

SYSTEMS REFERENCE DELIVERABLE



**Generic smart grid requirements –
Part 2-2: Market related domain**

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SYSTEMS REFERENCE DELIVERABLE



**Generic smart grid requirements –
Part 2-2: Market related domain**

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IEC SRD 62913-2-2, which is a Systems Reference Deliverable, has been prepared by IEC systems committee Smart Energy.

The text of this Systems Reference Deliverable is based on the following documents:

Draft SRD	Report on voting
SyCSmartEnergy/88/DTS	SyCSmartEnergy/97/RVDTS

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

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

A list of all parts in the IEC SRD 62913 series, published under the general title *Generic smart grid requirements*, 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 website 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- withdrawn,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.

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INTRODUCTION

Under the general title *Generic smart grid requirements*, the IEC SRD 62913 series consists of the following parts:

- *Part 1: Specific application of the Use Case methodology for defining generic smart grid requirements according to the IEC systems approach;*
- Part 2: is composed of five subparts which refer to the clusters that group several domains:
 - *Part 2-1: Grid related domains* – these include transmission grid management, distribution grid management, microgrids and smart substation automation;
 - *Part 2-2: Market related domain;*
 - *Part 2-3: Resources connected to the grid domains* – these include bulk generation, distributed energy resources, smart home / commercial / industrial / DR-customer energy management, and energy storage;
 - *Part 2-4: Electric transportation related domain;*

IEC SRD 62913 refers to 'clusters' of domains for its different parts so as to provide a neutral term for document management purposes simply because it is necessary to split in several documents the broad scope of smart grid.

The document for each domain is composed as follows.

- Purpose and scope.
- Business analysis: to address domain's strategic goals and principles regarding its smart grid environment. It also lists business use cases and system use cases identified, their associated business roles and system roles (actors) and the simplified role model highlighting main interactions between actors.
- Generic smart grid requirements: extracted from Use Cases described in Annex B.
- Annex A lists links between domains, technical committees and gathered materials (existing standardization documents, user stories, Use Cases and functional architectures).
- Annex B includes a complete description of Use Cases per domain based on IEC 62559-2.
- Bibliography.

The purpose of this document is to define the generic smart grid requirements of the market related domain, based on the methods and tools developed in IEC SRD 62913-1.

This analysis is based on the business input from domain experts as well as existing material on grid management in a smart grid environment when relevant. Table 1 highlights the domains and business use cases described in this document.

Table 1 – Content of IEC SRD 62913-2-2:2019

Domain	Content	Scope
Market	Described with 1 business Use Case and 6 system Use Cases identified	

GENERIC SMART GRID REQUIREMENTS –

Part 2-2: Market related domain

1 Scope

This part of IEC SRD 62913 initiates and illustrates the IEC's systems approach based on Use Cases and involving the identification of generic smart grid requirements for further standardization work for market related domains, based on the methods and tools developed in IEC SRD 62913-1.

It captures possible “common and repeated usage” of a smart grid system, under the format of “Use Cases” with a view to feeding further standardization activities. Use Cases can be described in different ways and can represent competing alternatives. From there, this document derives the common requirements to be considered by these further standardization activities in terms of interfaces between actors interacting with the given system.

To this end, Use Case implementations are given for information purposes only. The interface requirements to be considered for later standardization activities are summarized (typically information pieces, communication services and specific non-functional requirements: performance level, security specification, etc.).

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1.1

active demand definition

demand offered for the purposes of, but not restricted to, providing active power management, voltage and frequency regulation and system reserve

3.1.2

aggregation

process of combining data from various sources

[SOURCE: ISO/IEC 29182-2:2013, 2.4.2]

3.1.3

dispatchable generation source

source of electricity that can be dispatched at the request of power grid operators or of the plant owner

Note 1 to entry: That is, generating plants that can be turned on or off, or can adjust their power output according to an order.

3.1.4

flexibility

modification of electricity injection and/or extraction, on an individual or aggregated level, in reaction to an external signal in order to provide a service within the energy system

Note 1 to entry: This definition is based on EURELECTRIC, Active Distribution System management. A key tool for the smooth integration of distributed generation, 2013.

3.1.5

flexibility aggregator

entity that buys and aggregates the flexibility of consumption (demand response) and distributed generation in order to value them on the market and through the transportation products (adjustment mechanism, capacity market)

Note 1 to entry: Flexibility aggregator contracts with end-customer directly or through an intermediary like an energy supplier.

3.1.6

quality of service

collective effect of service performance which determines the degree of satisfaction of a user of the service

Note 1 to entry: The quality of service is characterized by the combined aspects of service support performance, service operability performance, serviceability performance, service integrity and other factors specific to each service.

[SOURCE: IEC 60050-191:1990, 191-19-01]

3.1.7

security

<of an electric power system> ability to operate in such a way that credible events do not give rise to loss of load, stresses of system components beyond their ratings, bus voltages or system frequency outside tolerances, instability, voltage collapse, or cascading

Note 1 to entry: In the context of smart grid, the term 'security' may be too vague. In this document it may be replaced by 'operational reliability' or 'operational security' to reflect the real practices of, for example, NERC or ENTSO-E.

[SOURCE: IEC 60050-191:1999, 191-21-03]

3.1.8

work programme

schedule for operations related to the creation, maintenance, and repair of network assets on the transmission or distribution grid

[SOURCE: evolVDSO, D2.1 Business Use Cases Definition and requirements, 2014]

3.2 Abbreviated terms

BRP	Balance Responsible Party
CBA	Cost Benefit Analysis
EHV	Extremely High Voltage
DER	Distributed Energy Resources
DR	Demand-Response
DSO	Distribution System Operator
FCR	Frequency Control Reserve
FRR	Frequency Restoration Reserve

HV	High Voltage
HVDC	High Voltage Direct Current
LV	Low Voltage
MV	Medium Voltage
RR	Restoration Reserve
SGAM	Smart Grid Architecture Model
TSO	Transmission System Operator

4 Market

4.1 Purpose and scope

4.1.1 Clause objective

The purpose of Clause 4 is to present a business analysis of the market domain in a smart grid context, and more specifically to describe the smart grid requirements of the domain using the generic Use Case approach as defined in [1]¹. This analysis is based on a European perspective, and will need to be extended to other regions (such as North-American markets).

4.1.2 General context

4.1.2.1 General

Two technological trends are impacting the electric power system:

- the development of distributed renewable energy sources, which are intermittent;
- the development of smart grid technologies.

4.1.2.2 An electric power system perspective – the need to strengthen the management of balance between demand and supply through interconnected transmission grids

The functioning of the electric power system requires maintaining the balance between supply and demand at any time, in order to avoid situations leading to load shedding or even blackouts, which could have dramatic economic consequences.

The electric power system, in which balance between demand and supply is managed at the level of transmission networks by the TSO, provides the following benefits.

- It contributes to ensure security of supply and cost optimization to the benefits of consumers, by reducing and localizing the impacts of faults and other unexpected events, and by using the most efficient generation capacities at each synchronous area at first and if not existing at the national level.
- It offers a better use and increases the value of intermittent renewable energy sources, by mitigating their variations (see for example North-South grid interconnections in Germany).
- It allows solidarity between regions which have high penetration of distributed renewable energy sources and others with lower shares of renewable energy sources.

To ensure the reliability of the electric power system, stakeholders can rely on the following key players:

¹ Numbers in square brackets refer to the Bibliography.

- regulated actors, like system and grid operators, who manage the networks and ensure physical balance between production and consumption in their balancing zone for system operators;
- deregulated actors (such as suppliers/retailers, flexibility aggregators, producers, or electricity traders/brokers), who operate within a balancing zone, on which balance responsible parties have a financial responsibility.

4.1.2.3 Evolutions needed for the electric power system

4.1.2.3.1 A need for more flexibilities

First, the development of renewable energy sources, more particularly wind and solar power, increases the variability and uncertainties on balance between supply and demand. The electric power system will need more flexibility to maintain this balance and further face new challenges.

A global cost benefit analysis (CBA) should be achieved to assess the economic relevance of the flexibility versus grids developments.

4.1.2.3.2 New constraints in distribution networks

The increased penetration of distributed generation from renewable energy sources into distribution and transmission networks tends to generate operational problems. The risk to violate grid operational constraints increases.

Grid operators have traditionally managed these constraints in the long term with network reinforcement, investments, and in the operational time horizon by switching actions, emergency control of customers and, if other means fail, by disconnection of less critical feeders and customers.

Otherwise the result is an uncontrolled wider and longer nonselective blackout.

A more dynamic management of the grid would allow grid operators to optimize network investments and to reduce the risk of blackouts and a loss or limitation of customers' physical access to the market.

With the increasingly dynamic power flows, it also becomes necessary to take into account the dynamic grid constraints in the electricity markets in a fair and transparent way.

4.1.2.3.3 Expected benefits of smart grid technologies on flexibilities and network management

Furthermore, smart grid technologies, including the deployment of smart metering systems for residential and business customers and communicating electrical equipment, will enable the development of further flexibilities and contribute to the reliability and efficiency of the electric power system.

These flexibilities, which can be defined as a modification of injection and/or extraction on an individual or aggregated level, in reaction to an external signal in order to provide a service within the energy system, may be traded within the electricity market, to deliver ancillary services, services to grid operators, for the TSO for balancing purposes, or to allow an optimization of production costs for instance.

Flexibilities can be incentivized and remunerated by:

- a variation of electricity prices (purchased or supplied),
- a variation of network tariffs,
- a direct compensation for the provider of the flexibility.

Furthermore, the activation of localized flexibilities (injection or extraction) can allow system and grid operators to solve specific grid constraints. These local flexibilities, developed by actors within their balancing zone, impact the balance between supply and demand and therefore have to be taken into account in its management at a system level.

Table 2 lists some examples of flexibility products based on active demand, as well as their main characteristics.

Table 2 – Examples of flexibility products based on active demand

Active demand product	Conditionality	Typical example
Bi-directional conditional re-profiling	Conditional (real option)	Having the capacity to provide a specified demand modification during a given period in a bi-directional range $[y, x]$ MW, including both demand increase and decrease. The delivery is called upon by the buyer of the active demand product (similar to a reserve service).
Conditional re-profiling	Conditional (real option)	Having the capacity to provide a specified demand modification during a given period. The delivery is called upon by the buyer of the active demand product (similar to a reserve service).
Scheduled re-profiling	Unconditional (obligation)	Obligation to provide a specified demand modification (reduction or increase) at a given time to the product buyer.

The business analysis of the market domain will detail how these flexibilities can be provided and used by various roles of the electric power system within the electricity market.

4.1.3 Overview of electricity market

The purpose of electricity market is to allow actors of the electric power system to purchase and sell energy and energy-related products and services. Trading can take place:

- on stock exchanges – such as EPEX Spot for instance;
- via mutual agreement (direct or brokered).

Even though the domain is referred to as “market” in the singular, it is more accurate to speak about “electricity markets” in the plural. Indeed, separate marketplaces or market mechanisms with specific sets of rules, roles, and objectives may exist in the same zone and even be coordinated.

The business analysis of the domain focuses on the flexibility products and services traded within electricity markets which allow market players to execute/enable their business processes. These internal processes are out of the scope of this document.

4.2 Business analysis

4.2.1 General overview

The electricity markets are going to have a preponderant place for the whole electric power system. The development of new electricity usages and the integration of DER need reliable and efficient market mechanisms. To contribute to the security of the system and to obtain the best deals between market participants, the development of market facilities, market products and a better cooperation between actors are required.

Flexibility products and services may be traded within existing or new markets and market mechanisms – depending on various elements such as legal rules, the time scale or geographic scale.

Here are some major improvements expected for the main domain business roles from the integration of flexibility products and services within electricity markets.

- End-customers may benefit from better energy supply contracts and reduced electricity bills if they accept to modulate their consumption and participate in the market (via a supplier, a flexibility aggregator/operator, or another third party).
- Suppliers will be able to propose to their customers flexible offers and create value with attractive tariffs, by developing active demand offers combined with competitive tariffs during off-peak periods and/or less competitive tariffs during peak periods for instance. This flexibility can create value on energy markets or allow system or grid operators to solve network constraints. Suppliers may also participate in a capacity market or mechanism – when such a market/mechanism has been implemented.
- Flexibility aggregators will develop, offer and manage various flexibility products and stakeholders for grid users (consumers, producers, and/or prosumers), system operators, or grid operators.
- System operators and grid operators may obtain (new) flexibilities to ensure the network reliability, plan work programmes and ultimately realize investments – as long as these flexibilities meet certain requirements according to the legal framework.
- Producers may rely on new levers to sell their production, plan their investments and works, and self-insure against business risks – by buying flexibilities.

A strong coordination between certain roles will be needed to prevent market side effects and ensure the overall optimization of the system. More specifically, Transmission system operators and grid operators may have to reinforce their cooperation to prevent situations where their actions on a given network would generate unacceptable constraints on another network, or situations where they compete for the same products. Different models may be proposed, with shared portfolio or separate markets/mechanisms for instance. These models should be assessed through a global analysis taking into account all the aspects of the system to select the most economically efficient option, complying with the legal framework.

Regarding the potential use of flexibilities by system and/or grid operators, the following points should be noted.

- Local flexibilities obtained by grid operators may benefit the overall electric power system, provided that the benefits for the grid exceed their costs (additional energy costs, management costs, loss of opportunity, etc.). Regulation mechanisms would have to be implemented to manage the activation and ex-post certification of such flexibilities. Grid operators may have to pay compensations for their use.
- Several ways to request local flexibilities may exist; grid operators should be incited to use the most cost-efficient ones.
- Flexibility price signals should combine their value for the grid and their value for the market. Flexibilities exist in limited number. A strong coordination between flexibilities activated for grid purposes and flexibilities activated for market purposes should therefore be targeted, in order to avoid reducing their value and as a result the incentive for the customer.

It is proposed that the focus of the market should be the support of power system stakeholders' activities via the use of flexibilities in marketplaces. Several new and evolving business processes are proposed in 4.2.2, and could be described as business use cases.

4.2.2 List of business roles and business use cases of the domain

The business use cases listed are a result of the business analysis carried out previously – the list is not exhaustive, and it is likely to grow as new Use Cases come to light.

Table 3 lists the business roles that have been identified so far. This list is not exhaustive.

Table 3 – Identified business roles of the domain

Business roles	Definition
Balance responsible party	Party that has a contract proving financial security and identifying balance responsibility with the imbalance settlement responsible party 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. Additional information: The meaning of the word “balance” in this context signifies that the quantity contracted to be provided or to be consumed must 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. [SOURCE: ENTSO-E, EFET, and eBIX, 2014][2]
Billing agent	The party responsible for invoicing a concerned party. [SOURCE: ENTSO-E, EFET, and eBIX, 2014]
Centralized electricity producer	Electricity producer with generator(s) connected to the transmission grid. Production can be dispatchable and/or non-dispatchable. This is a type of producer. [SOURCE: based on ADDRESS, D1.1 Technical and commercial conceptual architectures, 2009]
Client / customer (of electricity supplier)	A party connected to the grid that contract for the ability to consume electricity at a metering point.
Decentralized electricity producer	Electricity producer with generator(s) connected to the distribution grid. Production can be dispatchable and/or non-dispatchable. This is a type of producer. [SOURCE: based on ADDRESS, D1.1 Technical and commercial conceptual architectures, 2009]
Distribution grid operator	Entity responsible for the planning, operation and maintenance of the electricity distribution network (LV, MV, and potentially HV). Equivalent to distribution network operators or distribution system operators. In some countries, the distribution grid operator may also manage the metering system (for example France).
Electricity trader / broker	Entity whose principal commercial activity is the purchase and resale of electricity on the wholesale power markets. Traders may be speculators and can contribute to risk management. They may be operating on cross-border interconnections. [SOURCE: ADDRESS, D1.1 Technical and commercial conceptual architectures, 2009]
Flexibility aggregator	A party which aggregates flexibilities for its customers. May activate flexibility sites.
Flexibility operator	A party which technically operates flexibilities for its customers.
Grid user	A party connected to the grid and consuming and/or producing electricity. Grid users include consumers, producers, and prosumers. Equivalent to party connected to the grid.

Business roles	Definition
Imbalance settlement responsible party	A party that is responsible for settlement of the difference between the contracted quantities and the realized quantities of energy products for the balance responsible parties in a market balance area. NOTE The imbalance settlement responsible party has the responsibility to invoice. The imbalance settlement responsible party may delegate the invoicing responsibility to a more generic role such as a billing agent. [SOURCE: ENTSO-E, EFET, and eblX, 2014]
Metered data user	Party that is authorized to acquire energy usage information from the metering data manager.
Metering data manager	The metering data manager is a macro-role, including: • Metered data aggregator: A party responsible for the establishment and qualification of metered data from the metered data responsible. This data is aggregated according to a defined set of market rules. • Metered data responsible: A party responsible for the establishment and validation of metered data based on the collected data received from the metering system operator. The party is responsible for the history of metered data for a metering point. • Metering point administrator: A party responsible for registering the parties linked to the metering points in a metering grid area. The metering point administrator is also responsible for maintaining the metering point technical specifications, and for creating and terminating metering points. • Other metered data user relationship manager: Respond to regulatory changes and expand the range of smart-related services offered to actors of the electric power system (not grid users/suppliers/BRPs). The possibility to provide regulated services based on data management and provision in order to facilitate national and local public policies and enable customer empowerment. [SOURCE: ENTSO-E role model]
Producer	Party generating electric energy. [SOURCE: IEC 60050-617:2009, 617-02-01] This is a type of grid user.
Prosumer	The term prosumer comes from the contraction of producer and consumer; a prosumer is therefore a consumer who has generation and/or storage capabilities in its premises (e.g. embedded generation such as photo-voltaic, micro-turbine, etc.). [SOURCE: ADDRESS, D1.1 Technical and commercial conceptual architectures, 2009]
Service provider	Entity providing electricity-related services (such as energy efficiency or communication services).
(Electricity) supplier / retailer	Party having a contract to supply electric power and energy to a customer. [SOURCE: IEC 60050-617:2009, 617-02-08] Suppliers can generate flexibilities through modulation of electricity prices (time-of-use, critical peak prices, etc.), flexibilities which can have value on energy markets and/or for network operations. The supplier may also deliver energy related-services.
System operator	Party responsible for safe and reliable operation of a part of the electric power system in a certain area and for connection to other parts of the electric power system. [SOURCE: IEC 60050-617:2009, 617-02-09]

Business roles	Definition
Transmission system operator	A natural or legal person responsible for operating, ensuring the maintenance of and, if necessary, developing the transmission system in a given area and, where applicable, its interconnections with other systems, and for ensuring the long term ability of the system to meet reasonable demands for the transmission of electricity. [SOURCE: Directive 2009/72/EC]

Table 4 lists the business Use Cases that have been. This list is non-exhaustive.

Table 4 – Business Use Cases of the market related domain

Index of business Use Cases	Identified business Use Cases	Brief description	System Use Case required to enable/execute the business Use Case	Business cases	Level of maturity
UC62913-2-2-B001	Deliver services based on data provision	The business Use Case describes how the metering data manager transmits consumption data to consumers or metered data user while respecting relevant data privacy issues.	• Browse and download personal consumption data • Collect consumer's consent • Revoke consumer's consent • Collect consumer's consumption data for a given purpose • Produce data services • Execute data transmission	Facilitate/enable customer empowerment and sustainable national and local public policies	<i>Incomplete due to uncertainty (Regulatory,...)</i>

4.2.3 List of system Use Cases and system roles

4.2.3.1 System Use Cases and system roles of the domain

Table 5 lists the system Use Cases which have been identified so far to enable the business Use Cases described above to operate. The list is non-exhaustive and will be updated when new editions of IEC SRD 62913-2-2 are published.

Table 5 – Identified system Use Cases of the domain

Index of the system Use Cases	Identified system Use Cases
UC62913-2-2-S001	Browse and download personal consumption data
UC62913-2-2-S002	Collect consumer's consent
UC62913-2-2-S003	Collect consumer's consumption data for a given purpose
UC62913-2-2-S004	Execute data transmission
UC62913-2-2-S005	Produce data services
UC62913-2-2-S006	Revoke consumer's consent

4.3 Generic smart grid requirements

The market requirements in 4.3 have been extracted from the following Use Cases described in Annex B according to the IEC 62559-2 Use Case template:

- Deliver services based on data provision.

The IEC core standards shall support the needs and requirements listed in Table 6.

Table 6 – Requirements extracted from market Use Cases

Requirement ID	Requirement description	Link to Use Cases
R62913-2-2-001	An agreement for data services exists between the metering data manager and the metered data user	Annex B.1.1.1 Narrative
R62913-2-2-002	The metering data manager and the metered data user have an agreement for data services	Annex B.1.1.1 Scenario 1
R62913-2-2-003	The consumer gives his or her consent for data collection	Annex B.1.1.1 Scenario 1
R62913-2-2-004	The consumer gives his or her consent for data transmission	Annex B.1.1.1 Scenario 1

Annex A (informative)

Links with other TCs and gathered materials

A.1 General

In order to capture generic smart grid requirements, existing materials have been gathered (standardization documents, user stories, Use Cases, and functional architectures) as a starting point for further work on generic smart grid requirements.

A.2 Market

A.2.1 Identified TCs

Below are listed the relevant TCs working on smart grid requirements of the domain.

- IEC SG 3 – Smart Grid
- IEC TC 57: Power systems management and associated information exchange
 - WG 13: Energy management system application program interface (EMS – API)
 - WG 14: System interfaces for distribution management (SIDM)
 - WG 16: Deregulated energy market communications
 - WG 17: Power system intelligent electronic device communication and associated data models for distributed energy resources and distribution automation
 - WG 21: Interfaces and protocol profiles relevant to systems connected to the electrical grid
- IEC PC 118 – Smart grid user interface

A.2.2 Gathered materials

A.2.2.1 General

Concerning standardization, it seems interesting to refer to IEC SG 3 (Strategic Group on Smart Grid) general recommendation on Markets. SG 3 worked together with IEC SyC Smart Energy to progressively gather smart grid requirements information with a single method, within a single framework, based on Use Cases, and then enable standards to be developed in harmony, and incrementally match the moving market expectations. The IEC Smart Grid Standardization Roadmap [3] states that in the electricity market domain, electrical energy is purchased and sold as a commodity. The price of electrical energy is set by supply and demand. In future domains, market and price information will be distributed to a larger extent and to participants in the domain which do not today receive price and market information. Information must be distributed online and within a far shorter time period than today. Pricing information at the consumer site may be available on an hourly or even shorter basis. The relevant standards are not within the scope of the IEC.

The IEC Smart Grid Standardization Roadmap states:

“The IEC should seek close cooperation with stakeholders in the domain “markets”. A lot of proprietary work is done in that field. The IEC should seek close cooperation with organizations such as UN/CEFACT and UN/EDIFACT as well as other important regulatory authorities and trade associations. An investigation of the most promising market data systems must be performed. This input is vital for an extension of the smart grid with market information.” Recommendation G-4

NOTE Many works have been undertaken to address market related communication, especially in the IEC 62325 series [4]. Many parts are also to come. This series is the result of large worldwide co-operation between stakeholders. Its structure allows creating region-specific profiles and its acceptance is already very encouraging. This series is now part of the set of smart grid core standards.

A.2.2.2 Standardization documents

Name	Author or organization	Status	Date	Relevant sections or pages (optional)
IEC 62325-301:2018, <i>Framework for energy market communications – Part 301: Common information model (CIM) extensions for markets</i>	IEC TC 57 WG 16	IS	2018	
IEC 62325-351:2016, <i>Framework for energy market communications – Part 351: CIM European market model exchange profile</i>	IEC TC 57 WG 16	IS	2016	
IEC 62325-450:2013, <i>Framework for energy market communications – Part 450: Profile and context modelling rules</i>	IEC TC 57 WG 16	IS	2013	
IEC 62325-451-1:2017, <i>Framework for energy market communications – Part 451-1: Acknowledgement business process and contextual model for CIM European market</i>	IEC TC 57 WG 16	IS	2017	
IEC 62325-451-2:2014, <i>Framework for energy market communications – Part 451-2: Scheduling business process and contextual model for CIM European market</i>	IEC TC 57 WG 16	IS	2014	
IEC 62325-451-3:2014, <i>Framework for energy market communications – Part 451-3: Transmission capacity allocation business process (explicit or implicit auction) and contextual models for European market</i>	IEC TC 57 WG 16	IS	2014	
IEC 62325-451-4:2017, <i>Framework for energy market communications – Part 451-4: Settlement and reconciliation business process, contextual and assembly models for European market</i>	IEC TC 57 WG 16	IS	2017	
IEC 62325-451-5:2015, <i>Framework for energy market communications – Part 451-5: Problem statement and status request business processes, contextual and assembly models for European market</i>	IEC TC 57 WG 16	IS	2015	
IEC TR 62325-501:2005, <i>Framework for energy market communications – Part 501: General guidelines for use of ebXML^a</i>	IEC TC 57 WG 16	TR	2005	
IEC TS 62325-502:2005, <i>Framework for energy market communications – Part 502: Profile of ebXML</i>	IEC TC 57 WG 16	TS	2005	
IEC TS 62325-503:2014, <i>Framework for energy market communications – Part 503: Market data exchanges guidelines for the IEC 62325-351 profile</i>	IEC TC 57 WG 16	TS	2014	
IEC TS 62325-504:2015, <i>Framework for energy market communications – Part 504: Utilization of web services for electronic data interchanges on the European energy market for electricity</i>	IEC TC 57 WG 16	TS	2015	
IEC TR 62325-101:2005, <i>Framework for energy market communications – Part 101: General guidelines^a</i>	IEC TC 57 WG 16	TR	2005	
IEC TR 62325-102:2005, <i>Framework for energy market communications – Part 102: Energy market example model^a</i>	IEC TC 57 WG 16	TR	2005	
^a Withdrawn.				

A.2.2.3 Existing Use Cases

Name	Author or organization	Publication date	Source
Acknowledgment process	IEC		IEC 62325-451-1
Scheduling process	IEC		IEC 62325-451-2
Nominate with acknowledgement only	IEC		IEC 62325-451-2
Nominate with acknowledgement, confirmation and anomaly	IEC		IEC 62325-451-2
Nominate with acknowledgement and confirmation	IEC		IEC 62325-451-2
Transmit planned schedules	IEC		IEC 62325-451-2
Transmission capacity allocation business process (explicit or implicit auction)	IEC		IEC 62325-451-3
Establish offered capacity			IEC 62325-451-3
Explicit auction process	IEC		IEC 62325-451-3
Implicit auction process	IEC		IEC 62325-451-3
Settlement/reconciliation	IEC		IEC 62325-451-4
Status request	IEC		IEC 62325-451-5
WGSP-2128 (including WGSP-2129): Flexibility Offering	CEN/CLC/ETSI	November 2012	Smart Grid Coordination Group – Sustainable Processes [5]
WGSP-2400: Using Flexibility	CEN/CLC/ETSI	November 2012	Smart Grid Coordination Group – Sustainable Processes

Annex B (informative)

Use Cases

B.1 Market

B.1.1 Business Use Cases

See Table B.1.

Table B.1 – UC62913-2-2-B001 Deliver services based on data provision

UC62913-2-2-B001 Deliver services based on data provision				
1 Description of the use case				
1.1 Name of use case				
Use case identification				
ID	Area(s)/Domain(s)/Zone(s)		Name of use case	
UC62913-2-2-B001	Distribution Grid Management		Deliver regulated services based on data provision	
1.2 Version management				
Version management				
Version No.	Date	Name of author(s)	Changes	Approval status
1.3 Scope and objectives of use case				
Scope and objectives of use case				
Scope	1) Collection and revocation of the consumer’s consent for: – collection of individual consumption data (for example: index, load curves, $P_{\max}$, etc.) for a given purpose, or – collection of individual consumption data and transmission of these data to metered data users for a given purpose; 2) Collection and transmission of individual consumption data to consumers who are equipped with smart meters; 3) Collection, processing, and transmission of a consumer’s individual consumption data to authorized third parties for a given purpose. Commercially sensitive data and all elements regarding personal or confidential information are thereby excluded, except when the consumer has given explicit consent.			
Objective(s)	In compliance with the regulatory framework and relevant rules regarding cybersecurity and data protection, the objectives of this Use Case are to: – Provide to consumers: empower them and help them manage their consumption, – Provide to metered data users (suppliers, service providers, etc.): to facilitate energy demand management actions or services and sustainable development policies.			
Related business case(s)	Facilitate/enable customer empowerment and sustainable national and local public policies			

UC62913-2-2-B001 Deliver services based on data provision	
1.4 Narrative of Use Case	
Narrative of use case	
Short description	
The generic business Use Case describes how the metering data manager transmits consumption data to consumers or authorized third parties while respecting relevant data privacy issues. The business Use Case includes the following steps: 1) Collection and revocation of the consumer's consent; 2) Collection and publication of personal consumption data to consumers which have smart metering systems; 3) Collection, processing and transmission of consumption data to authorized third parties.	
Complete description	

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UC62913-2-2-B001 Deliver services based on data provision

The process includes the following steps:

Prerequisite: Signature of an agreement for data services between the metering data manager and the metered data user

The metered data user asks the metering data manager to establish an agreement for data services with the following elements:

- Identity of the metered data user
- Purpose of the treatment
- Duration of the service (beginning and end)

The metering data manager proceeds to the demand.

1) Collection and revocation of the consumer's consent

a) Submission of a request to collect the consumer's consent

The metered data user asks the consumer to collect his or her individual consumption data for a given purpose (e.g. consumption reduction).

The metered data user asks the metering data manager to collect the consent of the consumer. The metered data user indicates the purpose of the request: during this process the metered data user provides the metering data manager with information describing the type of application the metered data user will provide.

b) Collection of the consumer's consent by the metering data manager

The metering data manager proceeds to the consumer's consent request:

- The consumer can give consent for data collection.
- In case of consent for data collection, the consumer can give consent for data transmission.

c) Information of the consumer and the metered data user of the consent request success

The metering data manager confirms to the consumer that his or her consent has been collected and reminds the consumer of its main characteristics (collection only or collection and transmission, purpose, data recipient and duration).

The metering data manager notifies the metered data user of the success of its consent request for data collection and transmission.

(see SUC – Collect consumer's consent)

d) Revocation of the consumer's consent

The consumer can, whenever he or she wants, revoke consent to the metering data manager.

The metering data manager proceeds to the revocation and sends a confirmation to the consumer.

In case of data transmission, the metering data manager informs the metered data user of the consumer's revocation and instantaneously stops the data transmission.

(See SUC – Revoke consumer's consent)

2) Collection and publication of personal consumption data to consumers which have smart metering systems

a) Collection of individual consumption data for a given purpose

(See SUC – Collect consumer's consumption data for a given purpose)

b) Production of data services for the consumer

(See SUC – Produce data services)

c) Transmission of the data to the consumer

(See SUC – Browse and download personal data consumption)

3) Collection, processing and transmission of consumption data to authorized third parties

a) Reception by the metering data manager, from the metered data user, of a request for data services

The metering data manager receives a demand for data services from the metered data user, with whom he or she previously signed an agreement. The metering data manager registers the demand.

The metering data manager verifies the validity of the consumer's consent for the transmission of his or her individual consumption data to the metered data user, i.e. that the metered data user is authorized to receive these data.

b) Realization by the metering data manager of the data services and transmission

The metering data manager proceeds to the transmission.

The metering data manager keeps traces from all of the operations of data treatment and data services. This traceability allows the metering data manager to answer every demand from certified control organisms.

(See SUC – Execute data transmission)

UC62913-2-2-B001 Deliver services based on data provision

Summary of use case

• Collection and revocation of the consumer's consent

Description: 4 steps:

- Submission of a request to collect the consumer's consent
- Collection of the consumer's consent by the metering data manager
- Informing the consumer and the metered data user of the consent request success
- Revocation of the consumer's consent
- Ask for consumer's consent

Description: The metered data user asks the consumer to collect his or her individual consumption data for a given purpose (e.g. consumption reduction).

- Submit a request to collect the consumer's consent

Description: The metered data user asks the metering data manager to collect the consent of the consumer.

The metered data user indicates the purpose of the request

- Receive the demand

Description:

- Receive the request

Description:

- Send a request to collect consumer consent

Description: The metering data manager proceeds to the consumer's consent request

- Receive the request

Description:

- Send consent

Description:

- The consumer can give consent for data collection
- In case of consent for data collection, the consumer can give consent for data transmission

- Receive consent

Description:

- Inform the consumer of the consent request success

Description: The metering data manager confirms to the consumer that his or her consent has been collected and reminds the consumer of its main characteristics.

- Inform the metered data user of the consent request success

Description: The metering data manager notifies the metered data user of the success of its consent request

- Receive the information

Description:

- Receive the information

Description:

- Send revocation of the consent

Description: The consumer revokes his or her consent. The consumer can do it whenever he or she wants.

- Receive the request

Description:

- Confirm the Revocation of the consumer's consent

Description: The metering data manager proceeds to the revocation and sends a confirmation to the consumer.

- Receive the confirmation

Description:

- Inform the Revocation of the consumer's consent

Description: In case of data transmission, the metering data manager informs the metered data user of the consumer's revocation and instantaneously stops the data transmission.

- Receive the information

Description:

UC62913-2-2-B001 Deliver services based on data provision

- Collection and publication of personal consumption data to consumers which have smart metering systems

Description: 3 steps:

- Collection of individual consumption data
- Production of data services for the consumer
- Transmission of the data to the consumer
 - Collect and send individual consumption data

Description:

- Receive the information

Description:

- Produce data services for the consumer

Description:

- Send the data to the consumer

Description:

- Receive

Description:

- Collection, processing and transmission of consumption data to metered data user

Description: 2 steps:

- Reception by the metering data manager, from the metered data user, of a request for establishing an agreement for data services
- Realization by the metering data manager of the data services and transmission of the data
- Send a request for establishing an agreement for data services

Description: The metered data user sends a demand for data services to the metering data manager with whom he or she previously signed an agreement.

- Receive the request for establishing an agreement for data services

Description: The metering data manager receives a demand for data services from the metered data user, with whom he or she previously signed an agreement.

The metering data manager registers the demand.

- Proceed to a verification

Description: The metering data manager verifies the validity of the consumer's consent for the transmission of its individual consumption data to the metered data user, i.e. that the metered data user is authorized to receive these data.

- Execute data transmission

Description: The metering data manager proceeds to the transmission.

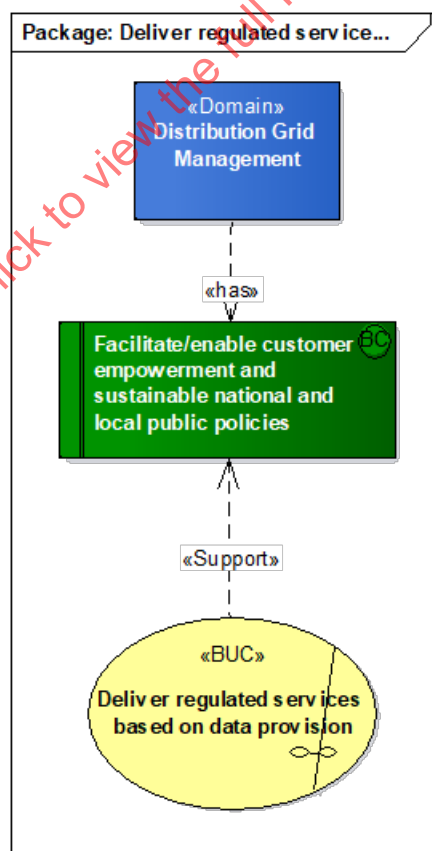
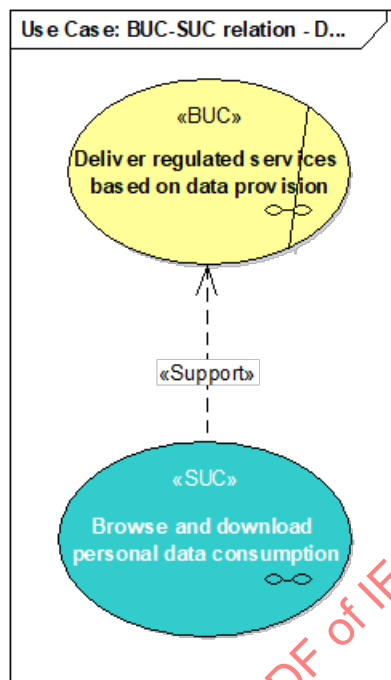
- Register the transfer

Description: The metering data manager keeps traces from all of the operations of data treatment and data services. This traceability allows the metering data manager to answer every demand from certified control organisms.

- Receive

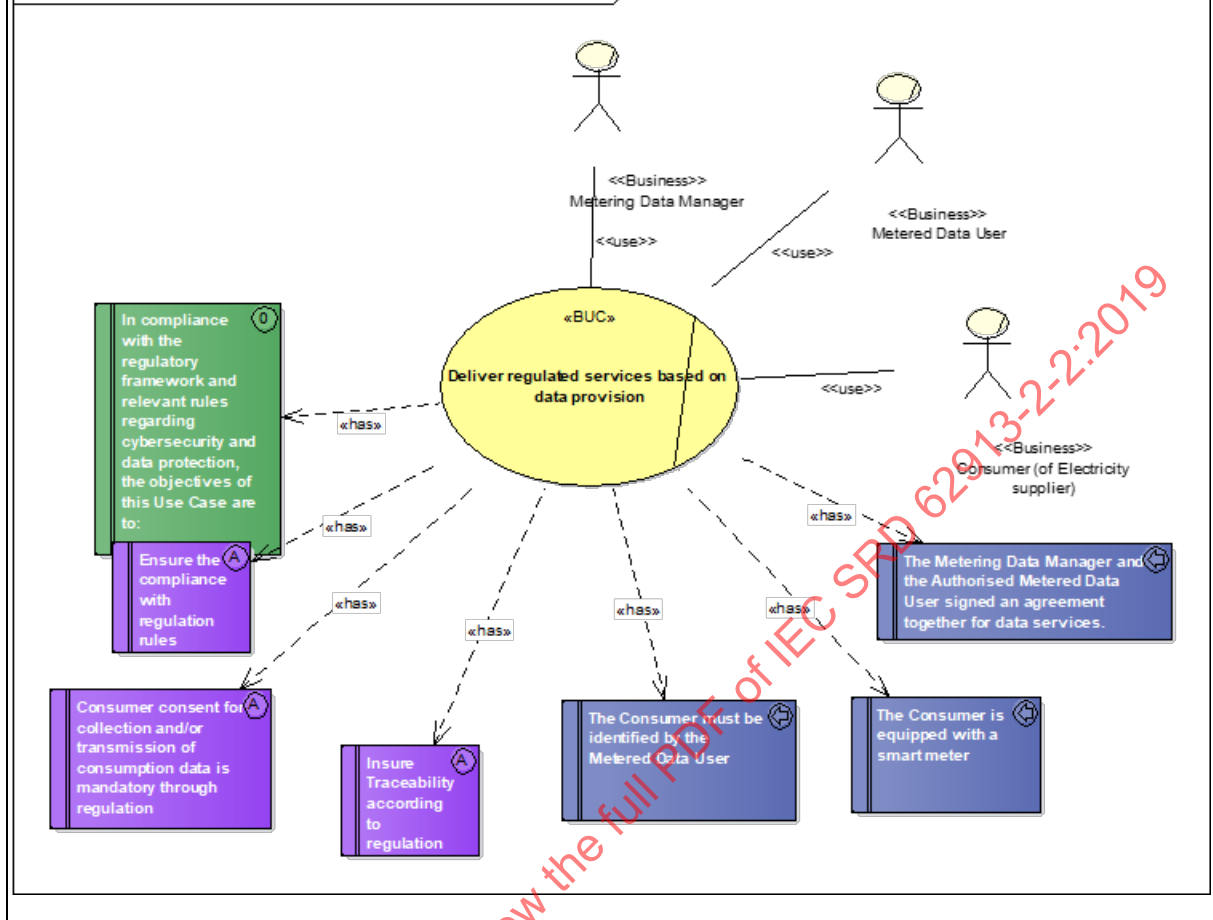
Description:

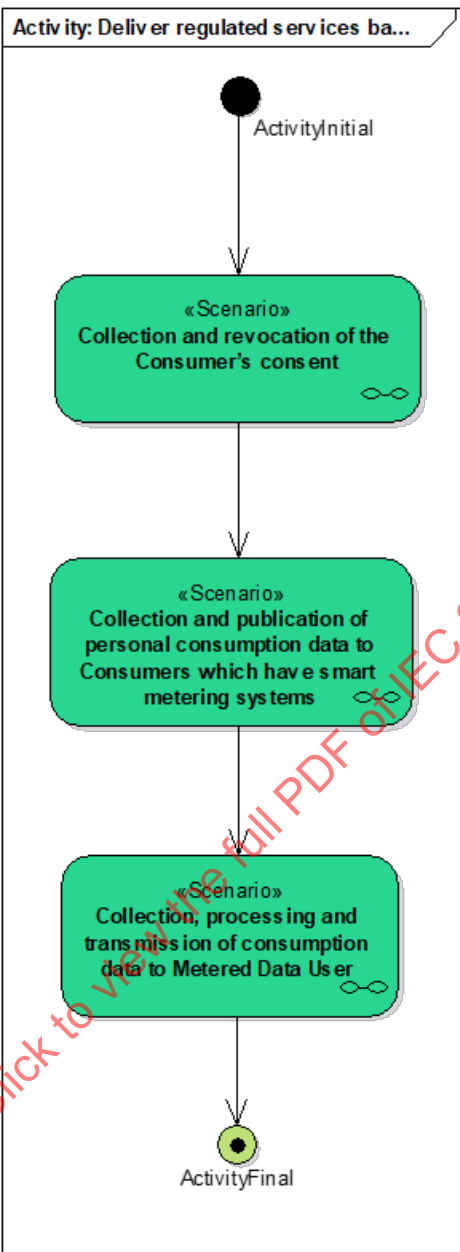
UC62913-2-2-B001 Deliver services based on data provision			
1.5 Key performance indicators (KPIs)			
Key performance indicators			
ID	Name	Description	Reference to mentioned use case objectives
1.6 Use case conditions			
Use case conditions			
Assumptions			
1		Ensure the compliance with regulation rules	
2		Consumer consent for collection and/or transmission of consumption data is mandatory through regulation	
3		Ensure traceability according to regulation	
Prerequisites			
1		The consumer must be identified by the metered data user	
2		The metering data manager and the authorized metered data user signed an agreement together for data services	
3		The consumer is equipped with a smart meter	
1.7 Further information to the use case for classification/mapping			
Classification information			
Relation to other use cases			
<<SUC>> [] Browse and download personal data consumption			
Level of depth			
Long version			
Prioritization			
Generic, regional or national relation			
Generic			
Nature of the use case			
BUC			
Further keywords for classification			
1.8 General remarks			
General remarks			

UC62913-2-2-B001 Deliver services based on data provision**2 Diagrams of use case****Diagram(s) of use case**

UC62913-2-2-B001 Deliver services based on data provision

Use Case: Deliver regulated services based on data provision - overview



UC62913-2-2-B001 Deliver services based on data provision**3 Technical details****3.1 Actors**

Actors			
Grouping (e.g. domains, zones)		Group description	
Actor name	Actor type	Actor description	Further information specific to this use case
Consumer (of electricity supplier)	Business	See Table 3	Consumer equipped with a smart meter
Metered data user	Business	See Table 3	
Metering data manager	Business	See Table 3	

UC62913-2-2-B001 Deliver services based on data provision

3.2 References

References						
No.	Reference Type	Reference	Status	Impact on use case	Originator / organization	Link

4 Step by step analysis of use case

4.1 Overview of scenarios

Scenario conditions

No.	Scenario name	Scenario description	Primary actor	Triggering event	Pre-condition	Post-condition
1	Collection and revocation of the consumer's consent	4 steps: - Submission of a request to collect the consumer's consent - Collection of the consumer's consent by the metering data manager - Information of the consumer and the metered data user of the consent request success - Revocation of the consumer's consent				
2	Collection and publication of personal consumption data to consumers which have smart metering systems	3 steps: - Collection of individual consumption data - Production of data services for the consumer - Transmission of the data to the consumer				
3	Collection, processing and transmission of consumption data to metered data user	2 steps: - Reception by the metering data manager, from the metered data user, of a request for establishing an agreement for data services - Realization by the metering data manager of the data services and transmission of the data				

Steps – Scenarios

Collection and revocation of the consumer's consent

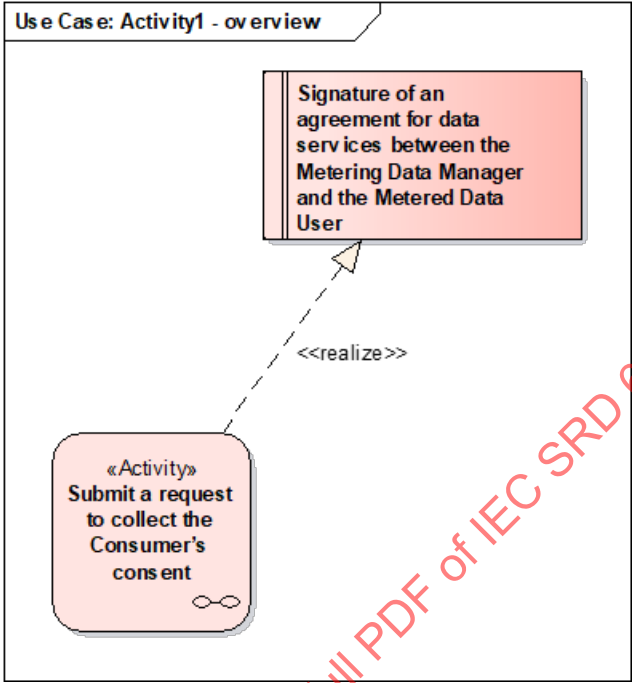
4 steps:

- Submission of a request to collect the consumer's consent
- Collection of the consumer's consent by the metering data manager
- Informing the consumer and the metered data user of the consent request success
- Revocation of the consumer's consent

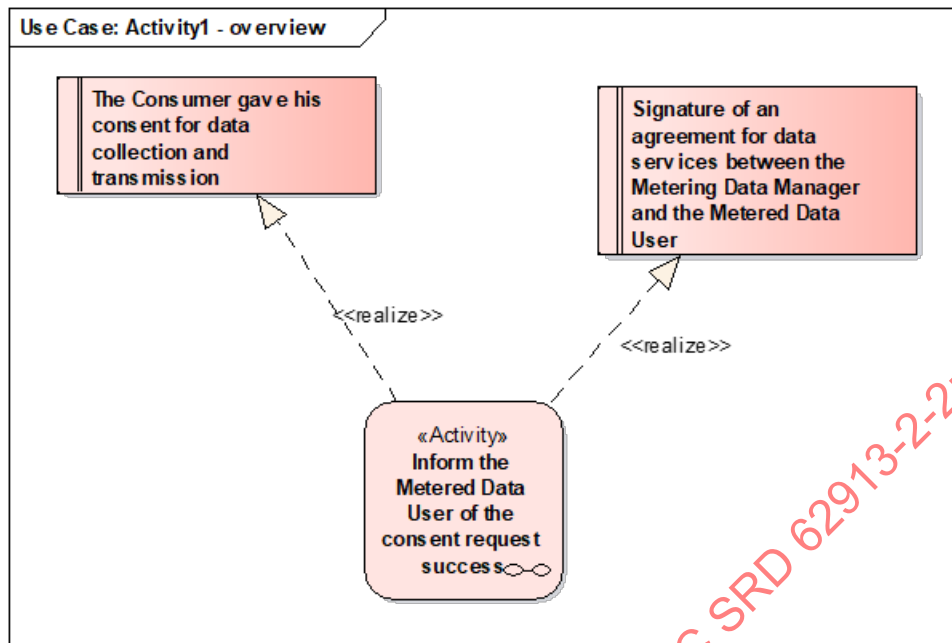
UC62913-2-2-B001 Deliver services based on data provision**Scenario step by step analysis**

Scenario								
Scenario name		Collection and revocation of the consumer's consent						
Step No	Event	Name of process/ activity	Description of process/ activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
1.1		Ask for consumer's consent	The metered data user asks the consumer to collect his or her individual consumption data for a given purpose (e.g. consumption reduction).		Metering data manager			
1.2		Submit a request to collect the consumer's consent	The metered data user asks the metering data manager to collect the consent of the consumer. The metered data user indicates the purpose of the request		Metered data user	Metering data manager		Req1
1.3		Receive the demand			Consumer (of electricity supplier)			
1.4		Receive the request			Metering data manager			
1.5		Send a request to collect consumer consent	The metering data manager proceeds to the consumer's consent request	Create	Metering data manager	Consumer (of electricity supplier)		
1.6		Receive the request			Consumer (of electricity supplier)			
1.7		Send consent	- The consumer can give consent for data collection - In case of consent for data collection, the consumer can give consent for data transmission	Create	Consumer (of electricity supplier)	Metering data manager		
1.8		Receive consent			Metering data manager			

UC62913-2-2-B001 Deliver services based on data provision								
1.9		Inform the consumer of the consent request success	The metering data manager confirms to the consumer that his or her consent has been collected and reminds the consumer of its main characteristics.	Report	Metering data manager	Consumer (of electricity supplier)		Req2, Req3
1.10		Inform the metered data user of the consent request success	The metering data manager notifies the metered data user of the success of its consent request	Report	Metering data manager	Metered data user		Req1, Req2
1.11		Receive the information			Metered data user			
1.12		Receive the information			Consumer (of electricity supplier)			
1.13		Send revocation of the consent	The consumer revokes consent. The consumer can do it whenever he or she wants.	Cancel	Consumer (of electricity supplier)	Metering data manager		Req2, Req3
1.14		Receive the request			Metering data manager			
1.15		Confirm the Revocation of the consumer's consent	The metering data manager proceeds to the revocation and sends a confirmation to the consumer.	Report	Metering data manager	Consumer (of electricity supplier)		
1.16		Receive the confirmation			Consumer (of electricity supplier)			
1.17		Inform the revocation of the consumer's consent	In case of data transmission, the metering data manager informs the metered data user of the consumer's revocation and instantaneously stops the data transmission.	Cancel	Metering data manager	Metered data user		Req1
1.18		Receive the information			Metered data user			
Ask for consumer's consent								
<u>Business section:</u> Collection and revocation of the consumer's consent/Ask for consumer's consent The metered data user asks the consumer to collect his or her individual consumption data for a given purpose (e.g. consumption reduction). Submit a request to collect the consumer's consent								
<u>Business section:</u> Collection and revocation of the consumer's consent/Submit a request to collect the consumer's consent The metered data user asks the metering data manager to collect the consent of the consumer. The metered data user indicates the purpose of the request								

UC62913-2-2-B001 Deliver services based on data provision	
Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Req1	Signature of an agreement for data services between the metering data manager and the metered data user
Use Case: Activity1 - overview 	
• <u>Receive the demand</u> <u>Business section:</u> Collection and revocation of the consumer's consent/Receive the demand • Receive the request <u>Business section:</u> Collection and revocation of the consumer's consent/Receive the request • Send a request to collect consumer consent <u>Business section:</u> Collection and revocation of the consumer's consent/Send a request to collect consumer consent The metering data manager proceeds to the consumer's consent request • Receive the request <u>Business section:</u> Collection and revocation of the consumer's consent/Receive the request • Send consent <u>Business section:</u> Collection and revocation of the consumer's consent/Send consent – The consumer can give consent for data collection – In case of consent for data collection, the consumer can give consent for data transmission • Receive consent <u>Business section:</u> Collection and revocation of the consumer's consent/Receive consent • Inform the consumer of the consent request success <u>Business section:</u> Collection and revocation of the consumer's consent/Inform the consumer of the consent request success The metering data manager confirms to the consumer that his or her consent has been collected and reminds the consumer of its main characteristics.	

UC62913-2-2-B001 Deliver services based on data provision	
Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Req2	The consumer gave consent for data collection and transmission
Req3	The consumer gave consent for data collection
Use Case: Activity1 - overview <pre> graph TD UC1["«Activity» Inform the Consumer of the consent request success"] UC2["The Consumer gave his consent for data collection and transmission"] UC3["The Consumer gave his consent for data collection"] UC1 -.-> <<realize>> UC2 UC1 -.-> <<realize>> UC3 </pre>	
Inform the metered data user of the consent request success	
Business section: Collection and revocation of the consumer's consent/Inform the metered data user of the consent request The metering data manager notifies the metered data user of the success of its consent request	
Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Req1	Signature of an agreement for data services between the metering data manager and the metered data user
Req2	The consumer gave consent for data collection and transmission

UC62913-2-2-B001 Deliver services based on data provision

- Receive the information

Business section: Collection and revocation of the consumer's consent/Receive the information

- Receive the information

Business section: Collection and revocation of the consumer's consent/Receive the information

- Send revocation of the consent

Business section: Collection and revocation of the consumer's consent/Send revocation of the consent

The consumer revokes consent. The consumer can do it whenever he or she wants.

UC62913-2-2-B001 Deliver services based on data provision	
Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Req2	The consumer gave consent for data collection and transmission
Req3	The consumer gave consent for data collection
Use Case: Activity1 - overview <pre> graph BT A["«Activity» Send revocation of the consent"] B["The Consumer gave his consent for data collection and transmission"] C["The Consumer gave his consent for data collection"] A -.-> <<realize>> B A -.-> <<realize>> C </pre>	
- Receive the request <u>Business section:</u> Collection and revocation of the consumer's consent/Receive the request - Confirm the revocation of the consumer's consent <u>Business section:</u> Collection and revocation of the consumer's consent/Confirm the revocation of the consumer's consent The metering data manager proceeds to the revocation and sends a confirmation to the consumer. - Receive the confirmation <u>Business section:</u> Collection and revocation of the consumer's consent/Receive the confirmation - Inform the revocation of the consumer's consent <u>Business section:</u> Collection and revocation of the consumer's consent/Inform the revocation of the consumer's consent In case of data transmission, the metering data manager informs the metered data user of the consumer's revocation and instantaneously stops the data transmission.	

UC62913-2-2-B001 Deliver services based on data provision	
Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Req1	Signature of an agreement for data services between the metering data manager and the metered data user
Use Case: Activity1 - overview	
• <u>Receive the information</u> <u>Business section:</u> Collection and revocation of the consumer's consent/Receive the information Collection and publication of personal consumption data to consumers which have smart metering systems 3 steps: • Collection of individual consumption data • Production of data services for the consumer • Transmission of the data to the consumer	

UC62913-2-2-B001 Deliver services based on data provision								
Scenario step by step analysis								
Scenario								
Scenario name		Collection and publication of personal consumption data to consumers which have smart metering systems						
Step No	Event	Name of process/ activity	Description of process/ activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
2.1		Collect and send individual consumption data		Report	Consumer (of electricity supplier)	Metering data manager		Req3
2.2		Receive the information			Metering data manager			
2.3		Produce data services for the consumer			Metering data manager			Req3
2.4		Send the data to the consumer		Execute	Metering data manager	Consumer (of electricity supplier)		Req3
2.5		Receive			Consumer (of electricity supplier)			
• <u>Collect and send individual consumption data</u>								
<u>Business section:</u> Collection and publication of personal consumption data to consumers which have smart metering systems/Collect and send individual consumption data								
Requirement list (refer to "Requirement" section for more information)								
Requirement R-ID					Requirement name			
Req3					The consumer gave consent for data collection			
Use Case: Activity1 - overview The Consumer gave his consent for data collection «Activity» Collect and send individual consumption data <<realize>>								
• <u>Receive the information</u>								
<u>Business section:</u> Collection and publication of personal consumption data to consumers which have smart metering systems/Receive the information								
• <u>Produce data services for the consumer</u>								
<u>Business section:</u> Collection and publication of personal consumption data to consumers which have smart metering systems/Produce data services for the consumer								
Requirement list (refer to "Requirement" section for more information)								
Requirement R-ID					Requirement name			
Req3					The consumer gave consent for data collection			