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Sustainability in buildings and civil engineering works — Guidelines on the application of the general principles in ISO 15392

Développement durable dans les bâtiments et les ouvrages de génie civil — Lignes directrices pour l'application des principes généraux de développement durable

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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 documents 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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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 59, *Buildings and civil engineering works*, Subcommittee SC 17, *Sustainability in buildings and civil engineering works*.

This second edition cancels and replaces the first edition (ISO [TS12720:2013](http://www.iso.org/standard/67999)/[TS 12720:2014](http://www.iso.org/standard/67999)), which has been technically revised.

The main changes are as follows:

- reflection of the revised sustainability objectives as published in ISO 15392:2019;
 - the increased number and realignment of sustainability objectives from ten in ISO 15392:2008 to 18 in ISO 15392:2019;
- inclusion of text in Clause 6 describing the categorising of the 18 sustainability objectives into 4 grouped objectives as well as the descriptions, purposes and anticipated outcomes for each of those groupings; ~~and~~
- removal of ~~normative~~ Annex A.

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

This document is intended for use by stakeholders involved during the life cycle of a construction works. More and more decision makers involved in construction projects are establishing goals to improve the sustainability performance of a construction works.

Decision-making typically relates to the planning, design, construction, use and operation, and end-of-life processes. The planning and design phases usually include the project inception/initiation, conception of need and feasibility, and initial and detailed design, all of which lead to the actual construction and occupancy of the building.

The objective of providing the guidance included in this document is aims to demonstrate to each actor at each phase of the construction project a way to implement the nine general principles of sustainability in buildings and civil engineering works, as described in ISO 15392.

Although the following topics are currently outside the scope of this document, these the guidelines in this document can also facilitate the different actors in

- identifying and setting performance targets,
- elaborating relevant practical tools (criteria, indicators, measurement methods) for assessing/measuring the actual performance levels, and
- formalizing a management system based on the general principles of sustainability, which can be monitored, assessed, and improved.

Application of the nine general principles to the life cycle of construction works introduces a multidimensional puzzle leading to a complex framework. Clause 4 presents the different primary elements of the framework and the related facets to be considered regarding each element. Clause 5 introduces the methodological approach for applying sustainability thinking to the development of the construction works and identifies six phases of the decision-making process and 18 sustainability objectives. Clause 6 gives application guidance developed on the basis of these objectives and related issues of concern (see Table 3) and detailed recommendations attached to each issue (see Table 4).

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Sustainability in buildings and civil engineering works — Guidelines on the application of the general principles in ISO 15392

1 Scope

This document provides guidance for the application of the nine general principles of sustainability in buildings and civil engineering works as specified in ISO 15392:2019, 5.3. It shows the different actors involved with the construction works how to take these principles into account in their decision-making processes in order to increase the contribution of the construction works to sustainability and sustainable development.

This document provides a step-by-step approach for:

- encouraging the application of the general principles by all stakeholders at each stage of the project and its use, from the decision to build and the initial development of the project brief until the end-of-life of the construction works;
- helping interested parties to consider and/or incorporate sustainability thinking in all phases of the building's or civil engineering works' life cycle, for all relevant issues of concern, by raising key questions in relation to the general principles;
- understanding the outcome (effect) of the application of the general principles;
- building on acquired experience to develop best practices and engendering a continuous improvement process.

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 6707-1, Buildings and civil engineering works — Vocabulary — Part 1: General terms](#)

[ISO 14050, Environmental management — Vocabulary](#)

[ISO 15392:2019, Sustainability in buildings and civil engineering works — General principles](#)

[ISO/TR 15686-11, Buildings and constructed assets — Service life planning — Part 11: Terminology](#)

[ISO/TR 21932, Sustainability in buildings and civil engineering works — A review of terminology](#)

[ISO 14050, Environmental management — Vocabulary](#)

[ISO 15392:2019, Sustainability in building construction — General principles](#)

[ISO 6707-1, Building and civil engineering — Vocabulary — Part 1: General terms](#)

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6707-1, ISO 14050, ISO 15392, ISO/TR 21932, ISO 6707-1, ISO/TR-15686-11 and ISO 14050/TR 21932 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/>

Where conflicts arise, the terms and definitions within ISO 15392 and ISO/TR 21932 govern.

4 Elements of the framework

Sustainability related to buildings and civil engineering works is a complex issue, and the application of a holistic approach is one of its general principles. When incorporating sustainability thinking into the different processes involved in the development of a construction works, it is relevant to keep in mind the elements presented in Table 1 as pieces of a multidimensional puzzle to be assembled. It should be noted that, often, different individual aspects will interrelate with one another.

Table 1 — Primary elements for consideration

Primary elements	Facets to be considered
Primary aspects of sustainability	<ul style="list-style-type: none"> — environmental protection — economic efficiency — social needs
General principles of sustainability related to construction works (ISO 15392:2019, 5.3)	<ul style="list-style-type: none"> — continual improvement — equity — global thinking and local action — holistic approach — continual improvement — equity — global thinking and local action — holistic approach — involvement of interested parties — long-term consideration and resilience — risk management — responsibility — transparency
-	<ul style="list-style-type: none"> — provision of functionality, health, comfort, safety and accessibility — performance management during operation

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Primary elements	Facets to be considered
<p>Sustainability objectives (ISO 15392:2019, 5.2)</p> <p>Sustainability objectives (ISO 15392:2019, 5.2)</p>	<ul style="list-style-type: none"> — application of life cycle thinking; — provision of economic value over time; — provision of social and cultural value over time and for all; — minimization of adverse end-of-life impacts; — limitation of adverse environmental impacts and where possible, maintenance or provision of environmental value over time; — adaptability; — efficient and responsible management throughout the process; — integration into the relevant planning schemes and policies (including sustainability planning) related to local building / town-planning and infrastructure; — involvement of interested parties and consideration of their needs; — reconciliation of contradictory interests or requirements arising from short-term and long-term planning or decision-making; — stimulation of innovation; — stimulation of a pro-active approach; — improvement of the construction sector and the built environment; — provision of functionality, health, comfort, safety and accessibility; — performance management during operation; — application of life cycle thinking; — provision of economic value over time; — provision of social and cultural value over time and for all; — minimization of adverse end-of-life impacts; — limitation of adverse environmental impacts and where possible, maintenance or provision of environmental value over time; — adaptability; — efficient and responsible management throughout the process;

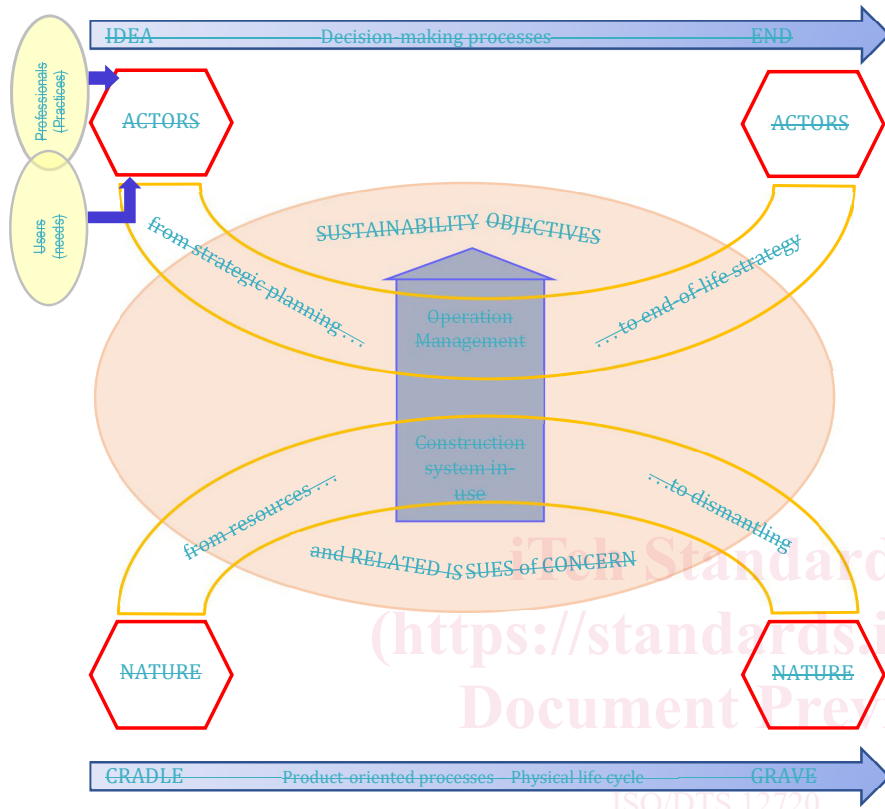
Primary elements	Facets to be considered
	<ul style="list-style-type: none"> — integration into the relevant planning schemes and policies (including sustainability planning) related to local building / town planning and infrastructure; — involvement of interested parties and consideration of their needs; — reconciliation of contradictory interests or requirements arising from short-term and long-term planning or decision-making; — stimulation of innovation; — stimulation of a pro-active approach; — improvement of the construction sector and the built environment; — decoupling of economic growth from increasing adverse impacts on the environment and/or society; — maximization of beneficial impacts and value through application of restorative and regenerative approaches; — reduction of adverse impacts while improving value, where impacts as well as value may be judged against any combination of the three primary aspects of sustainability.
<p>The functions of a building and its site</p>	<ul style="list-style-type: none"> — supporting main activities corresponding to users' needs — providing useable and functional indoor and outdoor spaces — providing a healthy indoor environment — providing safety and security — providing for privacy — providing a sense of place
<p><u>The functions of a civil engineering works</u></p> <p><u>The functions of a civil engineering works</u></p>	<ul style="list-style-type: none"> — conveying and managing flows (material, water, energy, waste, goods, persons, information, etc.) — storing, treating, or converting flows — producing, storing, distributing, or managing energy — connecting places, functions, or people — producing services for the community — accommodating medium- or large-scale activities — providing safety and security — protecting the environment, goods, or people <u>— producing services for the community</u> <u>— accommodating medium- or large-scale activities</u>

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Primary elements	Facets to be considered
	<ul style="list-style-type: none"> — providing safety and security — protecting the environment, goods, or people
Main stakeholder groups	<ul style="list-style-type: none"> — clients — designers: architects, engineers, and related consultants — contractors: builders, constructors, services engineers — suppliers and manufacturers — users — facility managers — community interest groups — regulatory authorities — users — facility managers — community interest groups — regulatory authorities
Main types of construction works ^a	<ul style="list-style-type: none"> — buildings <ul style="list-style-type: none"> — residential buildings — commercial buildings — public buildings — industrial buildings — etc. — buildings <ul style="list-style-type: none"> — residential buildings — commercial buildings — public buildings — industrial buildings — etc. — civil engineering works <ul style="list-style-type: none"> — parks and public spaces — transportation systems — water and sewerage systems — energy generation and distribution systems — waste systems

Primary elements	Facets to be considered
	<ul style="list-style-type: none"> — airports — etc.
Decision-making processes	<ul style="list-style-type: none"> — strategic planning — project definition — design — construction and handover — operation and maintenance — end-of-life strategy
Geographical scales linked to a project	<ul style="list-style-type: none"> — construction works and its site — local and extended neighbourhood — city or region
Physical life cycle stages of a construction works ("cradle to grave")	<ul style="list-style-type: none"> — production stage (including extraction of raw materials and manufacturing of products) — construction stage — in-use stage (including use, operation, maintenance, repair, replacement, and refurbishment) — end-of-life stage
Combined product and process approach (see Figure 1)	<ul style="list-style-type: none"> — product-oriented, in terms of performance (technical, functional, environmental, social, economic) of the resulting works — process-oriented, in terms of decision-making over the entire life of the works
<p>^a For each type of works (buildings or civil engineering works) the issues of concern should be studied from a relevance and significance point of view. It is not in the scope of this document to elaborate more on the types of works.</p>	

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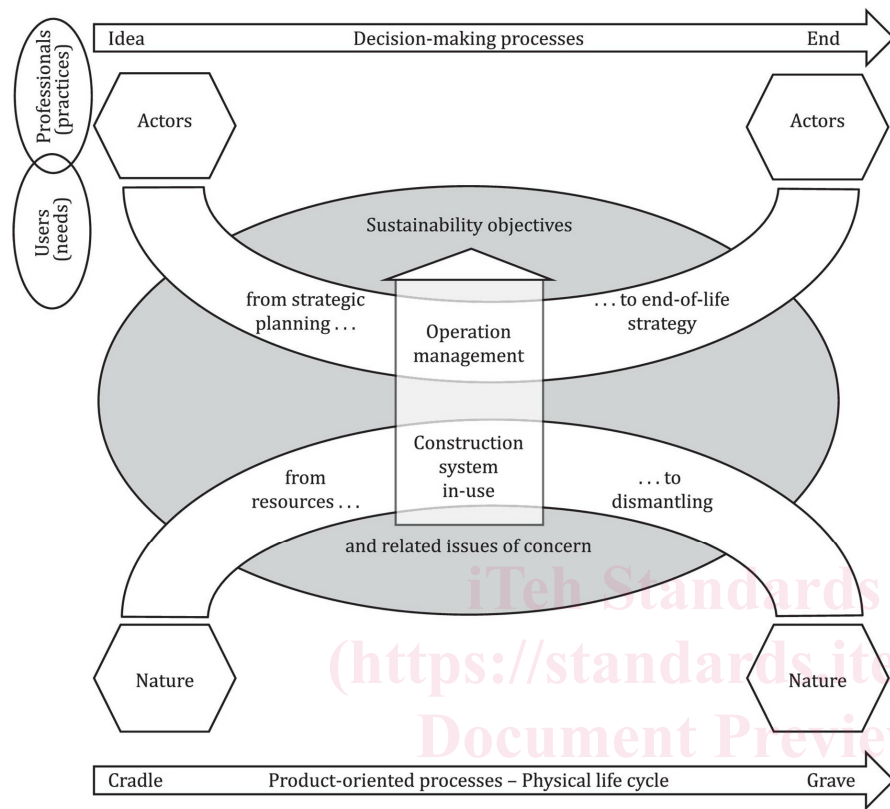


Figure 1 — Diagram of process-oriented and product-oriented life cycles

5 Methodological approach

5.1 General

The starting point of the methodology of applying sustainability thinking to development of construction works is from ISO 15392:2019, 5.1, Paragraph 1.

Six main phases are identified within the decision-making processes that relate to the life cycle of a construction works, from the first expression of a need (idea) until the end-of-life of the works. These are:

- strategic planning (leading to the project definition)
- project definition (leading to the creation of the project/client brief)
- design (conceptual, detailed)
- construction and handover (including commissioning)
- operation and maintenance (including repair, replacement, and refurbishment)
- end-of-life strategy (deconstruction, waste treatment, and disposal)

— strategic planning (leading to the project definition);

— project definition (leading to the creation of the project/client brief);