

IEA-SHC TASK59: FACT SHEET

Multidisciplinary planning process:

Enhancing the use of the European standard EN 16883:2017

CERTIFICATION PROTOCOLS

This is part of a series of fact sheets meant to facilitate and enhance the use of the European standard EN 16883:2017 Conservation of cultural heritage – Guidelines for improving the energy performance of historic buildings.

This particular fact sheet presents certification protocols that can be used as a supplement to EN 16883.

Introduction

A number of protocols for the assessment of environmental sustainability of buildings have been developed in recent years. The general objectives of these protocols are to assess the resource use in the production, use and post use phases. They determine the sustainability level of the building through scores attributed to a set of requirements, often as a rating system. As a general consideration, these protocols are useful for highlighting otherwise neglected aspects of long-term impact on the environment; however, they sometimes prove to be counterproductive for historic buildings, shifting the attention of decision-makers to aspects not properly related to the multidisciplinary nature of heritage conservation.

Contributors:

Elena Lucchi
Eurac Research
(Italy)

Alessia Buda
Politecnico di Milano
(Italy)

Tor Broström
Uppsala University
(Sweden)

Protocol	Short description	Pros and cons	Ref
Environmental labelling			
Protocols for historic buildings			
GBC Historic Building® (Italy)	This is a voluntary third-party certification tool for assessing the sustainability level of restoration, refurbishment, and integration processes in pre-industrial buildings including also specific requirements oriented towards historic buildings. The protocol is applied for restoration, redevelopment or recovery interventions even in case of partial interventions. It is applicable to buildings constructed before 1945 or after 1945 if there are pre-industrial features. The protocol is divided in several topic areas, with different weights: (i) Historic value (20 points); (ii) Sustainable sites (13 points); (iii) Water efficiency (8 points); (iv) Energy and atmosphere (29 points); (v) Materials and resources (14 points); (vi) Indoor environmental quality (16 points); (vii) Innovation in design (6 points); (viii) Regional priority (4 points).	It features an interface designed to provide a verification of the historic buildings' sustainability performance, including a scoring method to evaluate the heritage preservation. After a preliminary survey phase follows a pre-certification phase where a 'historic building identity card' is drawn up with all collected data. Even though it is designed for historic buildings, the protocol assigns more weight to environmental impact (26%) than to higher respect to Historical Value (18%).	1
General protocols - Building level			
BREEAM Refurbishment (UK)	Design and assessment method for sustainable housing refurbishment projects, helping to cost-effectively improve the sustainability and environmental performance of existing dwellings. <i>Criteria:</i> (i) Management; (ii) Energy; (iii) Water Resources; (iv) Materials; (v) Pollution; (vi) Waste; (vii) Health & Wellbeing; (viii) Innovation.	An internationally established protocol. Flexible environmental performance assessment system for buildings to be adapted to local specificities. Does not provide a scheme specific to historic buildings.	2
Haute Qualité Environnementale (HQE) (France)	A process for certification of the sustainability for the phases of construction, renovation, and maintenance of all building types. <i>Criteria:</i> (i) Energy; (ii) Site; (iii) Components; (iv) Worksite; (v) Waste; (vi) Water; (vii) Maintenance; (viii) Spaces Quality; (ix) Air Quality; (x) Water Quality; (xi) Hygrothermal Comfort; (xii) Acoustic Comfort; (xiii) Visual Comfort; (xiv) Olfactory Comfort.	This protocol has been defined to certify the environmental quality of project. It is not specific for historic construction.	3
Leadership in Energy and Environmental Design protocol (LEED) Rating systems (U.S.A.)	International certification rating voluntary system for the design, construction and management of sustainable buildings and high-performance territorial areas. It has been developed by the US Green Building Council. The rating scale is divided in "Base" (40-49 points), "Silver" (50-59 points), "Gold" (60-79 points), "Platinum" (80-110 points). <i>Criteria:</i> (i) Site sustainability (26 points); (ii) Efficient water management (10 points); (iii) Regional Priority (4 points); (iv) Materials and resources (14 points); (v) Indoor air quality (15 points); (vi) Design and innovation (6 points).	An internationally established protocol. Does not provide a scheme specific to historic buildings.	4

<p>Protocollo Itaca (Italy)</p>	<p>Green protocol recognized by several Italian regions and used both from public and private asset. The evaluation method was developed under the request of the Ministry of Economic Development to define the level of environmental performance of buildings and to compare different options in new, converted or renovated modern cases. 43 indicators are included to identify each criterion. The reference performance scale to be used for the normalization of the indicator is in the range from -1 (Negative) to 0 (Sufficient), +3 (Good) +5 (Best). <i>Criteria:</i> (i) Quality of the Site (45 points); (ii) Resources Consumption (80 points); (iii) Environmental Impact (30 points); (iv) Indoor Quality (40 points); (v) Services (20 points).</p>	<p>It is equipped with 70 sheets on the energy and sustainable characteristics of buildings, with the aim of evaluating possible improvement actions. However, aspects related to existing buildings are not applicable to historical buildings as they do not consider the conservation of heritage values as one of the criteria. It takes into consideration issues and problems peculiar to Italy.</p>	<p>5</p>
<p>General protocols - Urban level</p>			
<p>LEED® Neighbourhood Development (LEED-ND) (U.S.A.)</p>	<p>Independent and third-party rating system for certifying exemplary development projects that integrates the principles of smart growth, urbanism, and green building into a national system for neighbourhood design. Projects are mixed-use and may constitute whole neighbourhoods, portions of neighbourhoods, or multiple neighbourhoods. Several categories for sustainable development are defined, and few of these issues are mandatory. The topic areas have different weights, which indicate the number of credits that the assessment could score. <i>Criteria:</i> (i) Smart location and linkage (25.9%); (ii) Neighbourhood pattern & design (37.9%); (iii) Green infrastructure & buildings (26.8%); (iv) Innovation and design process (5.6%); Regional priority (3.7).</p>	<p>It raises awareness of the importance of preservation and reuse of existing buildings, landmarks, from a social sustainability point of view. It connects reuse and rehabilitation of historic resources with energy, water, waste, and infrastructure efficiency. The focus on cultural heritage is less evident as it is assigned 2 credits out of 110. These credits are not mandatory.</p>	<p>6</p>
<p>BREAM Communities (BREAM C) (UK)</p>	<p>This is an independent method of assessing, rating, and certifying the master-planning of whole communities, considering sustainable criteria and economic issues. It has been defined by the Building Research Establishment. Several categories for sustainability are defined, identifying also mandatory issues as a condition for certification. <i>Criteria:</i> (i) Governance; (ii) Social and economic wellbeing; (iii) Resource and energy; (iv) Land use and ecology; (v) Transport and movement; (vi) Innovation.</p>	<p>It focuses on how the new development should adapt to the local character and preserve the identity of existing buildings that have been identified in the assessment as being of significant value to the community. Cultural heritage is assigned 0.9 credits out of 107. These credits are not mandatory.</p>	<p>7</p>

Energy labelling

"CasaClima R" (Italy)	<p>Energy certification protocol for optimizing energy efficiency and human comfort and for controlling the quality of construction in the refurbishment of existing buildings with construction restraints referred to the regulation on building (e.g. building distance), landscape protection, heritage preservation, hygiene and public health (e.g. height of living space etc.), barrier-free construction, fire protection and seismic safety. It has been defined by the Climate House Agency of South Tyrol and it uses a specific software (CasaClima software).</p> <p><i>Criteria:</i> (i) total energy efficiency, (ii) evaluation of thermal bridges, (iii) airtightness, (iv) moisture protection, (v) requirements for building services.</p>	<p>Energy certification protocol with clear rules for the calculation of the energy performance of an existing building, assuring also high quality in planning and solving thermal bridges and moisture problems. It requires compliance with performances parameters that recall the legislation for new buildings, not considering the specifics of heritage values.</p> <p>It refers to the Autonomous Province of Bolzano (Italy) but the certification protocol can be applied worldwide both to residential and non-residential buildings. The certification must be drawn up by a specialized technician.</p>	8
EnerPHit (Germany)	<p>Energy certification standard for the refurbishment of existing buildings, maximizing energy efficiency, human comfort, and economical convenience. It has been defined by the Passive House Institute (PHI) based on the Passive House (PH) Standard for new buildings, when there are building constraints.</p> <p><i>Criteria:</i> for the "Energy demand method": (i) heating load; (ii) cooling and dehumidification load; (iii) airtightness; (iv) renewable primary energy demand; (v) renewable energy generation; and for the "Building component method" (i) opaque envelope; (ii) interior insulation; (iii) exterior colour; (iv) window, overall; (iv) glazing; (v) solar load; (vi) ventilation minimum recovery; (vi) minimum moisture recovery efficiency.</p>	<p>The certification standard can be applied worldwide to residential and non-residential buildings. It can also be applied to historic buildings.</p> <p>Some criteria cannot be fulfilled due to specific constraints related to historic buildings; exceptions are accepted if the necessary proofs are provided (e.g. written confirmation by the historic building preservation authority).</p>	9

References

1. www.gbitalia.org/historic-building
2. www.breeam.org
3. www.assohqe.org/hqe
4. www.usgbc.org
5. www.itaca.org
6. www.usgbc.org
7. www.breeam.com
8. <https://www.agenziacasaclima.it/it/home-1.html>
9. www.passiv.de

Project structure

The project consists of four work packages called “Subtasks”

Subtask B > Multidisciplinary planning process

led by Uppsala University, Sweden

Investigate how existing guidelines for improving the energy performance of historic buildings can be enhanced and complemented in order to better meet the needs of the end user by providing an integrated design platform

Organizational details

Full project title

Deep Renovation of Historic Buildings Towards Lowest Possible Energy Demand and CO₂ Emission (NZEB)

Project sponsor

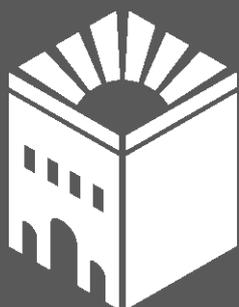
International Energy Agency's
> Solar Heating & Cooling Programme (SHC) Task 59
> Energy in Buildings and Communities (ECB) Annex 76

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Operating Agent

Alexandra Troi
Institute for Renewable Energy
EURAC Research
Via Volta 13/A
I-39100 Bolzano / Bozen
Italy



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<http://task59.iea-shc.org>



<http://annex76.iea-ebc.org>



task59@eurac.edu



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