



**International
Standard**

ISO 55011

**Asset management — Guidance for
the development of public policy to
enable asset management**

*Gestion d'actifs — Orientations pour le développement de
politiques publiques pour favoriser la gestion d'actifs*

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 251, *Asset management*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

0.1 Purpose

This document provides guidance to advance the adoption of asset management through public policy, specifically focused on the external context of all organizations that manage assets.

This guidance defines and describes an enabling environment for asset management, and outlines how it can be created, sustained and improved through the use of public policy (see [Clause 4](#)).

It outlines how participants in that environment can act and interact with one another to influence the development and deployment of public policies to enable asset management in their countries and jurisdictions (see [Annexes A](#) and [B](#)).

This document provides a consistent approach (see [Annexes C](#) and [D](#)) to the development of public policy instruments (see [5.2.1](#)) that enable asset management and help achieve government objectives. These can include implementing a framework of recommended practices for effective public investment (see [Table 1](#)), achieving the United Nations Sustainable Development Goals (UN SDGs), and otherwise generating greater value to society.

0.2 Relationship with other standards

ISO 55000 provides context for the standards on asset management developed by ISO/TC 251 (e.g. ISO 55001, ISO 55002, ISO/TS 55010, this document, ISO 55012 and ISO 55013).

ISO 55001 specifies requirements for an organizational “asset management system” and ISO 55002 gives guidance to an organization on the application of ISO 55001.

All concepts, terms and definitions in the above standards are written from the perspective of each individual organization. From this perspective, this document relates to the external context within which an organization operates and which is created by conditions established by its external influencers.

This document is written from a broader perspective and recognizes that many different individuals and organizations (“participants”) are involved in advancing the adoption of asset management in their respective countries and jurisdictions. It is intended to positively shape the external context of all organizations, rather than any single organization, through the development, or influencing the development, of supportive public policies.

0.3 Target audience

This document is intended for those individuals and organizations that want, and are able, to advance and support the adoption of asset management in their respective countries or jurisdictions through public policy. This document acknowledges government officials as the primary participants in the public policy process and recognizes other participants who can be involved in that process. Secondary users are intended to be individuals and organizations that want to advance and support the adoption of asset management and who are seeking guidance on how to do so.

NOTE 1 This guidance is relevant to all levels of government. The target audience includes government and other officials who recognize the benefits of asset management and would like, and are able, to advance asset management through their work. These individuals can include those who:

- advise on public policy;
- implement public policy;
- issue implementing agency guidance;
- issue executive guidance;
- issue final regulations;
- submit proposed legislation or regulations;

- approve proposed legislation or regulations;
- pass legislation;
- are involved in the development of legislation, policy, reporting and control frameworks, including audits;
- influence policy-makers who can mandate asset management and/or support the adoption and allocation of resources;
- set strategic direction for public policy.

NOTE 2 The target audience can also include non-government individuals and organizations who recognize the benefits of asset management and would like, and are able, to influence the public policy formulation processes used by governments as well as the standards development processes used by non-government standards bodies for advancing asset management.

0.4 Document structure

The document structure is as follows:

- [Clause 4](#) describes the context in which relevant participants in the policy-making process can use public policy instruments to achieve asset management outcomes.
- [Clause 5](#) identifies the public policy instruments deployed by governments to enable asset management.
- [Clause 6](#) sets out recommended practices for effective public investment, how public policy instruments can be developed to enable asset management, and elements of good practice.
- [Annexes A](#) to [E](#) provide details on government and non-government participants, potential behaviours and actions they can take to enable asset management. They document case studies based on global best practices demonstrating the development and application of public policy instruments that enable asset management.

0.5 Benefits of this document

0.5.1 General

The benefits of asset management to individual organizations are described in ISO 55000.

Adoption of this document can facilitate the creation and improvement of an enabling environment, which in turn can improve the overall maturity of asset management within businesses, organizations and nationally across countries. From a broader perspective, this can help achieve governmental objectives such as providing improved public services, infrastructure that supports the desired level for service and safer public infrastructure at all levels of government, improving the country's competitiveness in trade with other countries, assuring that taxpayers get a better return on their taxes, and being more responsive to societal well-being.

The benefits of adopting this document are outlined in 0.5.2 and 0.5.3.

The benefits of supporting the adoption of asset management for government and non-government participants are described in more detail in [Annexes A](#) and [B](#), respectively.

0.5.2 Benefits of a consistent approach

An effective enabling environment for asset management should result in the broad adoption of a consistent approach to asset management across the organizations that own, operate or are otherwise responsible for assets within a country or jurisdiction. Adopting a consistent approach has its own benefits, which include:

- a) using consistent terminology to discuss asset management and common processes to create asset management systems;
- b) having agreed minimum datasets that:
 - 1) reduce duplication of effort by asset owners when providing minimum consistent elements for different jurisdictions;

- 2) enable alignment and closer collaboration, and facilitate dialogue between jurisdictions, associations and regulators;
- c) creating a community of practice with common objectives and common understandings to promote better performance outcomes both internal and external to organizations;
- d) alignment with validation and verification programmes or schemes;
- e) alignment with competency improvement programmes to demonstrate asset management proficiency among practitioners;
- f) providing stakeholders with an understanding of the benefits of a consistent and national approach to asset management within government and non-government organizations.

0.5.3 Beneficial outcomes of adopting this document

When an enabling environment for asset management is successfully realized, the expected outcomes or benefits include, but are not limited to, the following:

- a) better use of financial and non-financial resources, including:
 - 1) enabling greater resource efficiency (e.g. from energy, water, materials, land and labour), while reducing environmental impacts and sustaining service delivery;
 - 2) contributing to a better use of finances, ensuring quality services with an acceptable return on investment and a predictable life cycle cost;
 - 3) facilitating the identification of the human resources that will be required to operate the assets and their enablers, their competencies and the scheduling of their induction;
 - 4) providing an understanding/identification of the financial resources required to build capacity in asset management;
- b) consideration of the needs and expectations of stakeholders and citizens, by providing effective services;
- c) alignment of government objectives, at different levels of administration and in public service providers, contributing to the achievement of national or subnational objectives;
- d) improved decision-making over the long term, including those:
 - 1) that reduce the risks of inefficient use of funding from taxpayers and other funding providers;
 - 2) taken over the entire life cycle of the assets, allowing optimization of the total life cycle cost, through the cost-risk performance analysis;
 - 3) that consider the impacts of climate change and the need for climate-resilient assets;
- e) fostering research and innovation partnerships;
- f) maximization of value delivered to society by national and/or subnational assets;
- g) continued improvement of the services provided by the state or non-government service providers;
- h) improved transparency and accountability of government decisions and associated actions, as appropriate, which can build trust and credibility within communities of agencies tasked with managing critical infrastructure;
- i) ability to promote, interact with and meet the requirements of other policy objectives, such as the UN SDGs;
- j) effective risk management, which can lead to:
 - 1) reduced financial loss, improved safety, goodwill and reputation, and minimizing environmental and social impacts;
 - 2) reduced liabilities for insurance premiums, fines, penalties, etc.;

- 3) build resilience, better response and continuity of service;
- k) demonstrated social responsibility, which can:
 - 1) improve the organization's ability to reduce emissions, conserve resources and adapt to climate change;
 - 2) enable the organization to demonstrate social responsibility and ethical business practices, and where applicable, meet requirements under environmental, social and governance (ESG) obligations;
 - 3) create safer communities.

See [Annex E](#) for example case studies demonstrating how benefits can be achieved by using the approaches and practices identified in this document.

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Asset management — Guidance for the development of public policy to enable asset management

1 Scope

This document gives guidance on establishing, sustaining and improving an enabling environment for asset management through public policy.

This document is applicable to all types and levels of government.

While ISO 55000, ISO 55001 and ISO 55002 make reference to organizational policy, this document refers to public policy. The focus of this document is on influencing the choice and development of public policy instruments that promote the adoption of asset management and use of asset management systems through ISO 55001 and ISO 55002.

NOTE This document is intended to provide guidance on the development and application of policy instruments based on international best practices. It is not intended to provide guidance on general public policy-making or on political issues.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 55000, *Asset management — Vocabulary, overview and principles*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 55000 and the following apply.

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

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

3.1

capacity building

provision of relevant competencies, skills, knowledge, experience, and the associated funding, technology and other resources that enable individuals or organizations to accomplish new tasks to achieve asset management objectives

[SOURCE: Federation of Canadian Municipalities, 2019^[24], p.19, modified — “provision” replaced “acquisition” and “and the associated funding, technology and other resources” and “to achieve asset management objectives” added.]

3.2

enabling environment for asset management

set of circumstances, objects or conditions, external to organizations managing the assets, that positively affect their adoption of asset management and the achievement of *government* (3.4) objectives

Note 1 to entry: Enabling environments for asset management are unique to different countries or regions and can be unique to different geographic areas within a country. Examples of conditions can include physical conditions (e.g. natural resources) or non-physical conditions (e.g. legal, bureaucratic, fiscal, informational, political, cultural).

Note 2 to entry: Commonly agreed upon aspects of the enabling environment for asset management typically fit into five categories: economic, political, administrative, socio-cultural and resources. These factors provide the context for incentives and opportunities in the achievement of government objectives (including through asset management). For example, economic factors including the funding of physical infrastructure or administrative actions can include creating incentives for performance.

Note 3 to entry: *Public policies* (3.7) are developed and issued by different levels of government, each of which can have its own enabling environment for asset management consisting of varying conditions.

Note 4 to entry: This document focuses on the conditions in the external context created by the contribution, interests and demands of non-government participants, and the strategic directions of government participants which can be modified by public policies.

[SOURCE: Amjad et al. 2015^[12]; Ojomo 2016^[40], modified]

3.3

governance

system of directing and controlling

[SOURCE: ISO/IEC TR 29110-5-3:2018, 3.12]

3.4

government

act of, or responsibility for, managing, governing and promoting the development of a jurisdiction, including responsibilities for the definition, design, development and institutionalization of *public policies* (3.7) expressed in the provision of products and services to its stakeholders

Note 1 to entry: Government can refer to the act of governing, as well as to the institutions (e.g. agencies or organizations) responsible for governing.

Note 2 to entry: The term “government” refers to all levels of government.

Note 3 to entry: The term “government” is usually used to designate the highest instance of executive administration (the power of the state that, according to the constitution of a country, has the attribution of governing the people and administering public interests, faithfully complying with legal ordinances), generally recognized as the leadership of a state (any sovereign country, with its own politically organized structure, as well as designating the set of institutions that control and administer a nation) or a nation. States can have several levels or spheres of government, depending on the political organization of that country, such as local or municipal, regional or state governments, and national or federal.

3.5

local government

organization that is responsible for the *governance* (3.3) of a local area and for providing services, etc.

Note 1 to entry: Local government can be a level of *subnational government* (3.13) in non-federal countries and a sub-regional level of *government* (3.4) in federal countries.

Note 2 to entry: The terms “regions” and “local” can also refer more generically to subnational territories with specific socio-economic or territorial characteristics that can, but not always, correspond to administrative or political units.

3.6

public investment

investment spending by the *government* (3.4) on physical infrastructure (e.g. roads, public buildings) and intangible infrastructure (e.g. human capital development, innovation, research and development) with a long-term productive life

Note 1 to entry: Statistics generally capture direct public investment as measured by gross fixed capital formation.

3.7

public policy

principled guide to a course of actions taken by the *government* (3.4) as a response to a perceived need, formulated by a specific political process, and adopted, implemented and enforced by a specific public agency that expects results

Note 1 to entry: Public policy is different from the term “policy” used in ISO 55000. In ISO 55000, “top management” issues policies that provide intention and direction of the organization. In this document, government organizations issue public policies that typically provide a “principled guide” to be followed by various organizations within their jurisdictions. Examples of public policy in this context that enable asset management include those given in 6.2.

3.8

public policy instrument

intervention made by the *government* (3.4) which is intended to support the achievement of *public policy objectives* (3.10)

Note 1 to entry: See [Figure 1](#), [5.2.1](#) and [Annex C](#) for examples.

3.9

public policy-maker

representative of the *government* (3.4) who is responsible for developing, administering or influencing *public policies* (3.7)

Note 1 to entry: A public policy-maker is not necessarily responsible for implementing public policies.

Note 2 to entry: Public policy-makers can include regulators, elected officials (e.g. politicians) and their delegates, and public administrators.

3.10

public policy objectives

result to be achieved by a *public policy* (3.7)

3.11

public policy process

set of interrelated or interacting activities through which a *public policy* (3.7) is formed, implemented and evaluated

3.12

service delivery

act of providing a service to customers

3.13

subnational government

level of *government* (3.4) below national (regional and local) governments

Note 1 to entry: “Regional government” or “region” refers to the level of government immediately below the national level in federal countries (i.e. federated states) or in unitary countries (with a specific regional level).

4 Enabling environment for asset management from a public policy perspective

4.1 General

The successful implementation of asset management in any organization is influenced by the organization's internal and external contexts. These contexts are described in ISO 55000, ISO 55001 and ISO 55002, and include a variety of conditions such as economic, political, administrative and socio-cultural conditions, and resources. This document focuses on organizations' external contexts and a subset of conditions that contribute, through public policy, to the successful implementation of asset management and in turn, government objectives (e.g. UN SDGs). This relationship is illustrated in [Figure 1](#).

Success in creating and maintaining the enabling environment for asset management in political jurisdictions depends on the creation of appropriate public policies with a level of consensus that allows them to be sustained over time. This document provides guidance on the choice, development and deployment of public policy instruments (see [Clauses 5](#) and [6](#) for details). It outlines considerations and actions that can be taken by government and non-government participants to achieve government objectives and ultimately deliver greater value to society.

The guidance in this document recognizes governments as the primary actors in the formation of public policy. However, non-government actors with an interest and expertise in asset management also have a role to play in the policy-making process. Those involved in the development, implementation or improvement of public policy to create or improve the enabling environment for asset management are referred to as "participants" in this document.

The enabling environment for asset management is formed from the interactions of government and non-government participants, outlined conditions, and the legal, regulatory and policy frameworks (including public policy instruments). The enabling environment for asset management is dynamic and changes constantly in response to the actions of its participants.

To create an enabling environment for asset management through public policy, its participants should act and interact with one another in ways that positively support and advance the adoption of asset management within their political jurisdictions. The participants in the enabling environment for asset management are grouped by type and described in [4.2](#) according to the ways in which they can enable the adoption of asset management through public policies. [Annexes A](#) and [B](#) provide examples of participant actions and behaviours in an enabling environment for asset management.

4.2 Participants in the enabling environment for asset management

4.2.1 Government participants

Government organizations and officials, at all levels of government and regulatory agencies, are the most significant participants in developing and improving public policies. They generally have the authority to develop and improve public policy, for example, through the creation of formal rules, delegations, mandates, inducements and capacity building that directly affect the outcomes of the enabling environment for asset management. These participants, however, do not necessarily have the asset management expertise that exists in asset owning or managing organizations, or in organizations that promote asset management.

[Annex A](#) describes different government participants in the enabling environment for asset management and ways they can support asset management through public policy.

4.2.2 Non-government participants

Non-government participants in the enabling environment can promote asset management through public policy by engaging with government agencies and officials in the development of their public policy instruments. Non-government participants can include asset owners, asset management advocacy groups, industry organizations and individuals that support asset owners or operators, professional associations, academia, the media, and other potential institutions and organizations (including, but not limited to, lenders, investors and insurers).

These non-governmental participants can have knowledge, experience and/or expertise in asset management, but generally do not have the authority to issue public policy instruments to create, sustain or enhance that enabling environment. For example, non-government standards bodies issue voluntary standards that can also inform the development of public policy that advances asset management. Although standards do not have the force of law, in many countries and business sectors they can positively influence behaviour. Other non-government participants can contribute to the advancement of asset management through other actions that can involve, for example, knowledge-sharing, promoting the benefits of asset management, capacity building and professional development opportunities.

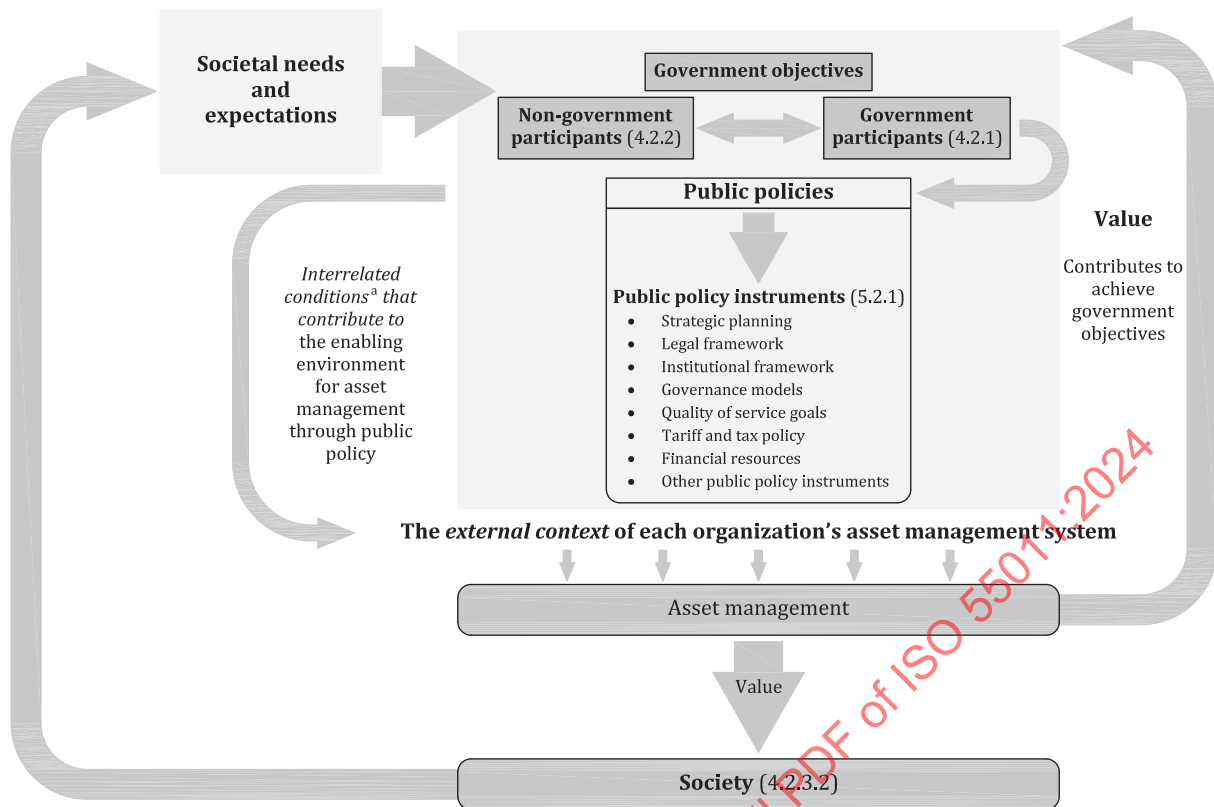
[Annex B](#) describes these non-government participants and ways they can support asset management in the enabling environment.

4.2.3 Other participants

4.2.3.1 Asset owners, operators and custodians

Organizations that own, operate or are otherwise responsible for assets are the target audiences of other International Standards on asset management (e.g. ISO 55001, ISO 55002, ISO/TS 55010) and the ones to which those asset management requirements are addressed. Asset owners and operators are found among both government and non-government participants in the enabling environment for asset management. They create organizational policies and support tools that are unique to their own organizational contexts, including, but not limited to:

- organization-specific strategic plans, which include the strategic objectives of the organization;
- organization-specific asset management policies, as required by ISO 55001;
- organization-specific asset management training programmes.



^a Example categories of conditions include: economic, political, administrative, socio-cultural and resources.

Figure 1 — Key elements and relationships in the enabling environment for asset management from a public policy perspective

4.2.3.2 Society

Society represents the entire population of a jurisdiction and is ultimately impacted by good or poor asset management practices. Members of society are uniquely positioned as the recipients of services and products enabled through the application of asset management by asset owners and service providers. While members of society normally expect that it is the role of government to create a suitable environment for effective asset management, members of society can also seek to influence other participants (particularly governmental ones) in the development of public policy instruments that enable asset management. In either case, it is important for the government to communicate the need for expenditure on asset management and to gain societal acceptance for this cost by explaining the value that will be obtained, including how assets support the services provided. Conversely, society has a role in communicating to the government the need for expenditure on asset management.

4.3 Interaction between participants

Interaction between different participants is fundamental to the creation of a successful enabling environment for asset management through public policy. Coordination between public policy-makers, organizational leaders, asset management experts and relevant non-government participants can result in a public policy developed with the required asset management input. The resulting public policy instruments developed can generate more value for both government and society.

[Annex D](#) provides example actions and considerations by the government to enable asset management through different public policy instruments.

5 Public policy instruments

5.1 General

All elements of the enabling environment play positive roles in advancing the adoption of asset management. Public policy instruments are powerful elements for the creation or improvement of an enabling environment for asset management because they can mandate the adoption, or provide incentives or support for the adoption of asset management to aid in the realization of government objectives in their respective countries and jurisdictions.

An overview of public policy instruments that can be deployed by governments to enable asset management is outlined in [5.2.1](#). Public policy instruments can involve varying types of interventions that can range from mandatory to voluntary to incentive-based according to the need and situation of respective governments and countries. The respective form(s) the public policy instrument can take are also described. For example, a government can choose to utilize financial interventions to support the adoption of asset management. They may include both budgetary programmes (mandatory) in addition to subsidies and competitive funding opportunities (incentive-based) that support asset management activities.

[Clause 6](#) describes how processes for developing these public policy instruments can connect government and non-government participants (see [4.2](#)) in the enabling environment and bring in asset management expertise to improve the effectiveness of those instruments. The benefits that can be realized from a consistent approach together with the strategic, coordinated development of public policies are outlined in 0.5.

5.2 Public policy instruments that can enable asset management

5.2.1 Identification of public policy instruments

Public policy instruments that can enable asset management include, but are not limited to, those that:

- a) promote and facilitate asset management, such as:
 - 1) government strategic planning;
 - 2) definition of a legal and regulatory framework;
 - 3) supervision of exchanges by an institutional framework;
- b) involve governance models, such as:
 - 1) corporate governance;
 - 2) public governance;
- c) involve governance policies, such as:
 - 1) tax policy (ethical tax standards);
 - 2) investment policy;
 - 3) trade policy;
 - 4) competition policy (including procurement rules);
- d) provide sector-specific rules and standards applicable to asset systems type (where practical), such as:
 - 1) service quality objectives and assessment systems;
 - 2) social and environmental responsibility standards;
- e) develop human capital, such as:
 - 1) education, training and capacity building policies;

- 2) development of research and innovation partnerships;
- f) develop financial economic and financial instruments, such as:
 - 1) integration of intangible data and information into the value chain;
 - 2) standards on the territorial location of the legal structures of management companies;
 - 3) alignment of financial and non-financial information (see ISO/TS 55010);
- g) help measure the success of asset management initiatives while building trust and support for government initiatives:
 - 1) performance metrics and benchmarking;
 - 2) public communication and engagement.

[Annex C](#) provides good practices in the development of these public policy instruments that enable asset management.

5.2.2 Forms of public policy instruments

Public policy instruments, such as those identified in [5.2.1](#), act as intermediary devices to orient relations between government and society and can be operationalized through different forms of government action. They are presented as a hierarchy of policy authorities as follows:

NOTE This list is illustrative and not exhaustive, and the hierarchy can vary according to the political system in use in the country or region under consideration.

- a) laws (e.g. mandating asset management policies and plans for government agencies);
- b) national guidance or executive directives (e.g. national guidance in the form of an oversight committee, such as Infrastructure Australia);
- c) regulations (e.g. audit functions for asset management);
- d) policies (e.g. including those that encourage adoption of whole of life cycle approaches);
- e) guidelines and manuals (e.g. asset governance).

It should be noted that some public policy instruments can be informed by expertise and an evidence base provided from non-government bodies, for example:

- a non-government standards body can create sector-specific technical or management system standards;
- an industry association can create guidance for sector specific asset management implementation or provide certification and training opportunities.

These non-government asset management inputs can work in the service of public policy instruments when they are linked to the achievement of government objectives.

6 Development of public policy instruments to enable asset management

6.1 General

The processes that governments use to develop and apply public policy instruments can create opportunities to achieve government objectives at the country or jurisdictional level.

The selection and development of different forms of public policy instruments (see [5.2.2](#)) vary depending on who is developing the instruments. For example, the different forms are developed by the following government participants in the enabling environment:

- a) legislative bodies that develop and publish laws;
- b) executive policy offices that develop and publish executive guidance;
- c) administrative offices that carry out laws and who issue regulations, agency policies and agency guidelines in doing so.

The specific policy-making processes differ according to the type of participant and vary by country. This is key to understanding at what specific point(s) and how asset management experts or expertise can be engaged in the development process(es).

In developing public policy instruments, public policy-makers and those who advise them should consider the common elements of good practices described in [6.2](#).

6.2 Common elements of good practices in public policy

6.2.1 Bringing subject matter expertise into the policy-making process

Good practices in government policy-making processes engage participants impacted by the prospective policy elements and give them an opportunity to comment and possibly affect the policies being developed. Engagement can be initiated by either government or non-government participants.

While specific expertise pertaining to the law in question may be consulted in the development of new laws, disciplines like asset management (that can take a systematic multi-disciplined view) should also be consulted. Bringing asset management expertise and the holistic, integrative approach of asset management into applicable policy-making processes can make a significant contribution to the likelihood that the policies will achieve their intended outcomes (see [Annex E](#) for example case studies).

Although governments control the public policy-making processes, non-government subject matter experts can sometimes bring their expertise into those processes. Examples of good practice in doing this come mainly from asset management advocacy groups and professional associations that advocate asset management to or on behalf of their members. These examples include:

- a) establishing and maintaining periodic contacts with officials involved in the policy-making processes;
- b) being aware of upcoming policy-making activities that impact asset management and providing input into those activities;
- c) showcasing the asset management activities of key policy-makers in conferences and publications.

6.2.2 Defining actions and relationships of participants in an enabling environment for asset management

The general ways in which participants in an enabling environment can support the adoption of asset management are discussed in [4.2](#). Specific actions that government and non-government participants can take are presented in [Annexes A](#) and [B](#), respectively. [Annex C](#) presents good practices for how governments can develop specific public policy instruments. [Annex D](#) presents more explicit examples of actions and considerations by governments in the development and application of specific public policy instruments.

To advance asset management for specific public purposes, the participants in the enabling environment should be aware of those purposes and know how to work together to achieve them. For example, effective public and private investments in assets and infrastructure, within a country or other political jurisdiction, require the necessary relationships among participants so that actions can be appropriately understood, coordinated and executed. Public investment delivers the service that the entity is either required to do or chooses to meet its policy directives and expectations of stakeholders.

[Table 1](#) outlines a framework for effective public investment that should be considered in the development of public policy instruments that support asset management.

Although these principles apply specifically to public investments in infrastructure assets, similar principles should be developed for public policies to guide private investments in infrastructure and other assets.

Table 1 — Recommended practices for effective public investment

Desired outcomes	Recommended practices
a) Coordinated public investment between different levels of government and public policies	— Investing with an integrated strategy, adapted to the different territories. — Adopt effective instruments of coordination between administrations, at national and sub-national levels. — Ensure horizontal coordination between sub-national governments to invest at the appropriate level.
b) Increased capacity for public investment and consistency and alignment of public policies at all levels of government	— Assessing the long-term effects of public investment and the associated risks upstream. — Involve stakeholders throughout the investment cycle. — Mobilize private actors and financing institutions to diversify funding sources and build capacity. — Strengthen the expertise of public officials and institutions involved in public investment projects. — Focus on results and promote learning from experience. — Promote and support public officials and institutions to develop asset management competence.
c) Sound public investment framework at all levels of government	— Establish a future-focused budgetary framework that is adapted to the investment objectives sought that considers total cost of those assets over their complete life cycles, including operating costs. — Develop sound and transparent financial management at all levels of the administration. — Promote the transparency of public procurement and its strategic use at all levels of the administration. — Ensure the quality and consistency of regulations at all levels of the administration using similar or standardized language. — Ensure consistency and quality of asset management practices at all levels of the administration using similar or standardized language.
NOTE Source: References [41] , [42] and [43] , modified.	

6.2.3 Leveraging a range of public policy instruments and consideration of interaction effects

A good practice also involves the strategic development, and sometimes concurrent coordination, of the public policy instruments to enable asset management. In almost every area of policy-making, there are a range of policy instruments that can be used to achieve desired policy outcomes. It is common that several policy instruments are used in conjunction with each other, depending on the complexity of the issue to be addressed.

An example of a policy mix to achieve a desired outcome is from regulation and funding. In order to promote asset management, a government may implement a policy instrument that mandates conformity with an asset management standard such as ISO 55001 via regulation while also allowing multi-year funding models to support better long-term planning as part of asset management.

6.2.4 Sustaining or improving the enabling environment for asset management

Good practice for improving the enabling environment for asset management is not limited to the government participants in the enabling environment (e.g. improving the public policy instruments deployed by government for enabling asset management or the processes that produce those instruments). Good practices to achieve this result also include sharing expertise and strengthening the capabilities and credibility of the non-government participants in the enabling environment. For example, standards bodies, academia and professional associations can play an important role in offering global best practices and expertise to sustain or improve the enabling environment for asset management. Society itself can also play a role in communicating to government the need for improvement of the enabling environment for asset management, as it inherits the outputs of public policy as services, products or programmes. Engagement with society will inform and provide guidance on the requirements of public policy.

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Annex A (informative)

Government participants in enabling environments for asset management

A.1 Government participants

A.1.1 General

Government participants in enabling environments for asset management include, but are not limited to:

- legislative bodies that issue laws;
- executive policy offices that issue executive guidance;
- administrative agencies that implement laws and executive guidance.

NOTE In some jurisdictions, this can include integrated government agencies that combine funding, regulation, planning and delivery.

The participants in the enabling environment for asset management described in [A.1.2](#) to [A.1.5](#) have the authority to issue and/or implement the public policy instruments that can enable asset management in their respective countries or area of influence.

A.1.2 Legislative agencies

Legislative agencies issue laws that authorize government activities, including the authority to issue policies and regulations, and delegate those authorities to administrative agencies. Legislative agencies may organize their policy-making activities into committees and subcommittees responsible for broad sectors of the economy (e.g. transportation, water, energy, communications,) and for issues of public interest (e.g. defence, workplace safety, health, environmental quality, natural resources). The officials who work in most legislative agencies may include elected officials as well as non-elected professional staff. The legislative agencies may also include an agency that reviews the execution of government programmes for compliance with the applicable laws and audits the financial activities of administrative agencies.

A.1.3 Executive policy offices

Executive policy offices develop and issue executive guidance that has the legal effect of the law with respect to authorities assigned to national government agencies and how those agencies are expected to operate. This guidance generally cannot supersede the authority of the law. These offices may work directly under the chief executive official of a country (e.g. Prime Minister or President) and are organized in different ways by different countries.

A.1.4 Administrative agencies

Administrative agencies can be called by many different names, according to their country or area of influence, and carry out functions assigned to them by law or executive guidance. These functions may include issuing agency policies or regulations that have the force of law. These agencies usually follow the same organizational patterns as the legislative bodies responsible for the laws that created them. Officials who work in administrative agencies may include elected officials and persons appointed by elected officials as well as professional staff whose service may be independent of the elected officials.

A.1.5 Intergovernmental associations

Intergovernmental associations may be formed at all levels of government and organized around individual governments (e.g. state or provincial governments, municipal governments) or specific government functions (e.g. budget, procurement, information technology (IT)). These associations are similar to professional associations in that they coordinate the development of policy proposals and training activities delivered to their members. These associations can also play important roles in disseminating information on various subjects, such as asset management, throughout their members and in building coalitions of functional experts across political jurisdictions at different levels of government.

A.2 Government actions that support an enabling environment for asset management

[Table A.1](#) provides examples of government actions that support an enabling environment for asset management and can vary per jurisdiction. These actions include, but are not limited to, issuing policies and policy instruments that mandate, incentivize or provide support for the adoption of asset management within their respective political jurisdictions, and inviting asset management experts into their policy-making processes.

Table A.1 — Actions by government supporting an enabling environment for asset management

Government participant	Actions supporting an enabling environment for asset management
National governments	
Policy-making entities	— Pass laws and/or issue executive guidance that support asset management through mandates, incentives and/or capacity building for asset owners and operators; delegations of those authorities to administrative agencies; and requirements that non-government entities participate in the enabling environment for asset management. — Involve asset management experts from government agencies and non-government organizations in the development of asset management policies.
Grant or loan-making entities	— Condition the award of grants and loans on prospective recipients' ability to demonstrate asset management competence. — Provide training and other capacity building resources to help prospective recipients perform the required asset management activities.
Regulatory entities	— Require regulated entities to demonstrate asset management competence as appropriate. — Monitor compliance with regulation. — Provide training and other capacity building resources to help regulated entities perform the required asset management activities.
Asset owners and operators	— Adopt asset management practices and continuously improve them. — Participate in professional and intergovernmental associations that advocate for asset management. — Establish asset management policy coordination groups at the senior agency management level. — Encourage legislative entities and policy-making offices to support asset management in their public policy instruments. — As appropriate, employ and enforce contractual requirements to demonstrate asset management competence for:

Table A.1 (continued)

Government participant	Actions supporting an enabling environment for asset management
	— suppliers of critical equipment and services; — private sector organizations who participate with the agency.
Subnational governments	— Align with the enabling activities of the national government as appropriate. — Engage in enabling activities that are appropriate for the particular subnational government. See also participants and actions under national governments as applicable for subnational governments.

A.3 Benefits to government participants from supporting the adoption of asset management

[Table A.2](#) presents in general and in high-level terms, the benefits national and subnational governments realize from supporting the adoption of asset management by the asset owning organizations that operate within them.

Table A.2 — Benefits of supporting the adoption of asset management for government participants

Government participant	Benefits of supporting the adoption of asset management
National governments	Increases the likelihood that national objectives and the value from assets that will be achieved.
Subnational governments	Increases the likelihood that their governmental objectives and the value from assets that will be achieved.

Annex B

(informative)

Non-government participants in enabling environments for asset management

B.1 Non-government participants

B.1.1 General

Non-government participants in a country's or region's overall enabling environment for asset management and examples of their potential contributions include, but are not limited to, those participants described in [B.1.2](#) to [B.1.8](#).

B.1.2 Asset management advocacy groups

Asset management advocacy groups are mainly comprised of asset management experts and practitioners from their own countries and from around the world. These groups can collect useful examples of asset management approaches and their benefits from asset management practitioners with whom they are familiar. This information can be provided to other non-government participants in the enabling environment for asset management (including asset owners and operators) as well as government participants (e.g. public policy-makers who can issue policy instruments supporting asset management) to encourage the adoption of asset management and good practices. The more mature of these advocacy groups can also publish information on asset management, offer asset management training and/or offer certification programmes, to foster asset management expertise more widely.

B.1.3 Professional associations

Professional associations that can include members who are, have become or are becoming asset management experts and advocates. They can also play important roles in collecting and disseminating information on the ways that asset management can benefit their respective professions. Professional associations can:

- a) publish information and guidance materials on asset management deemed useful for their members;
- b) have their own training and certification programmes aimed at improving and demonstrating asset management competence of their members;
- c) have advocacy organizations that actively and effectively engage the policy-making processes in their respective countries;
- d) use various media actively to communicate with their members and with groups they want to influence.

There can also be associations of professionals whose work intersects with other aspects of asset management. Example professions include, but are not limited to:

- consultants and solution providers who support asset management;
- insurers whose clients are impacted by the risks mitigated by asset management;
- bond rating companies whose ratings can be affected by their clients' asset management practices.

B.1.4 Individual organizations that own or operate assets

Individual organizations that own or operate assets and want to share their asset management experiences with the broader community. Large organizations that play significant roles in their respective industries

can also engage advocacy programmes that actively and effectively engage the policy-making processes in their areas of influence. It is important to note that these organizations create policies, support tools and case studies within their own unique enabling environments for asset management (see [4.2.3](#)).

B.1.5 Organizations and individuals who can support asset owners or operators

Organizations and individuals who can support asset owners or operators, whose own activities are impacted by how well asset management is implemented by those owners or operators, and who generate case studies and lessons learned from their experiences.

B.1.6 Academia

Academics who conduct research into, or teach, asset management or related disciplines (e.g. engineering, management, public administration, service design/development, financial planning, economics and economic forecasting, asset operations and maintenance, human resources, community planning and development).

B.1.7 Media

Media that communicate with audiences interested in asset management.

B.1.8 Industry and manufacturers

Industry and manufacturers who produce, deliver or design the various types and class of asset, and who then develop the life cycle management properties that are used in asset management planning.

B.2 Non-government actions that support an enabling environment for asset management

[Table B.1](#) provides examples of non-government actions that support an enabling environment for asset management. These actions include, but are not limited to, advocating government organizations to support asset management, sharing information and collaborating with other participants in the enabling environment, and requiring or otherwise supporting the adoption of asset management by the asset owning organizations with which they interact.

Table B.1 — Actions by non-government supporting an enabling environment for asset management

Non-government participant	Actions supporting an enabling environment for asset management
Asset management advocacy groups	— Hold events for asset management practitioners. — Sponsor training and certification programmes for asset management practitioners. — Influence government entities to support asset management. — Collaborate with other participants in the enabling environment. When engaging unions ensure the appropriate support for asset management is obtained prior to engaging in advocacy activities with public policy-makers. In the case of other non-government participants, ensure that they are sufficiently familiar with the benefits they will receive from supporting asset management and that they take the actions available to them.
Professional associations that advocate asset management	— Provide information and guidance on asset management to members in asset-intensive sectors. — Sponsor training and certification programmes for asset management practitioners. — Influence government entities to support asset management. — Collaborate with other participants in the enabling environment. When engaging unions and employee associations, ensure the appropriate support for asset management is obtained prior to engaging in advocacy activities with public policy-makers. In the case of other non-government participants, ensure that they are sufficiently familiar with the benefits they will receive from supporting asset management and that they take the actions available to them.
Standards bodies	— Issue interoperable standards that support and enable adoption of asset management where appropriate. — Involve asset management experts and practitioners in the development of standards that support the adoption of asset management.
Insurers	— Charge lower rates to organizations that demonstrate asset management competence and higher rates to those that do not.
Lenders/Investors	— Give more favourable terms to organizations that demonstrate asset management competence.
Rating agencies	— Rate loans and bonds based on whether the lending agencies require their loan recipients to demonstrate asset management competence, with higher ratings given to loans with such requirements and lower ratings to loans without them.
Customers of asset-intensive suppliers	— Require suppliers of critical equipment and services to demonstrate asset management competence.
Employees of asset-intensive organizations	— Adopt asset management practices to the maximum extent possible within current authorities. — Promote the adoption of asset management practices to other levels of the organization, especially to higher management. — Participate in professional associations that advocate asset management.

Table B.1 (continued)

Non-government participant	Actions supporting an enabling environment for asset management
Unions operating in asset-intensive industries	— Include asset management requirements that impact workplace safety or other working conditions in bargaining agreements.
Academia	— Offer asset management courses at all levels of study and include asset management in broader engineering and management courses. — Organize special interest groups for alumni who practice asset management at senior levels of their organizations.
Asset owners and operators	— Adopt asset management practices and continuously improve them. — Participate in professional associations that advocate asset management. — Establish asset management policy coordination groups at the senior management level and within the board of directors. — Influence government entities to support asset management in the public policy instruments they issue. — Require suppliers of critical equipment and services to demonstrate asset management competence. — In some countries, it can be necessary that the entities that advocate for the creation of public policy instruments for asset management previously convince asset owners and operators about the benefits of their implementation and collaborate with them in obtaining resources or incentives to facilitate their implementation.

B.3 Benefits to non-government participants from supporting the adoption of asset management

[Table B.2](#) outlines examples of the benefits of supporting the adoption of asset management for non-government participants.

Table B.2 — Benefits of supporting the adoption of asset management for non-government participants

Non-government participant	Benefits of supporting the adoption of asset management
Asset management advocacy groups	Becoming known for successfully advancing the adoption of asset management through the work of partner organizations can increase the membership and prominence of these groups.
Professional associations that advocate asset management	Becoming known for successfully advancing the adoption of asset management by their association members and for successfully influencing government entities and education/training to members to support asset management can increase the membership and prominence of these groups.
Standards bodies	Becoming known for successfully advancing the adoption of asset management through their standards can increase the membership and well-being of these bodies and attract more participants in their standards development processes.
Insurers	Requiring insured organizations to demonstrate asset management competence can reduce the risk of loss due to asset and other performance failures.
Lenders/investors	Requiring organizations that receive loans or investments to demonstrate asset management competence can reduce the risk of loss due to asset and other performance failures and/or improved delivery of value.
Rating agencies	Requiring lending agencies to require their loan recipients to demonstrate asset management competence will help them reduce the risks of making bad loans.
Customers of asset-intensive suppliers	Requiring their suppliers to demonstrate asset management competence can increase the likelihood of receiving goods and services of acceptable quality.

Table B.2 (continued)

Non-government participant	Benefits of supporting the adoption of asset management
Employees of asset-intensive organizations	Employees in such organizations will have greater confidence in their workplace safety and their organization's overall success and financial viability if their organizations demonstrate awareness of and competence in asset management.
Unions operating in asset-intensive industries	Requiring asset-intensive organizations that employ their members to demonstrate asset management competence can provide greater assurance of safe working conditions particularly in jobs that involve the operation of equipment that experiences high accident rates.
Academia	Becoming known as an effective educator of people who go on to successful careers based on the asset management expertise gained from their education will attract more students to their asset management programmes and advance academic research and development activities.
Asset owners and operators	Supporting the development of public policy instruments that enable asset management can further assist asset owners and operators to realize value from their assets. Further, requiring their suppliers to demonstrate asset management competence can increase the likelihood of receiving goods and services of acceptable quality.

B.4 Non-government opportunities to influence public policies that support the adoption of asset management

[Table B.3](#) provides examples of opportunities that several types of non-government participants in an enabling environment for asset management can have to influence public policies that support the adoption of asset management.

Table B.3 — Opportunities to influence public policies that support the adoption of asset management

Non-government participant	Opportunities to influence public policies that support the adoption of asset management
Asset management advocacy groups	— Hold conferences for asset management practitioners and include government policy-makers to get acquainted with them and expose them to asset management success stories and benefits. — Invite government policy-makers to participate in training and certification programmes for asset management practitioners. — Influence government entities and relevant standards bodies to support asset management in the ways available to them. In the case of government entities, this support can include funding. — Collaborate with other participants in the environment to get them to engage their advocacy efforts with government entities and relevant standards bodies.
Professional associations that advocate asset management	— Influence government entities and relevant standards bodies to support asset management in the ways available to them. In the case of government entities, this support can include funding. — Collaborate with other participants in the environment to get them to engage their advocacy efforts with government entities and relevant standards bodies.
Standards bodies	— Influence government entities to support asset management in the ways available to them. — Collaborate with other participants in the environment to get them to engage their advocacy efforts with government entities.
Insurers	— Work through their own associations to influence government entities and relevant standards bodies to support asset management in the ways available to them.
Lenders/investors	— Work through their own associations to influence government entities and relevant standards bodies to support asset management in the ways available to them.
Rating agencies	— Work through their own associations to influence government entities and relevant standards bodies to support asset management in the ways available to them.
Customers of asset-intensive suppliers	— Work through their own associations to influence government entities and relevant standards bodies to support asset management in the ways available to them.
Employees of asset-intensive organizations	— Work through their own associations to influence government entities and relevant standards bodies to support asset management in the ways available to them.
Unions operating in asset-intensive industries	— Influence government entities and relevant standards bodies to support asset management in the ways available to them (e.g. requirements that impact workplace safety or other working conditions).
Academia	— Serve as expert witnesses and/or advisors supporting the efforts of other participants in the environment to influence government entities and relevant standards bodies to support asset management in the ways available to them. — Educate current and future leaders in business and government on the benefits and techniques of asset management.
Asset owners and operators	— Influence government entities and relevant standards bodies to support asset management in the ways available to them. — Collaborate with other participants in the environment to get them to engage their advocacy efforts with government entities and relevant standards bodies. If the organization has sufficient influence, influence government entities and relevant standards bodies directly to support asset management through appropriate public policies.

Annex C

(informative)

Developing public policy instruments that improve asset management outcomes

[Table C.1](#) provides examples of good practices in the development of public policy instruments that enable better asset management outcomes.

Table C.1 — Good practices in the development of public policy instruments that enable better asset management outcomes

Public policy instrument	Form(s) of government action	Good practices that improve asset management outcomes
Government strategic planning	Individual laws, executive guidance or directives, agency policies and agency guidelines.	Provide all stakeholders, in particular, the agencies, with clear strategic objectives on which to base long-term planning for the management activities of existing and new assets to achieve those objectives. This should be expressed in government strategic plans.
Legal and regulatory framework	The body of laws, executive guidance or directives, and agency policies.	Create the authorities to issue policy instruments that enable asset management and delegate those authorities to different agencies. An ideal legal framework for asset management would resolve any gaps or overlaps in the authorities essential for good asset management. It would also provide compelling incentives for good asset management and mechanisms to hold agencies accountable for performance.
Institutional framework or reform	The body of laws and executive guidance or directives that assigns authorities to issue and implement public policies to different agencies.	Delegate clear authorities to enable asset management to the agencies best positioned to carry out those authorities to achieve the policy objectives.
Governance models	The full set of public policy instruments, e.g. the laws and executive guidance or directives that create the authorities to issue and implement public policies, the incentives for complying with those policies, and the resources to support the implementation of those policies; the assignment of those authorities, incentives and resources to different agencies.	Provide the full range of clearly articulated asset management authorities, properly delegated to avoid conflicts; effective incentives for complying with those policies and mechanisms for assuring compliance; and adequate resources to support the effective implementation of asset management.
Setting of service objectives	Usually in agency policies, but sometimes only in guidelines.	Provide clear expectations (key performance indicators) by which to measure achievement of organizational objectives while ensuring transparency and accountability to taxpayers.
Tariff and tax policy	Sometimes in laws, but usually in agency policies.	Provide positive incentives for complying with asset management policies and negative incentives for lack of compliance in a way that promotes fair, equitable and financially sustainable services including the medium- and long-term cost coverage.

Table C.1 (continued)

Public policy instrument	Form(s) of government action	Good practices that improve asset management outcomes
Financial	Mainly laws that authorize the maximum levels of funds available for government programmes that affect the adoption of asset management. Some of these authorized funding levels can positively or negatively impact agencies' abilities to invest optimally in their own asset portfolios. Some of the authorized funds can impact the funding available as grants, subsidies and other financial incentives, to subordinate levels of government for the purpose of supporting their asset investments. These instruments may also include executive guidance or directives and agency policies that direct appropriated funds to specific activities that support asset management, e.g. training and adequate information and communications technology (ICT) systems.	Provide sufficient funds to assure the successful implementation of government strategic plans to achieve government objectives, including supporting activities (e.g. capacity building, training and adequate ICT systems). Provide financial incentives based on demonstration of asset management systems' implementation.
Education, training and capacity building	These can be authorized and provided resources in law but are usually implemented in agency policies and supported by grant programme guidelines.	Provide or improve asset management awareness and skills to the people expected to support asset management activities. This includes educational and capacity building programmes at the post-secondary level and those provided by professional associations and professional service providers to members as well as training to top management so that current and future managers are aware of the virtues of asset management and able to lead its implementation in the organizations for which they are responsible. It also includes organizational capacity building, so that the relevant staff get the necessary awareness, competences and experience to implement, sustain and improve asset management in the organizations to which they belong and, at the same time, contribute to change management.
Research and innovation partnerships	These can be authorized in law but are usually implemented in agency policies and supported by grant programme guidelines.	Encourage and support the development of new ways to approach asset management including: identifying the existing gaps; enabling and promoting problem-driven research and innovation on asset management; fostering co-production and knowledge transfer; and promoting a strong link between the knowledge and practice.
Data and information	These can be authorized in law but are usually implemented in agency policies and supported by agency guidelines.	Assure the availability and usefulness of data and information to support effective asset management activities and decisions and communicate them to taxpayers.
Competition policy and procurement	Authorized in law but implemented in government-wide and agency policies and supported by agency guidelines.	Assure that the acquisition of assets is based on their contribution to the government's mission performance and considers the total cost of those assets over their complete life cycles. Also, assure that the procurement of consumables and services needed to support them are consistent with social or other policies that are included among the government's objectives.

Table C.1 *(continued)*

Public policy instrument	Form(s) of government action	Good practices that improve asset management outcomes
Audits	Requirements for audits can be in law, executive guidance or directives, or agency policies; instructions for audits are usually provided as agency guidelines.	Provide a critical element of asset management, i.e. to assure that actions comply with government policy and relevant standards and the results are accurately reported. Reports of the intended results of the policies should be audited by an independent agency. Accurate audit results are the basis for continuous improvement. Audits should be meaningful and the economic regulator/authority responsible for monitoring should take on board the audit outcomes/recommendations and have the technical proficiency to do so.

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Annex D

(informative)

Example actions and considerations by government in the development and application of public policy instruments

[Table D.1](#) provides examples of specific actions and considerations by government in the development and application of public policy instruments to enable asset management.

Table D.1 — Example actions and considerations by government to enable asset management

Public policy instrument	Example actions and considerations by government to enable asset management
Government strategic planning	— Communicate government objectives and enable the alignment of industry and public services decisions and investment with government objectives by: — defining the national objectives linked to each area of government and determine which of these areas have critical assets that should be managed; — formulating long-term strategic plans to achieve government objectives that acknowledge and consider the assets involved in achieving those objectives; — requiring areas with critical assets to carry out their strategic planning, and ensuring that their strategic objectives are aligned with the national objectives; — requiring each government agency or public service company with strategic assets that, in the preparation of the strategic asset management plan (SAMP), the asset management objectives and the value to be realized are aligned with the strategic objectives of each area, connecting, through asset management, the critical state assets and their life cycle with the national objectives. — As part of strategic planning process, perform demand analysis, and balance between investments in new assets and maintaining existing assets.
Legal framework	— Create laws to require strategic asset management plans, defined asset management systems and associated plans.
Institutional framework	— Create laws and policies for areas of government that have critical assets and the regulatory and control agencies of those areas to issue regulations and guidelines for the implementation of asset management within their respective areas.
Governance models	— Create policies, regulations and guidelines to ensure that assets will be managed throughout their life cycle and that the necessary resources are provided for this purpose. — Create the overarching structure for asset management to ensure that the assets to be included in the asset management system are aligned with the government's strategic objectives, that asset management decisions are systemically analysed by all relevant areas of government that have links to that asset, that its supportability is ensured from design for its entire useful life and that the life cycle cost is properly determined before decisions are made. — Create rules to ensure that resources for the operation of embedded assets are allocated and controlled according to life cycle cost calculations. — Ensure regular coordination and collaboration of data and information, possibly in the form of a dashboard with compliance and performance indicators in terms of asset management. — Promote interdisciplinary work for asset management tasks (break down departmental silos) in each government agency or public service company with strategic assets.
Quality of service goals	— Issue norms and guidelines for the creation and use of leading performance indicators to measure the achievement of objectives.

Table D.1 (continued)

Public policy instrument	Example actions and considerations by government to enable asset management
Tariff and tax policy	— Redefine the tariff policies for operators, providing guidance that balances costs and risks, that is not based on the asset age limit set in state administrative and accounting regulations (age limits at which tariffs should cease) and that considers depreciation consequences.
Financial instruments	— Create laws and policies to ensure that areas of government that own critical assets are provided with the necessary financial resources for asset management implementation, including training, incorporation of ICT systems, etc. — Create financial incentives for asset owners or operators to improve asset management performance.
Education, training and capacity building	— Create policies that encourage formal training in asset management through professional and higher education. — Create policies to encourage the delivery of training programmes to train personnel in implementing, sustaining and improving asset management in their organizations. — Institute recognition awards to operators and contractors with high asset management performance.
Research and innovation partnerships	— Index a percentage of annual funding allocations to research and development programmes that support asset management. — Regulatory agencies can partner with professional asset management associations to improve the development or application of public policy instruments that enable asset management.
Data and information	— Require reliable and regularly updated information about public services by service delivery providers to support the definition of public policies and organizational strategies, and evaluation of services provided to society.
Competition policy and procurement	— Legislate purchases of assets based on life cycle costing. — Develop new criteria for evaluating investment projects and rating bids in tenders based on life cycle costs and long-term risks. — Develop or authorize development of guidance for purchasing processes aligned with best practice asset management concepts.
Audits	— Utilize the services of competent professional auditors trained in asset management. — Develop audit processes in asset management based on maturity scales to aid in the progress of organizations to a level eligible for certification (e.g. to ISO 55001).

Annex E (informative)

Case studies

This annex provides a selection of case studies that outline the types of public policy instruments developed or applied to improve asset management, and the challenges, successes, lessons learned and benefits realized across a variety of sectors and governments. The case studies included are intended to be informative and are not exhaustive. Case studies are presented for Portugal (see [Table E.1](#)), Canada (see [Table E.2](#)), Japan (see [Table E.3](#)) and Australia (see [Table E.4](#)).

Table E.1 — Case study 1

Country/region: Portugal	
Name of government: Portuguese Republic	
Level of government: National	Sector(s) covered: Drinking water, wastewater, storm water
Public policy instruments development or applied: Government strategic plan Legal framework Institutional framework (authorities) Governance models (and contracts) Quality of service Tariff and tax policy Financial instruments Training and capacity building Research and innovation	
Case study description: When Portugal joined the European Union (EU) in 1986, coverage of essential water services (including water supply, wastewater and storm water) was low and the quality of the service provided was very poor in most of the country. Even in larger cities, water was unsafe to drink, interruptions were frequent, and most of the wastewater was disposed in non-controlled septic tanks or drained directly to the receiving bodies, without any treatment. ^[10] By joining the EU, Portugal started to have access to cohesion funds aiming to leverage the development of the country. For water services, a coherent public policy started to take shape in 1993 by the Portuguese National Government and led by the Ministry of the Environment. A major reform in the legal and institutional frameworks and sound strategic planning were key cornerstones for this process. The main government's objectives in the first years were to build new infrastructure to increase the service coverage and improve the quality of service, promoted by the allocation of European funds through the Ministry of Public Works. In recent years, the major challenge has been to ensure service sustainability by maximizing the value realized from the existing infrastructure assets over the long term through asset management practices.	
How Portugal applied select public policy instruments to achieve government objectives: — Government strategic plan: Portugal has had seven-year strategic plans since 2000 that include strategic directions and set priorities for asset management, considering a long-term vision for the existing assets and maximizing their value. These plans include: an assessment of the situation; establishment of national objectives; the definitions of priorities; an estimation of investment needs; and definition of the funding strategy. — Legal framework: Infrastructure asset management practices are recognized in legislation as duties of water utilities. Utilities serving more than 30 000 inhabitants, for example, are required to have an infrastructure asset management system.	

Table E.1 (continued)

- Institutional framework (authorities): Portugal's Water and Waste Services Regulation Authority (ERSAR) is charged with a clear mandate and the skills to promote the enforcement of asset management included in its regulatory model. Their regulatory interventions for all water utilities have resulted in improvements in utilities' information management and accounting systems, which are foundational to effective infrastructure asset management. Additional responsibilities include dissemination of service quality information, annual excellence awards to utilities, distribution of technical guides, and promotion of and support for infrastructure asset management projects.
- Governance models (and contracts): Incentives for the consolidation of small and medium size water utilities to achieve economies of scale are also providing opportunities for implementation of asset management practices. ERSAR is responsible for legal and contractual regulation, and requires certain asset management practices as part of contracts and defining minimum quality of service targets and indicators.
- Quality of service: ERSAR established regulation in 2011 with a fully audited annual assessment for all water supply and wastewater utilities based on 16 quality of service indicators. Assessment results are made publicly available and have encouraged utilities to increase efficiency while creating concise, reliable and easily interpretable information. Since 2014, the information is now available through a free mobile application, and since 2016, several new asset management indices have been included. Since 2022, storm water services are included.
- Tariff and tax policy: A tariff policy was set by ERSAR for public water services with the objective of progressing towards cost recovery, consistent with the economic capacity of the population. Asset management is considered in the tariff policy, for long-term sustainability of the assets, particularly by accommodating the need of expansion and rehabilitation costs based on priorities. Taxes to encourage desirable behaviour have also been introduced (e.g. the efficient use of water through a water resources usage tax). These taxes feed the Environmental Fund, which partially returns to the water utilities to support asset management activities such as improving asset registries.
- Financial instruments: The funding program for Portugal's water services includes measures to support good practices on asset management, in accordance with the priorities defined in the national strategic plan. For instance, some incentive mechanisms are being introduced to require minimum values of the asset knowledge and management indices to assign certain kinds of EU funds.
- Training and capacity building: The National Civil Engineering Laboratory (LNEC) leads continuous asset management training and capacity building initiatives for water utilities through programmes such as iGPI initiatives and ProAguas.
- Research and innovation: Research first began under the programme "Water Infrastructure Asset Management".^[52] Since then, several relevant projects have followed, at national, European and international levels (e.g. AWARE-P project, EU TRUST project, the iGPI initiatives, implemented in Portugal by the LNEC and Instituto Superior Técnico (IST) with involvement of ERSAR and several water utilities). An integrated infrastructure asset management methodology was developed and published in two technical guides (see References ^[54] and ^[55]). An innovative infrastructure asset management decision support software was also developed and tested in several utilities.^[53] Master dissertations and PhD theses have also contributed (e.g. see References ^[11], ^[57], ^[58] and ^[59]). Many national and international conferences, workshops, courses and meetings have been organized in Portugal (e.g. IWA LESAM 2007, Infrastructure Asset Management workshop in IWA, World Water Congress 2014).

Challenges, successes and lessons learned:

Despite Portugal's successes, certain challenges have been presented to public policy-makers and offer additional opportunities for future improvement. These include, but are not limited to, the following:

- Legal framework challenges: Although infrastructure asset management practices are recognized in Portugal's legislation, the current legislation does not refer to the specific requirements of a management system and there is no verification of compliance with these duties and penalty tools. The regulatory authority made efforts to make the legal requirements more specific (and thus increase legal effectiveness by allowing easier identification of any breaches of duty, etc.), namely through the development of new asset knowledge and management indices. These indices are now audited annually as part of the quality of service assessment process.^[56]
- Institutional framework challenges: The major challenges are related with the financial sustainability of the services due to the limited power of the regulator to set the tariffs (only recommendations can be issued). This is a challenge to overcome in order to further improve service quality and ensure full cost-recovery. The recent strengthening of ERSAR's authority will allow them to define the sector's tariffs, apply fines and enforce debts.

Table E.1 (continued)

- Financial resources challenges: Even with incentive mechanisms, some studies have revealed that there is a rehabilitation funding gap that is expected to increase in the near future at current investment trends (e.g. see Reference [11]). This, combined with the reduction of subsidies from the EU, is a major challenge to the sector in the medium term in which solutions should be explored to address the future funding gap.

Benefits or outcomes realized:

With a consistent public policy from 1993 to 2019, Portugal significantly improved public investments in the water sector (about EUR 13 billion), and the coverage and quality of the service provided by public infrastructure improved considerably across the country, including:

- increase in water supply coverage from 81 % to 96 %;
- increase in high quality drinking water from 50 % to 99 %;
- increase in sewerage and treatment coverage from 28 % to 85 %;
- increase in good quality water resources from 19 % to 78 %;
- increase in good quality coastal bathing waters from 53 % to 99 %;
- increase in good quality inland bathing waters from 17 % to 95 %.

Progress towards climate and ESG goals:

The coordination and integration of these public policy instruments resulted in significant improvements in Portugal to SDG 6 (clean water and sanitation), SDG 3 (public health), SDG 9 (innovation and infrastructure) and SDG 17 (adequate partnerships). The quality of water services also made improvements to SDG 15 (life in land) and SDG 14 (life below water).

Table E.2 — Case study 2

Country/region: Canada	
Name of government: Government of Canada	
Level of government: National State	Sector(s) covered: Water, wastewater, & waste Transportation General government (e.g. treasury, administration) Environment, including flood defence Natural resources and land management Parks and recreation
Public policy instruments development or applied: Financial instruments Training and capacity building Data and information Research and innovation partnerships	
Case study description: Local governments and municipalities in Canada provide a broad range of services to communities. A typical municipality is responsible for the delivery of water, wastewater, stormwater, roads, transit, and parks and recreation services. Municipalities own and are responsible for 60 % of Canada's public sector infrastructure. Following Canada's "infrastructure golden age" in which the country experienced a significant build out of municipal infrastructure following World War II to support the baby boom population, there followed several decades of under-investment in infrastructure. Triggered by the economic issues experienced during the late 1970s, the country fell from infrastructure spending as a portion of gross domestic product (GDP), with a high of 5 % in 1966 to a low of just over 2 % around 1998. This situation resulted in a significant amount of capital renewal items being deferred and the average age of infrastructure increasing, with infrastructure assets declining in condition and becoming more and more expensive to repair and renew. Today, municipalities are living with this legacy, and infrastructure constructed during the golden age is at, or past, the end of its useful life now, having not been properly maintained over a period of three decades. Problems such as climate change, population change, higher customer expectations and the COVID-19 pandemic are further compounding this challenge.	