

Guidelines to Support the Sustainable Conservation of Cultural Heritage Buildings in Slovenia

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Abstract

Cultural heritage holds a constitutional status in Slovenia, immovable cultural heritage being its vital part. The most extensive categories of the Register of cultural heritage are buildings and settlements. In accordance with the principles of revitalizing and adapting heritage buildings to contemporary requirements with the aim of their sustainable conservation, energy renovation is also included in the integral approach. Such approach must adhere to cultural protection conditions and include measures that do not threaten the protected values. Energy renovation should be coordinated with other technical measures to meet the essential requirements for buildings. To support these efforts, the national Guidelines for energy renovation of cultural heritage buildings were introduced in 2016 as a manual that supports the conservators' decisions and informs building owners and renovation contractors about the specifics of the approach to designing and implementing measures. At the end of 2023, the national research project V5-2358 (DEDIS) began, focused to provide an update of the guidelines. The additions will include refreshed chapters on the relevant national and European legislation, characteristics and regulation of cultural heritage protection, necessary preliminary investigations of the condition of buildings, and, as the main part, technical measures of renovation and their interdependence, with a special focus on the installation and use of renewable energy sources. The guidelines will consider the experiences of successful renovation projects and the results of an extensive interaction with key stakeholders through interviews and online surveys. The paper presents the preparatory activities leading to conceptualisation of the refined purpose, goals and content of the renewed guidelines.

Keywords: guidelines; sustainable conservation; integral approach; cultural heritage buildings

1. Introduction

Slovenia has 30,965 units of cultural heritage listed in the national Register of cultural heritage, including 8,082 are monuments of local

significance and 343 monuments of national significance (Ministrstvo za kulturo Republike Slovenije, 2025). Buildings and settlements constitute a significant part of the national cultural assets. Given that many of these

buildings are publicly owned, they fall under the mandatory 3% annual energy renovation rate, as required by the Article 7 of the Energy Efficiency Directive, EED (Directive (EU) 2023/1791, 2023). Additionally, these buildings are addressed also in the revised Energy Performance of Buildings Directive, EPBD (Directive (EU) 2024/1275, 2024).

The status of cultural heritage in Slovenia is not solely determined by the age of buildings. Rather, it is based on various criteria, including their authors/architects, architectural and artistic value, building methods and materials used, typical of a certain historical period. Further defining characteristic also include the buildings' originality, rarity or uniqueness. The special significance of the building can also arise from other historical and even political circumstances.

Cultural heritage buildings are tangible witnesses to national history, culture, art and technology, as well as broader societal developments over longer or shorter periods of time. A special protection regime applies to them, designed to prevent interventions that would compromise their historical identity and values. However, these buildings, like all others, are preserved mainly by their continuous use. We must regularly maintain, repair and, where feasible, upgrade them. Only by doing so we can achieve their sustainability for future generations.

Energy renovation, when aligned with cultural protection requirements represents a legitimate, logical and professionally appropriate element of the integrated conservation of cultural heritage buildings. Such strategy has multifaceted environmental, social, economic and cultural benefits. Enhancing energy efficiency improves living comfort while reducing operating costs, fostering a more positive perception and engagement among owners and users. As part of a comprehensive or wider renovation, it helps to reduce the building's vulnerability and improves its resilience, enabling it to withstand the

challenges of changing circumstances in nature and society.

This is a coherent set of measures designed to address existing problems and circumstances, and to achieve favourable effects that endure over time. However, numerous challenges are inherent in this process. Buildings that have successfully defied many adversities for decades or centuries and managed to preserve at least some of their cultural and historical characteristics, can be irreversibly deprived of the values that define them as heritage in an instant by inappropriate interventions.

2. Objectives: identifying the gaps

In energy renovation projects, the technical profession deals primarily with measurable or quantitative indicators, such as energy use for building operation, CO₂ emissions and the share of renewable energy sources (RES), while the cultural protection profession primarily focuses on qualitative indicators that describe cultural and historical characteristics or protected values of the building.

Furthermore, on the one hand we have the aspect of needs and wishes of building owners and users, and principles of good management, and on the other hand, we also have the formal requirements set by common European and national laws.

Here we perceive several gaps, the filling of which is the key to an all-round successful and comprehensively managed and implemented renovation project. Technical experts generally do not have the knowledge that would enable them to accurately identify important building features that limit or eliminate certain renovation measures.

On the other hand, cultural heritage protection experts are often not familiar with technical innovations, e.g. materials, products and systems that may enable solving known problems in a way that does not threaten protected values.

The key guide of any building renovation must be its integrity, of course within the framework of what is possible and justified. In most cases, we design a varied set of measures that, due to technical, logistical, financial and other challenges, are implemented only once during the life of the building.

Within the administrative, technical, environmental and economic framework, we want to ensure the long-term fulfilment of essential requirements, the reduction of energy use and the reduction of negative impacts on the environment, and the improvement of living and working comfort. All the above can have a significant impact on reducing maintenance and operating costs and increasing the building's market value.

Another common weak point is the availability of financial resources, i.e. the possibility of cultural heritage buildings to equally apply for co-financing sources for comprehensive energy renovation. In the past, public tenders did not differentiate between building statuses, which meant that cultural heritage buildings could not reach the entry threshold expressed by the achieved energy indicators after energy renovation or the physical extent of the required measures.

In 2016, the national Guidelines for energy renovation of cultural heritage buildings (in further text: Guidelines) (Ministrstvo za infrastrukturo Republike Slovenije & Ministrstvo za kulturo Republike Slovenije, 2016) were introduced to address these gaps.

The content is based on the following two main principles:

1. In accordance with the principles of good management, the energy renovation of a cultural heritage building must also include other reasonable measures to improve the condition of the building (e.g. static renovation, fire protection, etc.).

2. The energy renovation of a cultural heritage building must seek an appropriate balance between the preservation of protected values and the energy efficiency of buildings.

As the primary criterion of acceptability of the measures their impact on the protected values and cultural-historical characteristics of the building was determined, not the contribution to the improvement of the building's energy indicators.

A specific definition of a comprehensive energy renovation of cultural heritage buildings was presented in the Guidelines. Buildings that have recognizable building elements or are protected as cultural heritage usually cannot be comprehensively renovated without a negative impact on the protected values. Therefore, with this term we denote the specialty of a comprehensive energy renovation, from which all those measures that would unacceptably change the character or appearance of the building are excluded. The extent of the comprehensive energy renovation therefore depends on the architectural and historical importance of the building, which must be considered.

Simply put, a comprehensive energy renovation of cultural heritage buildings only includes energy efficiency measures permitted by cultural protection conditions and confirmed by a cultural protection consent. This definition enables cultural heritage buildings to qualify for co-financing of their energy renovation.

The Guidelines were put into practical use shortly after publication. They are taken into consideration in energy renovation projects, cited as a reference in various tender documents and referred to in many national strategic documents. After almost a decade since their introduction, the time has come to review and refresh the content. At the end of 2023, the national research project V5-2358 (DEDIS) began, focusing on providing an update of the Guidelines.

3. Methodology

3.1. Starting points

Since the publication of the Guidelines in 2016, the number of projects of energy renovation of cultural heritage buildings has been constantly growing. One of the main reasons lies in the easier access to co-financing sources, both for the private (subsidies from the national Eco Fund) and public (cohesion fund) sector, which has been enabled by the definition of the comprehensive energy renovation, written in the Guidelines. Also, successfully implemented projects serve as good practice examples and foster further similar initiatives.

The Guidelines consist of several chapters, from description of the legal framework and building typologies, presentation of preparatory investigations, clarification of technical measures with their impacts and possible interactions, to explanation of renovation outcomes reflected in indoor climate and comfort.

Nevertheless, the legislative changes and technical progress (new materials, products and technologies) bring forward the need for an upgrade of the Guidelines. Not only this, more extensive introduction of RES like solar collectors and photovoltaics opens several fields that need more attention. In particular, this is true for their electric and fire safety, and responsible positioning both on heritage buildings and within heritage settlements.

3.2. Analysis of the national framework related to energy efficiency of buildings

Cultural heritage buildings are specifically treated in national strategic and legislative documents on energy efficiency and renovation of buildings. The first step was to study them for implications on the cultural heritage buildings to include their main accents into the updated Guidelines.

Performing desk research by collating and examining said relevant information helped to gain insights into the national legislative framework, which was crucial to understand the overall context and identify current demands and limitations related to energy renovation of cultural heritage buildings.

The review of legislation was directed from the more general to the more specific, i.e. from national strategies and action plans, through laws to regulations. The most important highlights are presented in the Results chapter.

3.3. Obtaining feedback from the stakeholders

The work on updating the Guidelines continued with collection of practical experience of implemented renovation projects and survey among the recent thematic written sources. The main preparatory activity was dedicated to obtaining feedback to the existing Guidelines and related information from cultural heritage professionals and representatives of local communities. This was done through interviews and online surveys.

With the first target group – employees of the regional units of the Institute for the Protection of Cultural Heritage of Slovenia (IPCHS), the interest focused on the experience from the practical use of the Guidelines, suggestions for content amendments, and relation and approach to use of RES technologies. From the second target group – the municipalities, we gained information about RES technologies on cultural heritage buildings and in heritage settlements in the context of local urban planning policies.

Interviews were held at all seven regional units of the IPCHS, all together 48 employees were present (from 3 to 9 employees per interview to ensure the presence of various experts, e.g. architects, conservators). A questionnaire was developed, divided into ten thematic sections and consisting of thirty questions. The questionnaire was also sent to the IPCHS units in advance by invitation, which allowed the employees to

familiarise themselves with the questions. The interviews were semi-structured, with the conversation following the flow of the questions, but with the possibility of sub-questions or additional explanations. Interviews were held in person at each regional unit.

The survey included 89 municipalities, among them seven city municipalities, with a higher representation of those more actively engaged in the protection of architectural and settlement heritage. Most respondents were professionals working in departments related to environment and spatial planning, urbanism, and energy consulting, while in some cases (e.g. small municipalities) responses were provided by mayors or directors of municipal administrations. The survey was conducted with the "Ika" online survey tool.

4. Results and discussion

4.1. The national legislative framework

The National Energy Efficiency Action Plan 2017–2020 (Ministrstvo za infrastrukturo Republike Slovenije, 2015) mentions essential support in the transfer of knowledge and experience in the field of energy renovation of cultural heritage buildings, which is the task of the governmental Project Office for energy renovation of buildings. The office plays a key supporting role in the project "Energy renovation of buildings in state and municipal ownership" as part of the Operational Programme for the implementation of European cohesion policy. The Guidelines are an integral part of the documentation published by the office in support of the comprehensive energy renovation of public buildings.

The Operational programme of measures to reduce greenhouse gas emissions until 2020 (Ministrstvo za okolje, prostor in energijo Republike Slovenije, 2014) envisages the creation of a completely new measure, a support scheme for the renovation of building cultural heritage. The full scope of the instrument

includes development of renovation criteria, demonstration projects, development and deployment of technologies, financial support scheme and provision of targeted funds.

The National Energy and Climate Action Plan 2020 (Vlada Republike Slovenije, 2020) states that when placing solar power plants, restrictions and protection regimes of cultural heritage are to be considered. When renovating cultural heritage buildings, in addition to sectoral legislation, recommendations such as the Guidelines shall be consulted. A part of the cohesion funds should be allocated specifically to this group of publicly and privately owned buildings, and special public tenders should be created for the co-financing of their renovation measures.

The Long-term energy renovation strategy for 2050 (Vlada Republike Slovenije, 2021) brings two proposals aimed at strengthening the supporting environment for the integrated conservation of cultural heritage. The first proposal includes a review and revision of the Guidelines. The second proposal is to introduce changes in the field of local fiscal legislation so that local communities would be given greater autonomy in the creation of fiscal revenues and their management.

The Act on Energy Efficiency (Zakon o učinkoviti rabi energije, 2020) mentions cultural heritage in two places. The protection of cultural heritage shall be considered when determining the methods of promotion and the amount of incentives for energy efficiency measures. Public sector entities must establish an energy management system that includes goals from the fields of energy efficiency and RES, and measures to achieve them. This obligation also applies to energy managers of cultural heritage buildings.

The most important novelty concerns the right and duty to possess an energy performance certificate. Until the adoption of this act, buildings that are protected in accordance with

the regulations on the protection of cultural heritage were listed among the exceptions. A cultural heritage building now does not need an energy certificate only if it is used for ritual purposes or religious activities (sacral heritage).

The Building Act (Gradbeni zakon, 2021) permits deviations from essential and other requirements (e.g. due to special requirements for the protection of cultural heritage), but they must not threaten the safety of the facility, the life and health of people, neighbouring properties or the environment.

The Recovery and Resilience Plan (Ministrstvo za finance Republike Slovenije, 2021) draws attention to the definition of the comprehensive energy renovation of cultural heritage buildings from the respective Guidelines and emphasises that potential cultural protection requirements for renovation shall be considered.

The Rules on efficient use of energy in buildings (Pravilnik o učinkoviti rabi energije v stavbah, 2022) and the corresponding Technical Guideline TSG-I-004: 2022 Energy Efficiency of Buildings (Ministrstvo za okolje in prostor, 2022) explain that exemptions may be applied to cultural heritage buildings in accordance with the Building Act and the provisions of the Rules.

The latter separate cultural heritage into two groups. Cultural heritage that is not used for other purposes is exempted from the application of this regulation. For all other cultural heritage buildings, the rules apply, but to a limited extent depending on the cultural protection conditions and approval by the IPCHS.

4.2. Interviews with stakeholders

Interviews conducted at regional units of the IPCHS reveal a predominately negative perception among experts regarding the installation of photovoltaic (PV) devices on buildings and sites of cultural heritage significance. The key arguments or objections include the degradation of the historical

structures, interventions in the original material substance, potential threats to structural stability, and increased fire risks. Despite some proposals for integrated PV solutions that would be less visually invasive, the prevailing professional stance remains that the installation of PV devices on cultural heritage buildings is generally unacceptable, except in cases where alternative energy solutions are not feasible (e.g., mountain huts without grid connections).

Additionally, issues have been identified in the approval processes, as many PV installations are carried out without prior heritage conservation assessments. Discussions on future developments highlights the necessity of stricter regulations, enhanced oversight, and the promotion of alternative approaches, such as community solar power plants and the placement of PV devices in degraded areas or on industrial buildings.

4.3. Online survey

The online survey conducted among municipalities provides insight into local perspectives on the integration of PV devices in cultural heritage areas.

The survey results indicate a diversity of opinions on the placement of PV devices in cultural heritage areas – most respondents acknowledge that PV devices impact the appearance of settlements, and nearly one third express the view that PV should not be installed in cultural heritage areas. Nevertheless, 42 municipalities have already implemented PV devices on public buildings, most commonly on schools, sports facilities, and utility buildings.

The analysis of municipal spatial planning acts reveals that only 38 municipalities include provisions on PV devices, with even fewer specifically addressing regulations for cultural heritage buildings. Most municipalities do not record significant interest from residents in installing PV devices in such areas, nor do they frequently consult with the IPCHS.

The results highlight the need for better information dissemination and adjustments to spatial planning acts that would enable the harmonized development of RES while preserving cultural heritage.

The feedback obtained from stakeholders to our inquiry about the structure and content of the existing Guidelines was overwhelmingly positive. Many useful suggestions about possible additions to the topics were collected, which will help the updated document to stay in line both with the national cultural protection doctrine and national strategic orientations, thus maintaining its relevance and applicability in the future.

5. Conclusions

Energy renovation measures can rarely be conceived and implemented following the “copy-paste” approach, where past examples serve as direct templates for intervention. Today, when inter- and multidisciplinary approach is the key principle of successful projects, guidelines and similar tools combining and presenting knowledge from different fields are essential for supporting informed decision-making.

The updated Guidelines will continue to assist decision-makers in fulfilling the fundamental goal, which is finding the balance between preserving historical values and enhancing the energy efficiency of cultural heritage buildings.

For individual renovation measures, the ranking system places preservation of protected features ahead of improving energy performance indicators.

One of the important outcomes of the use of the Guidelines visible in practice has been the improvement of communication and collaboration among the cultural protection professionals, architects and engineers, building managers and users. The Guidelines help the stakeholders to better understand specific legal and technical boundary conditions, gain missing knowledge and differentiate between technical

and economic feasibility of renovation measures, and limitations of the cultural heritage protection regulations.

The Guidelines also help dispel the common misconception that the sole purpose of energy renovation is to improve energy indicators.

Positive effects can be achieved on several levels with a reasonable and verified set of measures that are carried out during energy renovation: elimination of damage and defects on the building envelope, solution of various building physics challenges, reduction of energy consumption costs and environment emissions, extension of regular maintenance intervals, reduction of temperature asymmetry and rise of surface temperatures in rooms, easier regulation of internal microclimatic conditions and the like.

The current Slovenian legislative and strategic framework based on EPBD and EED recognizes the importance and sensitivity of cultural heritage buildings. The updated Guidelines for their energy renovation, scheduled for publication in late 2025, will represent a useful and necessary addition to this framework, securing the sustainable conservation of cultural heritage buildings and their appropriate adaptation to the needs of future generations.

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