



SLOVENSKI STANDARD
oSIST prEN 15978:2024
01-julij-2024

Trajnostnost gradbenih objektov - Vrednotenje učinkov ravnanja z okoljem v stavbah - Zahteve in navodilo

Sustainability of construction works - Assessment of environmental performance of buildings - Requirements and guidance

Nachhaltigkeit von Bauwerken - Bewertung der Umweltleistung von Gebäuden - Anforderungen und Anleitungen

Contribution des ouvrages de construction au développement durable - Évaluation de la performance environnementale des bâtiments - Exigences et recommandations

Ta slovenski standard je istoveten z: prEN 15978

oSIST prEN 15978:2024

ICS:

13.020.20	Okoljska ekonomija. Trajnostnost	Environmental economics. Sustainability
91.040.01	Stavbe na splošno	Buildings in general

oSIST prEN 15978:2024

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 15978

May 2024

ICS 91.040.99

Will supersede EN 15978:2011

English Version

Sustainability of construction works - Assessment of environmental performance of buildings - Methodology

Contribution des ouvrages de construction au
développement durable - Evaluation de la performance
environnementale des bâtiments - Méthode de calcul

Nachhaltigkeit von Bauwerken - Bewertung der
umweltbezogenen Qualität von Gebäuden -
Berechnungsmethode

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 350.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

European foreword	4
Introduction	5
1 Scope.....	8
2 Normative references.....	8
3 Terms and definitions	9
4 Abbreviations.....	21
5 The assessment process	22
6 Purpose of the assessment	23
7 Specification of the object of assessment.....	25
7.1 General.....	25
7.2 Functional equivalent	25
7.3 Reference study period.....	27
7.4 System boundary	28
7.5 Building model for performance assessment.....	53
7.6 Quantification of the building parts and their life cycle	57
8 Scenarios for describing/defining the building life cycle	60
8.1 General.....	60
8.2 Requirements for scenarios.....	61
8.3 Time-related characteristics and associated scenarios.....	62
8.4 Scenarios for climate conditions.....	62
8.5 Scenarios for the pre-construction stage (module A0)	63
8.6 Scenarios for the product stage (modules A1 to A3).....	63
8.7 Scenarios for the construction process stage (modules A4-A5)	63
8.8 Scenarios for Use Stage (modules B1 to B8)	64
8.9 Scenarios for the end of life stage (modules C1 to C4)	67
8.10 Scenarios for benefits and loads beyond the system boundary - Module D.....	68
9 Level of granularity of assessment and relevant data needs.....	69
9.1 General.....	69
9.2 Data Needs and data quality	70
9.3 Quantification specific to operational energy use	71
9.4 Quantification specific to operational water use	71
9.5 Using Environmental Product Declaration(s) - EPD	72
10 Calculation of the environmental indicators	72
10.1 Environmental impacts and aspects and related indicators.....	72
10.2 Indicators describing environmental aspects relating to the local environment.....	77
11 Synergies between circularity and environmental performance of buildings.....	79
12 The Assessment Report	79
12.1 General.....	79
12.2 General information on the assessment.....	79
12.3 General information on the object of assessment.....	80
12.4 Statement of boundaries and scenarios used in the assessment	81
12.5 Statement regarding the building model description	81
12.6 Data sources, types and quality	81

12.7	List of indicators used for assessment and expression of results.....	81
12.8	Specific information in the assessment report.....	82
13	Communication of assessment results	83
14	Verification of results.....	84
	Annex A (normative) Building-integrated and site generated energy reporting.....	85
A.1	General	85
A.2	Approach A.....	85
A.3	Approach B.....	86
A.4	Documentation and reporting of background information.....	86
A.5	Illustrative example of reporting impacts under Approaches A and B.....	88
A.6	Energy use and exported energy scenarios (following Approach A).....	94
	Annex B (normative) Information describing environmental aspects and impacts to local environment.....	98
B.1	General	98
B.2	Local land use and land use change	98
B.3	Local emissions to outdoor air, soil and ground and surface water	100
	Annex C (normative) Synergies between circularity and the environmental performance of buildings	102
C.1	General	102
C.2	Purpose	102
C.3	Coverage of circularity aspects.....	102
C.4	Scenarios.....	103
C.5	Level of detail of the constituent parts	103
C.6	Bill of materials	103
C.7	Scoring.....	104
C.8	Ease of disassembly	104
C.9	Reuse and recycling potential of dismantled building products and components .	105
C.10	Contribution to overarching United Nations sustainable development goals (SDG goals).....	110
	Bibliography	111

prEN 15978:2024 (E)**European foreword**

This document (prEN 15978:2024) has been prepared by Technical Committee CEN/TC 350 “Sustainability of construction works”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 15978:2011.

In relation to EN 15978:2011, the following changes have been made:

- Environmental impact indicators have been aligned with EN 15804+A2;
- prEN 15978 has been aligned with EN 15643 regarding modules A0, B8 and D1 and D2;
- Use of baseline and future prospect scenarios have been described;
- Requirements and recommendations have been provided for different design stages;
- Existing and forthcoming national and EU regulations have been taken into account in the requirements written in prEN 15978, e.g. decarbonation of energy production;
- System boundaries of module B7 “Operational Water Use” (B7.1, B7.2 and B7.3) have been provided in a detailed way similar to module B6 “Operational Energy Use” (B6.1, B6.2 and B6.3);
- The assignment of activities between B4 (Replacement) and B5 (Refurbishment) has been clarified;
- Two approaches for the reporting of building generated energy have been described in Clause 7 and Annex A to improve transparency:
 - Approach A as in EN 15978:2011 and
 - Approach B where a proportion of the embodied impacts of the energy production appliances that export energy are outside the system boundary of the building together with their operational impacts and these are reported as additional information
- Impacts resulting from the user’s activities may be declared optionally in Module B8, including impacts of commuting of users.
- To ensure that all on-site activities are considered, a separate sub-module A5.1 has been introduced to account for deconstruction of existing construction works with the benefits and loads beyond the system boundary in module D1.
- Synergies between circularity and the environmental performance of buildings are included in the normative text and in Annex C in prEN 15978.
- Demand for information concerning environmental impacts and aspects at the local environment level is in the normative text in prEN 15978.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

Introduction

The purpose of this document is to provide calculation rules for the assessment of the environmental performance of new and existing buildings.

This document is part of a suite of European Standards, Technical Specifications and Technical Reports for the assessment of the environmental performance of buildings that together support quantification of the contribution of the assessed building to sustainable construction and sustainable development.

The environmental performance of a building is only one aspect of its sustainability. The social and economic performance of the building are also aspects of sustainability that should be assessed as part of a sustainability assessment. These are described in the framework standard (EN 15643).

NOTE 1 The environmental assessment at building level requires information from products and services (EN 15804:2012+A2:2019).

The evaluation of technical and functional performance is beyond the scope of this document. Technical and functional characteristics are taken into account here by reference to the functional equivalent, which also forms a basis for comparison of the results of assessments.

This document is intended to support the decision-making process and documentation of the assessment of the environmental performance of a building. The assessment results are based on scenarios that affect the environmental performance of the building, such scenarios are uncertain, for example, there may be new processes and/or technologies or changes in operation, and could affect the assessment result. Figure 1 illustrates how the assessment of the environmental performance takes place within the concept of the sustainability assessment of buildings.

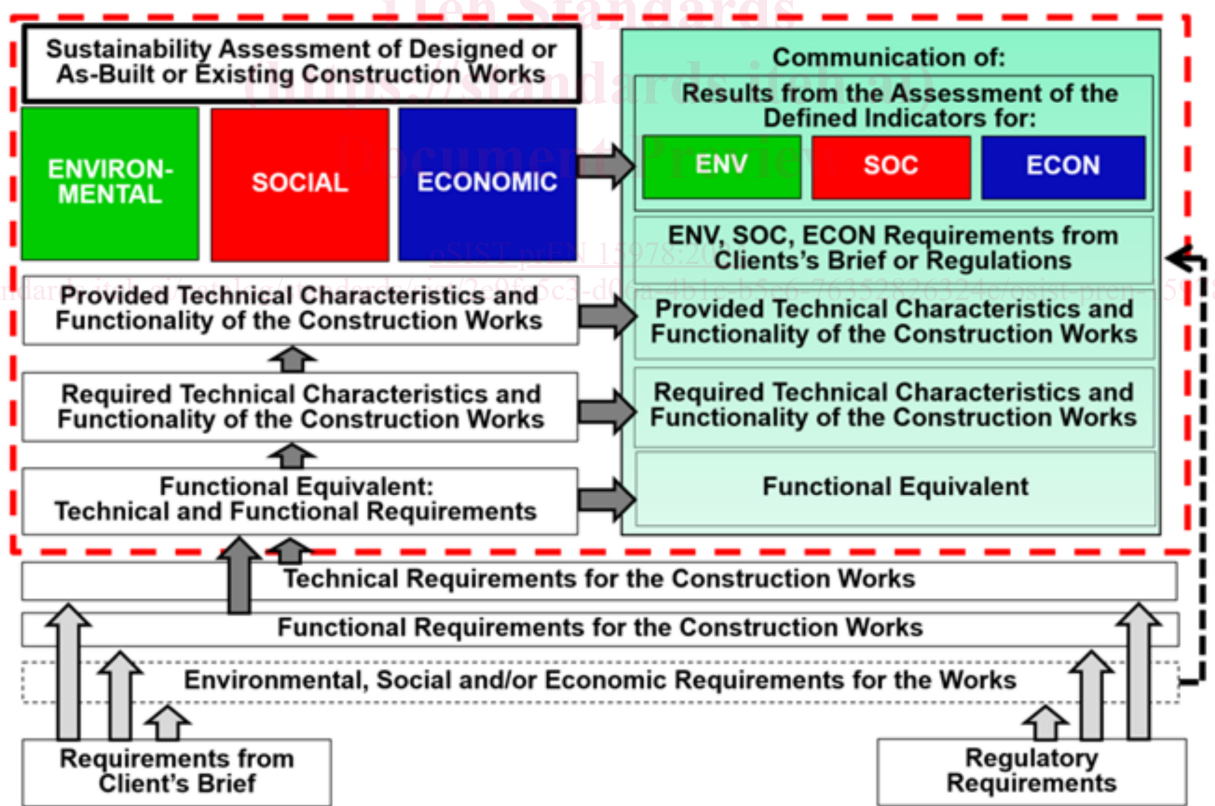


Figure 1 — Concept of sustainability assessment of buildings

NOTE 2 The outer box with the red dotted line represents the area standardized by CEN/TC 350.

prEN 15978:2024 (E)

In this document, the assessment method for the quantitative evaluation of the environmental performance of the building is based on a life cycle approach. The general requirements for sustainability assessment of buildings are described in EN 15643 (the general framework standard). Other standards developed by CEN/TC 350 in this area, and how they are related to this European Standard, are shown in Figure 2

Framework level	Sustainability Assessment of Construction Works			Technical characteristics	Functionality
		EN 15643:2021 Sustainability of Construction Works – Framework for Assessment of Buildings and Civil Engineering Works			Service Life Planning – Principles ISO 15686-1
Works level	prEN 15978 rev Assessment of Environmental Performance of Buildings	EN 16309:2014 Assessment of Social Performance of Buildings	EN 16627:2015 Assessment of Economic Performance of Buildings	EN ISO 52000-1 Energy Performance of Buildings	
	EN 17680:2023 Evaluation of the Potential for Sustainable Refurbishment of Buildings				
	EN 17472:2022 Assessment of Civil Engineering Works				
Product level	EN 15804 + A2:2019 Environmental Product Declarations – Core Rules for Construction Products			Service Life Prediction Procedures ISO 15686-2, Feedback from Practice ISO 15686-7, Reference Service Life & Service Life Estimation ISO 15686-8	
	EN 15942:2021 Communication Format B-to-B				
	EN 15941:2023 Data Quality				
	prEN 17672 Horizontal Rules for B-to-C Communication				
	CEN/TR 16790 Guidance for EN 15804				
	CEN/TR 17005 Additional Indicators				

Figure 2 — Standards of CEN/TC 350

NOTE 3 This document supports the assessment of buildings within the Level(s) Framework (see Bibliography) for macro objectives 1, (Greenhouse gas emissions along a building's life cycle), 2 (Resource efficient and circular material life cycles) and 3 (Efficient use of water resources). Other standards from CEN/TC350 can also support Level(s) macro Objectives 4 (Healthy and comfortable spaces) and 5 (Adaptation and resilience to climate change), EN16309, and macro objective 6 (Optimized life cycle cost and value), EN 16627.

NOTE 4 Level(s), is a common European approach to assess and report on the sustainability of buildings. Using existing standards, the voluntary Level(s) framework provides a common language for building sustainability, which other initiatives can also use. More information can be found at [Level\(s\) \(europa.eu\)](https://www.europa.eu/level-s).

Buildings and constructed assets have an impact on sustainable development. Therefore, the internationally recognized Sustainable Development Goals (SDGs) formulated by the United Nations also apply to the construction and real estate industry. As part of targets towards sustainable cities and communities formulated in SDG 11, the construction of sustainable and resilient buildings is also required, as is an efficient use of natural resource and a substantial reduction of waste generation through prevention, reduction, and reuse formulated in SDG12. These goals are closely interrelated with the other SDGs. Both providers and buyers of real estate need clear characteristics and assessment criteria in order to evaluate, assess and communicate the contribution of buildings to sustainable development.

Assessments based on the requirements of this document can be used to demonstrate whether the development and use of an assessed building has the potential to contribute to United Nations SDG Goals 11, 12, and 13, and other SDGs such as 6, 7, and 15 (Figure 3)



Figure 3 — Sustainable Development Goals (SDGs) formulated by the United Nations, particularly relevant to the environmental performance of buildings and constructed assets

NOTE 5 EN ISO 52000-1, in common with all EPB standards, provides a certain flexibility with regard to the methods, the required input data and references to other EPB standards. For the use of EN52000-1, informative default choices are provided in EN ISO 52000-1:2017, Annex B.

NOTE 6 In the case EN ISO 52000-1 is used in the context of national or regional legal requirements, mandatory choices can be given at national or regional level for such specific applications.

iTeh Standards
(<https://standards.itih.ai>)
Document Preview

[oSIST prEN 15978:2024](https://standards.itih.ai/catalog/standards/sist/2e9fa5c3-d06a-4b1e-b5e6-76352826324c/osist-pren-15978-2024)

<https://standards.itih.ai/catalog/standards/sist/2e9fa5c3-d06a-4b1e-b5e6-76352826324c/osist-pren-15978-2024>

prEN 15978:2024 (E)**1 Scope**

This document specifies the calculation method, based on Life Cycle Assessment (LCA) and other quantified environmental information, to assess the environmental performance of a building and its site, and gives the means for the reporting and communication of the outcome of the assessment. The standard is applicable to new and existing buildings and refurbishment projects.

The document gives:

- the description of the object of assessment,
- the system boundary that applies at the building level,
- the procedure to be used for the inventory analysis,
- the list of indicators and procedures for the calculation of these indicators,
- demand for information concerning environmental impacts and aspects at the local environment level (including emissions to indoor air),
- demand for information concerning building generated energy reporting and design for circularity as technical characteristics that support environmental performance,
- the requirements for the data necessary for the calculation, and
- the requirements for presentation of the results in reporting and communication.

The approach to the assessment covers all stages of the building life cycle and is based on data obtained from Environmental Product Declarations (EPD), their “information modules” (EN 15804:2012+A2:2019) and other data and information necessary and relevant for carrying out the assessment. The assessment includes all building related construction products, processes and services, used over the life cycle of the building.

Methodologies for and approaches to the interpretation and the making of value judgments of the results of the assessment are not within the scope of this document.

NOTE 1 This document provides system boundaries, calculation rules and indicators to compile and assess the life cycle inventory and life cycle environmental impacts of buildings.

NOTE 2 The document also provides the methodological basis and assessment rules to support the achievement of environment related macro objectives in Europe and instruments such as the European reporting framework Level(s). More information can be found at [Level\(s\) \(europa.eu\)](https://europa.eu).

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.

EN 15316-4-5, *Energy performance of buildings - Method for calculation of system energy requirements and system efficiencies - Part 4-5: District heating and cooling*

EN 15643:2021, *Sustainability of construction works — Framework for assessment of buildings and civil engineering works*

EN 15804:2012+A2:2019, *Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction products*

EN 15941:2024, *Sustainability of construction works — Data quality for environmental assessment of products and construction works — Selection and use of data*

EN ISO 52000-1 *Energy performance of buildings — Overarching EPB assessment — Part 1: General framework and procedures*

ISO 15686-1:2011, *Building and constructed assets — Service life planning — Part 1: General principles and framework*

ISO 15686-2, *Building and constructed assets — Service life planning — Part 2: Service life prediction procedures*

ISO 15686-7, *Building and constructed assets — Service life planning — Part 7: Performance evaluation for feedback of service life data from practice*

ISO 15686-8, *Building and constructed assets — Service life planning — Part 8: Reference service life and service-life estimation*

3 Terms and definitions

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

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

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

3.1 average data

calculated mean of data based on a fully representative sample for a *construction product* (0) or *construction service* (EN 15804:2012+A2:2019, 3.7), provided by one or more manufacturers, either from their multiple plants or based on multiple similar construction products of the manufacturer(s)

Note 1 to entry: The product category or construction service can contain similar products or construction services.

[SOURCE: EN 15941:2024, 3.1]

3.2 brief

document that states the *client's* (3.7) requirements for a construction project

[SOURCE: ISO 6707-2:2017, 3.2.18, modified – terms “client” and “construction” added in the definition]

3.3 building < noun >

construction works (3.14) that have the provision of shelter for its occupants or contents as one of its main purposes and are usually enclosed and designed to stand permanently in one place

[SOURCE: ISO 6707-1:2020, 3.1.1.3 modified – “partially and totally” has been removed from the definition; Note 1 to entry deleted]

prEN 15978:2024 (E)**3.4****building fabric**

all *construction products* (3.11) that are fixed to the *building* (3.3) in a permanent manner, so that the dismantling of the product changes the performance of the building and the dismantling or replacement of the product constitute construction operations

3.5**building integrated system**

installed technical equipment that enables the continued operation of a *building's* (3.3) core functions

Note 1 to entry: This includes the technical equipment for space heating, space cooling, ventilation, domestic hot water, built-in (installed) lighting, in building transportation (e.g. lifts, escalators, travelators) building automation and control, on-site electricity generation, or a combination thereof, (including those systems using energy from renewable sources), and other systems e.g. for sanitation, security, fire safety, and IT communications.

Note 2 to entry: Building-integrated technical equipment (including onsite energy generating equipment) are construction products/building components.

3.6**cleaning**

all operations that ensure a level of cleanliness and appearance, consisting of separating and eliminating generally visible dirt from a surface by means of the following combined factors, in variable proportions, such as chemical action, mechanical action, temperature, duration of application

[SOURCE: ISO 22716:2007, 2.8]

3.7**client**

person or organization that requires a *building* (3.3) to be provided, altered or extended and is responsible for initiating and financing a project, and approving the *brief* (3.2)

[SOURCE: ISO 6707-2:2017, 3.8.2,]

3.8**complementary product category rules****c-PCR**

product group specific or horizontal PCR, which provide additional compliant and non-contradictory requirements to EN 15804

Note 1 to entry: c-PCR are meant to be used together with EN 15804.

[SOURCE: CEN/TR 16970:2016, 3.1]

3.9**component**

construction product (3.11) manufactured as a distinct unit to serve a specific function or functions

[SOURCE: ISO 6707-1:2020, 3.4.13, modified – term construction added]

3.10

construction element
building component
building element
assembled system
part of works

component (3.9) or a set of assembled components incorporated in a *building* (0) or other *construction works* (3.14)

[SOURCE: EN 15643:2021, 3.15]

3.11

construction product

item manufactured or processed for incorporation in *construction works* (3.14)

[SOURCE: EN 15643:2021, 3.16]

3.12

construction site

area where *construction work* (3.13) is undertaken or *construction services* (EN 15804:2012+A2:2019, 3.7) are provided

[SOURCE: ISO 21930:2017, 3.2.10]

3.13

construction work

activities of forming a *construction works* (3.14)

Note 1 to entry: Refers to both *buildings* (3.3) and *civil engineering works* (EN 15643:2021, 3.10)

[SOURCE: ISO 6707-1:2020, 3.1.1.1, modified - Note 1 to entry deleted]

3.14

construction works

all constructed assets (*buildings* (3.3), *civil engineering works* (EN 15643:2021, 3.10), *landscaping* (3.40), *external works* (3.29) and other structures) resulting from construction operations

Note 1 to entry: This includes buildings, civil engineering works, structures, landscaping, external works and other types of construction within a built environment.

Note 2 to entry: From an economic perspective, completed construction works are typically referred to as a constructed asset.

[SOURCE: ISO 15392:2019, modified – some terms in Note 1 to entry combined into definition]

3.15

cut-off criteria

specification of the amount of material or energy flows or the level of significance associated with unit processes or product system that may be excluded from a study

[SOURCE: EN ISO 14044:2006+A12017, 3.18, modified – term “flow” made plural, term “environmental” deleted from definition, term “to be” replaced in the definition by “that may be” after term “product system”]

prEN 15978:2024 (E)**3.16****declared unit**

quantity of a *construction product* (0) for use as a reference unit in an *EPD* (0) for an environmental declaration based on one or more information modules

EXAMPLE Mass (kg), volume (m³).

Note 1 to entry Adapted from the definition in ISO 21930:2017.

[SOURCE EN 15804:2012+A2:2019, 3.9]

3.17**deconstruction**

process of selectively and systematically dismantling a *building* (3.3) to reduce the amount of *waste* (3.68) created and generate a supply of high value *secondary materials* (3.58) that are suitable for *reuse* (3.56) and *recycling* (3.48)

3.18**design for deconstruction**

design of a *building* (3.3), *building component* (3.10), or *construction product* (3.11) that will permit the selective and systematic dismantling of a buildings to reduce the amount of *waste* (3.68) created and generate a supply of high value *secondary materials* (3.58) that are suitable for *reuse* (3.56) and *recycling* (3.48)

3.19**disassembly**

non-destructive taking-apart of a *construction works* (3.14) or constructed asset into constituent materials or *components* (3.9, 3.10)

[SOURCE: ISO 20887:2020, 3.12, modified - Note 1 has been removed]

3.20**design for disassembly**

approach to the design of a product or constructed asset that facilitates *disassembly* (3.19) at the end of its useful life, in such a way that enables *components* (3.9, 3.10) and parts to be *reused* (3.56), *recycled*, (3.47), *recovered* (3.46) for energy or, in some other way, diverted from the waste stream

[SOUCRE: ISO 20887:2020, 3.13]

3.21**embodied impact**

sum of an *environmental impact* (3.24) caused within the *system boundary* (3.61, 3.62) by the processes associated with the extraction, production, transportation, installation, emissions in use (excluding operational energy and water use), waste treatment and disposal at end of life of materials and products that comprise the building.

Note 1 to entry: Embodied impact of a building will comprise all impacts associated with the materials and products used within the scope of the object of assessment.

Note 2 to entry: Module D1 captures net embodied impacts beyond the system and is reported separately as additional information

Note 3 to entry: Adapted from the definition for “carbon footprint of a product” in ISO 14067:2018, 3.1.1.1.