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English Version

Sustainability of construction works - Evaluation of the potential for sustainable refurbishment of buildings

Contribution des ouvrages de construction au développement durable - Évaluation du potentiel d'une réhabilitation d'un bâtiment contribuant au développement durable

Nachhaltigkeit von Bauwerken - Bewertung des Potentials zur nachhaltigen Sanierung von Gebäuden

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European foreword

This document (prEN 17680:2022) has been prepared by Technical Committee CEN/TC 350 “Sustainability of construction works - Evaluation of the potential for sustainable refurbishment of buildings”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

Introduction

This document is part of a series of European Standards written by CEN/TC 350 that provide a system for the sustainability assessment of buildings using a life cycle approach. The sustainability assessment quantifies impacts and aspects for environmental, social and economic performance of buildings using quantitative and qualitative indicators, both of which are measured without value judgement. The purpose of this series of European Standards is to enable comparability of the results of assessments. This series of European Standards does not set benchmarking or levels of performance. European (and other) countries face big challenges transforming the existing building stock to environmentally, economically and socially feasible buildings for the future within a low carbon society and a higher focus on resource efficiency as a contribution to sustainable development. The transformation and reduction of environmental impacts of existing buildings should be done in a cost-effective manner and hence the refurbishment should be accessible and sustainable in all senses (i.e. environmental, social and economic). The need for refurbishment emerges due to the increasing demands for better-quality housing and the quest for energy efficiency of commercial and industrial buildings.

In concept, the integrated building performance incorporates environmental, social and economic performance as well the technical and functional performance, and these are intrinsically related to each other, as illustrated in Figure 4. Although the assessment of technical and functional performance does not form part of this series of standards, their interrelationship with environmental, social and economic performance is prerequisite for an assessment of sustainability performance of buildings and is therefore taken into account. This document, EN 17680, defines a simple method for qualifying the considerations to be made in relation to evaluating the potential of refurbishing an existing building, serves to determine the most sustainable and cost-effective approach to improve performance in line with regulatory requirements among others. In the interest of conserving resources, options for continued use and refurbishment are to be examined intensively and, if suitable, are to be given preference over new construction. This document is a part of the framework of standards for sustainability of buildings as shown in Figure 1.

This document is primarily designed to support the strategic decision process on how to refurbish existing building(s) in a sustainable way, taking into consideration that not all buildings should be refurbished if the existing conditions of a building do not permit. A starting point for decisions on (further) handling of existing buildings is a comprehensive analysis. This includes a building diagnosis to determine damage and deficits as well as an assessment of the current technical and functional performance. The potential for an improvement in building performance and (as far as possible) the effort required for this are assessed. An alignment with requirements and possibilities resulting from future user requirements or possible uses, the changing environment concerning politics and legislation, market situation, environmental conditions and social values, as well as technical progress, is possible. The results of the analysis can be used to make fundamental decisions on how to deal with existing buildings. If refurbishment or repurposing are viable options, these can be investigated using the results of a building diagnosis and being subjected to a sustainability assessment in accordance with EN 15643.

In this document, a procedure is offered to support the assessment of existing building based on an indicator system and classification levels. Examples are given in an informative annex.

Framework level	Sustainability Assessment			Technical characteristics	Functionality
		EN 15643 Sustainability of Construction Works – Framework for Assessment of Buildings and Civil Engineering Works			Service Life Planning – Principles ISO 15686-1
Works level	EN 15978-1 (EN 15978 rev) Assessment of Environmental Performance of Buildings	prEN 15978-2 (EN 16309 rev) Assessment of Social Performance of Buildings	prEN 15978-3 (EN 16627 rev) Assessment of Economic Performance of Buildings	EN ISO 52000 Energy Performance of Buildings	
	prEN 17680 Assessment of Options for Sustainable Refurbishment of Buildings				
	EN 17472 Sustainability Assessment of Civil Engineering Works				
Product level	EN 15804 + A2 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 15942rev Communication Format B-to-B				
	EN 15941rev Data Quality				
	EN 17672 Rules for B-to-C Communication				
	EN ISO 22057 Data templates for the use of EPDs in BIM				
	CEN/TR 16790 Guidance for EN 15804				
	CEN/TR 17005 Additional environmental impact categories and indicators.				

Figure 1 — Framework standards for sustainability of buildings

Refurbishment can be seen as an opportunity, not only to modernize a building's aesthetic, but also to enhance its overall technical and functional (usability) performance, and its potential contribution to the surrounding environment and local community.

The transformation should be done in a cost-effective manner and hence the refurbishment should be sustainable. This document gives a simple method for which buildings to be given first priority for a sustainable refurbishment also taking into consideration that not all buildings should be refurbished.

Benefits of sustainable refurbishment in comparison to deconstruction and redevelopment:

- Reduced landfill disposal
- Contribution to extending whole building lifetime
- Reduced environmental footprint through greater conservation and reuse of materials
- Contributing to lower life cycle costs

Reduction in overall embodied environmental impact relative to new building. Other benefits may include:

- Retention of community infrastructure
- Additional benefits of local economic development
- Neighbourhood renewal and well-being for all stakeholders.
- Protection for built cultural heritage
- Better adaptation to climate change (e.g. limiting the solar gain in summer)

1 Scope

This document provides a methodology for the evaluation of the potential for sustainable refurbishment of an existing building, as a means of contributing to the circular economy, to support the decision-making process. Sustainable refurbishment aims to close the gap between current performance and current requirements fulfilling authorities' sustainability regulations and contribute to meet sustainability goals which maximizes the environmental, social and economic performance. It also aims to allow the adaptability to fulfil future needs. It can be used for a building or part(s) of a building, as well as a portfolio of buildings.

This document gives a methodology for assessing performance characteristics of existing buildings in terms of:

- 1) Technical aspects
- 2) Adaptability
- 3) Usability
- 4) Social aspects
- 5) Energy, water and operational impacts
- 6) Quality of indoor environment (including health aspects)
- 7) Economic feasibility
- 8) Climate change resilience
- 9) Embodied environmental impacts

The document describes the work to be done in main applicable categories of a 6 steps process:

- Step 0: Establish brief of the object of the assessment
- Step 1: Evaluating the building
- Step 2: Sustainable deconstruction
- Step 3: Sustainable construction process
- Step 4: Sustainable commissioning
- Step 5: Sustainable in use

NOTE In this document the users are people and organisations using the building, including the facility management. In some buildings visitors are also important users and need to be taken into account.

This approach is generic for all types of buildings. At present this document does not cover civil engineering work and it does not give benchmarks for the evaluation.

Assessment of the impacts of sustainable refurbishment of buildings is covered by calculation methods described in EN 15978, EN 16309 and EN 16627.