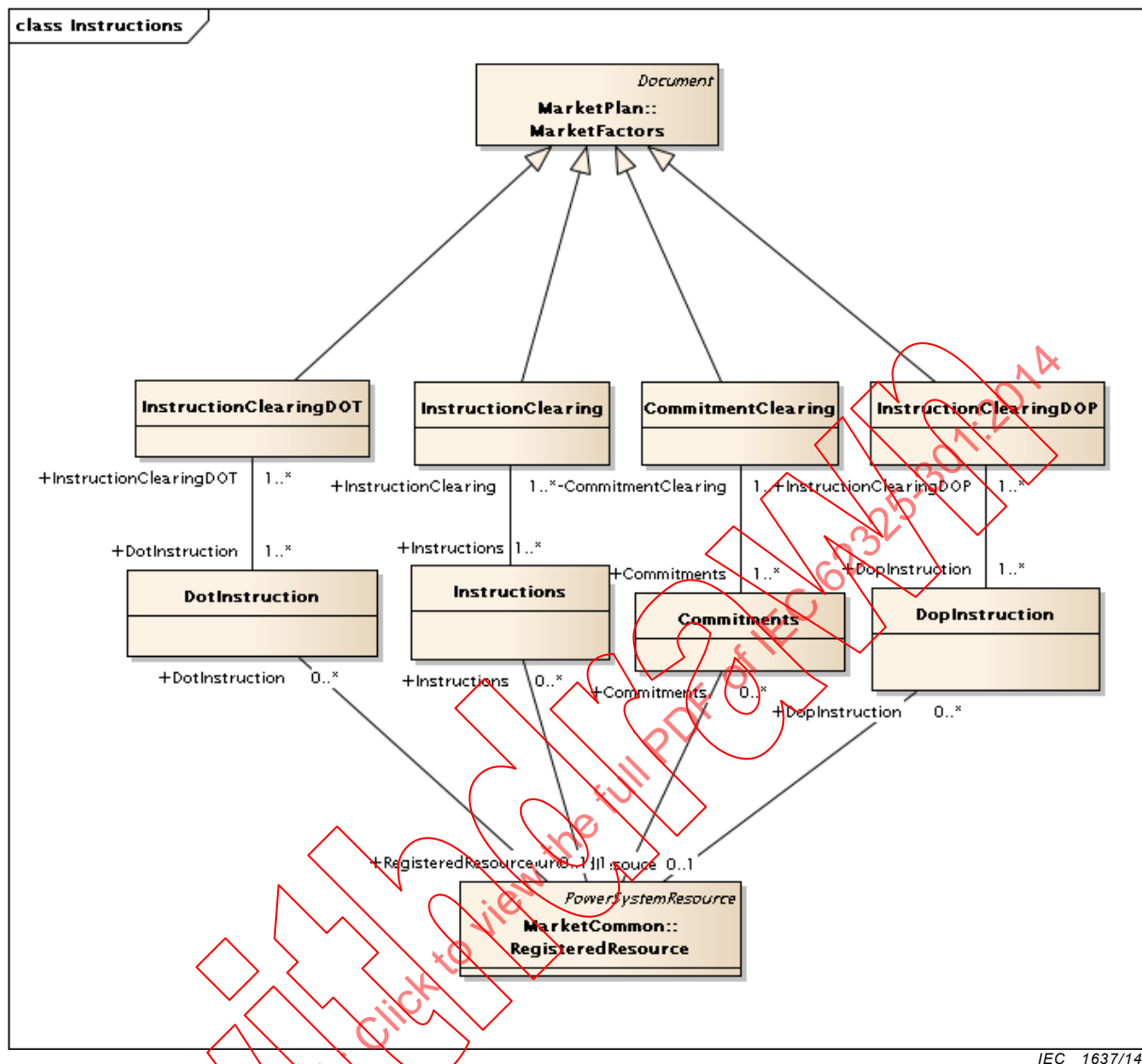


**Figure 34 – Diagramme de classe MarketResults::  
Instructions**

Cette figure montre les classes utilisées pour modéliser les instructions envoyées aux participants du marché après l'ajustement du marché. Les principales classes et leurs relations incluent la classe RegisteredResource qui modélise la ressource participante, ainsi que les classes Commitment et CommitmentClearing qui modélisent les résultats qui demandent l'engagement de la ressource. DotInstruction et DopInstruction autorisent la modélisation des résultats d'une répartition dynamique (ou anticipée) qui peut être utilisée dans le marché en temps réel.

La Figure 35 montre le diagramme de classe MarketClearing.

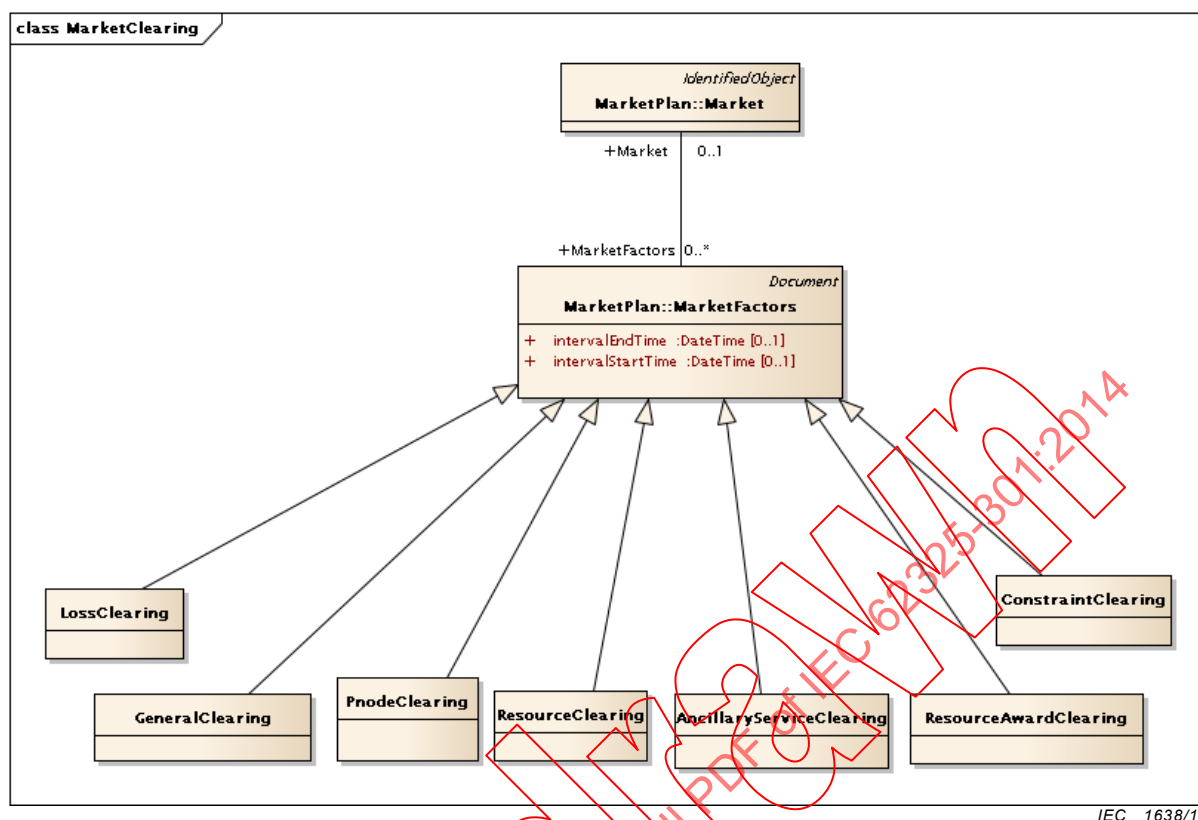
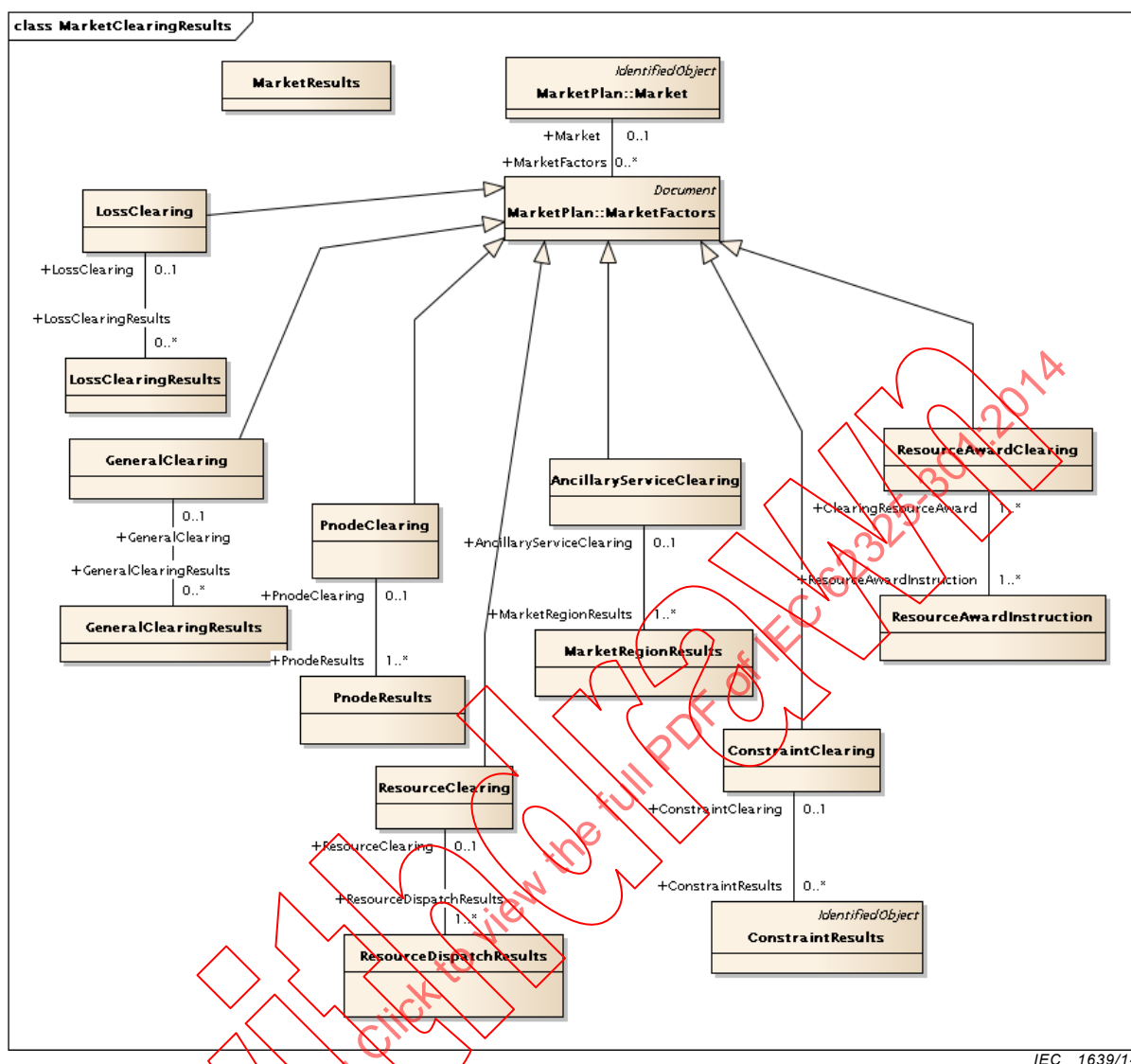


**Figure 35 – Diagramme de classe MarketResults::MarketClearing**

Chaque classe d'équilibre du marché définie hérite de la classe MarketFactors pour définir les intervalles de temps et le type d'exécution du marché.

La Figure 36 montre le diagramme de classe MarketClearingResults.

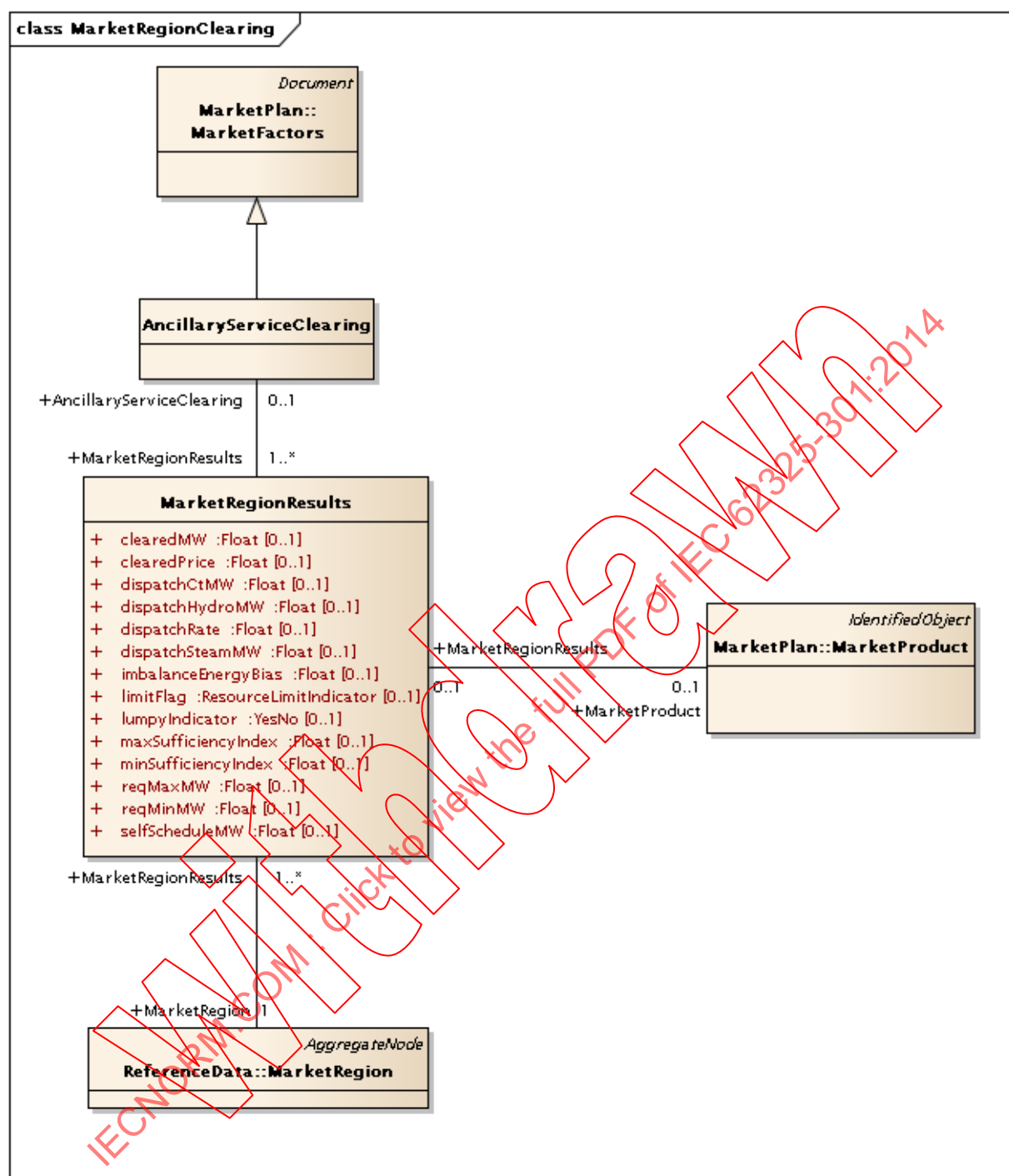


IEC 1639/14

Figure 36 – Diagramme de classe MarketResults::MarketClearingResults

Cette figure montre les classes et les relations utilisées pour modéliser les résultats de l'ajustement du marché de manière générale. La classe MarketResults résume le processus de marché. La classe LossClearingResults récapitule les pertes. GeneralClearingResults est utilisé pour modéliser la charge d'équilibre sur une base de zone de charge. Les classes PnodeClearing et PnodeClearingResults sont utilisées pour modéliser les prix marginaux locaux (LMP) au niveau des nœuds de tarification individuels. Les classes ResourceClearing et ResourceDispatchInstruction comprennent les instructions de répartition et l'indicateur d'une répartition dans un cas normal ou dans un cas de contingence. La classe AncillaryServiceClearing comprend des informations sur les services auxiliaires. La classe ConstraintResults comprend des contraintes de liaison et leurs coûts implicites associés. ResourceAwardInstruction inclut des attributions de puissance active et des informations LMP.

La Figure 37 montre le diagramme de classe MarketRegionClearing.

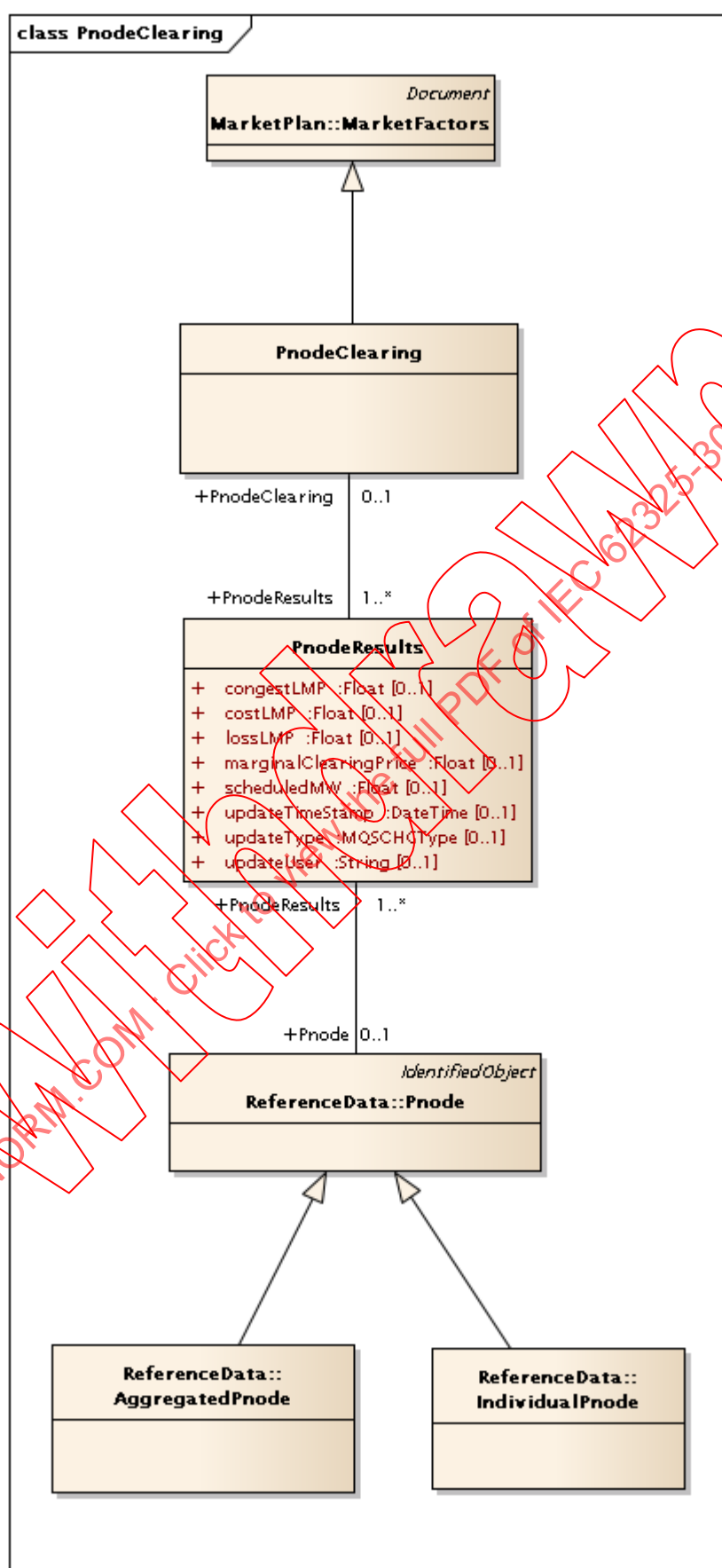


IEC 1640/14

**Figure 37 – Diagramme de classe MarketResults::MarketRegionClearing**

Cette figure montre les classes et les relations utilisées pour modéliser les résultats de l'ajustement du marché des services auxiliaires au niveau d'une région du marché. Le modèle inclut les résultats au niveau des produits de services auxiliaires spécifiques grâce à la classe MarketProduct et à l'association à MarketRegionResults.

La Figure 38 montre le diagramme de classe PnodeClearing.

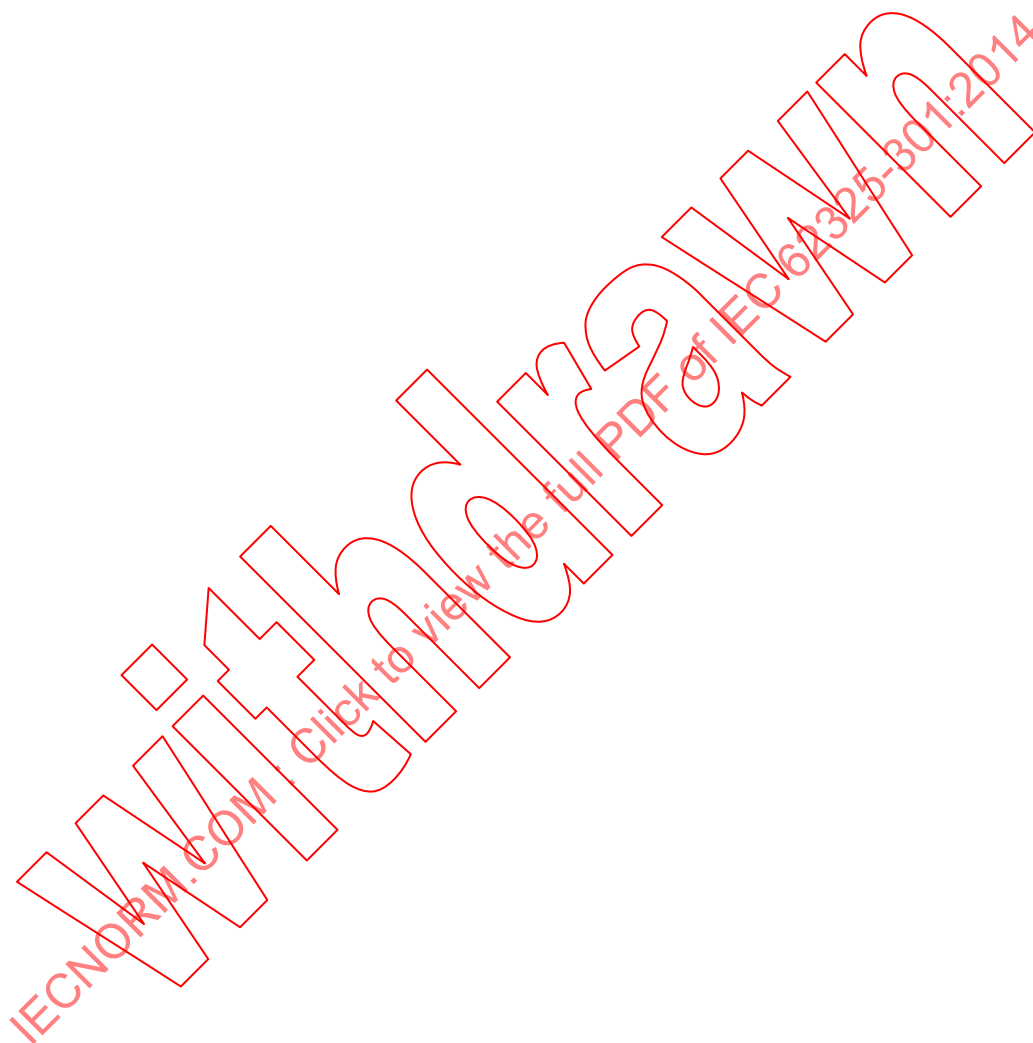


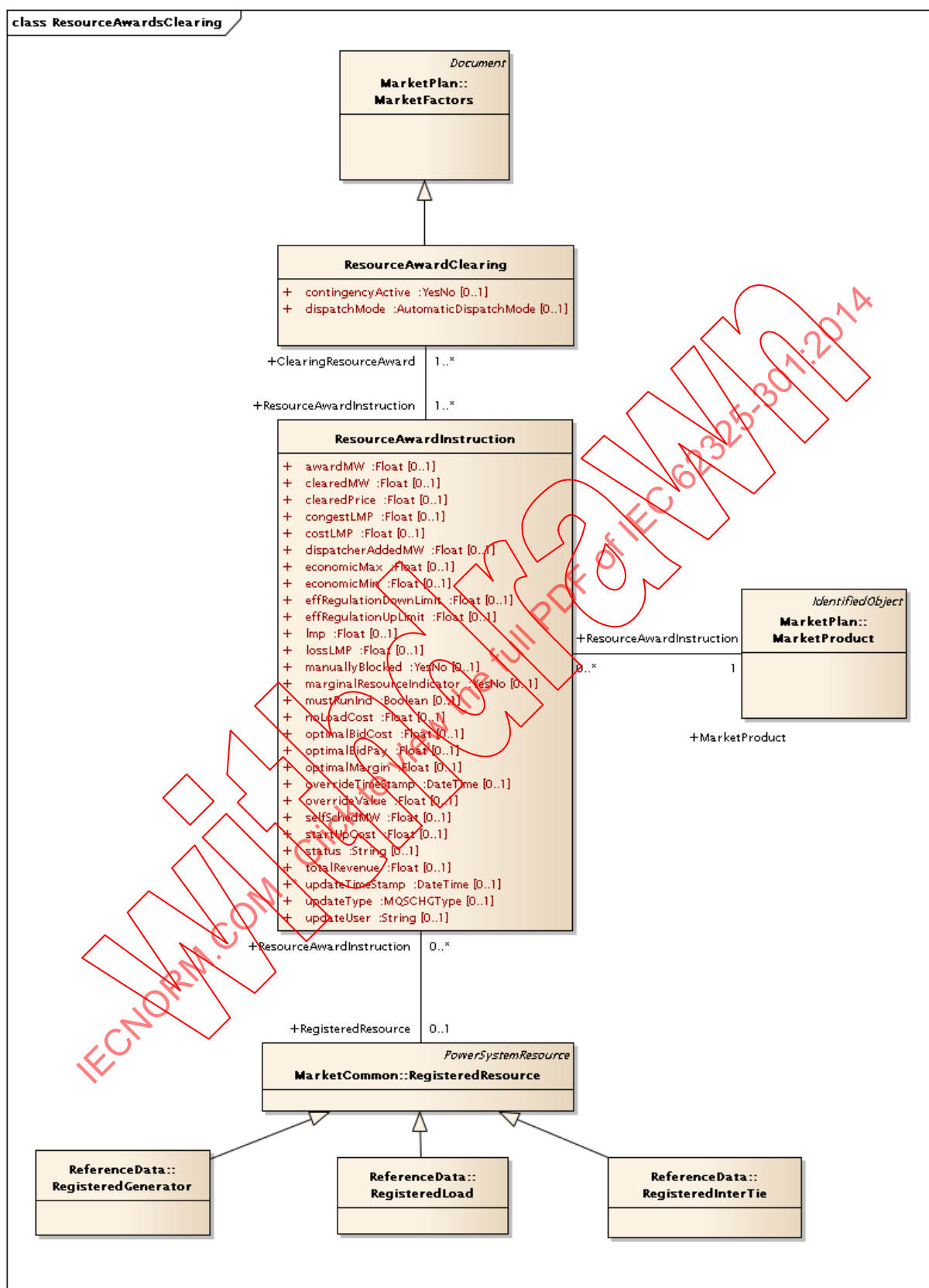
IEC 1641/14

Figure 38 – Diagramme de classe MarketResults::PnodeClearing

Cette figure montre les classes et les relations utilisées pour modéliser les résultats de l'ajustement du marché au niveau des nœuds de tarification. Les prix marginaux locaux (LMP) et leurs composants (énergie, congestion et pertes) sont affichés pour chaque nœud de tarification. La modélisation des résultats au niveau des Pnodes agrégés et des Pnodes individuels est prise en charge par les classes AggregatedPnode et IndividualPnode.

La Figure 39 montre le diagramme de classe ResourceAwardsClearing.





Cette figure montre les classes et les relations utilisées pour modéliser les résultats de l'ajustement du marché en mettant l'accent sur ResourceAwardInstruction. La classe principale de ce diagramme est ResourceAwardInstruction qui modélise les détails de

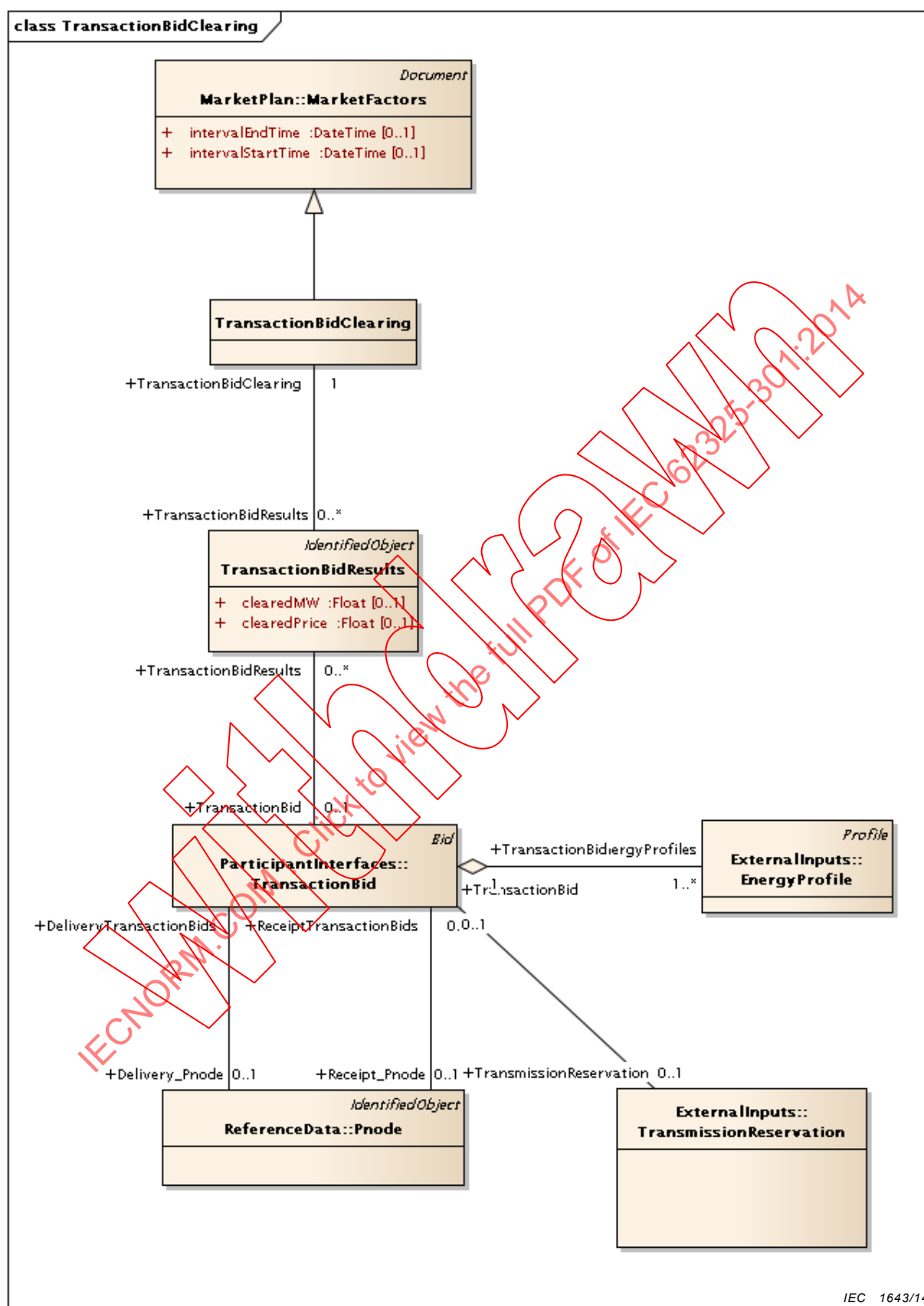


l'attribution à la ressource comprenant la puissance active, le prix marginal local (LMP) et ses composantes d'énergie, de congestion et de coût. Le modèle de ressource inclut les sous-classes RegisteredGenerator, RegisteredLoad et RegisteredInterTie.

La Figure 40 montre le diagramme de classe TransactionBidClearing.

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Withdrawn



Cette figure montre les classes et les relations utilisées pour modéliser les résultats de l'ajustement du marché en mettant l'accent sur les résultats de transaction. Ce modèle inclut

la classe TransactionBid et ses relations avec les Pnodes Point de livraison et Point de réception.

### 6.5.6.3.2 AncillaryServiceClearing

Modèle les résultats de l'ajustement du marché par rapport aux produits des services auxiliaires

Le Tableau 243 montre tous les attributs de AncillaryServiceClearing.

**Tableau 243 – Attributs de MarketResults::AncillaryServiceClearing**

| nom                  | type              | description                 |
|----------------------|-------------------|-----------------------------|
| intervalEndTime      | DateTime          | Hérité de: MarketFactors    |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors    |
| type                 | String            | Hérité de: Document         |
| createdDateTime      | DateTime          | Hérité de: Document         |
| lastModifiedDateTime | DateTime          | Hérité de: Document         |
| revisionNumber       | String            | Hérité de: Document         |
| electronicAddress    | ElectronicAddress | Hérité de: Document         |
| subject              | String            | Hérité de: Document         |
| title                | String            | Hérité de: Document         |
| docStatus            | Status            | Hérité de: Document         |
| status               | Status            | Hérité de: Document         |
| aliasName            | String            | Hérité de: IdentifiedObject |
| mRID                 | String            | Hérité de: IdentifiedObject |
| name                 | String            | Hérité de: IdentifiedObject |

Le Tableau 244 montre toutes les extrémités d'association de AncillaryServiceClearing avec d'autres classes.

**Tableau 244 – Extrémités d'association de MarketResults::AncillaryServiceClearing avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type                | description                 |
|--------------------|----------------------------|---------------------|-----------------------------|
| [0..1]             | [1..*] MarketRegionResults | MarketRegionResults |                             |
| [0..*]             | [0..*] MktActivityRecord   | MktActivityRecord   | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market              | Market              | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent  | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject       | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name                | Hérité de: IdentifiedObject |

### 6.5.6.3.3 BillDeterminant

Modélise différents frais pour prendre en charge la facturation et le règlement

Le Tableau 245 montre tous les attributs de BillDeterminant.

**Tableau 245 – Attributs de MarketResults::BillDeterminant**

| nom                  | type              | description                                                                                                                        |
|----------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------|
| calculationLevel     | String            | Niveau de l'ordre de calcul des frais.                                                                                             |
| configVersion        | String            | La version de configuration de la logique de calcul pour le règlement.                                                             |
| deleteStatus         | String            |                                                                                                                                    |
| effectiveDate        | DateTime          |                                                                                                                                    |
| exception            | String            |                                                                                                                                    |
| factor               | String            |                                                                                                                                    |
| frequency            | String            |                                                                                                                                    |
| numberInterval       | Integer           | Nombre d'intervalles de l'élément déterminant de facturation le jour de l'opération, ex. 300 pour des intervalles de cinq minutes. |
| offset               | String            |                                                                                                                                    |
| precisionLevel       | String            | Le niveau de précision de la valeur actuelle.                                                                                      |
| primaryYN            | String            |                                                                                                                                    |
| referenceFlag        | String            |                                                                                                                                    |
| reportable           | String            |                                                                                                                                    |
| roundOff             | String            |                                                                                                                                    |
| source               | String            |                                                                                                                                    |
| terminationDate      | DateTime          |                                                                                                                                    |
| unitOfMeasure        | String            | L'unité de mesure de la valeur actuelle de l'élément déterminant de facturation.                                                   |
| type                 | String            | Hérité de: Document                                                                                                                |
| createdDateTime      | DateTime          | Hérité de: Document                                                                                                                |
| lastModifiedDateTime | DateTime          | Hérité de: Document                                                                                                                |
| revisionNumber       | String            | Hérité de: Document                                                                                                                |
| electronicAddress    | ElectronicAddress | Hérité de: Document                                                                                                                |
| subject              | String            | Hérité de: Document                                                                                                                |
| title                | String            | Hérité de: Document                                                                                                                |
| docStatus            | Status            | Hérité de: Document                                                                                                                |
| status               | Status            | Hérité de: Document                                                                                                                |
| aliasName            | String            | Hérité de: IdentifiedObject                                                                                                        |
| mRID                 | String            | Hérité de: IdentifiedObject                                                                                                        |
| name                 | String            | Hérité de: IdentifiedObject                                                                                                        |

Le Tableau 246 montre toutes les extrémités d'association de BillDeterminant avec d'autres classes.

**Tableau 246 – Extrémités d'association de MarketResults::BillDeterminant avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type               | description                                                                                                                         |
|--------------------|----------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| [0..*]             | [0..*] MktUserAttribute    | MktUserAttribute   |                                                                                                                                     |
| [0..1]             | [0..*] ChargeProfileData   | ChargeProfileData  |                                                                                                                                     |
| [0..*]             | [0..*] ChargeComponents    | ChargeComponent    | Un élément déterminant de facturation peut avoir 0-n ChargeComponent et un ChargeComponent peut être associé à 0-n BillDeterminant. |
| [0..1]             | [0..1] ChargeProfile       | ChargeProfile      |                                                                                                                                     |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent | Hérité de: Document                                                                                                                 |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject      | Hérité de: IdentifiedObject                                                                                                         |
| [1..1]             | [0..*] Names               | Name               | Hérité de: IdentifiedObject                                                                                                         |

#### 6.5.6.3.4 ChargeProfile

Un type de profil pour les charges financières

Le Tableau 247 montre tous les attributs de ChargeProfile.

**Tableau 247 – Attributs de MarketResults::ChargeProfile**

| nom            | type    | description                                                               |
|----------------|---------|---------------------------------------------------------------------------|
| type           | String  | Le type de profil: montant, prix ou quantité.                             |
| frequency      | String  | La fréquence de calcul: quotidienne ou mensuelle.                         |
| numberInterval | Integer | Le nombre d'intervalles des données de profil.                            |
| unitOfMeasure  | String  | L'unité de mesure appliquée à l'attribut de valeur des données de profil. |
| aliasName      | String  | Hérité de: IdentifiedObject                                               |
| mRID           | String  | Hérité de: IdentifiedObject                                               |
| name           | String  | Hérité de: IdentifiedObject                                               |

Le Tableau 248 montre toutes les extrémités d'association de ChargeProfile avec d'autres classes.

**Tableau 248 – Extrémités d'association de MarketResults::  
ChargeProfile avec d'autres classes**

| [mult à partir de] | [mult vers] nom          | type              | description                 |
|--------------------|--------------------------|-------------------|-----------------------------|
| [0..1]             | [0..1] BillDeterminant   | BillDeterminant   |                             |
| [0..1]             | [0..*] ChargeProfileData | ChargeProfileData |                             |
| [0..*]             | [0..1] PassThroughBill   | PassThroughBill   |                             |
| [0..*]             | [0..1] Bid               | Bid               |                             |
| [0..*]             | [0..*] ProfileDatas      | ProfileData       | Hérité de: Profile          |
| [0..1]             | [0..*] DiagramObjects    | DiagramObject     | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names             | Name              | Hérité de: IdentifiedObject |

#### 6.5.6.3.5 Classe racine ChargeProfileData

Modèle de différents frais associés à un profil d'énergie pour prendre en charge la facturation et le règlement

Le Tableau 249 montre tous les attributs de ChargeProfileData.

**Tableau 249 – Attributs de MarketResults::ChargeProfileData**

| nom       | type     | description                                                                                                      |
|-----------|----------|------------------------------------------------------------------------------------------------------------------|
| sequence  | Integer  | Le numéro de séquence du profil.                                                                                 |
| timeStamp | DateTime | La date et l'heure d'un intervalle.                                                                              |
| value     | Float    | La valeur d'un intervalle selon un type de profil (montant, prix ou quantité), en fonction de l'unité de mesure. |

Le Tableau 250 montre toutes les extrémités d'association de ChargeProfileData avec d'autres classes.

**Tableau 250 – Extrémités d'association de MarketResults::  
ChargeProfileData avec d'autres classes**

| [mult à partir de] | [mult vers] nom        | type            | description |
|--------------------|------------------------|-----------------|-------------|
| [0..*]             | [0..1] BillDeterminant | BillDeterminant |             |
| [0..*]             | [0..1] ChargeProfile   | ChargeProfile   |             |

#### 6.5.6.3.6 CommitmentClearing

Modélise les résultats de l'ajustement du marché qui demandent la gestion de la production.

Le Tableau 251 montre tous les attributs de CommitmentClearing.

**Tableau 251 – Attributs de MarketResults::CommitmentClearing**

| nom                  | type              | description                 |
|----------------------|-------------------|-----------------------------|
| intervalEndTime      | DateTime          | Hérité de: MarketFactors    |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors    |
| type                 | String            | Hérité de: Document         |
| createdDateTime      | DateTime          | Hérité de: Document         |
| lastModifiedDateTime | DateTime          | Hérité de: Document         |
| revisionNumber       | String            | Hérité de: Document         |
| electronicAddress    | ElectronicAddress | Hérité de: Document         |
| subject              | String            | Hérité de: Document         |
| title                | String            | Hérité de: Document         |
| docStatus            | Status            | Hérité de: Document         |
| status               | Status            | Hérité de: Document         |
| aliasName            | String            | Hérité de: IdentifiedObject |
| mRID                 | String            | Hérité de: IdentifiedObject |
| name                 | String            | Hérité de: IdentifiedObject |

Le Tableau 252 montre toutes les extrémités d'association de CommitmentClearing avec d'autres classes.

**Tableau 252 – Extrémités d'association de MarketResults::CommitmentClearing avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type               | description                 |
|--------------------|----------------------------|--------------------|-----------------------------|
| [1..*]             | [1..*] Commitments         | Commitments        |                             |
| [0..*]             | [0..*] MktActivityRecord   | MktActivityRecord  | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market              | Market             | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject      | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name               | Hérité de: IdentifiedObject |

#### 6.5.6.3.7 Classe racine Commitments

Apporte les informations nécessaires (sur la base de ressources) pour la collecte des résultats d'engagement de Démarrage/Arrêt. Ces informations sont utiles pour tous les marchés.

Le Tableau 253 montre tous les attributs de Commitments.

**Tableau 253 – Attributs de MarketResults::Commitments**

| nom                 | type                            | description                                                                                                                                                                                                                                                                |
|---------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| commitmentType      | CommitmentType                  | Type de statut UC (engagement volontaire, engagement ISO ou engagement SCUC)                                                                                                                                                                                               |
| instructionCost     | Float                           | Coût total associé au changement du statut de la ressource.                                                                                                                                                                                                                |
| instructionType     | AutomaticDisplnstTypeCommitment | Indique s'il s'agit d'un démarrage ou d'un arrêt.                                                                                                                                                                                                                          |
| intervalEndTime     | DateTime                        | Heure de fin de la période d'engagement. Ce sera sur une limite d'intervalle.                                                                                                                                                                                              |
| intervalStartTime   | DateTime                        | Heure de début de la période d'engagement. Ce sera sur une limite d'intervalle.                                                                                                                                                                                            |
| minStatusChangeTime | Integer                         | Temps de démarrage de la période d'engagement SCUC. Temps de démarrage calculé en fonction de StartupTimeCurve, fourni avec la Bid.<br><br>Il s'agit d'une combinaison de l'Offre du temps de démarrage et du temps d'indisponibilité de l'unité.<br><br>Unités en minutes |
| noLoadCost          | Float                           | Coût à charge nulle de l'unité en cas de produit énergétique                                                                                                                                                                                                               |
| updateTimeStamp     | DateTime                        |                                                                                                                                                                                                                                                                            |
| updateType          | MQSCHGType                      |                                                                                                                                                                                                                                                                            |
| updateUser          | String                          |                                                                                                                                                                                                                                                                            |

Le Tableau 254 montre toutes les extrémités d'association de Commitments avec d'autres classes.

**Tableau 254 – Extrémités d'association de MarketResults::Commitments avec d'autres classes**

| [mult à partir de] | [mult vers] nom           | type               | description |
|--------------------|---------------------------|--------------------|-------------|
| [0..*]             | [1..1] RegisteredResource | RegisteredResource |             |
| [1..*]             | [1..*] CommitmentClearing | CommitmentClearing |             |

#### 6.5.6.3.8 ConstraintClearing

Regroupe tous les éléments associés aux contraintes avec obligation et aux violations de contraintes par intervalle et par marché.

Le Tableau 255 montre tous les attributs de ConstraintClearing.



**Tableau 255 – Attributs de MarketResults::ConstraintClearing**

| nom                  | type              | description                 |
|----------------------|-------------------|-----------------------------|
| intervalEndTime      | DateTime          | Hérité de: MarketFactors    |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors    |
| type                 | String            | Hérité de: Document         |
| createdDateTime      | DateTime          | Hérité de: Document         |
| lastModifiedDateTime | DateTime          | Hérité de: Document         |
| revisionNumber       | String            | Hérité de: Document         |
| electronicAddress    | ElectronicAddress | Hérité de: Document         |
| subject              | String            | Hérité de: Document         |
| title                | String            | Hérité de: Document         |
| docStatus            | Status            | Hérité de: Document         |
| status               | Status            | Hérité de: Document         |
| aliasName            | String            | Hérité de: IdentifiedObject |
| mRID                 | String            | Hérité de: IdentifiedObject |
| name                 | String            | Hérité de: IdentifiedObject |

Le Tableau 256 montre toutes les extrémités d'association de ConstraintClearing avec d'autres classes.

**Tableau 256 – Extrémités d'association de MarketResults::ConstraintClearing avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type               | description                 |
|--------------------|----------------------------|--------------------|-----------------------------|
| [0..1]             | [0..*] ConstraintResults   | ConstraintResults  |                             |
| [0..*]             | [0..*] MktActivityRecord   | MktActivityRecord  | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market              | Market             | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject      | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name               | Hérité de: IdentifiedObject |

#### 6.5.6.3.9 ConstraintResults

Fournit les résultats du marché sur le traitement des contraintes pour le DAM ou le RTM. Les données incluent le type de contrainte (avec obligation ou violée), la valeur résolue de la contrainte et le coût implicite associé.

Le Tableau 257 montre tous les attributs de ConstraintResults.

**Tableau 257 – Attributs de MarketResults::ConstraintResults**

| nom                       | type                  | description                                                                                                                                                                                                |
|---------------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| baseFlow                  | Float                 | Le flux de puissance de la base de la branche.                                                                                                                                                             |
| BGLimit                   | Float                 | Cette valeur est déterminée dans le DA et le RTM. L'optimisation SCUC garantit que le flux de MW du groupe de branches ne dépassera pas cette limite dans la bonne direction.                              |
| BGTRResCap                | Float                 | Capacité de réservation TR du groupe de branches – Cette valeur est déterminée dans le DA et le RTM. Cela correspond à la quantité de capacité de transport restante que le détenteur de TR peut utiliser. |
| bindingLimit              | Float                 | Limite en MW.                                                                                                                                                                                              |
| clearedValue              | Float                 | MW octroyés.                                                                                                                                                                                               |
| competitivePathConstraint | YesNo                 | Indicateur de contrainte de voie non concurrentielle (Y/N) précisant si le coût implicite d'une voie non concurrentielle est différent de zéro.                                                            |
| constraintType            | ResultsConstraintType | Type de contrainte.                                                                                                                                                                                        |
| limitFlag                 | ConstraintLimitType   | Indicateur de limite ("Maximum", "Minimum").                                                                                                                                                               |
| optimizationFlag          | YesNo                 | Inclus dans l'optimisation Y/N.                                                                                                                                                                            |
| overloadMW                | Float                 | MW de surcharge de transport.                                                                                                                                                                              |
| percentMW                 | Float                 | Flux de MW réel en pourcentage de limite.                                                                                                                                                                  |
| shadowPrice               | Float                 | Coût implicite (\$/MW) du produit. Coût implicite de la contrainte correspondante.                                                                                                                         |
| updateTimeStamp           | DateTime              | Horodatage de mise à jour.                                                                                                                                                                                 |
| updateType                | MQSCHGType            | Type de changement du MQS.                                                                                                                                                                                 |
| updateUser                | String                | Utilisateur mis à jour.                                                                                                                                                                                    |
| aliasName                 | String                | Hérité de: IdentifiedObject                                                                                                                                                                                |
| mRID                      | String                | Hérité de: IdentifiedObject                                                                                                                                                                                |
| name                      | String                | Hérité de: IdentifiedObject                                                                                                                                                                                |

Le Tableau 258 montre toutes les extrémités d'association de ConstraintResults avec d'autres classes.

**Tableau 258 – Extrémités d'association de MarketResults::ConstraintResults avec d'autres classes**

| [mult à partir de] | [mult vers] nom           | type               | description                 |
|--------------------|---------------------------|--------------------|-----------------------------|
| [0..*]             | [1..1] MktContingency     | MktContingency     |                             |
| [0..*]             | [0..1] ConstraintClearing | ConstraintClearing |                             |
| [1..*]             | [1..1] Flowgate           | Flowgate           |                             |
| [0..1]             | [0..*] DiagramObjects     | DiagramObject      | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names              | Name               | Hérité de: IdentifiedObject |

### 6.5.6.3.10 Classe racine DopInstruction

Apporte les informations nécessaires (sur la base de ressources) pour la collecte des résultats du point d'exploitation de répartition (DOP, *Dispatch Operating Point*) sur un intervalle de répartition. Ces informations ne sont utiles que pour le marché d'intervalle RT.

Le Tableau 259 montre tous les attributs de DopInstruction.

**Tableau 259 – Attributs de MarketResults::DopInstruction**

| nom             | type        | description                                                                                                                                                                                                                                                                                                      |
|-----------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| mwDOP           | ActivePower | Point d'exploitation réparti (MW)                                                                                                                                                                                                                                                                                |
| timestampDOP    | DateTime    | Horodatage du DOP                                                                                                                                                                                                                                                                                                |
| plotPriority    | Integer     | Une valeur utilisée pour établir la priorité du DOP lors du traçage. Ceci s'applique uniquement lorsque deux DOP existent pour une même heure, mais avec des valeurs en MW différentes. Par ex. lors de l'indication d'une étape sur la courbe. Elle est utilisée pour déterminer si la courbe monte ou descend. |
| runIndicatorDOP | YesNo       | Indication de la validité du DOP.<br>Montre que le DOP est calculé à partir du dernier processus (YES). L'indicateur NO montre que le DOP est copié depuis une exécution précédente.<br>2 intervalles maximum peuvent être manqués.                                                                              |
| updateUser      | String      |                                                                                                                                                                                                                                                                                                                  |
| updateTimeStamp | DateTime    |                                                                                                                                                                                                                                                                                                                  |
| updateType      | MQSCHGType  |                                                                                                                                                                                                                                                                                                                  |

Le Tableau 260 montre toutes les extrémités d'association de DopInstruction avec d'autres classes.

**Tableau 260 – Extrémités d'association de MarketResults::DopInstruction avec d'autres classes**

| [mult à partir de] | [mult vers] nom               | type                   | description |
|--------------------|-------------------------------|------------------------|-------------|
| [0..*]             | [0..1] RegisteredResource     | RegisteredResource     |             |
| [1..*]             | [1..*] InstructionClearingDOP | InstructionClearingDOP |             |

### 6.5.6.3.11 Classe racine DotInstruction

Apporte les informations nécessaires (sur la base de ressources) pour la collecte des résultats de la cible d'exploitation de répartition (DOT, *Dispatch Operating Target*) sur un intervalle de répartition. Ces informations ne sont utiles que pour le marché d'intervalle RT.

Le Tableau 261 montre tous les attributs de DotInstruction.

**Tableau 261 – Attributs de MarketResults::DotInstruction**

| nom                        | type     | description                                                                                                                                                                                                                                 |
|----------------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| actualRampRate             | Float    | Taux de rampe réel.                                                                                                                                                                                                                         |
| compliantIndicator         | YesNo    | Indicateur précisant si la ressource est conforme à l'instruction (plus/moins 10 %).<br>Indique si une unité peut fixer un prix (tarification ex-post).                                                                                     |
| DOT                        | Float    | Valeur de la cible d'exploitation de répartition.                                                                                                                                                                                           |
| economicMaxOverride        | Float    | Remplacement de la limite maximale économique d'une unité: cette valeur est nulle. Sinon, cette valeur remplace la valeur de la colonne Energie ( <i>Energy</i> ).<br>Autorise le répartiteur à remplacer la valeur énergétique de l'unité. |
| expectedEnergy             | Float    | Energie prévue.                                                                                                                                                                                                                             |
| generatorPerformanceDegree | Float    | Le degré de performances du générateur (DGP, <i>Degree of Generator Performance</i> ) utilisé pour l'unité. Mesure de la façon dont un générateur répond pour augmenter/réduire les signaux. Calculée toutes les cinq minutes.              |
| hourAheadSchedEnergy       | Float    | Résultats du HASP.                                                                                                                                                                                                                          |
| hourlySchedule             | Float    | Programme horaire (programme énergétique du DA).                                                                                                                                                                                            |
| instructionTime            | DateTime | La date/l'heure pour l'instruction.                                                                                                                                                                                                         |
| maximumEmergencyInd        | Boolean  | True si le seuil d'urgence maximal est activé; sinon False. S'il est demandé à une unité d'atteindre son seuil d'urgence maximal, cet indicateur est défini sur True.                                                                       |
| meterLoadFollowing         | Float    | Suivi de charge du sous-système du compteur.                                                                                                                                                                                                |
| nonRampRestrictedMW        | Float    | Quantité de MW souhaitée qui n'est pas restreinte par une rampe. Si aucune limite de taux de rampe n'existe pour l'unité, il s'agit de la valeur en MW sur laquelle l'unité a dû se positionner.                                            |
| nonSpinReserve             | Float    | Réserve non tournante utilisée pour fournir de l'énergie.                                                                                                                                                                                   |
| previousDOTTimeStamp       | DateTime | Horodatage lorsque la valeur DOT précédente a été émise.                                                                                                                                                                                    |
| rampRateLimit              | Float    | La limite du taux de rampe pour l'unité en MW par minute. Données d'offre du participant.                                                                                                                                                   |
| regulationStatus           | YesNo    | Statut de régulation (Yes/No).                                                                                                                                                                                                              |
| spinReserve                | Float    | Réserve tournante utilisée pour fournir de l'énergie.                                                                                                                                                                                       |
| standardRampEnergy         | Float    | Energie de rampe normalisée (MWh).                                                                                                                                                                                                          |
| supplementalEnergy         | Float    | Energie supplémentaire fournie par la répartition en temps réel.                                                                                                                                                                            |
| unitStatus                 | Integer  | Résultats de sortie du cas identifiant la raison pour laquelle l'unité a été engagée par le logiciel.                                                                                                                                       |

Le Tableau 262 montre toutes les extrémités d'association de DotInstruction avec d'autres classes.

**Tableau 262 – Extrémités d'association de MarketResults::DotInstruction avec d'autres classes**

| [mult à partir de] | [mult vers] nom               | type                   | description |
|--------------------|-------------------------------|------------------------|-------------|
| [0..*]             | [0..1] RegisteredResource     | RegisteredResource     |             |
| [1..*]             | [1..*] InstructionClearingDOT | InstructionClearingDOT |             |

### 6.5.6.3.12 ExPostLoss

Modèle de calcul ex-post des pertes de MW.

Le Tableau 263 montre tous les attributs de ExPostLoss.

**Tableau 263 – Attributs de MarketResults::ExPostLoss**

| nom                  | type              | description                 |
|----------------------|-------------------|-----------------------------|
| intervalEndTime      | DateTime          | Hérité de: MarketFactors    |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors    |
| type                 | String            | Hérité de: Document         |
| createdDateTime      | DateTime          | Hérité de: Document         |
| lastModifiedDateTime | DateTime          | Hérité de: Document         |
| revisionNumber       | String            | Hérité de: Document         |
| electronicAddress    | ElectronicAddress | Hérité de: Document         |
| subject              | String            | Hérité de: Document         |
| title                | String            | Hérité de: Document         |
| docStatus            | Status            | Hérité de: Document         |
| status               | Status            | Hérité de: Document         |
| aliasName            | String            | Hérité de: IdentifiedObject |
| mRID                 | String            | Hérité de: IdentifiedObject |
| name                 | String            | Hérité de: IdentifiedObject |

Le Tableau 264 montre toutes les extrémités d'association de ExPostLoss avec d'autres classes.

**Tableau 264 – Extrémités d'association de MarketResults::ExPostLoss avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type               | description                 |
|--------------------|----------------------------|--------------------|-----------------------------|
| [1..1]             | [0..*] ExPostLossResults   | ExPostLossResults  |                             |
| [0..*]             | [0..*] MktActivityRecord   | MktActivityRecord  | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market              | Market             | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject      | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name               | Hérité de: IdentifiedObject |

### 6.5.6.3.13 Classe racine ExPostLossResults

Modélise les résultats de calcul ex-post des pertes de MW. Résume les pertes en deux catégories: pertes liées au transport très haute tension et pertes totales. Calcul effectué pour chaque zone de sous-contrôle.

Le Tableau 265 montre tous les attributs de ExPostLossResults.

**Tableau 265 – Attributs de MarketResults::ExPostLossResults**

| nom         | type  | description                                                                                                     |
|-------------|-------|-----------------------------------------------------------------------------------------------------------------|
| totalLossMW | Float | Pertes totales de MW dans l'entreprise<br>Utilisation de l'attribut: A titre informatif – Sortie du moteur LPA. |
| ehvLossMW   | Float | Pertes de MW THT dans l'entreprise<br>Utilisation de l'attribut: A titre informatif – Sortie du moteur LPA.     |

Le Tableau 266 montre toutes les extrémités d'association de ExPostLossResults avec d'autres classes.

**Tableau 266 – Extrémités d'association de MarketResults::ExPostLossResults avec d'autres classes**

| [mult à partir de] | [mult vers] nom       | type           | description |
|--------------------|-----------------------|----------------|-------------|
| [0..*]             | [1..1] ExPostLoss     | ExPostLoss     |             |
| [0..*]             | [0..1] SubControlArea | SubControlArea |             |

#### 6.5.6.3.14 ExPostMarketRegion

Modèle de calcul ex-post des MW octroyés sur une base régionale

Le Tableau 267 montre tous les attributs de ExPostMarketRegion.

**Tableau 267 – Attributs de MarketResults::ExPostMarketRegion**

| nom                  | type              | description                 |
|----------------------|-------------------|-----------------------------|
| intervalEndTime      | DateTime          | Hérité de: MarketFactors    |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors    |
| type                 | String            | Hérité de: Document         |
| createdDateTime      | DateTime          | Hérité de: Document         |
| lastModifiedDateTime | DateTime          | Hérité de: Document         |
| revisionNumber       | String            | Hérité de: Document         |
| electronicAddress    | ElectronicAddress | Hérité de: Document         |
| subject              | String            | Hérité de: Document         |
| title                | String            | Hérité de: Document         |
| docStatus            | Status            | Hérité de: Document         |
| status               | Status            | Hérité de: Document         |
| aliasName            | String            | Hérité de: IdentifiedObject |
| mRID                 | String            | Hérité de: IdentifiedObject |
| name                 | String            | Hérité de: IdentifiedObject |

Le Tableau 268 montre toutes les extrémités d'association de ExPostMarketRegion avec d'autres classes.

**Tableau 268 – Extrémités d'association de MarketResults::ExPostMarketRegion avec d'autres classes**

| [mult à partir de] | [mult vers] nom                  | type                      | description                 |
|--------------------|----------------------------------|---------------------------|-----------------------------|
| [1..1]             | [0..1] ExPostMarketRegionResults | ExPostMarketRegionResults |                             |
| [0..*]             | [0..*] MktActivityRecord         | MktActivityRecord         | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market                    | Market                    | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents       | ConfigurationEvent        | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects            | DiagramObject             | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                     | Name                      | Hérité de: IdentifiedObject |

#### 6.5.6.3.15 Classe racine ExPostMarketRegionResults

Modèle de calcul ex-post des MW octroyés sur une base régionale. Comprend le prix d'équilibre

Le Tableau 269 montre tous les attributs de ExPostMarketRegionResults.

**Tableau 269 – Attributs de MarketResults::ExPostMarketRegionResults**

| nom                | type  | description |
|--------------------|-------|-------------|
| exPostClearedPrice | Float |             |

Le Tableau 270 montre toutes les extrémités d'association de ExPostMarketRegionResults avec d'autres classes.

**Tableau 270 – Extrémités d'association de MarketResults::ExPostMarketRegionResults avec d'autres classes**

| [mult à partir de] | [mult vers] nom           | type               | description |
|--------------------|---------------------------|--------------------|-------------|
| [0..1]             | [1..1] ExPostMarketRegion | ExPostMarketRegion |             |
| [0..*]             | [1..1] MarketRegion       | MarketRegion       |             |

#### 6.5.6.3.16 ExPostPricing

Modèle de tarification ex-post des nœuds

Le Tableau 271 montre tous les attributs de ExPostPricing.

**Tableau 271 – Attributs de MarketResults::ExPostPricing**

| nom                  | type              | description                     |
|----------------------|-------------------|---------------------------------|
| energyPrice          | Float             | prix de l'énergie sur le marché |
| intervalEndTime      | DateTime          | Hérité de: MarketFactors        |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors        |
| type                 | String            | Hérité de: Document             |
| createdDateTime      | DateTime          | Hérité de: Document             |
| lastModifiedDateTime | DateTime          | Hérité de: Document             |
| revisionNumber       | String            | Hérité de: Document             |
| electronicAddress    | ElectronicAddress | Hérité de: Document             |
| subject              | String            | Hérité de: Document             |
| title                | String            | Hérité de: Document             |
| docStatus            | Status            | Hérité de: Document             |
| status               | Status            | Hérité de: Document             |
| aliasName            | String            | Hérité de: IdentifiedObject     |
| mRID                 | String            | Hérité de: IdentifiedObject     |
| name                 | String            | Hérité de: IdentifiedObject     |

Le Tableau 272 montre toutes les extrémités d'association de ExPostPricing avec d'autres classes.

**Tableau 272 – Extrémités d'association de MarketResults::ExPostPricing avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type                 | description                 |
|--------------------|----------------------------|----------------------|-----------------------------|
| [1..1]             | [0..*] ExPostResults       | ExPostPricingResults |                             |
| [0..*]             | [0..*] MktActivityRecord   | MktActivityRecord    | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market              | Market               | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent   | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject        | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name                 | Hérité de: IdentifiedObject |

#### 6.5.6.3.17 Classe racine ExPostPricingResults

Modèle de tarification ex-post des nœuds. Comprend les informations LMP, fondées sur Pnode.

Le Tableau 273 montre tous les attributs de ExPostPricingResults.



**Tableau 273 – Attributs de MarketResults::ExPostPricingResults**

| nom        | type  | description                                                                                                                                                                                                                                                                                                                                                                                           |
|------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| congestLMP | Float | Composant de congestion d'un prix marginal local (LMP) en unités monétaires par MW; composant de congestion du LMP horaire à un nœud de tarification spécifique<br><br>Utilisation de l'attribut: Résultat du logiciel de sécurité, tarification et répartition (SPD)/essais de faisabilité simultané (SFT) et correspond au composant de congestion horaire du LMP pour chaque nœud de tarification. |
| Imp        | Float | LMP moyen pondéré de 5 min.; prix marginal local du Pnode pour lequel le calcul de tarification est en cours d'exécution.<br><br>Utilisation de l'attribut: LMP moyen pondéré de 5 min. à afficher sur l'interface utilisateur                                                                                                                                                                        |
| lossLMP    | Float | Composant de perte d'un prix marginal local (LMP) en unités monétaires par MW; composant de perte du LMP horaire à un nœud de tarification spécifique<br><br>Utilisation de l'attribut: Résultat du logiciel de sécurité, tarification et répartition (SPD)/essais de faisabilité simultané (SFT) et correspond au composant de perte horaire du LMP pour chaque nœud de tarification.                |

Le Tableau 274 montre toutes les extrémités d'association de ExPostPricingResults avec d'autres classes.

**Tableau 274 – Extrémités d'association de MarketResults::ExPostPricingResults avec d'autres classes**

| [mult à partir de] | [mult vers] nom      | type          | description |
|--------------------|----------------------|---------------|-------------|
| [0..*]             | [1..1] ExPostPricing | ExPostPricing |             |
| [0..*]             | [1..1] Pnode         | Pnode         |             |

#### 6.5.6.3.18 ExPostResource

Modèle de tarification ex-post des ressources.

Le Tableau 275 montre tous les attributs de ExPostResource.

**Tableau 275 – Attributs de MarketResults::ExPostResource**

| nom                  | type              | description                 |
|----------------------|-------------------|-----------------------------|
| intervalEndTime      | DateTime          | Hérité de: MarketFactors    |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors    |
| type                 | String            | Hérité de: Document         |
| createdDateTime      | DateTime          | Hérité de: Document         |
| lastModifiedDateTime | DateTime          | Hérité de: Document         |
| revisionNumber       | String            | Hérité de: Document         |
| electronicAddress    | ElectronicAddress | Hérité de: Document         |
| subject              | String            | Hérité de: Document         |
| title                | String            | Hérité de: Document         |
| docStatus            | Status            | Hérité de: Document         |
| status               | Status            | Hérité de: Document         |
| aliasName            | String            | Hérité de: IdentifiedObject |
| mRID                 | String            | Hérité de: IdentifiedObject |
| name                 | String            | Hérité de: IdentifiedObject |

Le Tableau 276 montre toutes les extrémités d'association de ExPostResource avec d'autres classes.

**Tableau 276 – Extrémités d'association de MarketResults::  
ExPostResource avec d'autres classes**

| [mult à partir de] | [mult vers] nom              | type                  | description                 |
|--------------------|------------------------------|-----------------------|-----------------------------|
| [1..1]             | [0..*] ExPostResourceResults | ExPostResourceResults |                             |
| [0..*]             | [0..*] MktActivityRecord     | MktActivityRecord     | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market                | Market                | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents   | ConfigurationEvent    | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects        | DiagramObject         | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                 | Name                  | Hérité de: IdentifiedObject |

#### 6.5.6.3.19 Classe racine ExPostResourceResults

Modèle de tarification ex-post des ressources contenant des composants de LMP: énergie, congestion, perte. Fondé sur les ressources.

Le Tableau 277 montre tous les attributs de ExPostResourceResults.

**Tableau 277 – Attributs de MarketResults::ExPostResourceResults**

| nom           | type                | description                                                                                                                      |
|---------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------|
| congestionLMP | Float               | Composant LMP en dollars américains (déconseillé)                                                                                |
| desiredMW     | Float               | Sortie souhaitée d'unités                                                                                                        |
| dispatchRate  | Float               | Taux de répartition d'unité issu de la répartition d'unités en temps réel.                                                       |
| Imp           | Float               | LMP ( <i>Local Marginal Price</i> ) en dollars américains au niveau de l'équipement (déconseillé)                                |
| lossLMP       | Float               | Imp des pertes (déconseillé)                                                                                                     |
| maxEconomicMW | Float               | MW économique maximum                                                                                                            |
| minEconomicMW | Float               | MW économique minimum                                                                                                            |
| resourceMW    | Float               | Sortie MW actuelle de l'équipement<br>Utilisation de l'attribut: A titre informatif – A titre informatif – Sortie du moteur LPA. |
| status        | EquipmentStatusType | Statut de l'équipement                                                                                                           |

Le Tableau 278 montre toutes les extrémités d'association de ExPostResourceResults avec d'autres classes.

**Tableau 278 – Extrémités d'association de MarketResults::ExPostResourceResults avec d'autres classes**

| [mult à partir de] | [mult vers] nom           | type               | description |
|--------------------|---------------------------|--------------------|-------------|
| [0..*]             | [0..1] RegisteredResource | RegisteredResource |             |
| [0..*]             | [1..1] ExPostResource     | ExPostResource     |             |

#### 6.5.6.3.20 GeneralClearing

Modèle de résultat d'ajustement du processus de marché au niveau du marché. Identifie l'intervalle

Le Tableau 279 montre tous les attributs de GeneralClearing.

**Tableau 279 – Attributs de MarketResults::GeneralClearing**

| nom                  | type              | description                 |
|----------------------|-------------------|-----------------------------|
| intervalEndTime      | DateTime          | Hérité de: MarketFactors    |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors    |
| type                 | String            | Hérité de: Document         |
| createdDateTime      | DateTime          | Hérité de: Document         |
| lastModifiedDateTime | DateTime          | Hérité de: Document         |
| revisionNumber       | String            | Hérité de: Document         |
| electronicAddress    | ElectronicAddress | Hérité de: Document         |
| subject              | String            | Hérité de: Document         |
| title                | String            | Hérité de: Document         |
| docStatus            | Status            | Hérité de: Document         |
| status               | Status            | Hérité de: Document         |
| aliasName            | String            | Hérité de: IdentifiedObject |
| mRID                 | String            | Hérité de: IdentifiedObject |
| name                 | String            | Hérité de: IdentifiedObject |

Le Tableau 280 montre toutes les extrémités d'association de GeneralClearing avec d'autres classes.

**Tableau 280 – Extrémités d'association de MarketResults::GeneralClearing avec d'autres classes**

| [mult à partir de] | [mult vers] nom               | type                   | description                 |
|--------------------|-------------------------------|------------------------|-----------------------------|
| [0..1]             | [0..*] GeneralClearingResults | GeneralClearingResults |                             |
| [0..*]             | [0..*] MktActivityRecord      | MktActivityRecord      | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market                 | Market                 | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents    | ConfigurationEvent     | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects         | DiagramObject          | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                  | Name                   | Hérité de: IdentifiedObject |

#### 6.5.6.3.21 Classe racine GeneralClearingResults

Fournit la valeur prévisionnelle de la charge ajustée sur une base de zone de prévision de charge.

Le Tableau 281 montre tous les attributs de GeneralClearingResults.

**Tableau 281 – Attributs de MarketResults::GeneralClearingResults**

| nom                 | type        | description                                                                                                                  |
|---------------------|-------------|------------------------------------------------------------------------------------------------------------------------------|
| loadForecast        | ActivePower | Prévision de charge (MW), par période de temps (5', 10', 15')                                                                |
| totalLoad           | Float       | Quantité de charge dans la Zone de réglage<br>Utilisation de l'attribut: valeur de charge horaire pour le domaine spécifique |
| totalNetInterchange | Float       | Quantité d'échange pour la Zone de réglage<br>Utilisation de l'attribut: valeur d'échange horaire pour le domaine spécifique |

Le Tableau 282 montre toutes les extrémités d'association de GeneralClearingResults avec d'autres classes.

**Tableau 282 – Extrémités d'association de MarketResults::GeneralClearingResults avec d'autres classes**

| [mult à partir de] | [mult vers] nom        | type            | description |
|--------------------|------------------------|-----------------|-------------|
| [0..*]             | [0..1] GeneralClearing | GeneralClearing |             |
| [0..*]             | [0..1] SubControlArea  | SubControlArea  |             |

### 6.5.6.3.22 InstructionClearing

Modèle d'ajustement du marché relatif aux instructions de démarrage. Identifie l'intervalle

Le Tableau 283 montre tous les attributs de InstructionClearing.

**Tableau 283 – Attributs de MarketResults::InstructionClearing**

| nom                  | type              | description                 |
|----------------------|-------------------|-----------------------------|
| intervalEndTime      | DateTime          | Hérité de: MarketFactors    |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors    |
| type                 | String            | Hérité de: Document         |
| createdDateTime      | DateTime          | Hérité de: Document         |
| lastModifiedDateTime | DateTime          | Hérité de: Document         |
| revisionNumber       | String            | Hérité de: Document         |
| electronicAddress    | ElectronicAddress | Hérité de: Document         |
| subject              | String            | Hérité de: Document         |
| title                | String            | Hérité de: Document         |
| docStatus            | Status            | Hérité de: Document         |
| status               | Status            | Hérité de: Document         |
| aliasName            | String            | Hérité de: IdentifiedObject |
| mRID                 | String            | Hérité de: IdentifiedObject |
| name                 | String            | Hérité de: IdentifiedObject |

Le Tableau 284 montre toutes les extrémités d'association de InstructionClearing avec d'autres classes.

**Tableau 284 – Extrémités d'association de MarketResults::InstructionClearing avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type               | description                 |
|--------------------|----------------------------|--------------------|-----------------------------|
| [1..*]             | [1..*] Instructions        | Instructions       |                             |
| [0..*]             | [0..*] MktActivityRecord   | MktActivityRecord  | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market              | Market             | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject      | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name               | Hérité de: IdentifiedObject |

### 6.5.6.3.23 InstructionClearingDOP

Modèle d'ajustement du marché relatif à DispatchOperatingPoint. Identifie l'intervalle

Le Tableau 285 montre tous les attributs de InstructionClearingDOP.

**Tableau 285 – Attributs de MarketResults::InstructionClearingDOP**

| nom                  | type              | description                 |
|----------------------|-------------------|-----------------------------|
| intervalEndTime      | DateTime          | Hérité de: MarketFactors    |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors    |
| type                 | String            | Hérité de: Document         |
| createdDateTime      | DateTime          | Hérité de: Document         |
| lastModifiedDateTime | DateTime          | Hérité de: Document         |
| revisionNumber       | String            | Hérité de: Document         |
| electronicAddress    | ElectronicAddress | Hérité de: Document         |
| subject              | String            | Hérité de: Document         |
| title                | String            | Hérité de: Document         |
| docStatus            | Status            | Hérité de: Document         |
| status               | Status            | Hérité de: Document         |
| aliasName            | String            | Hérité de: IdentifiedObject |
| mRID                 | String            | Hérité de: IdentifiedObject |
| name                 | String            | Hérité de: IdentifiedObject |

Le Tableau 286 montre toutes les extrémités d'association de InstructionClearingDOP avec d'autres classes.

**Tableau 286 – Extrémités d'association de MarketResults::InstructionClearingDOP avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type               | description                 |
|--------------------|----------------------------|--------------------|-----------------------------|
| [1..*]             | [1..*] DopInstruction      | DopInstruction     |                             |
| [0..*]             | [0..*] MktActivityRecord   | MktActivityRecord  | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market              | Market             | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject      | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name               | Hérité de: IdentifiedObject |

#### 6.5.6.3.24 InstructionClearingDOT

Modèle d'ajustement du marché, relatif à Dispatch Operating Target (modèle de répartition anticipée). Identifie l'intervalle

Le Tableau 287 montre tous les attributs de InstructionClearingDOT.

**Tableau 287 – Attributs de MarketResults::InstructionClearingDOT**

| nom                  | type                  | description                                                                   |
|----------------------|-----------------------|-------------------------------------------------------------------------------|
| contingencyActive    | YesNo                 | Indique que le système fonctionne actuellement dans un mode avec contingence. |
| dispatchMode         | AutomaticDispatchMode |                                                                               |
| intervalEndTime      | DateTime              | Hérité de: MarketFactors                                                      |
| intervalStartTime    | DateTime              | Hérité de: MarketFactors                                                      |
| type                 | String                | Hérité de: Document                                                           |
| createdDateTime      | DateTime              | Hérité de: Document                                                           |
| lastModifiedDateTime | DateTime              | Hérité de: Document                                                           |
| revisionNumber       | String                | Hérité de: Document                                                           |
| electronicAddress    | ElectronicAddress     | Hérité de: Document                                                           |
| subject              | String                | Hérité de: Document                                                           |
| title                | String                | Hérité de: Document                                                           |
| docStatus            | Status                | Hérité de: Document                                                           |
| status               | Status                | Hérité de: Document                                                           |
| aliasName            | String                | Hérité de: IdentifiedObject                                                   |
| mRID                 | String                | Hérité de: IdentifiedObject                                                   |
| name                 | String                | Hérité de: IdentifiedObject                                                   |

Le Tableau 288 montre toutes les extrémités d'association de InstructionClearingDOT avec d'autres classes.

**Tableau 288 – Extrémités d'association de MarketResults::InstructionClearingDOT avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type               | description                 |
|--------------------|----------------------------|--------------------|-----------------------------|
| [1..*]             | [1..*] DotInstruction      | DotInstruction     |                             |
| [0..*]             | [0..*] MktActivityRecord   | MktActivityRecord  | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market              | Market             | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject      | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name               | Hérité de: IdentifiedObject |

#### 6.5.6.3.25 Classe racine Instructions

Apporte les informations nécessaires (sur la base de ressources) pour la collecte des résultats de l'instruction Démarrage/Arrêt. Ces informations sont utiles pour le DAM (RUC exclusivement) et le RTM (HASP, pré-répartition et intervalle).

Le Tableau 289 montre tous les attributs de Instructions.

**Tableau 289 – Attributs de MarketResults::Instructions**

| nom                  | type                            | description                                                                                                                                                                                                                                                                                                                                      |
|----------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| bindingDOT           | Float                           |                                                                                                                                                                                                                                                                                                                                                  |
| bindingInstruction   | YesNo                           |                                                                                                                                                                                                                                                                                                                                                  |
| instructionCost      | Float                           | Coût total associé au changement du statut de la ressource.                                                                                                                                                                                                                                                                                      |
| instructionSource    | MQSInstructionSource            | source de l'instruction pour les résultats qualité du marché (INS, ACT)                                                                                                                                                                                                                                                                          |
| instructionStartTime | DateTime                        | Moment auquel il convient que la ressource soit sur Pmin (pour les démarrages).<br>Moment auquel la ressource est hors ligne.                                                                                                                                                                                                                    |
| instructionType      | AutomaticDisplnstTypeCommitment | Indique s'il s'agit d'un démarrage ou d'un arrêt.                                                                                                                                                                                                                                                                                                |
| manuallyBlocked      | YesNo                           | Indicateur de blocage manuel (Yes/No). L'instruction a été bloquée par un opérateur.                                                                                                                                                                                                                                                             |
| minStatusChangeTime  | Integer                         | Temps de démarrage minimal exigé pour mettre l'unité en ligne (minutes).<br><br>Temps de démarrage de la période d'engagement SCUC. Temps de démarrage calculé en fonction de StartUpTimeCurve, fourni avec la Bid.<br><br>Il s'agit d'une combinaison de l'offre du temps de démarrage et du temps d'arrêt de l'unité.<br><br>Unités en minutes |
| updateTimeStamp      | DateTime                        |                                                                                                                                                                                                                                                                                                                                                  |
| updateType           | MQSCHGType                      |                                                                                                                                                                                                                                                                                                                                                  |
| updateUser           | String                          |                                                                                                                                                                                                                                                                                                                                                  |

Le Tableau 290 montre toutes les extrémités d'association de Instructions avec d'autres classes.



**Tableau 290 – Extrémités d'association de MarketResults::Instructions avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type                | description |
|--------------------|----------------------------|---------------------|-------------|
| [0..*]             | [1..1] RegisteredResource  | RegisteredResource  |             |
| [1..*]             | [1..*] InstructionClearing | InstructionClearing |             |

#### 6.5.6.3.26 Classe racine LoadFollowingOperatorInput

Modèle de capacités de suivi charge entrées par les opérateurs sur une base temporaire. Relatif aux ressources enregistrées dans les sous-systèmes mesurés

Le Tableau 291 montre tous les attributs de LoadFollowingOperatorInput.

**Tableau 291 – Attributs de MarketResults::LoadFollowingOperatorInput**

| nom                            | type       | description                                               |
|--------------------------------|------------|-----------------------------------------------------------|
| dataEntryTimeStamp             | DateTime   | Moment auquel la saisie de données a été réalisée         |
| tempLoadFollowingUpManualCap   | Float      | capacité LFU entrée manuellement sur une base temporaire. |
| tempLoadFollowingDownManualCap | Float      | capacité LFD entrée manuellement sur une base temporaire  |
| updateUser                     | String     |                                                           |
| updateTimeStamp                | DateTime   |                                                           |
| updateType                     | MQSCHGType |                                                           |

Le Tableau 292 montre toutes les extrémités d'association de LoadFollowingOperatorInput avec d'autres classes.

**Tableau 292 – Extrémités d'association de MarketResults::LoadFollowingOperatorInput avec d'autres classes**

| [mult à partir de] | [mult vers] nom           | type               | description |
|--------------------|---------------------------|--------------------|-------------|
| [0..*]             | [0..1] RegisteredResource | RegisteredResource |             |

#### 6.5.6.3.27 LossClearing

RT uniquement; n'est publié que toutes les 5 minutes pour les résultats des précédents intervalles de temps RT.

Le Tableau 293 montre tous les attributs de LossClearing.

**Tableau 293 – Attributs de MarketResults::LossClearing**

| nom                  | type              | description                 |
|----------------------|-------------------|-----------------------------|
| intervalEndTime      | DateTime          | Hérité de: MarketFactors    |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors    |
| type                 | String            | Hérité de: Document         |
| createdDateTime      | DateTime          | Hérité de: Document         |
| lastModifiedDateTime | DateTime          | Hérité de: Document         |
| revisionNumber       | String            | Hérité de: Document         |
| electronicAddress    | ElectronicAddress | Hérité de: Document         |
| subject              | String            | Hérité de: Document         |
| title                | String            | Hérité de: Document         |
| docStatus            | Status            | Hérité de: Document         |
| status               | Status            | Hérité de: Document         |
| aliasName            | String            | Hérité de: IdentifiedObject |
| mRID                 | String            | Hérité de: IdentifiedObject |
| name                 | String            | Hérité de: IdentifiedObject |

Le Tableau 294 montre toutes les extrémités d'association de LossClearing avec d'autres classes.

**Tableau 294 – Extrémités d'association de MarketResults::LossClearing avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type                | description                 |
|--------------------|----------------------------|---------------------|-----------------------------|
| [0..1]             | [0..*] LossClearingResults | LossClearingResults |                             |
| [0..*]             | [0..*] MktActivityRecord   | MktActivityRecord   | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market              | Market              | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent  | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject       | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name                | Hérité de: IdentifiedObject |

#### 6.5.6.3.28 Classe racine LossClearingResults

Indique la quantité perdue de MW pour les zones RUC, les zones de sous-contrôle et la perte totale.

Le Tableau 295 montre tous les attributs de LossClearingResults.

**Tableau 295 – Attributs de MarketResults::LossClearingResults**

| nom    | type  | description |
|--------|-------|-------------|
| lossMW | Float |             |

Le Tableau 296 montre toutes les extrémités d'association de LossClearingResults avec d'autres classes.

**Tableau 296 – Extrémités d'association de MarketResults::LossClearingResults avec d'autres classes**

| [mult à partir de] | [mult vers] nom        | type            | description |
|--------------------|------------------------|-----------------|-------------|
| [1..*]             | [0..1] SubControlArea  | SubControlArea  |             |
| [0..*]             | [0..1] LossClearing    | LossClearing    |             |
| [0..*]             | [0..1] HostControlArea | HostControlArea |             |
| [0..*]             | [0..1] RUCZone         | RUCZone         |             |

### 6.5.6.3.29 Classe racine MarketRegionResults

Fournit tous les résultats des services auxiliaires régionaux pour le DAM et le RTM. Les données spécifiques sont de type produit (régulation à la hausse, régulation à la baisse, réserve tournante, réserve non tournante ou total majoré des réserves) en fonction des MW octroyés, du prix d'équilibre et de la capacité totale exigée pour la région.

Le Tableau 297 montre tous les attributs de MarketRegionResults.

**Tableau 297 – Attributs de MarketResults::MarketRegionResults**

| nom                 | type                   | description                                                                                                                                                                 |
|---------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| clearedMW           | Float                  | Valeur de production octroyée en MW. Pour AS, cette valeur est clearedMW = AS Total. Pour AS, clearedMW – selfScheduleMW = AS Procured                                      |
| clearedPrice        | Float                  | Prix marginal (\$/MW) pour le produit (énergie, régulation à la hausse, régulation à la baisse, réserve tournante ou réserve non tournante) en fonction du calcul du prix.  |
| dispatchCtMW        | Float                  | MW commandables pour les unités de combustion.                                                                                                                              |
| dispatchHydroMW     | Float                  | MW commandables pour les unités hydrauliques.                                                                                                                               |
| dispatchRate        | Float                  | Taux de répartition en MW/minute.                                                                                                                                           |
| dispatchSteamMW     | Float                  | MW commandables pour les unités à vapeur.                                                                                                                                   |
| imbalanceEnergyBias | Float                  | Influence énergétique du déséquilibre (MW) par période de temps (5 s uniquement)                                                                                            |
| limitFlag           | ResourceLimitIndicator | Indicateurs AS locaux révélant si la limite supérieure ou inférieure de l'approvisionnement régional AS est contraignante                                                   |
| lumpyIndicator      | YesNo                  | L'indicateur "arrondi" (Y/N) indique si la ressource qui définit le prix est un générateur irrégulier par heure pendant l'horizon temporel.<br>Applicable uniquement au DAM |
| maxSufficiencyIndex | Float                  | Limite maximale de l'exigence régionale                                                                                                                                     |
| minSufficiencyIndex | Float                  | Limite minimale de l'exigence régionale                                                                                                                                     |
| reqMaxMW            | Float                  | Limite maximale de l'exigence régionale                                                                                                                                     |
| reqMinMW            | Float                  | Limite minimale de l'exigence régionale                                                                                                                                     |
| selfScheduleMW      | Float                  | Aof AS, selfScheduleMW = AS Self-Provided                                                                                                                                   |

Le Tableau 298 montre toutes les extrémités d'association de MarketRegionResults avec d'autres classes.

**Tableau 298 – Extrémités d'association de MarketResults::MarketRegionResults avec d'autres classes**

| [mult à partir de] | [mult vers] nom                 | type                     | description |
|--------------------|---------------------------------|--------------------------|-------------|
| [0..1]             | [0..1] MarketProduct            | MarketProduct            |             |
| [1..*]             | [0..1] AncillaryServiceClearing | AncillaryServiceClearing |             |
| [1..*]             | [1..1] MarketRegion             | MarketRegion             |             |

#### 6.5.6.3.30 Classe racine MarketResults

Cette classe contient des éléments constitués de valeurs uniques pour l'ensemble de l'horizon temporel du marché. C'est-à-dire que pour le DAM, il y a une valeur pour chaque élément, non élaborée sur une base horaire. Récapitulatif du processus de marché

Le Tableau 299 montre tous les attributs de MarketResults.

**Tableau 299 – Attributs de MarketResults::MarketResults**

| nom                         | type  | description                                                                       |
|-----------------------------|-------|-----------------------------------------------------------------------------------|
| startUpCost                 | Float | Coût total de démarrage (\$) sur l'horizon temporel                               |
| minimumLoadCost             | Float | Coût de charge minimal (\$) sur l'horizon temporel                                |
| contingentOperatingResAvail | YesNo | Indicateur global de disponibilité de réserve d'exploitation contingente (Yes/No) |
| energyCost                  | Float | Coût minimal en énergie (\$) sur l'horizon temporel                               |
| totalCost                   | Float | Coût total (énergie + AS) (\$) par heure pendant l'horizon temporel               |
| ancillarySvcCost            | Float | Coût AS total (c'est-à-dire le règlement) pendant l'horizon temporel              |
| totalRucCost                | Float | Capacité RUC totale pour cet intervalle                                           |

Le Tableau 300 montre toutes les extrémités d'association de MarketResults avec d'autres classes.

**Tableau 300 – Extrémités d'association de MarketResults::MarketResults avec d'autres classes**

| [mult à partir de] | [mult vers] nom     | type         | description |
|--------------------|---------------------|--------------|-------------|
| [0..1]             | [1..1] EnergyMarket | EnergyMarket |             |

#### 6.5.6.3.31 MarketStatement

Une déclaration est un ensemble d'éléments de lignes de déclaration. Chaque déclaration et ses éléments de lignes donnent le détail des charges spécifiques à tout moment. Utilisée par la facturation et le règlement

Le Tableau 301 montre tous les attributs de MarketStatement.

**Tableau 301 – Attributs de MarketResults: MarketStatement**

| nom                  | type              | description                                                              |
|----------------------|-------------------|--------------------------------------------------------------------------|
| tradeDate            | DateTime          | Date à laquelle Settlement est exécuté.                                  |
| referenceNumber      | String            | Le numéro de version de la précédente déclaration (en cas d'ajustement). |
| start                | DateTime          | Début d'une période de facturation.                                      |
| end                  | DateTime          | Fin d'une période de facturation.                                        |
| transactionDate      | DateTime          | Date à laquelle la déclaration est émise.                                |
| type                 | String            | Hérité de: Document                                                      |
| createdDateTime      | DateTime          | Hérité de: Document                                                      |
| lastModifiedDateTime | DateTime          | Hérité de: Document                                                      |
| revisionNumber       | String            | Hérité de: Document                                                      |
| electronicAddress    | ElectronicAddress | Hérité de: Document                                                      |
| subject              | String            | Hérité de: Document                                                      |
| title                | String            | Hérité de: Document                                                      |
| docStatus            | Status            | Hérité de: Document                                                      |
| status               | Status            | Hérité de: Document                                                      |
| aliasName            | String            | Hérité de: IdentifiedObject                                              |
| mRID                 | String            | Hérité de: IdentifiedObject                                              |
| name                 | String            | Hérité de: IdentifiedObject                                              |

Le Tableau 302 montre toutes les extrémités d'association de MarketStatement avec d'autres classes.

**Tableau 302 – Extrémités d'association de MarketResults: MarketStatement avec d'autres classes**

| [mult à partir de] | [mult vers] nom                | type                    | description                 |
|--------------------|--------------------------------|-------------------------|-----------------------------|
| [1..1]             | [0..*] MarketStatementLineItem | MarketStatementLineItem |                             |
| [0..1]             | [0..*] ConfigurationEvents     | ConfigurationEvent      | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects          | DiagramObject           | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                   | Name                    | Hérité de: IdentifiedObject |

#### 6.5.6.3.32 MarketStatementLineItem

Élément de ligne individuel sur une déclaration.

Le Tableau 303 montre tous les attributs de MarketStatementLineItem.

**Tableau 303 – Attributs de MarketResults::MarketStatementLineItem**

| nom                 | type     | description                                                        |
|---------------------|----------|--------------------------------------------------------------------|
| intervalNumber      | String   | Nombre d'intervalles.                                              |
| intervalDate        | DateTime | Date à laquelle le règlement est effectué.                         |
| quantityUOM         | String   | Unité de mesure de la quantité de l'élément de ligne.              |
| previousAmount      | Float    | Montant du précédent règlement.                                    |
| currentAmount       | Float    | Montant du règlement actuel.                                       |
| netAmount           | Float    | Montant net du règlement.                                          |
| previousQuantity    | Float    | Quantité du règlement précédent, en fonction de l'unité de mesure. |
| currentQuantity     | Float    | Quantité du règlement actuel, en fonction de l'unité de mesure.    |
| netQuantity         | Float    | Quantité nette du règlement, en fonction de l'unité de mesure.     |
| previousPrice       | Float    | Prix du précédent règlement.                                       |
| currentPrice        | Float    | Prix du règlement actuel.                                          |
| netPrice            | Float    | Prix net du règlement.                                             |
| previousISOAmount   | Float    | Montant du précédent règlement ISO.                                |
| currentISOAmount    | Float    | Montant du règlement ISO actuel.                                   |
| netISOAmount        | Float    | Montant net du règlement ISO.                                      |
| previousISOQuantity | Float    | Quantité du précédent règlement ISO.                               |
| currentISOQuantity  | Float    | Quantité du règlement ISO actuel.                                  |
| netISOQuantity      | Float    | Quantité nette du règlement ISO.                                   |
| aliasName           | String   | Hérité de: IdentifiedObject                                        |
| mRID                | String   | Hérité de: IdentifiedObject                                        |
| name                | String   | Hérité de: IdentifiedObject                                        |

Le Tableau 304 montre toutes les extrémités d'association de MarketStatementLineItem avec d'autres classes.

**Tableau 304 – Extrémités d'association de MarketResults::MarketStatementLineItem avec d'autres classes**

| [mult à partir de] | [mult vers] nom                         | type                    | description                 |
|--------------------|-----------------------------------------|-------------------------|-----------------------------|
| [0..*]             | [0..*] MktUserAttribute                 | MktUserAttribute        |                             |
| [0..*]             | [1..1] MarketStatement                  | MarketStatement         |                             |
| [0..*]             | [0..1] ContainerMarketStatementLineItem | MarketStatementLineItem |                             |
| [0..1]             | [0..1] PassThroughBill                  | PassThroughBill         |                             |
| [0..1]             | [0..*] ComponentMarketStatementLineItem | MarketStatementLineItem |                             |
| [0..1]             | [0..*] DiagramObjects                   | DiagramObject           | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                            | Name                    | Hérité de: IdentifiedObject |

#### 6.5.6.3.33 MitigatedBid

Résultats d'une offre atténuée publiés pour une période de règlement précise.

Le Tableau 305 montre tous les attributs de MitigatedBid.

**Tableau 305 – Attributs de MarketResults::MitigatedBid**

| nom       | type   | description                 |
|-----------|--------|-----------------------------|
| aliasName | String | Hérité de: IdentifiedObject |
| mRID      | String | Hérité de: IdentifiedObject |
| name      | String | Hérité de: IdentifiedObject |

Le Tableau 306 montre toutes les extrémités d'association de MitigatedBid avec d'autres classes.

**Tableau 306 – Extrémités d'association de MarketResults::MitigatedBid avec d'autres classes**

| [mult à partir de] | [mult vers] nom             | type                 | description                 |
|--------------------|-----------------------------|----------------------|-----------------------------|
| [0..*]             | [1..*] MitigatedBidClearing | MitigatedBidClearing |                             |
| [0..*]             | [0..1] Bid                  | Bid                  |                             |
| [0..1]             | [0..*] DiagramObjects       | DiagramObject        | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                | Name                 | Hérité de: IdentifiedObject |

#### 6.5.6.3.34 MitigatedBidClearing

Modèle d'atténuation de l'emprise sur le marché fondé sur des offres de références ou des offres atténuées. Sur la base d'intervalles.

Le Tableau 307 montre tous les attributs de MitigatedBidClearing.

**Tableau 307 – Attributs de MarketResults::MitigatedBidClearing**

| nom                  | type              | description                 |
|----------------------|-------------------|-----------------------------|
| intervalEndTime      | DateTime          | Hérité de: MarketFactors    |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors    |
| type                 | String            | Hérité de: Document         |
| createdDateTime      | DateTime          | Hérité de: Document         |
| lastModifiedDateTime | DateTime          | Hérité de: Document         |
| revisionNumber       | String            | Hérité de: Document         |
| electronicAddress    | ElectronicAddress | Hérité de: Document         |
| subject              | String            | Hérité de: Document         |
| title                | String            | Hérité de: Document         |
| docStatus            | Status            | Hérité de: Document         |
| status               | Status            | Hérité de: Document         |
| aliasName            | String            | Hérité de: IdentifiedObject |
| mRID                 | String            | Hérité de: IdentifiedObject |
| name                 | String            | Hérité de: IdentifiedObject |

Le Tableau 308 montre toutes les extrémités d'association de MitigatedBidClearing avec d'autres classes.

**Tableau 308 – Extrémités d'association de MarketResults::MitigatedBidClearing avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type               | description                 |
|--------------------|----------------------------|--------------------|-----------------------------|
| [1..*]             | [0..*] MPMResourceStatus   | MPMResourceStatus  |                             |
| [1..*]             | [0..*] MitigatedBid        | MitigatedBid       |                             |
| [1..*]             | [0..*] RMRDetermination    | RMRDetermination   |                             |
| [0..*]             | [0..*] MktActivityRecord   | MktActivityRecord  | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market              | Market             | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject      | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name               | Hérité de: IdentifiedObject |

#### 6.5.6.3.35 Classe racine MitigatedBidSegment

Modèle d'offre atténuée. Indique un segment d'offre linéaire par morceaux qui a été atténué

Le Tableau 309 montre tous les attributs de MitigatedBidSegment.

**Tableau 309 – Attributs de MarketResults::MitigatedBidSegment**

| nom               | type     | description                              |
|-------------------|----------|------------------------------------------|
| intervalStartTime | DateTime |                                          |
| thresholdType     | String   |                                          |
| segmentNumber     | Integer  | Numéro de segment de l'offre atténuée    |
| segmentMW         | Float    | Valeur MW du segment de l'offre atténuée |

Le Tableau 310 montre toutes les extrémités d'association de MitigatedBidSegment avec d'autres classes.

**Tableau 310 – Extrémités d'association de MarketResults::MitigatedBidSegment avec d'autres classes**

| [mult à partir de] | [mult vers] nom | type | description |
|--------------------|-----------------|------|-------------|
| [0..*]             | [1..1] Bid      | Bid  |             |

#### 6.5.6.3.36 MPMClearing

Modèle des résultats des essais d'emprise sur le marché et atténuation potentielle. Sur la base d'intervalles

Le Tableau 311 montre tous les attributs de MPMClearing.



**Tableau 311 – Attributs de MarketResults::MPMClearing**

| nom                   | type              | description                 |
|-----------------------|-------------------|-----------------------------|
| LMPMFinalFlag         | YesNo             |                             |
| SMPMFinalFlag         | YesNo             |                             |
| mitigationOccuredFlag | YesNo             |                             |
| intervalEndTime       | DateTime          | Hérité de: MarketFactors    |
| intervalStartTime     | DateTime          | Hérité de: MarketFactors    |
| type                  | String            | Hérité de: Document         |
| createdDateTime       | DateTime          | Hérité de: Document         |
| lastModifiedDateTime  | DateTime          | Hérité de: Document         |
| revisionNumber        | String            | Hérité de: Document         |
| electronicAddress     | ElectronicAddress | Hérité de: Document         |
| subject               | String            | Hérité de: Document         |
| title                 | String            | Hérité de: Document         |
| docStatus             | Status            | Hérité de: Document         |
| status                | Status            | Hérité de: Document         |
| aliasName             | String            | Hérité de: IdentifiedObject |
| mRID                  | String            | Hérité de: IdentifiedObject |
| name                  | String            | Hérité de: IdentifiedObject |

Le Tableau 312 montre toutes les extrémités d'association de MPMCclearing avec d'autres classes.

**Tableau 312 – Extrémités d'association de MarketResults::MPMCclearing avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type               | description                 |
|--------------------|----------------------------|--------------------|-----------------------------|
| [0..1]             | [0..*] MPMTestResults      | MPMTestResults     |                             |
| [0..*]             | [0..*] MktActivityRecord   | MktActivityRecord  | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market              | Market             | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject      | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name               | Hérité de: IdentifiedObject |

#### 6.5.6.3.37 Classe racine MPMResourceStatus

Modèle des résultats des essais d'emprise sur le marché; indique le statut de la ressource pour l'intervalle associé

Le Tableau 313 montre tous les attributs de MPMResourceStatus.

**Tableau 313 – Attributs de MarketResults::MPMResourceStatus**

| nom            | type   | description                                               |
|----------------|--------|-----------------------------------------------------------|
| resourceStatus | String | Statut de l'essai de l'intervalle<br>'N' – non applicable |

Le Tableau 314 montre toutes les extrémités d'association de MPMResourceStatus avec d'autres classes.

**Tableau 314 – Extrémités d'association de MarketResults::MPMResourceStatus avec d'autres classes**

| [mult à partir de] | [mult vers] nom             | type                 | description |
|--------------------|-----------------------------|----------------------|-------------|
| [0..*]             | [0..1] RegisteredResource   | RegisteredResource   |             |
| [0..*]             | [1..*] MitigatedBidClearing | MitigatedBidClearing |             |
| [0..*]             | [1..1] MPMTestCategory      | MPMTestCategory      |             |

#### 6.5.6.3.38 Classe racine MPMTestResults

Fournit les données en pourcentage (si approprié) du résultat et de la marge (*Margin Percent*) pour les essais MPM. Il existe des relations avec la zone pour les essais de la zone de congestion désignée, CurveSchedData pour les essais du segment d'offre, avec SubControlArea pour les essais au niveau élargi du système et des Pnodes pour les essais d'impact LMPM.

Le Tableau 315 montre tous les attributs de MPMTestResults.

**Tableau 315 – Attributs de MarketResults::MPMTestResults**

| nom           | type           | description                                                                                                                                                                               |
|---------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| outcome       | MPMTestOutcome | Résultat de l'essai. Pour le prix, l'impact et les essais de conductivité, les valeurs types sont NA (sans objet), Pass (réussite), Fail (échec), Disable (désactiver) ou Skip (ignorer). |
| marginPercent | PerCent        | Utilisé pour montrer le résultat en pourcentage de la marge de l'essai d'impact                                                                                                           |

Le Tableau 316 montre toutes les extrémités d'association de MPMTestResults avec d'autres classes.

**Tableau 316 – Extrémités d'association de MarketResults::MPMTestResults avec d'autres classes**

| [mult à partir de] | [mult vers] nom        | type            | description |
|--------------------|------------------------|-----------------|-------------|
| [0..*]             | [0..1] MPMClearing     | MPMClearing     |             |
| [1..*]             | [1..1] AggregatedPnode | AggregatedPnode |             |
| [0..*]             | [1..1] MPMTestCategory | MPMTestCategory |             |

**6.5.6.3.39 PassThroughBill**

PassThroughBill est utilisé pour:

- 1) Des transactions de charge dans les deux sens avec ou sans implication ISO (d'où l'expression ?pass thru?)
- 2) Des charges ou paiements directs spécifiques calculés de façon externe ou fournis directement aux règlements
- 3) Eléments déterminants spécifiques à la facturation des charges fournis de façon externe et utilisés pour le calcul des charges

Le Tableau 317 montre tous les attributs de PassThroughBill.

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**Tableau 317 – Attributs de MarketResults::PassThroughBill**

| nom                  | type              | description                                                                                                                                         |
|----------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| adjustedAmount       | Money             |                                                                                                                                                     |
| amount               | Money             | Montant des frais du produit/service.                                                                                                               |
| billedTo             | String            | Entreprise à laquelle la transaction PTB est facturée.                                                                                              |
| billEnd              | DateTime          | Date de fin de la période de facturation                                                                                                            |
| billRunType          | String            | Type de processus de règlement; par exemple, prélim., final et nouveau processus.                                                                   |
| billStart            | DateTime          | Date de début de la période de facturation                                                                                                          |
| effectiveDate        | DateTime          | Date effective de la transaction                                                                                                                    |
| isDisputed           | Boolean           | Indicateur de transaction litigieuse                                                                                                                |
| isProfiled           | Boolean           | Indicateur montrant si des données de profil sont associées au PTB.                                                                                 |
| paidTo               | String            | Entreprise à laquelle la transaction PTB est réglée.                                                                                                |
| previousEnd          | DateTime          | Date de fin de la précédente période de facturation                                                                                                 |
| previousStart        | DateTime          | Date de début de la précédente période de facturation                                                                                               |
| price                | Money             | Prix du produit/service.                                                                                                                            |
| productCode          | String            | Identifiant du produit pour la détermination du type de charge de la transaction.                                                                   |
| providedBy           | String            | Entreprise auprès de laquelle la transaction PTB est effectuée.                                                                                     |
| quantity             | FloatQuantity     | Quantité du produit.                                                                                                                                |
| serviceEnd           | DateTime          | Date de fin de la prestation de service, si périodique.                                                                                             |
| serviceStart         | DateTime          | Date de début de la prestation de service, si périodique.                                                                                           |
| soldTo               | String            | Entreprise à laquelle la transaction PTB est vendue.                                                                                                |
| taxAmount            | Money             | Part des taxes sur les services sélectionnés.                                                                                                       |
| timeZone             | String            | Code du fuseau horaire                                                                                                                              |
| tradeDate            | DateTime          | Date d'opération                                                                                                                                    |
| transactionDate      | DateTime          | Date à laquelle a lieu la transaction.                                                                                                              |
| transactionType      | String            | Type de la transaction. Par exemple, facturation client, correspondance créances clients/comptes créditeurs ou éléments déterminants de facturation |
| type                 | String            | Hérité de: Document                                                                                                                                 |
| createdDateTime      | DateTime          | Hérité de: Document                                                                                                                                 |
| lastModifiedDateTime | DateTime          | Hérité de: Document                                                                                                                                 |
| revisionNumber       | String            | Hérité de: Document                                                                                                                                 |
| electronicAddress    | ElectronicAddress | Hérité de: Document                                                                                                                                 |
| subject              | String            | Hérité de: Document                                                                                                                                 |
| title                | String            | Hérité de: Document                                                                                                                                 |
| docStatus            | Status            | Hérité de: Document                                                                                                                                 |
| status               | Status            | Hérité de: Document                                                                                                                                 |
| aliasName            | String            | Hérité de: IdentifiedObject                                                                                                                         |
| mRID                 | String            | Hérité de: IdentifiedObject                                                                                                                         |
| name                 | String            | Hérité de: IdentifiedObject                                                                                                                         |

Le Tableau 318 montre toutes les extrémités d'association de PassThroughBill avec d'autres classes.

**Tableau 318 – Extrémités d'association de MarketResults::PassThroughBill avec d'autres classes**

| [mult à partir de] | [mult vers] nom                | type                    | description                 |
|--------------------|--------------------------------|-------------------------|-----------------------------|
| [0..*]             | [0..*] MktUserAttribute        | MktUserAttribute        |                             |
| [0..1]             | [0..1] MarketStatementLineItem | MarketStatementLineItem |                             |
| [0..1]             | [0..*] ChargeProfiles          | ChargeProfile           |                             |
| [0..1]             | [0..*] ConfigurationEvents     | ConfigurationEvent      | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects          | DiagramObject           | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                   | Name                    | Hérité de: IdentifiedObject |

#### 6.5.6.3.40 PnodeClearing

Résultats d'équilibre d'un nœud de tarification publiés pour une période de règlement précise.

Le Tableau 319 montre tous les attributs de PnodeClearing.

**Tableau 319 – Attributs de MarketResults::PnodeClearing**

| nom                  | type              | description                 |
|----------------------|-------------------|-----------------------------|
| intervalEndTime      | DateTime          | Hérité de: MarketFactors    |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors    |
| type                 | String            | Hérité de: Document         |
| createdDateTime      | DateTime          | Hérité de: Document         |
| lastModifiedDateTime | DateTime          | Hérité de: Document         |
| revisionNumber       | String            | Hérité de: Document         |
| electronicAddress    | ElectronicAddress | Hérité de: Document         |
| subject              | String            | Hérité de: Document         |
| title                | String            | Hérité de: Document         |
| docStatus            | Status            | Hérité de: Document         |
| status               | Status            | Hérité de: Document         |
| aliasName            | String            | Hérité de: IdentifiedObject |
| mRID                 | String            | Hérité de: IdentifiedObject |
| name                 | String            | Hérité de: IdentifiedObject |

Le Tableau 320 montre toutes les extrémités d'association de PnodeClearing avec d'autres classes.

**Tableau 320 – Extrémités d'association de MarketResults::PnodeClearing avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type               | description                 |
|--------------------|----------------------------|--------------------|-----------------------------|
| [0..1]             | [1..*] PnodeResults        | PnodeResults       |                             |
| [0..*]             | [0..*] MktActivityRecord   | MktActivityRecord  | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market              | Market             | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject      | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name               | Hérité de: IdentifiedObject |

#### 6.5.6.3.41 Classe racine PnodeResults

Fournit le prix total, le composant coût, le composant perte et le composant congestion pour les Pnodes des DAM / RTM. Plusieurs prix sont produits en fonction du type de processus (MPM, RUC, tarification ou programmation/répartition).

Le Tableau 321 montre tous les attributs de PnodeResults.

**Tableau 321 – Attributs de MarketResults::PnodeResults**

| nom                   | type       | description                                                                    |
|-----------------------|------------|--------------------------------------------------------------------------------|
| marginalClearingPrice | Float      | Prix marginal local (LMP) (\$/MWh)                                             |
| costLMP               | Float      | Composant coût du prix marginal local (LMP) en unités monétaires par MW.       |
| lossLMP               | Float      | Composant perte du prix marginal local (LMP) en unités monétaires par MW.      |
| congestLMP            | Float      | Composant congestion du prix marginal local (LMP) en unités monétaires par MW. |
| scheduledMW           | Float      | Programme MW total au niveau de Pnode                                          |
| updateUser            | String     |                                                                                |
| updateTimeStamp       | DateTime   |                                                                                |
| updateType            | MQSCHGType |                                                                                |

Le Tableau 322 montre toutes les extrémités d'association de PnodeResults avec d'autres classes.

**Tableau 322 – Extrémités d'association de MarketResults::PnodeResults avec d'autres classes**

| [mult à partir de] | [mult vers] nom      | type          | description |
|--------------------|----------------------|---------------|-------------|
| [1..*]             | [0..1] PnodeClearing | PnodeClearing |             |
| [1..*]             | [0..1] Pnode         | Pnode         |             |

#### 6.5.6.3.42 ResourceAwardClearing

Modélise les détails de l'offre et de l'ajustement du marché. La classe indique si une contingence est active et si le système de répartition automatique est actif pour cet intervalle de la solution de marché.

Le Tableau 323 montre tous les attributs de ResourceAwardClearing.

**Tableau 323 – Attributs de MarketResults::ResourceAwardClearing**

| nom                  | type                  | description                                                                   |
|----------------------|-----------------------|-------------------------------------------------------------------------------|
| dispatchMode         | AutomaticDispatchMode |                                                                               |
| contingencyActive    | YesNo                 | Indique que le système fonctionne actuellement dans un mode avec contingence. |
| intervalEndTime      | DateTime              | Hérité de: MarketFactors                                                      |
| intervalStartTime    | DateTime              | Hérité de: MarketFactors                                                      |
| type                 | String                | Hérité de: Document                                                           |
| createdDateTime      | DateTime              | Hérité de: Document                                                           |
| lastModifiedDateTime | DateTime              | Hérité de: Document                                                           |
| revisionNumber       | String                | Hérité de: Document                                                           |
| electronicAddress    | ElectronicAddress     | Hérité de: Document                                                           |
| subject              | String                | Hérité de: Document                                                           |
| title                | String                | Hérité de: Document                                                           |
| docStatus            | Status                | Hérité de: Document                                                           |
| status               | Status                | Hérité de: Document                                                           |
| aliasName            | String                | Hérité de: IdentifiedObject                                                   |
| mRID                 | String                | Hérité de: IdentifiedObject                                                   |
| name                 | String                | Hérité de: IdentifiedObject                                                   |

Le Tableau 324 montre toutes les extrémités d'association de ResourceAwardClearing avec d'autres classes.

**Tableau 324 – Extrémités d'association de MarketResults::ResourceAwardClearing avec d'autres classes**

| [mult à partir de] | [mult vers] nom                 | type                     | description                 |
|--------------------|---------------------------------|--------------------------|-----------------------------|
| [1..*]             | [1..*] ResourceAwardInstruction | ResourceAwardInstruction |                             |
| [1..*]             | [1..*] RUCAwardInstruction      | RUCAwardInstruction      |                             |
| [0..*]             | [0..*] MktActivityRecord        | MktActivityRecord        | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market                   | Market                   | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents      | ConfigurationEvent       | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects           | DiagramObject            | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                    | Name                     | Hérité de: IdentifiedObject |

### 6.5.6.3.43 Classe racine ResourceAwardInstruction

Modèle des résultats du marché, instruction pour la ressource. Contient les détails d'attribution comme attributs

Le Tableau 325 montre tous les attributs de ResourceAwardInstruction.

**Tableau 325 – Attributs de MarketResults::ResourceAwardInstruction**

| nom                       | type     | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| awardMW                   | Float    | Pour énergie DA: Non applicable;<br>Pour AS DA: Attribution marché AS DA;<br>Pour énergie RT: Non applicable;<br>Pour AS RT: Attribution marché AS RT (à l'exception des attributions relatives au marché AS DA et à l'alimentation automatique)                                                                                                                                                                                                                                                                                                             |
| clearedMW                 | Float    | Pour énergie DA: Programme total = programme du marché J-1 (DAM) + attribution à programmation automatique J-1 (DA);<br>Pour AS DA: Attributions services auxiliaires DA = attribution marché AS DA + attribution à programmation automatique AS DA;<br>Pour énergie RT: Programme total = programme RTM + attribution planification automatique RT;<br>Pour AS RT: Attributions services auxiliaires RT = attribution à programmation automatique RT + attribution marché AS RT + attribution marché AS DA + attribution à programmation automatique AS DA. |
| clearedPrice              | Float    | Prix marginal (\$/MW) pour le produit (régulation en à la hausse, régulation à la baisse, réserve tournante ou réserve non tournante) pour le calcul du prix.                                                                                                                                                                                                                                                                                                                                                                                                |
| congestLMP                | Float    | Composant congestion du prix marginal local (LMP) en unités monétaires par MW.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| costLMP                   | Float    | Composant coût du prix marginal local (LMP) en unités monétaires par MW.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| dispatcherAddedMW         | Float    | Quantité MW tier2 ajoutée par le répartiteur                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| economicMax               | Float    | Résultats du marché du marché des réserves synchronisées<br>Sortie max. de l'unité pour la répartition; offre comprise dans le maximum économique                                                                                                                                                                                                                                                                                                                                                                                                            |
| economicMin               | Float    | Sortie min. de l'unité pour la répartition; offre comprise dans le minimum économique                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| effRegulationDownLimit    | Float    | Limite effective de régulation à la baisse (MW)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| effRegulationUpLimit      | Float    | Limite effective de régulation à la hausse                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| lmp                       | Float    | Valeur du prix marginal local                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| lossLMP                   | Float    | Composant perte du prix marginal local (LMP) en unités monétaires par MW.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| manuallyBlocked           | YesNo    | Indique si une attribution a été bloquée manuellement (Y/N). Valide pour la réserve tournante et non tournante.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| marginalResourceIndicator | YesNo    | Indicateur (Yes/No) montrant que cette ressource définit le prix pour la répartition/programme                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| mustRunInd                | Boolean  | Identifie si l'unité a été configurée pour devoir être exécutée par le participant du marché en charge des offres dans l'unité                                                                                                                                                                                                                                                                                                                                                                                                                               |
| noLoadCost                | Float    | Coût à charge nulle de l'unité en cas de produit énergétique                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| optimalBidCost            | Float    | Coût optimal de l'offre                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| optimalBidPay             | Float    | Règlement optimal de réalisation de l'offre en fonction du prix marginal local                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| optimalMargin             | Float    | Marge optimale de réalisation de l'offre                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| overrideTimeStamp         | DateTime | Heure de la saisie manuelle de données.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



| nom             | type        | description                                                                                                                                                                                                                                                                                                                                              |
|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| overrideValue   | Float       | Fournit la capacité pour l'opérateur de réseau de remplacer des éléments, telles que les exigences en rotation, avant d'exécuter l'algorithme. Cette valeur est fondée sur les produits du marché (rotation, non-rotation, régulation à la hausse, régulation à la baisse ou RUC).                                                                       |
| selfSchedMW     | Float       | Pour énergie DA: Attribution à programmation automatique totale DA;<br>Pour AS DA: Attribution alimentation automatique AS DA;<br>Pour énergie RT: Attribution à programmation automatique totale RT;<br>Pour AS RT: Attribution alimentation automatique AS RT (à l'exception des attributions relatives au marché AS DA et à alimentation automatique) |
| startUpCost     | Float       | Couût de démarrage de l'unité en cas de produit énergétique                                                                                                                                                                                                                                                                                              |
| status          | String      | Dans ou en dehors du statut de la ressource                                                                                                                                                                                                                                                                                                              |
| totalRevenue    | Float       | Revenu total de l'offre (startup_cost + no_load_cost + bid_pay)                                                                                                                                                                                                                                                                                          |
| updateTimeStamp | DateTime    |                                                                                                                                                                                                                                                                                                                                                          |
| updateType      | MQSCHG Type |                                                                                                                                                                                                                                                                                                                                                          |
| updateUser      | String      |                                                                                                                                                                                                                                                                                                                                                          |

Le Tableau 326 montre toutes les extrémités d'association de ResourceAwardInstruction avec d'autres classes.

**Tableau 326 – Extrémités d'association de MarketResults::  
ResourceAwardInstruction avec d'autres classes**

| [mult à partir de] | [mult vers] nom              | type                  | description |
|--------------------|------------------------------|-----------------------|-------------|
| [0..*]             | [0..1] RegisteredResource    | RegisteredResource    |             |
| [1..1]             | [0..*] SelfScheduleBreakdown | SelfScheduleBreakdown |             |
| [0..*]             | [1..1] MarketProduct         | MarketProduct         |             |
| [1..*]             | [1..*] ClearingResourceAward | ResourceAwardClearing |             |

#### 6.5.6.3.44 ResourceClearing

Modèle des résultats du marché, notamment les résultats équilibrés des ressources. Associé à ResourceDispatchResults.

Le Tableau 327 montre tous les attributs de ResourceClearing.

**Tableau 327 – Attributs de MarketResults::ResourceClearing**

| nom                  | type              | description                 |
|----------------------|-------------------|-----------------------------|
| intervalEndTime      | DateTime          | Hérité de: MarketFactors    |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors    |
| type                 | String            | Hérité de: Document         |
| createdDateTime      | DateTime          | Hérité de: Document         |
| lastModifiedDateTime | DateTime          | Hérité de: Document         |
| revisionNumber       | String            | Hérité de: Document         |
| electronicAddress    | ElectronicAddress | Hérité de: Document         |
| subject              | String            | Hérité de: Document         |
| title                | String            | Hérité de: Document         |
| docStatus            | Status            | Hérité de: Document         |
| status               | Status            | Hérité de: Document         |
| aliasName            | String            | Hérité de: IdentifiedObject |
| mRID                 | String            | Hérité de: IdentifiedObject |
| name                 | String            | Hérité de: IdentifiedObject |

Le Tableau 328 montre toutes les extrémités d'association de ResourceClearing avec d'autres classes.

**Tableau 328 – Extrémités d'association de MarketResults::ResourceClearing avec d'autres classes**

| [mult à partir de] | [mult vers] nom                  | type                      | description                 |
|--------------------|----------------------------------|---------------------------|-----------------------------|
| [0..1]             | [0..*] ResourceLoadFollowingInst | ResourceLoadFollowingInst |                             |
| [0..1]             | [1..*] ResourceDispatchResults   | ResourceDispatchResults   |                             |
| [0..*]             | [0..*] MktActivityRecord         | MktActivityRecord         | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market                    | Market                    | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents       | ConfigurationEvent        | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects            | DiagramObject             | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                     | Name                      | Hérité de: IdentifiedObject |

#### 6.5.6.3.45 Classe racine ResourceDispatchResults

La classe ResourceDispatchResults comprend les résultats de marché qui peuvent être transmis à un coordinateur de programmation (SC). Les données spécifiques fournies se composent de plusieurs indicateurs tels que les indicateurs de contingence, le démarrage bloqué et la répartition RMR. Elles fournissent par ailleurs le statut prévisionnel global et le statut de régulation de la ressource.

Le Tableau 329 montre tous les attributs de ResourceDispatchResults.

**Tableau 329 – Attributs de MarketResults::ResourceDispatchResults**

| nom                      | type       | description                                                                                                                              |
|--------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------|
| blockedDispatch          | String     | Indicateur de répartition bloquée (Yes/No).                                                                                              |
| blockedPublishDOP        | String     | Blocage envoyant DOP vers ADS (Y/N)                                                                                                      |
| contingencyFlag          | YesNo      | Indicateur de réserve d'exploitation contingente (Yes/No). Ressource participant à la capacité AS dans la répartition de la contingence. |
| limitIndicator           | String     | Indique quelle limite constitue la contrainte                                                                                            |
| lowerLimit               | Float      | Limite inférieure de rampe d'énergie de la ressource                                                                                     |
| maxRampRate              | Float      | Taux de rampe maximum                                                                                                                    |
| operatingLimitHigh       | Float      | Limite opérationnelle supérieure intégrant toute réduction utilisée par la répartition en temps réel (RTD) pour l'intervalle de liaison. |
| operatingLimitLow        | Float      | Limite opérationnelle inférieure intégrant toute réduction utilisée par la répartition en temps réel pour l'intervalle de liaison.       |
| penaltyDispatchIndicator | YesNo      | Indicateur de répartition à pénalité (Yes / No) révélant une régulation non économique.                                                  |
| regulatingLimitHigh      | Float      | Limite de régulation supérieure intégrant toute réduction utilisée par la répartition en temps réel (RTD) pour l'intervalle de liaison.  |
| regulatingLimitLow       | Float      | Limite de régulation inférieure intégrant toute réduction utilisée par la répartition en temps réel pour l'intervalle de liaison.        |
| resourceStatus           | String     | Statut d'engagement de l'unité (Marche/Arrêt/Démarrage)                                                                                  |
| totalSchedule            | Float      | Programme ascendant total des ressources. Programme total = En + toutes les AS par ressource et par intervalle                           |
| updateTimeStamp          | DateTime   |                                                                                                                                          |
| updateType               | MQSCHGType |                                                                                                                                          |
| updateUser               | String     |                                                                                                                                          |
| upperLimit               | Float      | Limite supérieure de rampe d'énergie de la ressource                                                                                     |

Le Tableau 330 montre toutes les extrémités d'association de ResourceDispatchResults avec d'autres classes.

**Tableau 330 – Extrémités d'association de MarketResults::ResourceDispatchResults avec d'autres classes**

| [mult à partir de] | [mult vers] nom           | type               | description |
|--------------------|---------------------------|--------------------|-------------|
| [0..*]             | [0..1] RegisteredResource | RegisteredResource |             |
| [1..*]             | [0..1] ResourceClearing   | ResourceClearing   |             |

#### 6.5.6.3.46 Classe racine ResourceLoadFollowingInst

Modèle des résultats d'équilibre du marché pour les ressources réalisant des Offres pour être conformes à la charge

Le Tableau 331 montre tous les attributs de ResourceLoadFollowingInst.

**Tableau 331 – Attributs de MarketResults::ResourceLoadFollowingInst**

| nom                 | type     | description                                                                                                                                      |
|---------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| instructionID       | String   | Identifiant d'instruction unique pour chaque instruction; affecté par le coordinateur de programmation et fourni à l'ADS. L'ADS passe à travers. |
| intervalStartTime   | DateTime | Début de l'intervalle de temps pour lequel une exigence est définie.                                                                             |
| calcLoadFollowingMW | Float    | Moyenne pondérée pour RTPD et RTCD et identique pour RTID                                                                                        |
| dispWindowLowLimt   | Float    |                                                                                                                                                  |
| dispWindowHighLimt  | Float    |                                                                                                                                                  |

Le Tableau 332 montre toutes les extrémités d'association de ResourceLoadFollowingInst avec d'autres classes.

**Tableau 332 – Extrémités d'association de MarketResults::ResourceLoadFollowingInst avec d'autres classes**

| [mult à partir de] | [mult vers] nom           | type               | description |
|--------------------|---------------------------|--------------------|-------------|
| [0..*]             | [0..1] RegisteredResource | RegisteredResource |             |
| [0..*]             | [0..1] ResourceClearing   | ResourceClearing   |             |

#### 6.5.6.3.47 Classe racine RMRDetermination

Indique s'il s'agit d'une unité RMR "fiabilité – marche obligatoire": son activation est exigée pour satisfaire aux critères de fiabilité, à la demande de charge ou à la prise en charge de la tension.

Le Tableau 333 montre toutes les extrémités d'association de RMRDetermination avec d'autres classes.

**Tableau 333 – Extrémités d'association de MarketResults::RMRDetermination avec d'autres classes**

| [mult à partir de] | [mult vers] nom             | type                 | description |
|--------------------|-----------------------------|----------------------|-------------|
| [0..*]             | [1..*] MitigatedBidClearing | MitigatedBidClearing |             |
| [0..*]             | [0..1] Bid                  | Bid                  |             |

#### 6.5.6.3.48 RMROperatorInput

Saisie par l'opérateur RMR des exigences RMR par intervalle de marché.

Le Tableau 334 montre tous les attributs de RMROperatorInput.

**Tableau 334 – Attributs de MarketResults::RMROperatorInput**

| nom                  | type              | description                                                                                                                    |
|----------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------|
| manuallySchedRMRMw   | Float             | La valeur inférieure de la pré-répartition originelle ou du processus AC (ou besoin RMR) devient la valeur de pré-répartition. |
| updateUser           | String            |                                                                                                                                |
| updateTimeStamp      | DateTime          |                                                                                                                                |
| updateType           | MQSCHGType        |                                                                                                                                |
| intervalEndTime      | DateTime          | Hérité de: MarketFactors                                                                                                       |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors                                                                                                       |
| type                 | String            | Hérité de: Document                                                                                                            |
| createdDateTime      | DateTime          | Hérité de: Document                                                                                                            |
| lastModifiedDateTime | DateTime          | Hérité de: Document                                                                                                            |
| revisionNumber       | String            | Hérité de: Document                                                                                                            |
| electronicAddress    | ElectronicAddress | Hérité de: Document                                                                                                            |
| subject              | String            | Hérité de: Document                                                                                                            |
| title                | String            | Hérité de: Document                                                                                                            |
| docStatus            | Status            | Hérité de: Document                                                                                                            |
| status               | Status            | Hérité de: Document                                                                                                            |
| aliasName            | String            | Hérité de: IdentifiedObject                                                                                                    |
| mRID                 | String            | Hérité de: IdentifiedObject                                                                                                    |
| name                 | String            | Hérité de: IdentifiedObject                                                                                                    |

Le Tableau 335 montre toutes les extrémités d'association de RMROperatorInput avec d'autres classes.

**Tableau 335 – Extrémités d'association de MarketResults::RMROperatorInput avec d'autres classes**

| [mult à partir de] | [mult vers] nom            | type               | description                 |
|--------------------|----------------------------|--------------------|-----------------------------|
| [0..*]             | [0..1] RegisteredResource  | RegisteredResource |                             |
| [0..*]             | [0..*] MktActivityRecord   | MktActivityRecord  | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market              | Market             | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents | ConfigurationEvent | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects      | DiagramObject      | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names               | Name               | Hérité de: IdentifiedObject |

#### 6.5.6.3.49 Classe racine RUCAwardInstruction

Cette classe modélise les informations relatives aux attributions RUC

Le Tableau 336 montre tous les attributs de RUCAwardInstruction.

**Tableau 336 – Attributs de MarketResults::RUCAwardInstruction**

| nom               | type              | description                                                                                                                                                                                                                           |
|-------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| clearedPrice      | Float             | Prix marginal (\$/MW) pour le produit (régulation à la hausse, régulation à la baisse, réserve tournante ou réserve non tournante) pour le calcul du prix.                                                                            |
| marketProductType | MarketProductType | Le type de produit majeur peut comprendre les éléments suivants, sans pour autant s'y limiter:<br>Energie<br>Régulation à la hausse<br>Régulation à la baisse<br>Réserve tournante<br>Réserve non tournante<br>Réserve d'exploitation |
| RUCAward          | Float             | L'attribution RUC d'une ressource est la part de capacité RUC qui n'est pas soumise à un contrat RA ou RMR. L'attribution RUC d'une ressource est la part de capacité RUC qui est éligible pour un règlement de disponibilité RUC.    |
| RUCCapacity       | Float             | La capacité RUC d'une ressource est la différence entre (i) le RUC Schedule et (ii) la valeur supérieure du programme DA et la charge minimum.                                                                                        |
| RUCSchedule       | Float             | RUCSchedule d'une ressource constitue son niveau de sortie qui équilibre la prévision de charge utilisée dans RUC. La RUCSchedule dans RUC est similaire au DA Schedule dans DAM.                                                     |
| updateTimeStamp   | DateTime          |                                                                                                                                                                                                                                       |
| updateType        | MQSCHGType        |                                                                                                                                                                                                                                       |
| updateUser        | String            |                                                                                                                                                                                                                                       |

Le Tableau 337 montre toutes les extrémités d'association de RUCAwardInstruction avec d'autres classes.

**Tableau 337 – Extrémités d'association de MarketResults::RUCAwardInstruction avec d'autres classes**

| [mult à partir de] | [mult vers] nom              | type                  | description |
|--------------------|------------------------------|-----------------------|-------------|
| [0..*]             | [0..1] RegisteredResource    | RegisteredResource    |             |
| [1..*]             | [1..*] ClearingResourceAward | ResourceAwardClearing |             |

#### 6.5.6.3.50 Classe racine SelfScheduleBreakdown

Modèle des résultats à programmations automatiques. Comprend les quantités de MW à programmation automatique et le type de programmation automatique pour chaque type à programmation automatique inclus dans la valeur totale des MW à programmation automatique trouvée dans ResourceAwardInstruction..

Le Tableau 338 montre tous les attributs de SelfScheduleBreakdown.

**Tableau 338 – Attributs de MarketResults::SelfScheduleBreakdown**

| nom           | type                      | description                                                                        |
|---------------|---------------------------|------------------------------------------------------------------------------------|
| selfSchedMW   | Float                     | Valeur d'équilibre pour le type à programmation automatique spécifique répertorié. |
| selfSchedType | SelfScheduleBreakdownType | Type de panne de programmation automatique.                                        |

Le Tableau 339 montre toutes les extrémités d'association de SelfScheduleBreakdown avec d'autres classes.

**Tableau 339 – Extrémités d'association de MarketResults::SelfScheduleBreakdown avec d'autres classes**

| [mult à partir de] | [mult vers] nom                    | type                     | description |
|--------------------|------------------------------------|--------------------------|-------------|
| [0..*]             | [1..1]<br>ResourceAwardInstruction | ResourceAwardInstruction |             |

#### 6.5.6.3.51 Settlement

Spécifie un processus de règlement.

Le Tableau 340 montre tous les attributs de Settlement.

**Tableau 340 – Attributs de MarketResults::Settlement**

| nom                  | type              | description                                            |
|----------------------|-------------------|--------------------------------------------------------|
| tradeDate            | DateTime          | Date d'opération à laquelle le règlement est effectué. |
| type                 | String            | Hérité de: Document                                    |
| createdDateTime      | DateTime          | Hérité de: Document                                    |
| lastModifiedDateTime | DateTime          | Hérité de: Document                                    |
| revisionNumber       | String            | Hérité de: Document                                    |
| electronicAddress    | ElectronicAddress | Hérité de: Document                                    |
| subject              | String            | Hérité de: Document                                    |
| title                | String            | Hérité de: Document                                    |
| docStatus            | Status            | Hérité de: Document                                    |
| status               | Status            | Hérité de: Document                                    |
| aliasName            | String            | Hérité de: IdentifiedObject                            |
| mRID                 | String            | Hérité de: IdentifiedObject                            |
| name                 | String            | Hérité de: IdentifiedObject                            |

Le Tableau 341 montre toutes les extrémités d'association de Settlement avec d'autres classes.

**Tableau 341 – Extrémités d'association de MarketResults::Settlement avec d'autres classes**

| [mult à partir de] | [mult vers] nom              | type                  | description                 |
|--------------------|------------------------------|-----------------------|-----------------------------|
| [0..*]             | [0..*] MarketInvoiceLineItem | MarketInvoiceLineItem |                             |
| [0..*]             | [0..*] MarketLedgerEntry     | MarketLedgerEntry     |                             |
| [0..*]             | [0..1] EnergyMarket          | EnergyMarket          |                             |
| [0..*]             | [1..*] MajorChargeGroup      | MajorChargeGroup      |                             |
| [0..1]             | [0..*] ConfigurationEvents   | ConfigurationEvent    | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects        | DiagramObject         | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                 | Name                  | Hérité de: IdentifiedObject |

#### 6.5.6.3.52 TransactionBidClearing

Contient les intervalles utiles pour le TransactionBidResults associé. Par exemple, les résultats d'équilibre à J-1 pour les offres des transactions de chaque intervalle du jour de marché.

Le Tableau 342 montre tous les attributs de TransactionBidClearing.

**Tableau 342 – Attributs de MarketResults::TransactionBidClearing**

| nom                  | type              | description                 |
|----------------------|-------------------|-----------------------------|
| intervalEndTime      | DateTime          | Hérité de: MarketFactors    |
| intervalStartTime    | DateTime          | Hérité de: MarketFactors    |
| type                 | String            | Hérité de: Document         |
| createdDateTime      | DateTime          | Hérité de: Document         |
| lastModifiedDateTime | DateTime          | Hérité de: Document         |
| revisionNumber       | String            | Hérité de: Document         |
| electronicAddress    | ElectronicAddress | Hérité de: Document         |
| subject              | String            | Hérité de: Document         |
| title                | String            | Hérité de: Document         |
| docStatus            | Status            | Hérité de: Document         |
| status               | Status            | Hérité de: Document         |
| aliasName            | String            | Hérité de: IdentifiedObject |
| mRID                 | String            | Hérité de: IdentifiedObject |
| name                 | String            | Hérité de: IdentifiedObject |

Le Tableau 343 montre toutes les extrémités d'association de TransactionBidClearing avec d'autres classes.



**Tableau 343 – Extrémités d'association de MarketResults::TransactionBidClearing avec d'autres classes**

| [mult à partir de] | [mult vers] nom              | type                  | description                 |
|--------------------|------------------------------|-----------------------|-----------------------------|
| [1..1]             | [0..*] TransactionBidResults | TransactionBidResults |                             |
| [0..*]             | [0..*] MktActivityRecord     | MktActivityRecord     | Hérité de: MarketFactors    |
| [0..*]             | [0..1] Market                | Market                | Hérité de: MarketFactors    |
| [0..1]             | [0..*] ConfigurationEvents   | ConfigurationEvent    | Hérité de: Document         |
| [0..1]             | [0..*] DiagramObjects        | DiagramObject         | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                 | Name                  | Hérité de: IdentifiedObject |

### 6.5.6.3.53 TransactionBidResults

Contient les résultats d'équilibre pour chaque TransactionBid soumis au et accepté par le marché.

Le Tableau 344 montre tous les attributs de TransactionBidResults.

**Tableau 344 – Attributs de MarketResults::TransactionBidResults**

| nom          | type   | description                                       |
|--------------|--------|---------------------------------------------------|
| clearedMW    | Float  | Quantité de mégawatts de la transaction du marché |
| clearedPrice | Float  | Prix de la transaction de marché                  |
| aliasName    | String | Hérité de: IdentifiedObject                       |
| mRID         | String | Hérité de: IdentifiedObject                       |
| name         | String | Hérité de: IdentifiedObject                       |

Le Tableau 345 montre toutes les extrémités d'association de TransactionBidResults avec d'autres classes.

**Tableau 345 – Extrémités d'association de MarketResults::TransactionBidResults avec d'autres classes**

| [mult à partir de] | [mult vers] nom               | type                   | description                 |
|--------------------|-------------------------------|------------------------|-----------------------------|
| [0..*]             | [1..1] TransactionBidClearing | TransactionBidClearing |                             |
| [0..*]             | [0..1] TransactionBid         | TransactionBid         |                             |
| [0..1]             | [0..*] DiagramObjects         | DiagramObject          | Hérité de: IdentifiedObject |
| [1..1]             | [0..*] Names                  | Name                   | Hérité de: IdentifiedObject |

## 6.5.7 Packaging MktDomain

### 6.5.7.1 Généralités

Le paquetage MktDomain est une bibliothèque de données regroupant les grandeurs et les unités qui définissent les types de données des attributs (propriétés) pouvant être repris par n'importe quelle classe dans n'importe quel autre paquetage au sein de MarketOperations.

### 6.5.7.2 Enumération ActionType

Type d'action associé avec un ActionRequest par rapport à un ParticipantInterfaces::Trade.

Le Tableau 346 montre tous les libellés de ActionType.

**Tableau 346 – Libellés de MktDomain::ActionType**

| libellé | description           |
|---------|-----------------------|
| CANCEL  | Annule une opération. |

### 6.5.7.3 Enumération AnalogLimitType

Type de limite spécifié pour AnalogLimits.

Le Tableau 347 montre tous les libellés de AnalogLimitType.

**Tableau 347 – Libellés de MktDomain::AnalogLimitType**

| libellé          | description                      |
|------------------|----------------------------------|
| BranchMediumTerm | Limite à moyen terme de l'agence |
| BranchLongTerm   | Limite à long terme de l'agence  |
| BranchShortTerm  | Limite à court terme de l'agence |
| VoltageHigh      | Limite supérieure de tension     |
| VoltageLow       | Limite inférieure de tension     |

### 6.5.7.4 Enumération AnodeType

Types de nœud agrégé, par exemple:

SYS – Zone/région système;

RUC – Zone RUC;

LFZ – Zone de prévision de charge;

REG – Région énergie/services auxiliaires du marché

AGR – Ressource de production agrégée;

POD – Point de livraison;

ALR – Ressource de charge agrégée;

LTAC – Groupe de charge TransmissionAccessCharge (TAC);

ACA – Zone de réglage adjacente

ASR – Ressource système agrégée

ECA – Zone de réglage embarquée

Le Tableau 348 montre tous les libellés de AnodeType.

**Tableau 348 – Libellés de MktDomain::AnodeType**

| libellé | description                                      |
|---------|--------------------------------------------------|
| SYS     | Zone/région système;                             |
| RUC     | Zone RU                                          |
| LFZ     | Zone de prévision de charge                      |
| REG     | Région énergie/services auxiliaires du marché;   |
| AGR     | Ressource de production agrégée;                 |
| POD     | Point de livraison;                              |
| ALR     | Ressource de charge agrégée;                     |
| LTAC    | Groupe de charge TransmissionAccessCharge (TAC); |
| ACA     | Zone de réglage adjacent                         |
| ASR     | Ressource système agrégée                        |
| ECA     | Zone de réglage embarquée                        |

**6.5.7.5 Enumération ApnodeType**

Types de nœud agrégé, par exemple:

AG – Production agrégée

CPZ – Zone de tarification personnalisée

DPZ – Zone de tarification par défaut

LAP – Point d'agrégation de charge

TH – Plate-forme de négociation

SYS – Zone système

CA – Zone de réglage

GA – Agrégation générique

EHV – 500 kV

GH – Plate-forme générique

ZN – Zone

INT – Interface

BUS – Bus

Le Tableau 349 montre tous les libellés de ApnodeType.

**Tableau 349 – Libellés de MktDomain::ApnodeType**

| libellé | description                                               |
|---------|-----------------------------------------------------------|
| AG      | Production agrégée                                        |
| CPZ     | Zone de tarification personnalisée                        |
| DPZ     | Zone de tarification par défaut                           |
| TH      | Plate-forme de négociation                                |
| SYS     | Zone système                                              |
| CA      | Zone de réglage                                           |
| DCA     | Zone de congestion désignée                               |
| GA      | Agrégation générique                                      |
| GH      | Plate-forme générique                                     |
| EHV     | 500 kV – Nœuds de tarification agrégés très haute tension |
| ZN      | Zone                                                      |
| INT     | Interface                                                 |
| BUS     | Bus                                                       |

**6.5.7.6 Enumération AreaControlMode**

Mode de contrôle actuel de la zone

Le Tableau 350 montre tous les libellés de AreaControlMode.

**Tableau 350 – Libellés de MktDomain::AreaControlMode**

| libellé | description                                |
|---------|--------------------------------------------|
| CF      | CF = Fréquence constante                   |
| CTL     | Ligne d'interconnexion constante           |
| TLB     | Conditionnement par ligne d'interconnexion |
| OFF     | Contrôle d'arrêt                           |

**6.5.7.7 Enumération AutomaticDispatchMode**

Mode de répartition automatique

Le Tableau 351 montre tous les libellés de AutomaticDispatchMode.

**Tableau 351 – Libellés de MktDomain::AutomaticDispatchMode**

| libellé     | description                                                                    |
|-------------|--------------------------------------------------------------------------------|
| INTERVAL    |                                                                                |
| CONTINGENCY | Occurrence de la contingence, nouvelle répartition des réserves de contingence |
| MANUAL      | Remplacement de l'opérateur                                                    |

**6.5.7.8 Enumération AutomaticDisplnstTypeCommitment**

Types d'instruction des engagements.

Le Tableau 352 montre tous les libellés de AutomaticDisplnstTypeCommitment.

**Tableau 352 – Libellés de MktDomain::AutomaticDisplnstTypeCommitment**

| libellé   | description                     |
|-----------|---------------------------------|
| START_UP  | Type d'instruction de démarrage |
| SHUT_DOWN | Type d'instruction d'arrêt      |

**6.5.7.9 Enumération BidCalculationBasis**

La base est utilisée pour calculer la courbe du prix de l'offre pour une offre d'énergie par défaut.

Le Tableau 353 montre tous les libellés de BidCalculationBasis.

**Tableau 353 – Libellés de MktDomain::BidCalculationBasis**

| libellé    | description                                                                            |
|------------|----------------------------------------------------------------------------------------|
| LMP_BASED  | Fondé sur les prix payés à un emplacement de tarification en particulier.              |
| COST_BASED | Fondé sur les caractéristiques de production de l'unité et sur le coût du combustible. |
| NEGOTIATED | Montant négocié avec l'entité indépendante désignée.                                   |

**6.5.7.10 Enumération BidMitigationStatus**

Par exemple,

'S' – Atténuation par SMPM en cas de "faute"

'L' – Atténuation par LMPM en cas de "faute"

'R' – Modification par LMPM en raison des règles RMR

'M' – Atténuation en cas de "faute" par SMPM et LMPM

'B' – Atténuation en cas de "faute" par SMPM et modification par LMLM en raison des règles RMR

'O' – Original

Le Tableau 354 montre tous les libellés de BidMitigationStatus.

**Tableau 354 – Libellés de MktDomain::BidMitigationStatus**

| libellé | description |
|---------|-------------|
| S       |             |
| L       |             |
| R       |             |
| M       |             |
| B       |             |
| O       |             |

**6.5.7.11 Enumération BidMitigationType**

Par exemple,

Initial

Final

Le Tableau 355 montre tous les libellés de BidMitigationType.

**Tableau 355 – Libellés de MktDomain::BidMitigationType**

| libellé | description |
|---------|-------------|
| I       |             |
| F       |             |

#### 6.5.7.12 Enumération BidType

Par exemple,

DEFAULT\_ENERGY\_BID

DEFAULT\_STARTUP\_BID

DEFAULT\_MINIMUM\_LOAD\_BID

Le Tableau 356 montre tous les libellés de BidType.

**Tableau 356 – Libellés de MktDomain::BidType**

| libellé                  | description |
|--------------------------|-------------|
| DEFAULT_ENERGY_BID       |             |
| DEFAULT_STARTUP_BID      |             |
| DEFAULT_MINIMUM_LOAD_BID |             |

#### 6.5.7.13 Enumération BidTypeRMR

Le type de programmes automatiques d'offre d'offre présente deux types correspondant à la sortie exigée pour les exigences et la pré-répartition qualifiée.

Le Tableau 357 montre tous les libellés de BidTypeRMR.

**Tableau 357 – Libellés de MktDomain::BidTypeRMR**

| libellé               | description                                                                             |
|-----------------------|-----------------------------------------------------------------------------------------|
| REQUIREMENTS          | Type de programmes automatiques d'offreprogrammation pour la pré-répartition qualifiée. |
| QUALIFIED_PREDISPATCH | Type d'offre de programmation automatique pour les exigences en sortie.                 |

#### 6.5.7.14 Enumération BranchRatingType

Types de limite opérationnelle pour les réductions d'agence

Le Tableau 358 montre tous les libellés de BranchRatingType.

**Tableau 358 – Libellés de MktDomain::BranchRatingType**

| libellé   | description           |
|-----------|-----------------------|
| Normal    |                       |
| Emergency |                       |
| ShortTerm | Urgence à court terme |
| LongTerm  | Urgence à long terme  |

**6.5.7.15 Enumération CheckOutType**

Pour indiquer un type de vérification tel que la capacité ajustée ou la capacité de répartition

Le Tableau 359 montre tous les libellés de CheckOutType.

**Tableau 359 – Libellés de MktDomain::CheckOutType**

| libellé        | description |
|----------------|-------------|
| PRE_HOUR       |             |
| PRE_SCHEDULE   |             |
| AFTER_THE_FACT |             |

**6.5.7.16 Enumération CommitmentType**

Par exemple:

SELF – Engagement volontaire

ISO – Nouvel engagement pour cette période de marché

UC – Engagement existant qui était un vestige d'un précédent marché.

Le Tableau 360 montre tous les libellés de CommitmentType.

**Tableau 360 – Libellés de MktDomain::CommitmentType**

| libellé | description |
|---------|-------------|
| SELF    |             |
| ISO     |             |
| UC      |             |

**6.5.7.17 Enumération ConstraintLimitType**

Type de limite des résultats des contraintes avec obligation, par exemple:

MAXIMUM

MINIMUM

Le Tableau 361 montre tous les libellés de ConstraintLimitType.

**Tableau 361 – Libellés de MktDomain::ConstraintLimitType**

| libellé | description |
|---------|-------------|
| MAXIMUM |             |
| MINIMUM |             |

**6.5.7.18 Enumération ConstraintRampType**

Type de rampe de contrainte

Le Tableau 362 montre tous les libellés de ConstraintRampType.

**Tableau 362 – Libellés de MktDomain::ConstraintRampType**

| libellé | description |
|---------|-------------|
| FAST    |             |
| SLOW    |             |

**6.5.7.19 Enumération ContractType**

Type de contrat de transport, par exemple:

O – Autre

TE – Export de transport

TI – Import de transport

ETC – Contrat de transport existant

RMT – Contrat RMT

TOR – Droit de propriété de transport

RMR – Contrat RMR

CVR – Contrat converti.

Le Tableau 363 montre tous les libellés de ContractType.

**Tableau 363 – Libellés de MktDomain::ContractType**

| libellé | description                           |
|---------|---------------------------------------|
| ETC     | ETC – Contrat de transport existant   |
| TOR     | TOR – Droit de propriété de transport |
| RMR     | RMR – Contrat RMR                     |
| RMT     | RMT – Contrat RMT                     |
| O       | O – Autre                             |
| TE      | TE – Export de transport              |
| TI      | TI – Import de transport              |
| CVR     | CVR – Contrat converti.               |

**6.5.7.20 Enumération CostBasis**

Par exemple:

Coût soumission



Coût proxy

Coût enregistré

Le Tableau 364 montre tous les libellés de CostBasis.

**Tableau 364 – Libellés de MktDomain::CostBasis**

| libellé | description |
|---------|-------------|
| BIDC    |             |
| PRXC    |             |
| REGC    |             |

#### 6.5.7.21 Enumération CRRCategoryType

Types de catégorie des droits à revenu de congestion

Le Tableau 365 montre tous les libellés de CRRCategoryType.

**Tableau 365 – Libellés de MktDomain::CRRCategoryType**

| libellé | description                               |
|---------|-------------------------------------------|
| NSR     | Service réseau ( <i>Network service</i> ) |
| PTP     | Point à point ( <i>Point to Point</i> )   |

#### 6.5.7.22 Enumération CRRHedgeType

Type de couverture des droits à revenu de congestion

Le Tableau 366 montre tous les libellés de CRRHedgeType.

**Tableau 366 – Libellés de MktDomain::CRRHedgeType**

| libellé    | description |
|------------|-------------|
| OBLIGATION |             |
| OPTION     |             |

#### 6.5.7.23 Enumération CRRRoleType

Types de rôle qu'une organisation peut jouer vis-à-vis d'un droit à revenu de congestion.

Le Tableau 367 montre tous les libellés de CRRRoleType.

**Tableau 367 – Libellés de MktDomain::CRRRoleType**

| libellé | description |
|---------|-------------|
| SELLER  |             |
| BUYER   |             |
| OWNER   |             |

#### 6.5.7.24 Enumération CRRSegmentType

Type de CRR, dans les définitions types possibles du système de CRR (ex. "LSE","ETC").

Le Tableau 368 montre tous les libellés de CRRSegmentType.

**Tableau 368 – Libellés de MktDomain::CRRSegmentType**

| libellé | description                       |
|---------|-----------------------------------|
| AUC     |                                   |
| CAP     |                                   |
| CF      |                                   |
| CVR     | Droits convertis.                 |
| ETC     | Contrat de transport existant.    |
| LSE     | Société d'approvisionnement.      |
| MT      | Transport commercial.             |
| TOR     | Droits de propriété de transport. |

#### 6.5.7.25 Enumération DispatchResponseType

Par exemple:

NON\_RESPONSE

ACCEPT

DECLINE

PARTIAL.

Le Tableau 369 montre tous les libellés de DispatchResponseType.

**Tableau 369 – Libellés de MktDomain::DispatchResponseType**

| libellé      | description |
|--------------|-------------|
| NON_RESPONSE |             |
| ACCEPT       |             |
| DECLINE      |             |
| PARTIAL      |             |

#### 6.5.7.26 Enumération EnergyPricelndexType

Par exemple:

WHOLESALE

RETAIL

BOTH

Le Tableau 370 montre tous les libellés de EnergyPricelndexType.

**Tableau 370 – Libellés de MktDomain::EnergyPriceIndexType**

| libellé   | description |
|-----------|-------------|
| WHOLESALE |             |
| RETAIL    |             |
| BOTH      |             |

**6.5.7.27 Enumération EnergyProductType**

Type de produit énergétique

Le Tableau 371 montre tous les libellés de EnergyProductType.

**Tableau 371 – Libellés de MktDomain::EnergyProductType**

| libellé | description |
|---------|-------------|
| FIRM    | Ferme       |
| NFRM    | Non ferme   |
| DYN     | Dynamique   |
| WHL     | Transit     |

**6.5.7.28 Enumération EnergyTransactionType**

Définit le statut d'une transaction.

Le Tableau 372 montre tous les libellés de EnergyTransactionType.

**Tableau 372 – Libellés de MktDomain::EnergyTransactionType**

| libellé | description |
|---------|-------------|
| approve | Approbation |
| deny    | Négation    |
| study   | Etude       |

**6.5.7.29 Enumération EquipmentStatusType**

Statut de l'équipement

Le Tableau 373 montre tous les libellés de EquipmentStatusType.

**Tableau 373 – Libellés de MktDomain::EquipmentStatusType**

| libellé | description                       |
|---------|-----------------------------------|
| In      | L'équipement est en marche.       |
| Out     | L'équipement n'est pas en marche. |

**6.5.7.30 Enumération ExecutionType**

Types d'exécution des processus de marché

Le Tableau 374 montre tous les libellés de ExecutionType.

**Tableau 374 – Libellés de MktDomain::ExecutionType**

| libellé | description                           |
|---------|---------------------------------------|
| DA      | J-1                                   |
| HASP    | Exécution heure d'avant en temps réel |
| RTPD    | Pré-répartition en temps réel         |
| RTD     | Répartition en temps réel             |

#### 6.5.7.31 Enumération FlagTypeRMR

Indique si l'unité est de type RMR et son type de condition, par exemple:

'N' – l'unité n'est pas de type RMR

'1' – Unité RMR de condition 1

'2' – Unité RMR de condition 2

Le Tableau 375 montre tous les libellés de FlagTypeRMR.

**Tableau 375 – Libellés de MktDomain::FlagTypeRMR**

| libellé | description                         |
|---------|-------------------------------------|
| N       | 'N' – L'unité n'est pas de type RMR |
| 1       | '1' – Unité RMR de condition 1      |
| 2       | '2' – Unité RMR de condition 2      |

#### 6.5.7.32 Enumération FlowDirectionType

Indique le sens du flux d'énergie dans le Flowgate.

Le Tableau 376 montre tous les libellés de FlowDirectionType.

**Tableau 376 – Libellés de MktDomain::FlowDirectionType**

| libellé | description                    |
|---------|--------------------------------|
| Forward | Le flux va dans le sens aval.  |
| Reverse | Le flux va dans le sens amont. |

#### 6.5.7.33 Enumération FuelSource

Par exemple:

Bio Gas (décharge, eaux usées, méthanisation, etc.)

Biomass (Biomasse)

Coal (Charbon)

DIST

Natural Gas (Gaz naturel)

Geothermal (Energie géothermique)

HRCV

None (Aucun)

Nuclear (Energie nucléaire)

Oil (Pétrole)

Other (Autre)

Solar (Energie solaire)

Waste to Energy (Transformation des déchets en énergie)

Water (Energie hydraulique)

Wind (Energie éolienne)

Le Tableau 377 montre tous les libellés de FuelSource.

**Tableau 377 – Libellés de MktDomain::FuelSource**

| libellé | description                                        |
|---------|----------------------------------------------------|
| NG      | Gaz naturel                                        |
| NNG     | Gaz non naturel                                    |
| BGAS    | Biogaz (décharge, eaux usées, méthanisation, etc.) |
| BIOM    | Biomasse                                           |
| COAL    | Charbon                                            |
| DIST    |                                                    |
| GAS     |                                                    |
| GEOT    | Energie géothermique                               |
| HRCV    |                                                    |
| NONE    | aucun                                              |
| NUCL    | Energie nucléaire                                  |
| OIL     | Pétrole                                            |
| OTHR    | Autre                                              |
| SOLR    | Energie solaire                                    |
| WAST    | Transformation des déchets en énergie              |
| WATR    | Energie hydraulique                                |
| WIND    | Energie éolienne                                   |

#### 6.5.7.34 Enumération InterTieDirection

Sens d'une ligne d'interconnexion.

Le Tableau 378 montre tous les libellés de InterTieDirection.

**Tableau 378 – Libellés de MktDomain::InterTieDirection**

| libellé | description |
|---------|-------------|
| E       | Export.     |
| I       | Import.     |

#### 6.5.7.35 Enumération LoadForecastType

Types de zone de prévision de charge.

Le Tableau 379 montre tous les libellés de LoadForecastType.

**Tableau 379 – Libellés de MktDomain::LoadForecastType**

| libellé | description                  |
|---------|------------------------------|
| LFZ     | Zone de prévision de charge. |
| LZMS    | Zone du sous-système mesuré. |

#### 6.5.7.36 Enumération MarketProductSelfSchedType

Types d'offre de à programmation automatique de produits du marché

Le Tableau 380 montre tous les libellés de MarketProductSelfSchedType.

**Tableau 380 – Libellés de MktDomain::MarketProductSelfSchedType**

| libellé | description                                            |
|---------|--------------------------------------------------------|
| ETC     | Contrat de transport existant.                         |
| TOR     | Droit de propriété de transport.                       |
| RMR     | Marché Obligatoire pour Fiabilité ( <i>must run</i> )  |
| RGMR    | Marché Obligatoire pour Régulation ( <i>must run</i> ) |
| RMT     | Prise Obligatoire pour Fiabilité ( <i>must take</i> )  |
| PT      | Preneur de prix.                                       |
| LPT     | Preneur de prix inférieur.                             |
| SP      | Alimentation automatique                               |
| RA      | Adequation de la ressource.                            |

#### 6.5.7.37 Enumération MarketProductType

Par exemple:

Energie, régulation à la hausse, régulation à la baisse, réserve tournante, réserve non tournante, RUC, suivi de charge (ascendant et descendant).

Le Tableau 381 montre tous les libellés de MarketProductType.

**Tableau 381 – Libellés de MktDomain::MarketProductType**

| libellé | description                      |
|---------|----------------------------------|
| EN      | Type d'énergie                   |
| RU      | Régulation à la hausse           |
| RD      | Régulation à la baisse           |
| SR      | Réserve tournante                |
| NR      | Réserve non tournante            |
| RC      | Engagement de l'unité résiduelle |
| LFU     | Suivi de charge ascendant        |
| LFD     | Suivi de charge descendant       |
| REG     | Régulation                       |

**6.5.7.38 Enumération MarketType**

Type de marché.

Le Tableau 382 montre tous les libellés de MarketType.

**Tableau 382 – Libellés de MktDomain::MarketType**

| libellé | description                       |
|---------|-----------------------------------|
| DAM     | Marché à J-1                      |
| RTM     | Marché en temps réel              |
| HAM     | Marché à H-1                      |
| RUC     | Engagement de l'unité résiduelle. |

**6.5.7.39 Enumération MktAccountKind**

Type de compte de marché.

Le Tableau 383 montre tous les libellés de MktAccountKind.

**Tableau 383 – Libellés de MktDomain::MktAccountKind**

| libellé     | description |
|-------------|-------------|
| normal      |             |
| reversal    |             |
| statistical |             |
| estimate    |             |

**6.5.7.40 Enumération MktBillMediaKind**

Type de support de facturation.

Le Tableau 384 montre tous les libellés de MktBillMediaKind.

**Tableau 384 – Libellés de MktDomain::MktBillMediaKind**

| libellé    | description |
|------------|-------------|
| paper      |             |
| electronic |             |
| autre      |             |

**6.5.7.41 Enumération MktInvoiceLineItemKind**

Type d'élément de ligne de facturation.

Le Tableau 385 montre tous les libellés de MktInvoiceLineItemKind.

**Tableau 385 – Libellés de MktDomain::MktInvoiceLineItemKind**

| libellé       | description |
|---------------|-------------|
| initial       |             |
| recalculation |             |
| autre         |             |

**6.5.7.42 Enumération MPMTTestIdentifierType**

Type d'identifiant d'essai d'atténuation de l'emprise sur le marché, par exemple:

- 1 ? Essai de tarification globale
- 2 ? Essai de conductivité globale
- 3 ? Essai d'impact global
- 4 ? Essai de tarification locale
- 5 ? Essai de conductivité locale
- 6 ? Essai d'impact local

Le Tableau 386 montre tous les libellés de MPMTTestIdentifierType.

**Tableau 386 – Libellés de MktDomain::MPMTTestIdentifierType**

| libellé | description                        |
|---------|------------------------------------|
| 1       | 1 – Essai de tarification globale. |
| 2       | 2 – Essai de conductivité globale. |
| 3       | 3 – Essai d'impact global.         |
| 4       | 4 – Essai de tarification locale.  |
| 5       | 5 – Essai de conductivité locale.  |
| 6       | 6 – Essai d'impact local.          |

**6.5.7.43 Enumération MPMTTestMethodType**

Type de méthode d'essai d'atténuation d'emprise sur le marché.

Essais avec les seuils normalisés (par défaut) ou essais avec les seuils alternatifs.

Le Tableau 387 montre tous les libellés de MPMTTestMethodType.

**Tableau 387 – Libellés de MktDomain::MPMTTestMethodType**

| libellé   | description |
|-----------|-------------|
| NORMAL    | Normal.     |
| ALTERNATE | Alternatif. |

**6.5.7.44 Enumération MPMTTestOutcome**

Par exemple:

Succès



Echec

Désactivé

Ignoré

Le Tableau 388 montre tous les libellés de MPMTTestOutcome.

**Tableau 388 – Libellés de MktDomain::MPMTTestOutcome**

| libellé | description |
|---------|-------------|
| P       | Succès      |
| F       | Echec       |
| D       | Désactivé   |
| S       | Ignoré      |

#### 6.5.7.45 Enumération MQSCHGType

Par exemple:

ADD – ajouter

CHG – modifier

Le Tableau 389 montre tous les libellés de MQSCHGType.

**Tableau 389 – Libellés de MktDomain::MQSCHGType**

| libellé | description |
|---------|-------------|
| ADD     |             |
| CHG     |             |

#### 6.5.7.46 Enumération MQSInstructionSource

Valeurs valides, par exemple:

INS – Instruction de RTM

ACT – Instruction réelle après les faits

Le Tableau 390 montre tous les libellés de MQSInstructionSource.

**Tableau 390 – Libellés de MktDomain::MQSInstructionSource**

| libellé | description |
|---------|-------------|
| INS     |             |
| ACT     |             |

#### 6.5.7.47 Enumération OnOff

ON

OFF

Le Tableau 391 montre tous les libellés de OnOff.

**Tableau 391 – Libellés de MktDomain::OnOff**

| libellé | description |
|---------|-------------|
| ON      |             |
| OFF     |             |

#### 6.5.7.48 Enumération OutageType

Type d'indisponibilité: IN (disponible), OUT (indisponible), DERATE (réduit).

Le Tableau 392 montre tous les libellés de OutageType.

**Tableau 392 – Libellés de MktDomain::OutageType**

| libellé | description                                                             |
|---------|-------------------------------------------------------------------------|
| OUT     | Le statut de l'équipement est indisponible.                             |
| IN      | Le statut de l'équipement est à nouveau disponible.                     |
| DERATE  | L'équipement possède une limite réduite définie par l'attribut derateP. |

#### 6.5.7.49 Enumération ParticipationCategoryMPM

Par exemple:

'Y' - Participe à LMPM et à SMPM

'N' - N'est pas inclus dans les mesures de tarification LMP

'S' - Participe aux mesures de tarification SMPM

'L' - Participe aux mesures de tarification LMPM

Le Tableau 393 montre tous les libellés de ParticipationCategoryMPM.

**Tableau 393 – Libellés de MktDomain::ParticipationCategoryMPM**

| libellé | description |
|---------|-------------|
| Y       |             |
| N       |             |
| S       |             |
| L       |             |

#### 6.5.7.50 Enumération PassIndicatorType

Définit les acceptations individuelles qui produisent des résultats par type d'exécution/type de marché.

Le Tableau 394 montre tous les libellés de PassIndicatorType.

**Tableau 394 – Libellés de MktDomain::PassIndicatorType**

| libellé | description                                               |
|---------|-----------------------------------------------------------|
| MPM-1   | Acceptation de l'atténuation de l'emprise sur le marché 1 |
| MPM-2   | Acceptation de l'atténuation de l'emprise sur le marché 2 |
| MPM-3   | Acceptation de l'atténuation de l'emprise sur le marché 3 |
| MPM-4   | Acceptation de l'atténuation de l'emprise sur le marché 4 |
| RUC     | Engagement de l'unité résiduelle                          |
| RTPD    | Pré-répartition en temps réel                             |
| RTED    | Répartition économique en temps réel                      |
| HA-SCUC | Engagement d'unité à contrainte de sécurité à 1 h         |
| DA      | J-1                                                       |

**6.5.7.51 Enumération PurposeFlagType**

Indicateur d'objectif MPM, par exemple:

Nature des données de seuil:

'M' - Seuil d'atténuation

'R' - Seuil de rapport

Le Tableau 395 montre tous les libellés de PurposeFlagType.

**Tableau 395 – Libellés de MktDomain::PurposeFlagType**

| libellé | description |
|---------|-------------|
| M       |             |
| R       |             |

**6.5.7.52 Enumération RampCurveType**

Par exemple:

0 – Taux de rampe fixe indépendant de la fonction de taux de la sortie MW de l'unité

1 – Taux de rampe statiques comme fonction de la sortie MW de l'unité uniquement

2 – Taux de rampe dynamiques comme fonction de la sortie MW de l'unité uniquement

Le Tableau 396 montre tous les libellés de RampCurveType.