FuturHist

Policy Framework: An overview over European policies for energy efficiency in historic buildings

Project Overview

Principal Author
Gustaf Leijonhufvud (Uppsala University)

Contributors
Krzysztof Barnaś, Kinga Racoń-Leja, Judyta Rduch, Filip Suchoń (Cracow University of Technology), Petra Eriksson (Uppsala University), Yann Grandgirard (Edinburgh World Heritage), Daniel Herrera (Institute for Renewable Energy, Eurac Research), Marta Romero (Agencia de Vivienda y Rehabilitación de Andalucía)

Internal reviewers
Tomasz Jeleński, Ewelina Pekala (Sendzimir Foundation), Philipp Hesse, Franziska Haas, Kristina Biceva, Faye Nzegang (ICOMOS)

Date of publication:
30/09/2024

Project title

FuturHist – An integrated typology-based approach to guide the future development of European historic buildings towards a clean energy transition

Grant Agreement	101138562 (Horizon Europe)
Grant Agreement	10105114 and 10110887 (UKRI)
Work package	WP1
Deliverable number	D1.3
Dissemination level	Public
Version	1.1

Version	Date	Authors
1.0	10/09/2024	Gustaf Leijonhufvud
1.1	24/09/2024	Gustaf Leijonhufvud

Co-funded by the European Union

UK Research and Innovation

Co-funded by the European Union and the UK Research and Innovation. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Climate, Infrastructure and Environment Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.

Executive Summary

There are ambitious European and national targets on reducing energy use and carbon emissions in the built environment. At the same time, there is statutory protection of heritage values in the built environment. This report gives an overview of the relationship between policies for energy efficiency and heritage preservation in four European countries, and how they are applied in practice.

Existing management systems differ between countries and give different opportunities for how to accommodate necessary changes in policy. In this study of four European countries (Poland, Spain, Sweden, UK) we have investigated i) How are buildings protected (in terms of preservation), what are the legislative frameworks and how are they used in practice? , ii) How are heritage values in the building stock considered in construction law, energy efficiency, and other national sustainability policies?, iii) How can policy lever/hinder other dimensions of sustainability in the renovation of historic buildings?

The results show that energy efficiency and heritage policies are generally not well integrated. There are often opportunities to improve the energy performance of listed historic buildings, but achieving successful results requires holistic and systematic planning and design, as well as flexible requirements in building codes. High upfront costs and lack of public funding are seen as major economic obstacles. There is a need for a holistic perspective in the planning process. A one-sided focus on energy efficiency might have negative consequences for heritage significance and for other aspects, such as economy, circularity, and moisture risks.

Acknowledgement

The work described in this document has received funding from Horizon Europe Funding Programme under Grant Agreement Nº 101138562 and from UK Research and Innovation (UKRI) under the UK government's Horizon Europe funding guarantee (Grant numbers 10105114 and 10110887).

Disclaimer

Table of Contents

Contents

Abbreviations and definitions

EE	Energy Efficiency
Energy retrofit	Any type of renovations where increased energy efficiency is a major goal. It refers to the entire renovation process, from planning to evaluation.
EP	Energy Performance
EPBD	Energy Performance of Buildings Directive
EPC	Energy Performance Certificate
EU	European Union
GHG	Greenhouse Gas
HB	Historic Building
Historic building	Building of heritage significance. Includes also buildings that are not statutorily designated as cultural heritage (i.e. “listed buildings").
IEA SHC	International Energy Agency Solar Heating and Cooling Programme
LCA	Life Cycle Analysis
Planning process	The process of identifying the need for energy performance improvements and defining appropriate improvement measures that match the requirements for the building in question. It would cover all the steps of the proposed procedure of EN 16883 (from the client's intentions to the final decision), but not the implementation, monitoring or maintenance of the intervention afterwards.
Policy	Rules, regulations, guidelines, or official statements adopted by governments, organizations, or institutions to influence behavior, manage resources, or achieve specific objectives.

1. Introduction

This report gives an overview of the policy framework regarding energy efficiency in historic buildings in Europe. Understanding the opportunities and limitations of the existing policy framework is essential for the success of the FuturHist project, which aims to find scalable solutions that work across national borders.

Background

The overall aim of the FuturHist project is to develop a streamlined and standardised intervention approach at a building typology level, that can scale up energy retrofits of historic buildings and ensure a high impact by demonstrating its effectiveness on an archetype and trigger replication. The approach to be developed in FuturHist makes it possible to treat any old building as historic, independent of its level of protection, to minimise the environmental impact of buildings and to achieve the best possible performance to prepare for a clean energy transition.

The challenge of improving energy efficiency in historic buildings intersects with various policy areas, including climate change mitigation and adaptation, energy efficiency, housing, and heritage preservation. The built environment has long been seen as a sector with significant potential to enhance energy efficiency and reduce greenhouse gas emissions. Initially, relevant programs focused on economic savings and energy security, but over time, their priorities shifted towards reducing greenhouse gas emissions (Legner and Leijonhufvud 2019). Additionally, many energy efficiency programs now aim to improve living conditions by renovating existing buildings, and emphasise "sustainable renovation", integrating environmental, social, and financial considerations (Thuvander et al., 2012). EU considers the green transition as “putting people at the core of the transition” and to go hand in hand with economic growth and innovation (European Commission: The European Green Deal) The revision of the Energy Performance of Buildings Directive (EPBD), adopted in April 2024, sets ambitious targets for the decarbonization of the building stock in the EU. Reduced primary energy use is a priority, and energy performance standards will gradually come into force for non-residential buildings. Generally, there is a focus in the directive on “worst-performing buildings”. There is a possibility to exempt historic buildings from demands on reduced energy use. It is up to each member state to establish national trajectories for how to achieve the targets, and to implement necessary changes in the national legislation (European Commission: The Energy Performance of Buildings Directive). A

key question for policy makers is how to reconcile or balance heritage values in the building stock with demands on reduced energy use.

Energy efficiency policies can be categorized into regulatory, financial, and supportive measures (Tanaka, 2011). These policies range from "hard" measures like building codes and taxes to "soft" ones such as energy performance certificates (EPCs) and voluntary standards. Over time, there has been a shift from policies encouraging specific technologies to softer approaches aimed at addressing market failures (Legnér & Leijonhufvud, 2019).

When it comes to historic buildings, energy efficiency is not treated as a separate policy domain, and these buildings have often been seen as a niche and difficult subset of the broader building stock. Policymakers have commonly exempted officially designated historic buildings from general energy efficiency regulations (Webb, 2017). This approach has come under scrutiny for several reasons. First, heritage status does not inherently preclude energy efficiency improvements, and exempting these buildings may result in overlooked opportunities for cost-effective upgrades, leading to higher operational costs or even abandonment in the long run. Second, energy efficiency measures that could negatively impact heritage values should be carefully considered, even in non-designated buildings. Exempting listed buildings from demands on energy efficiency is not a silver bullet, as harmless interventions to reduce energy use might be prevented in listed buildings and harmful interventions might be implemented in non-listed buildings with heritage significance (Herrera-Avellanosa et al., 2019). Incorporating heritage considerations early in the planning process can help avoid detrimental effects on a building's historic character.

Standard energy-saving solutions can be problematic in both designated and non-designated historic buildings, but significant improvements are often possible with a tailored approach. (Herrera-Avellanosa et al., 2019). The European Standard 6883:2017 Conservation of cultural heritage: Guidelines for improving the energy performance of historic buildings laid a first brick in that direction by presenting a normative working procedure for selecting measures to improve energy performance. This work was followed by IEA SHC Task59 that gathered numerous international experts collaborating and sharing experiences towards three clearly defined goals: to document best practices that demonstrate the potential of historic building renovation, to compile already existing retrofit solutions for historic buildings, and to gather first impressions on the usability of the European standard. An evaluation of the standard pointed out that to ensure a lasting change in practice, the use of validated standardised approaches is needed (Leijonhufvud, Buda, and Broström, 2021).

In order to produce standardised approaches, there is a fundamental need to understand the policy context of the different countries (or regions) where the solutions will be implemented. It is well known that different countries in Europe have different traditions and different legislation covering heritage preservation (Ornelas et al., 2016). This results in a variety of existing barriers related to policy, and questions how they can be overcome. To better understand the policy

framework, the following research questions[1] have been used:

i) *How are buildings protected (in terms of preservation), what are the legislative frameworks and how are they used in practice?*

ii) *How are heritage values in the building stock considered in construction law, energy efficiency, and other national sustainability policies?*

iii) *How can policy lever/hinder other dimensions of sustainability in the renovation of historic buildings?*

2. Methodology

A literature study was combined with structured interviews of practitioners, public authorities, professional and private owners in four countries.

To provide a comprehensive overview of the policy frameworks across the four countries involved in the study, data was collected from national policies and official reports. These overviews were prepared by the respective national partners within the FuturHist project, each of whom has extensive experience in the development and implementation of policies within their country. This expertise enhances the validity of the information presented. The primary objective of these overviews is to offer a clear understanding for readers who may not be familiar with the specific policy contexts of each country. Consequently, the content is intentionally general, focusing on widely recognized information within the professional community. To maintain readability and clarity, only a limited number of sources have been referenced where necessary.

In addition, this study employed a structured interview approach to gather insights from stakeholders involved in the planning process of renovating historic buildings. In order to identify relevant stakeholder groups, we conducted an internal stakeholder mapping workshop as part of the FuturHist project. During this workshop, a brainstorming exercise was used to identify and categorize relevant groups involved in the renovation process.

The goal was not only to map out the stakeholders but also to tailor the interview questions in a way that would ensure relevance and meaning across all identified groups. This allowed us to

[1] The questions “How are the European directives applied (funding schemes, exemptions, etc.)” and “How is energy efficiency policy implemented?” from the Grant Agreement have been merged into question ii. The rationale for this is that the role of heritage values in policy is the core unit of analysis with relevance for FuturHist.

develop an understanding of the different perspectives from different actors involved in the planning process. This approach aimed to capture the diverse perspectives and expertise of each group while maintaining consistency where needed for comparative analysis. As a result, we identified four key stakeholder groups: Practitioners, Public Authorities, Professional Owners, and Private Owners. Together, the stakeholders formed a purposive sample, selected specifically because of their involvement, expertise and experience related to HBs and energy retrofits. Purposive sampling is a sampling technique in which respondents are hand-picked based on having a specific set of characteristics, as opposed to convenience sampling, in which respondents are selected at random and then filtered based on these characteristics. Purposive sampling is widely used in qualitative research on information-rich subjects (Palinkas et al., 2015).

Different sets of questions were designed for each group to align with their unique roles and contributions to the retrofit process. Below are examples of stakeholders in each group:

Practitioners:

- Architects
- Engineers (specializing in energy, mechanical & electrical systems, building performance)
- Contractors/Craftsmen
- Heritage experts
- Energy experts
- Retrofit experts

Public Authorities:

- Local heritage authorities
- Regional/national heritage authorities
- Planning officers
- Policy makers (at local/regional authority or central government level)

Professional Owners:

- Professional managers of public buildings
- Professional real estate owners
- Demo case owners
- Demo case users

Private Owners:

- Private owners of historic buildings

- Building users or tenants

Such categorisation was used to guide the development of tailored interview questions, ensuring that each set of questions was relevant to the stakeholders' roles and responsibilities in the retrofit process.

The participants were recruited based on two criteria: their involvement in the project's demo cases and the project partners' knowledge of individuals likely to provide valuable insights. This purposive sampling method ensured that the interviewees were well-positioned to provide meaningful information related to the study's objectives.

The interviews were conducted either face-to-face or online, depending on logistical constraints and the preferences of the interviewees. Each participant provided standard consent to allow the use of the data collected during the interviews (see the annex for the consent form). The interview process began with an introduction to the FuturHist project and an explanation of the interview's purpose, alongside a clarification of key terms to ensure consistency in understanding.

A structured set of questions was prepared for each stakeholder group, with some overlap across groups to enable comparison (see the annex for a list of all the interview questions). These questions were designed to elicit specific insights from each group's perspective while maintaining the flexibility to explore broader themes. The interviewer was encouraged to use prompts such as "interesting, tell me more", “how do you mean?”, “explain further”, “please elaborate” when appropriate to capture more in-depth responses. Interviews lasted between 30-90 minutes, depending on the interviewee’s availability and the depth of discussion.

The interviews were conducted in the local language, recorded, and later transcribed for analysis. Transcriptions were translated into English, with minor edits to improve clarity without altering the meaning. All transcripts were anonymised. This structured and methodical approach allowed for comprehensive data collection, ensuring that the perspectives of different stakeholder groups were systematically documented for subsequent analysis.

The interview answers to each question were summarized in order to identify common themes or conflicting statements. The interviews were also read one-by-one to identify cross-cutting and overlapping themes. Quotes have been selected that illustrate the most interesting themes/statements.

In order not to exhaust interviewees with multiple interviews we combined questions covering different themes within the FuturHist project in the list of questions. Only a selected number of questions are presented and analysed in this report. The remaining answers will be used for other deliverables from FuturHist.

3. Results and Discussion

National policy contexts

This section gives an overview of the national heritage planning system and its relationship with energy efficiency policies in the four countries.

Spain

Heritage policy

Article 46 of the Spanish Constitution of 1978 legally recognises preservation and promotes the enrichment of historical, cultural and artistic heritage as one of the functions that must be assumed by public authorities. This article, referred to the protection of the country's historical, cultural and artistic heritage, establishes the responsibility of all, both public institutions and citizens, to safeguard and transmit this heritage to future generations, and emphasises the importance of preserving and promoting the cultural assets that are part of Spain's common heritage. Therefore, laws and public policies must be created to guarantee this objective. Based on the constitutional mandate, the heritage protection of buildings in Spain is articulated at different levels, national, regional and local level.

National level

Constitución Española (Spanish Constitution), 1978

Article 46 of the Spanish Constitution of 1978 legally recognises the preservation and promote the enrichment of the historical, cultural and artistic heritage as one of the functions that must be assumed by the public authorities.

Ley 16/1985, de 25 de junio, del Patrimonio Histórico Español. BOE núm 155, de 29/06/1985 (Spanish Cultural Heritage Law).

The assets belonging to the Spanish Cultural Heritage are regulated by specific regulations, fundamentally contained in Law 16/1985 of 25 June 1985 on Heritage (Ley 16/1985, de 25 de junio, del Patrimonio Histórico Español. BOE núm 155, de 29/06/1985.). The general scheme of this Law includes three levels of protection based on the unique importance of the asset. From lowest to highest protection, they are as follows:

- Patrimonio Histórico Español (Spanish Historical Heritage),
- Inventario General de Bienes Muebles (General Inventory of Personal Property),

- Bienes de Interés Cultural (BIC) (Assets of Cultural Interest).

The protection of these assets means that the owners have certain rights and responsibilities established in Law 16/1985 on Spanish Historical Heritage.

Spanish Historical Heritage covers all real estate and personal property of artistic, historical, paleontological, archaeological, ethnographical, scientific or technical interest. It also covers Documentary and Bibliographical Heritage, archaeological sites and zones, natural sites, gardens and parks with an artistic, historical or anthropological value (Law 16/1985, art.1).

A higher level of protection is given to assets in the General Inventory of Personal Property, which possess a notable historical, archaeological, scientific, artistic, technical or cultural value and have not been declared of cultural value (Law 16/1985, art. 26).

The highest level of protection covers the real estate and personal property declared of cultural value. These assets are included in the General Register of Assets of Cultural Value. The administrative and functional regulation of this Law is under the Royal Decree 11/1986, (Real Decreto 11/1986, de 10 de enero, de Desarrollo Parcial de la LPHE).

Firstly, the Assets of Cultural Value may be established as such by law, which are the buildings designated as facilities for archives, libraries and state-owned museums, as well as the property assets kept in them. They also include caves, shelters and places that contain cave art, as well as castles, symbols, municipal boundary crosses and similar pieces, as well as ancient "hórreos" (granaries) or "cabazos" (manors) in Galicia and Asturias (Law 16/1985, arts. 40.2 and 60.1; and additional provision two).

Secondly, the Assets of Cultural Value may also be established by Royal Decree, which are protected individually and require the prior opening and processing of an administrative file. In the case of the Central Government, a favourable report is also required from any of the following advisory institutions: Spanish Historical Heritage Assets Classification, Valuation and Export Board, the Royal Academies, the Spanish Universities, the Higher Council for Scientific Research or the Higher Commissions. In the case of assets affecting the Autonomous Regions, the report will be issued by the institutions accepted by them.

This was the only Law in force until the Spanish regions legislated on the matter in the execution of their competences, with the national regulations remaining complementary and supplementary in nature. In Andalusia, Law 1/1991 of 13 June 1991 (repealed currently by Law 14/2007) on the Historical Heritage of Andalusia was adopted.

This Law also establishes the obligation to allocate at least 1% of public works contracts to the conservation or enrichment of Spanish Cultural Heritage or the promotion of artistic creativity, with preference given to the work itself or its immediate surroundings.

Law 14/2021, of 11 October, which amends Royal Decree-Law 17/2020, of 5 May, approving

measures to support the cultural sector and tax measures to address the economic and social impact of COVID-2019, has introduced the following new features to this measure:

- The percentage increases to 2%,
- Half of the funds should be allocated to the promotion of artistic creativity over the next four years,
- The 2% is generated by setting aside 2% of the funds provided by the State in budgets for each public work financed in whole or in part by the State.

Regional level

Historical Heritage of Andalusia Law. Ley 14/2007, de 26 de noviembre, del Patrimonio Histórico de Andalucía

In Andalusia, the regulation for Heritage preservation is the Ley 14/2007, de 26 de noviembre, del Patrimonio Histórico de Andalucía (Andalusian Historical Heritage Law 14/2007 of 26 November 2007), which determines the General Catalogue of Andalusian Historical Heritage as an instrument for the safeguarding, consultation and dissemination of the assets registered in it.

The catalogue is divided into three categories, with different levels of protection:

- Assets of Cultural Interest (BIC)
- Goods of General Cataloguing
- General Inventory of Tangible/movable Assets of the Spanish Historical Heritage.

In the specific case of real estate property, effective protection is provided by local urban planning. Thus, the regional Law establishes that those instruments of territorial or urban planning, as well as the sectorial plans or programmes which affect the real estate properties taking part of the historical heritage must establish a planning compatible with the protection of their values and their collective use. In addition, the inscription of a real state property in the General Catalogue of Andalusian Historical Heritage will entail the obligation to adapt urban planning to the protection needs of this property, and moreover, that urban plans affecting the area of Historic Sites, Historic Areas, Places of Ethnological Interest, Places of Industrial Interest and Heritage Areas will be adjusted to the protection requirements established in the Law.

It should be noted that the declaration of a “BIC” (Asset of Cultural Interest) implies the establishment of a zone around it for adjacent buildings, known as "buffer zone" (entorno), whose purpose is to conserve the values of the building ensemble in which the protected building is located.

As in the Spanish Heritage Law (LPHE), the Historical Heritage of Andalusia Law also includes measures to promote the preservation of Andalusian Heritage. In this case, in all public works financed totally or partially by the Administration of the Junta de Andalucía, whose budget

exceeds one million euros, an amount equivalent to at least 1 percent of the autonomous contribution will be allocated to works of preservation and enrichment of the Andalusian Historical Heritage.

Ley 7/2021 de 1 de diciembre de impulso para la sostenibilidad del territorio de Andalucia (LISTA), BOE núm. 303, de 20/12/2021

The Law for the Promotion of Territorial Sustainability in Andalusia, known as the LISTA law, is a piece of legislation that seeks to promote sustainability in urban and territorial development in the region. It includes regulations and measures to be taken into account during the elaboration of urban planning in relation to the protection of architectural, historical, cultural and natural heritage in Andalusia.

Local level

The local urban regulations represent the third level in the scheme for real estate protection. This content may be incorporated directly into the General Urban Development Plans, or by means of the obligatory preparation of Special Protection Plans or development planning with the same content. After the definitive approval of this protection plan, with a binding report from the Regional Ministry of Culture, the local councils can request the delegation of powers to authorise the works regulated by this plan.

The effective control of the protection regime is carried out in the act of granting the municipal building permit, which is a prerequisite in the case of intervention.

Heritage Policy in Relation to Construction Law, Energy Efficiency, and Other Sustainability Policies

National level

Ley 38/1999, de 5 de noviembre, de Ordenación de la Edificación

The Law for Building Regulations (LOE) is the law in charge of regulating building construction in Spain since 1999. It establishes the obligations and responsibilities of its different agents (developers, designers, builders, construction managers, quality control bodies and product suppliers), as well as the necessary guarantees for their proper development, in order to ensure quality through compliance with the basic requirements of buildings and the adequate protection of users' interests.

Real Decreto 314/2006, por el cual entra en vigor el Código Técnico de la Edificación (CTE) and following Real Decreto 732/2019, de 20 de diciembre por el que se modifica el Código Técnico de la Edificación, aprobado por el Real Decreto 314/2006, de 17 de marzo (Technical Building Code).

The Technical Building Code (CTE) is the main legislation that regulates the construction of

buildings in Spain since 2006 and includes the obligations imposed by European construction laws and the EPBD. It establishes the basic requirements for the safety and habitability of buildings, set out in Law 38/1999 of 5 November 1999 on Building Regulations (LOE), i.e. for the basic requirements of "structural safety", "fire safety", "safety in use", "hygiene, health and environmental protection", "noise protection" and "energy saving and thermal insulation". Its requirements are applied to the design, construction, maintenance and conservation phases. It is a performance-based regulation.

In general, the Technical Code is always mandatory for new buildings, except for those constructions of technical simplicity and of minor constructive entity, with a different use than residential or public use, whether temporary or permanent, which are developed on a single floor and do not affect the safety of people. New constructions of a residential or public nature must comply with the Technical Code regardless of their simplicity.

In the case of extension, modification, refurbishment or renovation works carried out on existing buildings, compliance depends on the nature of the intervention and, where appropriate, the degree of protection that the buildings concerned may have.

In particular, the accomplishment of the Technical Building Code's requirements concerning energy efficiency and energy saving (DB-HE), are exempted for buildings and monuments officially protected as part of a listed environment due to their special architectural or historic value, where compliance with such requirements would result in unacceptable alterations to their character or appearance.

Real Decreto 390/2021, de 1 de junio, por el que se aprueba el procedimiento básico para la certificación de la eficiencia energética de los edificios (Energy Performance Certificate).

This Royal decree establishes the technical and administrative conditions that must govern the buildings energy performance certification, and the correct transmission of the results obtained in this energy certification process to the users and owners of the buildings.

Likewise, the technical and administrative conditions are established for the approval of the methodology for calculating their energy efficiency rating, considering those factors that have the greatest impact on the energy consumption of buildings, as well as for the approval of the energy efficiency label as a common label throughout the national territory.

The purpose of the approval of this procedure is to promote energy efficiency in buildings, as well as to ensure that the energy they use is mostly covered by energy from renewable sources, with the consequent reduction of CO2 emissions in the building sector.

However, "Buildings officially protected are exempted, as part of a listed environment or because of their special architectural or historic value, provided that any energy efficiency improvements would unacceptably alter their character or appearance, with the authority issuing the official protection determining which elements are unalterable.".

Ley 9/2022, de 14 de junio, de Calidad de la Arquitectura (BOE 15 de junio de 2022) (Law on the Quality of Architecture)

This Laws aims to protect, promote and disseminate the quality of architecture as an asset of general interest and aims to promote the protection of architectural heritage, encourage conservation, promote research, innovation, digitisation, industrialisation and creativity and promote the application of the principle of quality in the field of public procurement, among other purposes. It is aligned with several European and international initiatives, such as the New European Bauhaus, the Urban Agendas, the Davos Declaration and the Renovation Wave.

The aims of the Law are specified in article 2 of the regulatory text and, among others, we can highlight the following ones which are especially relevant in this context:

- The protection of architectural heritage (both historical and contemporary) and the conservation of architectural elements and ensembles which, due to their exceptional values, "have been the object of national or international recognition". The importance of the protection of contemporary architectural heritage should be emphasised, as it is an urgent priority and will oblige public administrations to take into account in their decisions this aim mentioned in the Law.
- The function and important role of architecture in environmental protection, pointing out the importance of integrating buildings "into the natural ecosystem of the environment in which they are located". Article 2 (i, j, k and l) lists among the aims of the Law, aspects such as decarbonisation, climate neutrality, circular economy, energy efficiency, the use of renewable energies, the fight against energy poverty and the reduction of other negative environmental impacts. It should be noted that these goals are linked to increasing nearly zero-energy buildings and acting on the rehabilitation of the building stock "through comprehensive approaches".

Ley 7/2021 de 20 de mayo, de cambio climático y transición energética (Law on climate change and energy transition).

This Law aims to guarantee compliance with the objectives of the Paris Agreement, adopted on 12 December 2015 and signed by Spain on 22 April 2016. Thus, it aims to ensure the achievement of the objective of greenhouse gas emissions neutrality in Spain before 2050 and an efficient and renewable energy system, facilitating a fair transition and ensuring consistency with the objectives in the public and private sectors. In this context, the following targets for 2030 are:

- A reduction of at least 23% of greenhouse gas emissions compared to 1990.
- A coverage in final energy consumption of at least 42% of renewable energy sources.
- At least 74 % of the generation in the electricity system must be from renewable energy sources.
- A reduction of at least 39.5% in primary energy consumption compared to the baseline in

accordance with Community regulations.

Another of the objectives is the promotion of the efficient use of energy and the use of renewable sources in buildings, aligning the long-term strategy for building renovation with the objectives of the successive Integrated Energy and Climate Plans.

Ley 7/2022, de 8 de abril, de residuos y suelos contaminados para una economía circular

This Law aims to establish the principles of the circular economy through basic legislation on waste, as well as contributing to the fight against climate change and protecting the marine environment. It thus contributes to the fulfilment of the Sustainable Development Goals, included in the 2030 Agenda and in particular goals 12 -sustainable production and consumption-, 13 -climate action- and 14 -underwater life-. Furthermore, in terms of its contribution to the fight against climate change, this law is consistent with energy and climate planning.

On the other hand, waste policy contributes to job creation in certain sectors, such as those linked to preparing for re-use and recycling, so the law also contributes to the creation and consolidation of employment in the waste management sector.

Real Decreto 105/2008, de 1 de febrero por el que se regula la producción y gestión de los residuos de construcción y demolición. Regulation of the production and management of construction and demolition waste

This RD regulates the production and management of construction and demolition waste (CDW) in Spain. Its aim is to establish the legal regime for the production and management of construction and demolition waste, to promote, in this order, its prevention, reuse, recycling and other forms of recovery, ensuring that those destined for disposal operations receive appropriate treatment, and to contribute to the sustainable development of construction activity.

Regional level

Orden de 9 de diciembre de 2014, por la que se regula la organización y el funcionamiento del Registro de Certificados Energéticos Andaluces and Resolución de 2 de junio de 2023, de la Secretaría General de Energía, por la que se modifican los anexos de la Orden de 9 de diciembre de 2014, por la que se regula la organización y el funcionamiento del Registro de Certificados Energéticos Andaluces

This regulatory document regulates the organisation and operation of the Registration of Andalusian Energy Performance Certificates of new and existent buildings.

Decreto-ley 2/2018, de 26 de junio, de simplificación de normas en materia de energía y fomento de las energías renovables en Andalucía

This Decree-Law includes measures aimed at simplifying the obligations regarding energy saving,

energy efficiency and the use of renewable resources, both in the field of building and in the field of business activities carried out in Andalusia. It also establishes measures to boost and promote renewable energy projects in Andalusia, declaring the strategic nature of some of these investments.

Among the simplifications, we can find administrative procedures as well as impositions aiming to avoid double imposition of administrative formalities in the field of energy performance certification of buildings.

Ley 3/2023, de 30 de marzo, de Economía Circular de Andalucía (LECA) (Law of Circular Economy of Andalusia).

This Law places Andalusia at the head of an economic model aimed at sustainability and the responsible use of natural resources. The text, published in the Official Gazette of the Andalusian Regional Government (BOJA), contains measures to address the new environmental, technological, economic and social challenges. Among them are those focused on increasing the lifespan of products and encouraging the rational use of raw materials, the reduction of food waste, 'pay per use', the fight against programmed obsolescence and the development of the 'right to repair'.

The regulation includes innovative measures such as the creation of a public register of life cycle analysis of products, construction works and services; the promotion of responsible use and consumption; or the reduction of waste from industrial symbiosis and the consideration of by-products or end-of-waste status. All of these measures are supported by raising awareness and training in this context. In addition, the LECA also provides measures to eliminate bureaucratic barriers for companies, raising public awareness, training and prevention.

Key findings

The preservation of Historical Heritage in Spain is legally recognised by the Spanish Constitution, the highest regulation of the Spanish legal system, to which all Spanish public authorities and citizens are subject since 1978. This fact implies the integration of the preservation of historical, cultural and artistic heritage among the guiding principles of social and economic policy.

Based on this, the heritage protection of buildings in Spain is articulated at different levels, national, regional and local levels. Those regulations include different levels of protection based on the unique importance of the asset. In general, the protection of the asset is given by National Law, which establishes among two other categories, the highest category, “BIC”, Assets of Cultural Interest, but the management of the assets, are carried out by regions (except some exemptions).

Regional regulations are complementary to national regulations and can have new and different categories of protection, as new values are being introduced when talking about heritage protection, (architectural, landscaping, industrial, etc...). Autonomous regions also have their own

catalogues, registers and inventories for heritage which implies a certain heterogeneity. However, in the case of the highest category, "BIC" there is consistency in all the Spanish regions, and in this case, despite the protection is given by National Law, the management and procedures are carried out at regional level. The same happens with the Catalogues. At national level, there is the "Registro General de Bienes de Interés Cultural" (General Register of Assets of Cultural Value), which contains information on the assets that at regional or national level have some kind of protection. These cultural assets are registered in a database that includes the legally established levels of protection. In Andalusia, the database is "Catálogo General del Patrimonio Histórico Andaluz", General Catalogue of Andalusian Historical Heritage.

In general, the central government plays a coording role whilst the regions the managing one. In compliance with the provisions on urban planning and the environment, city councils are competent in the drawing up of urban planning tools such as special supplementary plans to the General Urban Planning Plans, as well as the inventory and custody of heritage assets. The effective control of the protection regime is carried out in the act of granting the municipal building permit, which is a prerequisite in the case of interventions.

The legal regulations also include promotion measures for conservation, maintenance and renovation works on historical heritage (i.e. 1%-2% allocation for culture promotion and enrichment) or local tax reductions or exemptions for some BIC assets.

The sustainable management of cultural heritage implies greater skills and efficiency at all levels, including the environmental one. Even though different European, national and regional plans and strategies include energy efficiency retrofitting as one of the main objectives for the decarbonisation, this is still a challenge for historic buildings, not unlike in Spain, as cultural or heritage values face energy retrofitting measures. Building regulations, such as the Building Technical Code ("CTE") exempt from compliance with requirements relating to energy efficiency and energy saving (DB-HE), *"for buildings and monuments officially protected as part of a listed environment on account of their special architectural or historic value, where compliance with such requirements would result in unacceptable alterations to their character or appearance…".* But concerning existent buildings, it also includes the principle of flexibility for listed buildings, which must be justified in the project and that allow to adopt solutions with the greatest possible degree of adaptation. Concerning the EPC, *"Buildings officially protected are exempted, as part of a listed environment or because of their special architectural or historic value, provided that any energy efficiency improvements would unacceptably alter their character or appearance, with the authority issuing the official protection determining which elements are unalterable."* On the other hand, in some funding programs for buildings renovation, energy demand reduction is not required, as envelope measures can be compromised in listed buildings. This is not the case of non-renewable primary energy reduction (30%), even though local regulations forbid in many cases the implementation of RES in historical environments due to visual pollution.

As these circumstances implies a potential risk of non-compliance with European energy reduction and decarbonisation targets, as well as the unsustainability of those buildings, both the

heritage and energy sectors need to agree on feasible technical, legislative, social and economic solutions and measures to address this challenge and find a balance between energy efficiency measures and the preservation of the historical heritage.

Poland

Heritage policy

In Polish law, heritage conservation is governed by the Monument Protection and Preservation Act (hereinafter: Monuments Act) and is the responsibility of the Minister of Culture and National Heritage (the current minister in charge of heritage). The Monument Act stipulates three major forms of heritage preservation, in descending order in terms of the significance of the heritage they are intended for:

- Monument to History status,
- The Register of Monuments (hereinafter: Register),
- Monument Records (hereinafter: Records).

Monument to History status and the Register of Monuments can be considered to be national-level, as the institutions in charge of them are central government entities. Records are local level, as they are maintained by municipalities.

Monument to History status is conferred by the President of Poland upon request by the minister in charge of heritage. It is the highest form of heritage protection and is the most difficult to subvert or lift, but is otherwise not much different to the protection offered to sites listed in the Register of Monuments. The status itself can be conferred upon manmade objects, buildings, sites, or developed areas of high historical significance.

The Register of Monuments is a central heritage protection document that is kept by the General Conservator of Historical Monuments (hereinafter: General Conservator), who is an official in charge of keeping the Register on behalf of the minister in charge of heritage. The document itself is divided into sections, one for each of Poland's 16 voivodeships (equivalent to regions), and each section is supervised by a given Voivodeship Conservator of Historical Monuments. Concerning immovable properties, the Register can accommodate entries for specific buildings, sites (small areas, like ensembles or complexes, including buildings) and territories (large areas like quarters or districts, including buildings).

The level and scope of protection extended to buildings and sites listed in the Register is at the full discretion of the relevant Voivodeship Conservator and, on account of belonging to a separate branch of legislation than laws on construction and planning, can significantly restrict the range of possible modifications without regard for applicable planning documents. Any and all works apart from routine maintenance to be performed on a building or site listed in the Register must be consulted with and officially approved by a Voivodeship Conservator and, as projects, must be

approved by the Construction Administration via a Building Permit, which is a full and comprehensive administrative procedure under the Code of Civil Procedure. A Building Permit will not be given to a project that targets a heritage building or site that is listed in the Register and has not had its documentation approved by a Voivodeship Conservator.

Both Monument to History status and the Register are governed by the central government administration, and the Voivodeship Conservators are considered central government officials. Listing in and delisting a building or site from the Register is done at the discretion of the relevant Voivodeship Conservator. There are no official guidelines on what a Voivodeship Conservator can or cannot demand from project owners in relation to retrofit projects or how detailed and specific those demands might be. This means that every heritage retrofit project is assessed by the heritage administration on an entirely case-by-case and discretionary basis, leading to very uneven approaches and opaqueness in decision-making. A Voivodeship Conservator's rulings may be appealed to the minister in charge of heritage, but they are only investigated on the grounds of what is best for the preservation of the heritage site in question and not the interest of the project sponsor/owner, namely, their financial or legal interests and potential energy efficiency goals are not considered.

As of the writing of this document, the Register has 80,095 entries which include individual HBs, groups of HBs, conservation areas, and archaeological sites (Register of Immovable Monuments, 2024).

The Monument Records are kept for each municipality that has one by that municipality's Municipal Conservator of Monuments (hereinafter: Municipal Conservator). These conservators are considered municipal (local government) officials. Projects that aim to modify buildings or sites listed in the Records are subject to consultation with a local Municipal Conservator, but the results of those consultations are not binding. Similarly, works on buildings or sites listed in the records follow the same approval procedures with the Construction Administration as for non-listed buildings and sites. As with the Register, the scope of the recommendations to be given is entirely discretionary and case-based.

As of the writing of this document, there are 117,986 buildings entered in the Records across Poland (Zestawienie danych statystycznych z krajowej ewidencji zabytków – zabytki nieruchome, 2024).

The Cultural Park is a territorial form of conservation that can be implemented via a municipal council resolution and is subject to consultation with a relevant Voivodeship Conservator. As it is a resolution, exemptions from its provisions cannot be granted and it can only be revised by the municipal council. This conservation policy is notable due to its potentially broad scope, as it was intended e.g. to regulate behaviours in public spaces in historical areas, for instance the selling of kitschy souvenirs by street vendors or the form and content of advertisement signs. However, this means that provisions mostly deal with the external appearance of public spaces, and this includes buildings' elevations that define these spaces.

Planning law

Another form of heritage protection under Polish law is the imposition of a heritage protection zone in a local spatial development plan (hereinafter: development plan, equivalent to a district-level zoning plan). The relevant provisions are set out in the Spatial Planning and Development Act. A development plan is adopted by municipal council resolution, and as such no exemption can be given from it. The plans and their adoption are governed by the Spatial Planning and Development Act.

A heritage protection zone is usually consulted with a Voivodeship or Municipal Conservator for specific regulations so that planning policies can complement heritage conservation across a larger area. However, such a zone does not generate a need to consult or approve projects planned in it with a Conservator of either type. Instead, compliance with the regulations imposed on such a zone is assessed by the Construction Administration during the project approval procedure, and no exemption can be made from these regulations on any grounds. The regulations themselves, however, are usually relatively vague and are limited to constraints on the external dimensions of buildings, their placement, general roof geometry, general façade geometry and the imposition or ban of specific finishings, materials or solutions.

Heritage Policy in Relation to Construction Law, Energy Efficiency, and Other Sustainability Policies

Construction law

Poland does not have a unified building code and construction regulations are scattered across dozens of acts and regulations from various branches of legislation. However, the key document in this respect is the *Regulation on the technical conditions to be met by buildings and their placement*, and features essential provisions expected in a building code. This regulation must be followed when constructing new buildings and in existing buildings that are to be subjected to extension, remodeling, or adaptive reuse. This regulation also defines the maximum U-values of building envelope elements and primary energy consumption levels. It stipulates that buildings listed in the Register of Monuments are exempt from its provisions, but must instead follow the guidelines and recommendations formed by a construction expert and/or a fire safety expert that must be preapproved by a Voivodeship Commandant of the State Fire Department and/or the Voivodeship Sanitary Inspector. This is in addition to the approval requirement as stipulated in the Monuments Act. This de facto means that buildings listed in the Register of Monuments can potentially be exempted from any and all energy performance requirements if the Voivodeship Conservator and Voivodeship Sanitary Inspector (thermal comfort and conditioning is considered the purview of sanitary services) approve this.

However, any existing building in which special circumstances prevent bringing it up to compliance with regulations, can also be exempted from the Regulations following a very similar procedure, but only to the degree defined by these circumstances. Note: the pertinent

circumstances are not defined anywhere and are judged on a case-by-case basis.

Energy Performance Certification law

Energy performance certification for buildings is governed by the Act on the Energy Performance of Buildings (hereinafter: Energy Performance Act). This act stipulates that buildings subject to protection under the Monuments Act (this includes all three forms of protection) are exempt from the requirement to prepare and produce energy performance certificates for as-designed and as-built states.

Policies, subsidies, incentives

The General Conservator is nominally responsible for implementing heritage conservation policy. They are aided in this by Voivodeship Conservators and institutions like the National Institute of Cultural Heritage. Together, the General Conservator and the Institute issue policy documents such as the *Guidelines of the General Conservator of Monuments* (Narodowy Instytut Dziedzictwa, 2024) and various guidances, such as *Opracowanie dotyczące możliwości termomodernizacji budynków zabytkowych ze szczególnym uwzględnieniem docieplenia przegród pionowych* (Kaliszuk-Wietecka et al., 2019). However, most of these policies are procedural in nature and the thermal retrofit guidance cited above is a brief and general document and is not considered binding for Voivodeship Conservators who issue decisions.

National and regional policies support HB retrofits mostly via renovation subsidies, applications for which can also cover energy retrofits, but there is currently no specific national subsidy programme that would specifically target HBs in this regard. There are, however, programmes that support energy retrofits in general, and HB owners can apply for those. From a scale standpoint, energy retrofit programmes appear to be more robust than heritage conservation ones. In addition, it should be stated that a building listed in the Register is less likely to be comprehensively retrofitted, whereas a building that is not listed is less likely to have its heritage values fully preserved. This is due to two factors:

First, a building listed in the Register must always be retrofitted using the Building Permit procedure, which requires significantly more comprehensive documentation and must be approved by the Voivodeship Conservator, who may place significant constraints on possible retrofit measures. A building that is not listed can go through a much faster administrative process that does not involve the conservation service.

Second, a building that is not listed in the Register does not benefit from building code exemptions and, in theory, must be retrofitted to a standard that allows an energy certificate to be issued for it. This often necessitates infringing upon its substance, as it becomes necessary to install mechanical ventilation with heat recovery, replace all windows, and achieve comparatively low envelope U-values.

Key findings

Buildings under central government heritage protection (Monument to History, Register of Monuments) are exempt from energy performance requirements as related to construction regulations and energy performance certification to a degree approved by state conservation, sanitation and fire safety services. This is verified and approved during any and all works.

Buildings under local government heritage protection (Monument Records) are not exempt from energy performance requirements as related to construction regulations but are exempted from energy performance certification. This is verified and approved during energy retrofit works, remodels, and/or extensions, and adaptive reuse projects.

While state policy nominally supports the energy retrofits of HBs, in practice access to subsidies and incentives is nowhere near the necessary level to have an impact on the more prevalent HB typologies, and the very status of a building listed in the Register may impede achieving high energy performance.

Sweden

Heritage policy

National

The legislative framework for conservation of heritage values at the national level is mainly guided by four different laws: Heritage conservation act, Cultural Monuments Ordinance, State Cultural Heritage Buildings Ordinance, The Environmental Code, and the Planning and Building Act (PBA). Quite few buildings in Sweden are listed as monuments at the national level (approximately 5700 building ensembles, of which approximately 3400 are churches). These monuments have the highest level of protection, and all intervention requires consent from either the Regional County Boards or the Swedish Heritage agency depending on their kind. Most of these buildings are publicly owned but a few have private owners. It is possible to apply for funding for the additional costs that incur when a building is renovated or maintained. When exempting HBs from EPBD and other policies is discussed, it often relates to this (very small) subset of the building stock.

At the national level, the Environmental Code includes provisions for conservation areas, which may be designated as areas of national interest due to their heritage value (riksintresse för kulturmiljövården). Sweden has approximately 1,500 such areas, overseen by the National Heritage Board, which manages the designation process. While the National Heritage Board provides a national overview, the management of these areas is handled at the regional level. Although designation does not usually impose strict requirements, it does influence decisions regarding the area's long-term development.

The Swedish National Heritage Board has emphasized the need for a comprehensive overview of

the country's historic environments, noting that these are finite resources that cannot be recreated once lost. They also underline that buildings currently viewed as mundane or unattractive may become crucial for understanding the nation's history in the future. Thus, preserving a wide range of buildings, including those not traditionally valued, is important for sustainable development from economic, social, and environmental perspectives.

Regional

The implementation of national legislation is carried out at the county level in Sweden's 21 counties. The County Administrative Boards are the regional authorities responsible for managing the state mandate. Each County Administrative Board has a cultural heritage department that manages issues related to the Cultural Heritage Act and the Environmental Code. This includes the management of requirement for special permits for any alterations that may affect the cultural value of designated and protected buildings. Within this scope, measures such as the installation of new technical systems to improve the energy performance of the buildings can be found.

Alterations The County Administrative Boards also handles a targeted funding for renovation of listed historic buildings. For these fundings there are no specific initiatives aimed at measures related to improving energy efficiency in this building stock.

Local

At the municipal level, the protection of heritage values in buildings is primarily managed through the Planning and Building Act (PBA) and the Swedish Building Regulations (BBR), which fall under the remit of regional and municipal authorities. The PBA is a central legal framework managed on the local level that governs how heritage values are integrated into planning, construction, and renovation. According to the PBA, all changes to existing buildings must be performed with caution, preserving the building's technical, historical, environmental, and artistic values. This requirement of caution applies to all existing buildings, regardless of their age, and ensures that renovations or modifications respect the building's original character.

The PBA also contains provisions for additional protections for buildings and environments that are deemed of particular value from a conservation perspective. If the preservation of such a building or environment is considered to be in the "genuine public interest," it may receive enhanced protection through the "prohibition of distortion". The Swedish Building Regulations (BBR) offer additional guidance on how to define and protect these particularly valuable buildings. Criteria include whether the building represents now-rare construction techniques, highlights past living conditions, illustrates historical urban planning and architectural ideals, or holds local importance. Buildings constructed before the 1920s, although not automatically considered of value, are more likely to meet these criteria due to their relative rarity and historical significance. However, the building's age alone is not sufficient to justify its designation as particularly valuable.

There is no national register that includes all buildings that are considered to be particularly

valuable. The municipalities have inventories of buildings and areas, but these are not consistent in their approach and they are not systematically updated. It is therefore not possible to say how many buildings in Sweden that are protected according to the PBA. The PBA is much more flexible in terms of requirement of preservation than the Cultural Monuments Ordinance. It also focuses on the public interest, hence what you can see from the street. Interventions to the historic fabric, use of replicas etc., is therefore often not considered an issue in the PBA.

Heritage Policy in Relation to Construction Law, Energy Efficiency, and Other Sustainability Policies

National

At the national level, Swedish policies promote the integration of energy efficiency with heritage conservation, acknowledging the need for trade-offs between sustainability goals and the preservation of historic values. Sweden's renovation strategy, which aligns with EU directives, mandates that member states submit national renovation strategies every three years. In Sweden’s renovation strategy report of 2019, a specific section was dedicated to the balance between heritage conservation and energy-efficient renovations. This section emphasized that it is possible to reduce energy consumption without compromising heritage values, provided that appropriate measures are taken based on a careful analysis of the specific building in question. The strategy recommended prioritizing interventions that minimize visible alterations to roofs, facades, windows, and doors, as these elements often hold significant heritage value. Additionally, it encouraged the use of materials and methods that are consistent with the building’s original construction. However, this section was ultimately omitted from Sweden’s final report to the EU (Sveriges tredje nationella strategi för energieffektiviserande renovering, 2020).

Swedish national policy also supports the goal of reducing environmental impact in the building sector while safeguarding cultural values. Municipalities, which play a key role in implementing these policies, are encouraged to develop local energy strategies that promote renewable energy sources such as district heating, solar energy, and biofuels. They are also tasked with protecting heritage buildings and ensuring that building conservation expertise is accessible, either through employment or external consultancy.

Among Sweden's environmental quality objectives, the objective for a "Good Built Environment" integrates environmental and heritage considerations into broader sustainability goals. National oversight is provided by the Swedish National Board of Housing, Building, and Planning, as well as the Swedish National Heritage Board, which monitor the impact of buildings on the environment and the protection of heritage buildings, respectively. One of the key tools for monitoring and achieving the "Good Built Environment" objective is a system of national indicators. These indicators track various aspects of sustainability, such as energy use, waste management, and greenhouse gas emissions, as well as the number of buildings protected for their heritage value. The national reporting on protected buildings highlights that the number of heritage buildings receiving legal protection is too small, with the rate of protection increasing

too slowly to meet conservation goals. It also concludes that there is a lack of a national overview of built heritage (Naturvårdsverket 2024).

Listed historic buildings are not exempt from energy performance certification. Recommendations on energy efficiency measures in the EPCs must not risk damaging heritage values. In the law (Boverkets föreskrifter och allmänna råd (2007:4) om energideklaration för byggnader) it is mentioned that measures such as external insulation and change of windows risk damaging heritage values, while e.g. energy efficient control strategies generally do not.

Local

At the municipal level, the Planning and Building Act (PBA) and Swedish Building Regulations (BBR) provide the legal framework for balancing energy efficiency and heritage conservation during renovation and construction projects. The building regulations set specific limits for energy use in both new and renovated buildings. When an alteration, such as an extension, is made, the energy performance requirements for the new parts of the building must meet the same standards as those for newly constructed buildings. If achieving the energy efficiency of a new building is not technically feasible, alternative performance measures, such as maximum U-values for individual building elements (e.g., walls, roofs, and windows), can be used.

The PBA and BBR also provide specific guidelines on how to approach energy renovations in heritage buildings. The regulations allow deviations from standard energy efficiency requirements when they would compromise a building's cultural or architectural values. For example, windows and entrance doors are considered crucial to a building’s heritage value, and replacement of these features must be done cautiously, with deference to the original character of the building. The BBR recommends that original windows and doors be retained or replaced with custom-made replicas, and alternative measures to improve energy efficiency, such as enhanced insulation or modern glazing techniques, should be considered.

In addition to construction guidelines, the BBR also addresses the need for using traditional materials and methods during renovations of heritage buildings. The regulations emphasize that materials and techniques from the building’s original construction period should be used to maintain both the physical integrity and historical accuracy of the structure. Failing to follow these guidelines could not only diminish the building’s heritage value but also lead to unintended consequences for its indoor climate and structural properties. The Swedish renovation strategy supports this approach, stressing that renovations should be tailored to each building's unique characteristics to ensure that both energy efficiency and heritage values are preserved.

Exterior changes that will affect the character of a building require building consent according to the PBA. Exceptions are made for buildings that are not within a detailed plan (i.e. mainly rural buildings) and since 2010 also for PVs in areas with detailed plans. However, in areas which are considered to be of high heritage value one still needs to apply for building consent for PVs.

Key Findings

There are relatively few buildings in Sweden with the highest level of heritage protection. A larger share of the building stock is protected by the PBA, but there is no national register listing all protected buildings and it is not known how many buildings that belong to this category. Also, heritage values in buildings that are not explicitly designated in detailed development plans are nevertheless to some extent protected by the PBA. There is uncertainty about the share of the stock that is actually protected and to what level.

Historic buildings are not exempt from energy performance certification, but there are no demands on energy performance on existing buildings. Recommendations of measures that risk damaging heritage values must not be included in EPCs. Demands on energy performance will be given when a building undergoes major renovation, but deviations from standard requirements can be made in order to preserve heritage values in the building.

In sum it is clear that current Swedish policies in theory protects heritage values and can offer a high degree of flexibility in relation to negotiating heritage and energy efficiency targets. The main challenge is rather how policies are applied in practice.

UK/Scotland

Preliminary note on legislative context in the UK

Legislation is different across the UK due to the existence of three jurisdictions, or three legal systems - England and Wales, Scotland, and Northern Ireland. There are similarities or differences between laws depending on the area – property, inheritance, employment, etc. European Union legislation has contributed to inform legislation in the UK until Brexit. The decision to maintain or not a continuity with European legislation depends on the approach taken in each jurisdiction.

Heritage policy

Designation

As stated by Historic Environment Scotland, Scotland's lead public body for the care and protection of the historic environment, in its Designation Policy and Selection Guidance (2019), "Designation is the legal recognition of some of the most important historic sites and places. Designation ensures that sites and places are recognised by law through the planning system and other regulatory processes and, as a result, protected. The level of protection and how a site or place is managed varies depending on the type of designation and its laws and policies." Historic sites and places must meet specific legal requirements for them to be designated.

In Scotland, designations of historic sites and places, and historic buildings in particular, are managed at 3 different levels, depending on the entity that is responsible for making decisions. The most relevant includes (entity responsible for designations indicated into brackets):

- *International:* World Heritage Sites (UNESCO)
- *National:* scheduled monuments and listed buildings (Historic Environment Scotland, a non-departmental public body with charitable status)
- *Local:* conservation areas (local governments).

As of March 2023, there are 8,300 scheduled monuments, 47,500 listed buildings, and 672 conservation areas in Scotland[2], and 19% of Scotland's housing stock consist in traditionally constructed buildings (erected before 1919)[3]. As of September 2024, there are 7 World Heritage Sites in Scotland, including the Old and New Towns of Edinburgh, inscribed in 1995.

World Heritage Sites

A World Heritage Site is inscribed on the World Heritage List based on its Outstanding Universal Value (OUV), which means, according to UNESCO's Operational Guidelines for the Implementation of the World Heritage Convention (1977, updated 2023), "cultural and/or natural significance which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity. As such, the permanent protection of this heritage is of the highest importance to the international community as a whole." Each World Heritage Site has a Statement of Outstanding Universal Value that details its cultural and/or natural significance and a Management Plan that outlines its significance and sets out the protection, preservation and management policies and actions.

Proposed developments that would affect the OUV, the authenticity, the integrity, and the setting of a World Heritage Site are managed through the planning system. There are no additional statutory controls in the UK.

Scheduled Monuments

This type of designation protects monuments of national importance. It is the recognition of the cultural significance of a site at a national level. Scheduled monuments cover a wide range of uninhabited sites and structures, dating from around 8,000 years ago up until the Second World War, and including sites such as prehistoric burial mounds, Roman forts, early Christian carved stones and ruined castles,[4] but exclude dwelling houses. A site must meet the criterion of national importance to become a scheduled monument. As set out in the Ancient Monuments and Archaeological Areas Act 1979, the site of a monument includes not only the land in or on which it is situated but also any land comprising or adjoining it which appears to be essential for the

[2] Our Past, Our Future is Scotland's new strategy for the historic environment
[3] The Scottish Government, Scottish House Condition Survey. In the UK, the term 'traditional building' refers to a building of traditional construction, using traditional techniques and materials, and mostly built before 1919.
[4] Historic Environment Scotland, Scotland's Scheduled Monuments (2019, updated 2021).

monument's support and preservation.

According to the Act and as summarized by Historic Environment Scotland in its guidance, "scheduled monument consent is required for any works that would demolish, destroy, damage, remove, repair, alter or add to a monument, or to carry out any flooding or tipping on a scheduled monument".[5] Historic Environment Scotland is responsible for managing Scheduled Monument Consent.

Listed Buildings

Listed Building is a statutory protection for buildings of special architectural or historic interest, recognising its cultural significance at a national level, as defined by the Listed Buildings and Conservation Areas (Scotland) Act 1997. Historic Environment Scotland, in its Designation Policy and Selection Guidance, defines 'buildings' as "anything made by people, such as houses, schools, factories, boundary walls, bridges and sculptures"[6]. This policy provides guidance on the elements that are considered when deciding if a building is of special architectural or historic interest. The Act states that listing covers both the exterior and the interior of a building, and also covers any object or structure fixed to the building, and/or buildings or structures which, though not fixed to the building, forms part of the land and has done so since before 1st July 1948.

There are 3 categories of listed buildings, depending on the importance of their cultural significance:

- *Category A:* Buildings of special architectural or historic interest which are outstanding examples of a particular period, style or building type.
- *Category B:* Buildings of special architectural or historic interest which are major examples of a particular period, style or building type.
- *Category C:* Buildings of special architectural or historic interest which are representative examples of a period, style or building type.

According to Historic Environment Scotland guidance, "the categories are advisory and affect how a building is managed in the planning system"[6]. As stated in the Act, listed building consent is required for works to a building which affect its character as a building of special architectural or historic interest. The relevant local planning authority is responsible for managing applications for Listed Building Consent but will have to consult Historic Environment Scotland on most applications.

[5] Historic Environment Scotland, Scheduled Monument Consents Policy (2019).
[6] Historic Environment Scotland's Designation Policy and Selection Guidance (2019, updated 2020).

Conservation areas

Conservation areas are “areas of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance” according to the Listed Buildings and Conservation Areas (Scotland) Act 1997. They could cover both urban and rural areas. It is the responsibility of local planning authorities to designate conservation areas and produce Conservation Area Appraisals and Management. Planning permission may be required for some developments (e.g. alteration to windows) that would not be required in non-designated areas.

The planning system

The role of the planning system is to manage the development and use of land in the public interest. In Scotland, it is based on a development plan that determines how a place will change in the future, and what is or is not possible. For any area in Scotland, the development plan includes the national and a local plan:

- the National Planning Framework (NPF4 was adopted in February 2023) that is applicable to the whole of Scotland,
- the relevant local development plan (LDP) for each of Scotland's 32 local authorities and the 2 national park authorities.

Planning applications for a development, e.g. construction of a new building or refurbishment of an existing building, are determined according to the policies set out in the development plan.

Both National Planning Framework 4 and local development plans include policies to protect and enhance designated historic sites and places, including historic buildings. Both also include policies in relation to climate mitigation and adaptation; in particular, the National Planning Framework 4 has a policy supporting the implementation of retrofit measures to existing buildings. Guidance is produced at the back of the local development plans to facilitate the submission of planning applications for proposed developments – e.g. Guidance on Listed Buildings and Conservation Areas produced by the City of Edinburgh Council, which mentions energy efficiency improvements and installation of renewables.

Under the Permitted Development Rights (PDR), specific developments affecting domestic or non-domestic buildings are granted planning permission by legislation, meaning that do not require planning permission. However, these developments must comply with specific requirements to fall under a PDR. Recent legislation has been adopted by the Scottish Government to facilitate the implementation of energy retrofit measures in the context of designated historic sites and places. The Planning Circular 1/2024: Householder Permitted Development Rights, published in 2024, has relaxed the rules on developments in conservation areas involving window replacement or installation of renewables (solar panels, ground or air source heat pumps). For instance, there is no restriction on the design or appearance of windows that are altered/replaced at the rear of a building located in conservation area, and solar panels can be installed on the rear elevation of the same building.

The willingness and, later, the introduction of relaxations to existing heritage protection policies generated concerns within the heritage sector in Scotland, in that the new PDR would conflict with the current historic environment legislation and undermine the conservation work carried out over several decades - as shown in the Built Environment Forum Scotland's (BEFS) response[8] to the Scottish Government consultation on PDRs Phase 3 that led to the creation of the Planning Circular 1/2024.

Heritage Policy in Relation to Construction Law, Energy Efficiency, and Other Sustainability Policies

Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 – Legislation / national

The Act defines statutory targets for Scotland to reduce its greenhouse gas emissions to net-zero by 2045 with an interim target of 75% reduction by 2030. In April 2024, there was a recognition that the 2030 target will be missed, and a new Climate Change Targets Bill is being proposed (under public consultation as of August 2024) to change the Scottish Government to setting targets for carbon emission reduction. The Scottish Government intends to move to a system of 5-yearly carbon budgets and away from a system of annual targets.

Scottish Government Climate Change Update to the Climate Change Plan 2018 – 2032 Securing a Green Recovery on a Path to Net Zero – Strategy / national

This strategic document sets out the Scottish Government's pathway to the greenhouse gases emissions reduction targets defined by the Climate Change Act 2019. I is an update to Scotland's 2018-2032 Climate Change Plan, which also proposes a route map for a green recovery from COVID-19. It outlines a comprehensive set of policies for emissions reductions in Scotland across all sectors. This includes:

- the introduction of minimum energy efficiency standards for the domestic private rented sector,
- regulations for all buildings to achieve a good level of energy efficiency,
- review the existing Energy Efficiency Standard for Social Housing (EESSH2) with a view to strengthening and realigning the standard with net zero requirements,
- develop proposals for a future regulatory framework for zero emissions heating, to be put in place to drive very significant scaling-up in deployment and accelerated market growth from 2025
- review of energy standards within building regulations, investigating the potential for

[8] BEFS is an s an umbrella body for organisations working in the built environment in Scotland. See BEFS's response on PDRs phase 3: https://www.befs.org.uk/wp-content/uploads/2023/08/PDR-3-.pdf

further, significant improvement on 2015 standards and how building standards can support other carbon and energy policy outcomes, including the decarbonisation of heat agenda.

The plan indirectly refers to historic buildings, as an action aims to work with stakeholders to further understand and support the application and use of low and zero emissions heating within designated historic environment assets and hard to treat buildings.

Scottish Government Heat in Buildings Strategy - achieving net zero emissions in Scotland's buildings (2021) – Strategy / national

The strategy sets out the pathway to decarbonise Scotland's buildings by 2045 through proposed policies and actions, including two strong requirements for domestic properties:

- all homes should meet a minimum energy efficiency standards equivalent to an EPC Band C by 2033,
- all homes use zero emissions heating (and cooling) by 2045,
- reform domestic EPC assessment process,
- work with stakeholders, including Historic Environment Scotland, to develop approaches and solutions to transition Scotland’s historic buildings to low and zero emissions heating while respecting and preserving the special characteristics of our buildings and places,
- work with Historic Environment Scotland to consider what specific support may be needed within regulations for buildings designated as listed or in conservation areas.

Scottish Government Local Heat and Energy Efficiency Strategies (Scotland) Order 20226 (2022) – Legislation / national

The Order defines a Local Heat and Energy Efficiency Strategy as a long-term strategic framework for the improvement of the energy efficiency of buildings in the local authority’s area, and the reduction of greenhouse gas emissions resulting from the heating of such buildings.

The Order requires local authorities to:

- publish their first Local Heat and Energy Efficiency Strategy and their first Local Heat and Energy Efficiency Delivery Plan on or before 31 December 2023
- keep its Local Heat and Energy Efficiency Strategy and its Local Heat and Energy Efficiency Delivery Plan under review
- publish an updated Local Heat and Energy Efficiency Strategy and Delivery Plan at intervals of no more than 5 years after the date of publication of the previous Strategy and Delivery Plan
- have regard to the guidance when preparing its Local Heat and Energy Efficiency Strategy and Delivery Plan

The City of Edinburgh Council has published its Local Heat and Energy Efficiency Strategy and Delivery Plan in 2023. The plan includes actions in relation to historic buildings.

Scottish Government Consultation on proposals for a Heat in Buildings Bill (2023/2024) – Legislation / national

The consultation for Heat in Building Bill proposed the creation of new regulatory requirements in relation to heating and energy efficiency in domestic and non-domestic existing buildings:

- all homes and businesses will have to move to a clean heating system by the end of 2045,
- people buying new homes and buildings before 2045 would be asked to move to a clean heating system within a set period after the sale,
- minimum energy efficiency standards for all homes by the end of 2033, to make them warmer and less expensive to heat - private landlords would need to do this by the end of 2028.

To meet this minimum energy efficiency standard, building owners will be able to choose between:

- a proposed listed of measures (270 mm loft insulation, cavity wall insulation, draught-proofing, heating controls, 80 mm hot water cylinder insulation, suspended floor insulation15),
- alternative option of meeting the standard based on the result of an EPC assessment.

The Scottish Government recognised that some of the measures in this list may not be suitable for traditional buildings, as these buildings may have specific requirements due to their construction type or status (e.g. listed buildings). They proposed collaborating with experts such as Historic Environment Scotland to develop the best solutions for these buildings.

The Scottish Government are considering developing “an assessment tool which would enable building owners to understand which types of clean heating system are most suitable for their building. This tool could also help assess which energy efficiency measures were most suitable for traditional buildings and which were not.”

Energy Performance Certificates (EPC) – Legislation / national

In Scotland, EPCs are compulsory when a building is being sold or rented out, or for new buildings. They should be made available to potential buyers or tenants. There are exemptions for stand-alone buildings (other than dwellings) with a useful floor area of less than 50m², temporary buildings with a planned use of two years or less, buildings with a low energy demand, i.e. non-residential agricultural buildings and workshops, or buildings sold for the purpose of

demolition.[9]

Listed and historic buildings, places of worship are not exempted from having an EPC if they are sold or rented out.

The Scottish Government ran two consultations in 2021 and 2023 on proposed reforms to EPCs, including the introduction of new metrics and the reduction of validity period from 10 to 5 years.

Building Standards

In Scotland, the Building (Scotland) Regulations 2004 (as amended) sets out the regulations and standards buildings must meet to ensure they are safe, efficient and sustainable. These legal requirements are triggered by the construction of a new building (including extensions of existing buildings), the alterations or the conversion (change of use or occupation) of an existing building, and are enforced through the building standard system. A conversion can either involve the whole building or part of it – for a dwelling, this includes changing a roof space, an unheated garage or a deep solum space into an apartment, or other habitable accommodation. In any case, the converted building must meet the requirements of the Building Standards and not be worse than before the conversion.

The Scottish Government publishes and regularly updates guidance in relation to building regulations and standards. Technical handbooks are essential as they provide practical guidance on how to comply with regulations and standards for domestic and non-domestic buildings. Additionally, there is specific guidance on the application of building standards during the conversion of traditional buildings: Guide for Practitioners 6: Conversion of Traditional Buildings, published by Historic Environment Scotland.[10]

In the technical handbooks, historic buildings are considered in the broader sense possible, i.e. protected or not, and include listed buildings, buildings located in conservation areas, non-protected traditional buildings built before 1919. With regard to the conversion of historic buildings, whilst the technical handbooks recommend reaching building standards requirements, when possible, they also promote a flexible approach:

- some technical requirements from the building standards can be relaxed. For domestic buildings, standard 6.2 ‘building insulation envelope’ allows conversions of historic buildings to achieve lower levels of U-values than for new constructions – the standard currently advise for these conversions to reach the minimum U-Values expected from the fabric of a new construction (0.7 for walls and floors, 0.35 for roofs and 3.3 for glazing). The requirement for zero direct emission heating systems could be relaxed if they

[9] The Energy Performance of Buildings (Scotland) Regulations 2008.
[10] The guide includes information on how to assess the significance and understand the performance of traditional buildings.

undermine the character (i.e. cultural significance) of a protected historic building.

- buildings standards requirements can be achieved in less sensitive areas of the building from a cultural significance perspective (i.e. in the attic of an historic building).
- alternative/innovative solution(s) can be implemented to compensate the inability to achieve a specific building standard such as standard 6.2 'building insulation envelope'. For instance, reducing energy demand without impacting the building fabric through improvements to the heating system, lighting system and/or installation of renewable heating or on-site generation of heat or power. There could be an opportunity to go beyond current requirements for heating systems improvements to offset the inability to comply with requirements of other standards such as fabric insulation targets.

The technical handbooks acknowledge that complying with the building standards when carrying out a conversion of a historic building can be more complex than for a new construction.

In the case of improving the insulation of an existing historic building, the technical handbooks emphasise that the proposed measures should:

- be compatible with the existing building fabric to avoid the risk of adverse consequences (in relation to moisture movement and permeability of the existing construction) and that specialist advice may be required,
- take into account other pieces of legislation (e.g. in relation to protected buildings or areas such as legislation related to listed buildings, conservation areas, etc.) and ensure that the building fabric is not damaged,
- be defined based on investigations into the characteristics of the building (construction, materials, form) and its cultural significance.

The technical handbooks also recognise that, whilst each historic building should be treated on its own merits in relation to insulating improvements, doing nothing should never be a default position.

Key findings

There are different levels of protection of historic buildings in Scotland and, sometimes, they can combine (e.g. a building can be listed and located in a conservation area and, very occasionally, in a World Heritage Site). In 2019, Scotland has set an ambitious target to become net-zero by 2045. To reach this target, the Scottish Government has developed and continues to develop a significant number of policies and strategies. All aspects of the built environment are being considered, ranging from changes to planning regulations, improvements to building standards in terms of energy efficiency, to reform of EPCs and the probable introduction of minimum energy efficiency standards for the domestic buildings and phasing out direct carbon emission heating in existing buildings.

There is a recognition, across all pieces of existing and planned future legislation, regulation and guidance in relation to energy performance, that designated historic sites and places must be dealt with in a sensitive manner, to preserve their cultural significance, their long-term integrity and the wellbeing of their occupants. In particular, the specific nature of historic buildings in terms of cultural significance and performance (in relation to their intrinsic characteristics in terms of construction techniques and materials) should be understood when considering energy efficiency interventions, to avoid unintended consequences – leading to potential loss of cultural significance, damage to the building fabric or issues in relation to the indoor environmental quality. It is also understood that specific skills, and potentially specific tools (or improvements to existing ones) are required to carry out appropriate alterations to existing buildings.

Whilst there are exemptions for historic buildings and a flexible approach is advised, current legislation, regulation and guidance tend to encourage, when it is technically and financially possible and acceptable from a conservation perspective, the full implementation of energy efficiency standards and requirements.

To facilitate the adoption of energy efficiency interventions, planning requirements have recently been relaxed for conservation areas through the implementation of the third phase of Permitted Development Rights (PDRs) for specific interventions (window alteration and installation of renewables), which raised significant concerns within the heritage sector.

As the energy efficiency legislative and regulatory landscape in Scotland has and continues to constantly evolve at fast pace, and the net-zero targets become closer, the tension between two major statutory duties concerning historic buildings – the protection of their cultural significance and their transition to net-zero – may increase, if simple, viable and affordable technical solutions are not found.

Comparison of national policy frameworks

The analysis identifies commonalities and discrepancies between the countries.

Commonalities

Central and regional governance. In all four countries, heritage protection involves both central (national) and regional (and/or local) authorities. In Spain, protection is managed across national, regional, and local levels, similarly to Poland that involves national, Voivodeship (regional) and Municipal (local) Conservators. In Sweden, regional County Boards play a key role in managing national heritage sites, and in Scotland, Historic Environment Scotland works alongside local governments.

Integration with planning Laws. Heritage protection is closely linked with planning and construction laws in each country. Spain and Scotland integrate heritage protection within local urban planning, Poland implements protection zones in local spatial development plans, and

Sweden's Planning and Building Act ensures that heritage values are considered in building regulations.

Multi-tier protection systems linked to central and regional governance. All countries use a multi-tier system to protect heritage assets. Spain distinguishes between assets of cultural interest and general inventories, while Poland uses the Monument to History status, Register of Monuments, and Monument Records. Similarly, Sweden and Scotland have hierarchical protections from national to local levels, such as listed buildings and conservation areas.

Exemptions for energy efficiency standards. All countries recognize the need for balancing energy efficiency with heritage preservation, and they allow for exemptions. In Spain and Poland, listed historic buildings may be exempt from meeting energy performance standards. Sweden allows deviations from energy requirements when they come into conflict with heritage values, and Scotland has similar provisions.

Discrepancies

Degree of centralization: Poland's heritage protection is mainly executed on the regional level with Voivodeship Conservators holding significant discretionary power over projects. In contrast, the legal systems in Scotland, Sweden and Spain provide more autonomy to local authorities to adapt national frameworks to local contexts.

Extent of listed buildings: Sweden has relatively few nationally protected buildings compared to other countries like Spain, focusing more on integrating heritage protection through local planning laws than national designations. On the other hand, Poland, Scotland and Spain have a more extensive system of formally listed and protected heritage buildings.

Flexibility of modifications to HBs: Spain's system offers a lot of flexibility through regional and local laws, which allow urban planning to be adjusted based on the needs of heritage preservation. Scotland's and Sweden's systems also offer flexibility through building standards, when it comes to the energy performance targets that must be reached, and how to achieve them, if possible. Conversely, Poland's system seems to be more rigid, with strict oversight by conservators, making it harder to modify protected buildings.

Interviews

Table 1. Respondents ID, stakeholder group, country and role

No	ID	Stakeholder group	Country	Role
1	PRAPL1	Practitioner	Poland	Designer (architect)
2	PRAPL2	Practitioner	Poland	Architect
3	PRAES1	Practitioner	Spain	Engineer
4	PRAES2	Practitioner	Spain	Architect
5	PRAES3	Practitioner	Spain	Architect
6	PRAES4	Practitioner	Spain	Researcher (architect)
7	PRASE1	Practitioner	Sweden	Heritage expert at architectural firm
8	PRASE2	Practitioner	Sweden	Heritage expert at architectural firm
9	PRAUK1	Practitioner	UK/Scotland	Designer (architect)
10	PUBPL1	Public Authority	Poland	Planner at heritage authority (architect)
11	PUBPL2	Public Authority	Poland	Administrative official at heritage authority
12	PUBPL3	Public Authority	Poland	Regional conservator at heritage authority
13	PUBPL4	Public Authority	Poland	Regional conservator at heritage authority
14	PUBES1	Public Authority	Spain	Heritage expert
15	PUBES2	Public Authority	Spain	Planner
16	PUBES3	Public Authority	Spain	Officer at heritage authority
17	PUBES1	Public Authority	Sweden	Heritage expert at national heritage authority body
18	PUBUK1	Public Authority	UK/Scotland	Policy and Strategy Manager
19	PROPL1	Professional Owner	Poland	Property manager
20	PROPL2	Professional Owner	Poland	Deputy head of real estate company
21	PROUK1	Professional Owner	UK/Scotland	CEO of social housing organisation
22	PRIPL1	Private Owner	Poland	Building owner
23	PRISE1	Private Owner	Sweden	Building owner
24	PRIUK1	Private Owner	UK	Owning a flat in a listed building
25	PRIUK2	Private Owner	UK	Owning a flat in a listed building

Results of the interviews

The subset of all interview questions that has direct relevance for policy is here presented one by one. Answers to other questions, but still related to policy, are then presented together. The presented results in the bullet point lists are summarizing the core statements/views of the individual answers. These are the questions directly relevant for policy:

1. FuturHist deals with the energy retrofit of historic buildings, **what do you think about current renovation rate?** Are we going to meet national/European targets?
2. Can you think of any regulatory barriers, and how important would they be? **Regulatory barriers** are related to policies in different sectors, as well as lack of information to stakeholders regarding such policies.
3. How well does current policy related to energy retrofit **work in practice**? What are strengths and weaknesses with current policies?
4. In sum, what do you think could be **improved** at the level of policy-making regarding energy retrofit of historic buildings?
5. There is a possibility in the EPBD to **exempt listed historic buildings** from demands on energy efficiency. What do you think about this option?
6. Can current policies on energy efficiency hinder **other dimensions of sustainability**?
7. If yes, **what can be done** to avoid negative effects on other sustainability dimensions?

1. FuturHist deals with the energy retrofit of historic buildings, what do you think about the current renovation rate? Are we going to meet national/European targets?

Practitioners

- Too slow.
- There are administrative bottlenecks.
- No, we won't reach targets and finance is the key problem.
- The pace is too fast and HBs might be at risk.
- I don't think so. But it is complicated, there is no use in renovating a building that is not in need of renovation. We often argue that we should do as little as possible in HBs.

"Conservation services have the deciding role here and conservation doctrine has evolved over the years, as has technology, mostly non-invasive technologies, so there is progress. Due to the high number of historical sites, state conservation institutions cannot keep up with the targets and the actual demand." PRAPL1

Public Authorities

- HBs is a small fraction of the total building stock and will not significantly affect the achievement of targets.
- The pace is fast but that is unfortunate for HBs.

"The pace is fast, which does not favour the appropriately high quality of projects, implementation and supervision. The scope is most often limited to the insulation of facades and usually the replacement of windows. The goals are right, one should strive to reduce energy consumption and switch to renewable sources, but in the case of historical buildings, these goals are too narrow and do not take into account other, equally important issues, such as the well-being of the monument, the protection of its heritage value." PRAPL1

Professional Owners

- Economy of scale does not exist yet for HB
- Don't think so, not enough public support.
- No, lack of money main obstacle.

"...retrofitting requires some quite exquisite technical ability. So the removal of window frames, the removal of doors, the installation of better insulation, the installation of alternative heat source is all quite technically demanding. And at the moment, we're sort of in the early adopter stage. It's quite additionally expensive. So there's a premium. You know, if you were to go and do this, there would be, there's a premium on your expenditure. Because these things tend to be not necessarily bespoke, but there aren't the economies of scale yet that drives down the cost of these innovative solutions. And so I think that is prohibiting or at least limiting organisations, institutions and individuals from attempting retrofit of their buildings." PROUK1

Analysis

Practitioners point to the slow pace of renovation, administrative bottlenecks and lack of finances, while public authorities argue that the pace of renovation is too fast, which is perceived as unnecessary and detrimental for HBs. Professional owners all point to the lack of finances/public support as a main obstacle.

Several respondents were a bit confused by the question and had difficulties answering. There was probably ambiguity about what was meant with "targets" – is it energy efficiency or preservation targets?

2. Can you think of any regulatory barriers, and how important would they be? Regulatory barriers are related to policies in different sectors, as well as lack of information to stakeholders regarding such policies.

Practitioners

- Multiple owners have difficulties to reach consensus.
- HBs are exempted from codes. Heritage policy limits use of new technologies.
- Authorities have their focus on new construction, thus HBs are left behind.

- Public HB protection is ineffective and becomes a bottleneck also in benign projects.
- Regulatory barriers are not the main problem.
- Certification of materials is problematic. Some traditional materials are difficult to certify, but they are still better.
- Generally, policies are clashing and there are possibilites to integrate them better.
- Lack of clarity on requirements associated with the planning system slow the process to retrofit HBs, what retrofit interventions are acceptable or not, which one do require a planning permission or not.

“the level of awareness within the planning structure with what you can and can't do with these properties and what I guess you do need planning permission for and what you don't need planning permission for it. It it's not immediately transparent. And sometimes you've got to go through an engagement process with local authorities to unpick what's going to be acceptable. Which takes time.” PRAUK1

Public Authority

- Option to exempt CH buildings from building code problematic.
- EE could be comparable to accessibility issues in the building codes – there is a need to find well adapted solutions.

“I also understand that energy efficiency or thermal comfort can be considered like accessibility, which is perhaps a more visual and easy example, isn't it? Obviously you are not able to install a lift no matter how in all kind of buildings or you are not going to change a Carlo Scarpa's stairs just to comply with the CTE [Building code in Spain], but maybe there will be always alternative solutions to improve accessibility and in case there were none, we must assume it.” PUBES1

- EPBD should be better adapted to local climate and local building tradition.
- Lack of policy integration
- Heritage authorities (in Poland) have to make interpretations of the law on a case-by case basis - there is a potential to make the law less ambiguous.

“But our law in this field is exceptionally intuitive and these guidelines are a kind of interpretation. Conservators usually must interpret the law themselves and decide on each case individually.” PUBPL3

- Ineffective administration.
- National targets (i.e. Net zero) are not aligned with planning policy. Absence of a clear roadmap for how the built environment can deliver on those targets. Policies in different sectors are disjoint. Could there be a specific target for CH building stock?

“...the Conservation Officers group /.../ sent letters to Minister for Public Finance and the chief planner around concerns on Permitted Development Rights 3 amendments which relate to conservation areas specifically and the changes to enable alterations to buildings, for example solar panels, and it is towards better, easier implementation of works towards net zero. There is concern not because there's an unwillingness to undertake these works, but the blanket approach - it seemed to be detrimental to previous efforts to manage conservation areas and the funding and the money that has gone into conservation areas over the years, so there's a sort of

imbalance and there is concern around previous work done to carefully manage an environment, and new legislation or amendments to legislation which, on the face of it, is well intended but has unintended consequences." PUBUK1

Professional Owners

- Public procurement tends to favor cheap solutions over high-quality ones.
- Private owners find contacts with relevant institutions difficult
- Regulatory barriers makes it necessary to combine PVs with batteries

Private Owners

- Policies do not facilitate concerted action among owners in buildings with multiple dwellings and where communal decisions on communal areas (such as roofs) should be made.
- Lack of information and understanding on planning system and requirements for HBs and on building standards

"we need listed building consent to change our windows. I think listed building consent would only be granted for the particular types of changes. I'm not actually sure what the regulations are in terms of putting a heat pump on the back of the building." PRIUK1

Analysis

There is a broad range of regulatory barriers identified in the answers. Lack of awareness from private owners on what is allowed from the planning system and requirements building standards. The uncertainty around the planning system when it comes to HBs has been pointed out by practitioners as a cause of uncertainty and loss of time on projects. Practitioners have mixed views, policies are described as ineffective and limiting but also as non-problematic. Several respondents from the public authorities group describe policies as lacking integration, being disjoint and ineffective. There is no clear regulatory barrier that is considered a major problem across all stakeholder groups.

3. How well does current policy related to energy retrofit work in practice? What are strengths and weaknesses with current policies?

Practitioners

- Policies are not well aligned.
- There is a lack of financial incentives.
- Building codes do not take local climatic conditions and related techniques into account.
- Gap between policy intentions and praxis.

"Perhaps it is a bit radical, but although I believe that European policies come with good intentions, the immediate praxis is not being at all sensitive to heritage. The uniqueness of such buildings requires a thorough analysis of them before intervention. So, European policies on energy retrofitting would be marvellous if they fell like when it rains and the land is ploughed. In other words, if the infrastructure is prepared to receive these resources or these policies, then

that's perfect. If you have heritage assets that they have been studied, perfectly analysed, where and how you can intervene, then that's perfect. And I am not talking about the utopia of the Kingdom, but about something that is feasible." PRAES3

- The problem is not in the regulations.
- Policy should provide certainty to the market so that the market can implement the policy.

"The thing with policy is it should provide confidence to the market to then deliver what's in that policy" UKPRA1

Public Authorities

- There is an information deficit on how to implement policies. There is a lack of EE policies targeting heritage buildings.
- Policies on EE do not consider HBs fully.
- Policies do not consider regional differences. Economic incentives are needed as investments are higher.
- The legislative framework is not to blame, the problem is how it is used in practice. There is not enough resources and knowledge at the administrative level.
- Policies are disjoint. Awareness in government departments of this situation.
- Low competence among various stakeholders involved in energy retrofit. Lack of control of methods of implementation and consequences of retrofits.

Professional Owners

- Lack of guidelines and/or awareness of guidelines.
- There are not enough funds. No problems in other areas.

Analysis

There is no direct criticism towards preservation policy to be found among the answers. There is, however, indirect criticism with recurring answers describing how energy and preservation policy are not well aligned and that there is a gap between policy intentions and practice. Several respondents point to a lack of knowledge about how to implement policies in a proper and thoughtful way. One respondent highlighted the role of policy to provide confidence to the market, so that the objectives set out in the policy can be delivered by the market.

4. In sum, what do you think could be improved at the level of policy-making regarding energy retrofit of historic buildings?

Practitioners

- Separate Energy Performance Certificates should be introduced for HBs.
- Align policies.
- Bespoke EE regulations for HBs.
- Strategic planning.

Public Authorities

- More research on how modern retrofit measures impact traditional buildings.
- Norms/standards are needed on thermal insulation materials for HBs. Reduce thickness of insulation, develop and use new nature-based materials, support production of roof-tile shaped PVs. Develop awareness among lawyers.
- Invent a EE policy for HB
- The specificity and advantages of traditional constructions should be noted. Interventions consisting of external insulation and replacement of windows should be limited, whilst other methods of reducing energy consumption promoted. Designs should require consideration of the thermal capacity and thermal-humidity flows in building structures. The use of vaporproof synthetic materials with a large carbon footprint needs to be limited.
- 1) No wishful thinking of new tech 2) Integrate EE in good renovation projects 3) Revise comfort standards 4) Focus on maintenance
- Better adaptation to the specific circumstances of each territory.
- More strategic planning.
- Communicate opportunities to owners.

Analysis

There is no main direction among the answers, and suggestions for improvement are targeting different levels of policy making. A common denominator is that HBs require special treatment from a policy perspective.

5. There is a possibility in the EPBD to exempt listed historic buildings from demands on energy efficiency. What do you think about this option?

Practitioners

- Makes sense to exempt.
- Too high demands on EP of HBs could lead to financial problems for owners.
- Mistake to exempt.

“However, in 99% of buildings, it is always possible to improve efficiency in some way, so it should not be a matter of exemption and non-compliance, but rather complying as far as possible and as much as the conservation of heritage values allows.” PRAES2

- Makes sense to exempt, but HBs with new use should fulfil some requirements.
- Makes sense to exempt, but can be problematic with housing.

Public Authorities

- Makes sense to exempt.
- Mistake to exempt, there is some uncertainty about consequences but a risk worth taking.

“Yes, as I was saying, I think it is irresponsible to exempt historic buildings from complying with energy efficiency demands. We have to look for alternative solutions. With time we will see if they

work or not, but I think that this objective has to be part of the proposals to be made. Obviously they cannot be supervised by the administration with the rigour of new construction, because it would mean implementing or developing an R+D+i project to give answers to a renovation project of this kind. And not everyone can get the resources needed for that. But I believe that this approach in the project is essential, and although we cannot verify the proposed solutions until sometime afterwards, it is a risk worth taking, and we must not avoid this, because in the end, even if the building must be tackled individually, there are other problems associated with it, such as a poor intervention, that they are abandoned, that they are transformed, or that they have a lack of maintenance as well. But in any case, I don't think they can be exempted." PUBES1

- More flexibility instead of exemption.
- Mistake to exempt, but important that there will be no fixed targets.

"Almost any building can improve its performance, but it should not be subject to fixed targets (savings, consumption, emissions), because there are other types of criteria and determining factors to be taken into account in its management and protection." PUBES3

- Uncertainty about to exempt or not to exempt, there are pros and cons.
- There should be an option to exclude HB:s.
- A very good idea to exempt.
- Exemption is necessary for listed buildings, but is also a good idea for non-listed buildings constructed with traditional methods.
- Uncertainty about exemption, but the "othering" of HBs is generally detrimental.

"Also we talk about normalising and mainstreaming. I have an inherent sort of aversion to the othering of historic buildings within the conversations around existing buildings and place making and development etc. I mean I think they're part and parcel in the same way that when you're talking about traditional building skills, it would be great to get to a point where these are folded into aspects of construction teaching, because we know we have X number of buildings that need looked after etc. They are already here, so I find that sort of othering a little difficult." PUBUK1

Professional Owners

- Sound, as HBs cannot be treated the same as new buildings due to their technical specificity.
- A very good instrument as it is not possible to meet all requirements in HBs.
- Mistake to exempt

"I don't think it should be a universal or a blanket exemption. I think that each and every organisation should be required to demonstrate good behaviour, and by that I mean to be able to show that either for technical, financial, or social reasons, achieving what might be a standard energy efficiency rating is not feasible, it's not possible. And I would draw comparison of achievement of the Scottish Energy efficiency standards in social housing, where you can get an exemption from the standard, if you can demonstrate technical or financial reasons why it's disproportionately unachievable. So my view is that everybody should try to do what they can but

where you can't, you can then show it's either technically, financially or socially not feasible to do so.” PROUK1

Analysis

Taking the answers at face value there is disagreement within and across stakeholder groups whether or not is a good idea to exempt historic buildings from demands on energy performance in the implementation of the revised EPBD. There is however a strong agreement that nonflexible demands of EP on HBs is a bad idea. The suggestions to not exempt HBs are made with the caveat that demands on EP must be flexible and take into account preservation of heritage values.

6. Can current policies on energy efficiency hinder other dimensions of sustainability?

Practitioners

- No.
- It is important that indicators account for a country's specificity in terms of its energy mix.
- Generally no, but solutions/materials with environmental drawback might be used.
- Generally no, but non-sustainable materials might be used.
- Current exemption can lead to abandoned houses in the future.
- Fire regulation requirements may hinder the wider use of natural materials.

“The increasing drive to only use non-combustible materials, particularly insulants is blocking the opportunity to start to use lower embodied carbon natural building products.” PRAUK1

Public Authorities

- Yes, because they do not always work as intended in practice.
- Yes, there needs to be a balance.
- We might do too much today because of the high energy costs.
- Moisture risks, economic inefficiency.
- LCA and circularity might be compromised with a focus on EE.

Professional Owners

- Yes, there need to be a holistic perspective.

7. If yes, what can be done to avoid negative effects on other sustainability dimensions?

Practitioners

- A more holistic planning process.

“Starting with complete assessments of environmental, social, and economic impact in each energy rehabilitation project, actively engaging local communities, and promoting education on sustainable practices to ensure that benefits are equitable and long-lasting.” PRAES2

- Bespoke EE regulations for HB.

- Strategic planning.

Public Authorities

- Invent an EE policy for HB.
- Better adaptation to the specific circumstances of each territory.
- More strategic planning.
- Communicate opportunities to owners.

Analysis of 6 & 7

Practitioners do not see a negative effect on other sustainability dimensions, while public authorities do. The only professional owner that answered the question argued that a more holistic perspective is needed. Regarding solution to the perceived problem there is a great overlap with the answers to question 4.

Answers related to policy that were given to other questions in the interview templates.

- Training for professionals (architects, craftspeople) in traditional buildings, functionality, materials, constructions, as well as how new technologies can be installed and adapted in traditional buildings.
- Building codes setting targets for IEQ and EE have to be flexible in HBs.

"That is to say, that when a building has certain levels of protection, then they should be more or less flexible with the regulations. But what we cannot do is to impose a technical code on a heritage asset, because tomorrow the code will change, but the asset will remain." PRAES3

- Policies of different sectors are not well integrated, neither in theory nor in practice.

"...you've got policies developing in different legislative areas towards meeting carbon targets, net zero heating buildings, etc. And lots of these are very well-intentioned, but many of them are, it feels, being developed in isolation, whereas this is a very integrated subject matter." PUBUK1

"I think that there is good stuff in all of it, but until it's joined up, I don't think it works because it's not related. Or it's not interdependent enough or it's too strong on one aspect and not in consideration of another. I don't think we're there yet. No." PUBUK1

- Owners, both professional and private, are frustrated over planning regulations that prevents them from doing what they think are plausible and rational interventions to save energy.

"...this dissonance between the government saying there is a climate emergency and you've got to do something about it, and the constraints of planning regulation. So I keep going on about my windows, but I've got hundreds of windows. They are where most of the heat is lost out of our buildings. And to be able to put in some decent windows that are more thermally efficient would be great and would go a significant way of helping me improve thermal efficiency. That with access to solar panels and other things would help me. So it's the planning constraints that I currently have that doesn't allow me to fully exploit technology, as is currently available."

PROUK1

- Lack of guidelines.
- Policies should be better adapted to local climate and local building tradition.

“It is also important to consider that the same characteristics should not be required for a house in Almería as for one in The Hague, for example. Mediterranean concepts such as cross ventilation or shading must also be considered when designing a building in Andalusia, not just achieving thermal balance with permanently closed windows.” PRAES2

- A holistic and systematic planning process is needed.

“Energy retrofitting regulations are mainly focused on limiting energy consumption. They do not address other aspects such as the use of buildings, the feasibility of the measures in place and the comfort conditions of the users.“ PRAES1

Discussion

The following cross-cutting findings have been identified in the interview results:

Preservation policy is not well aligned with energy efficiency policy. The overall impression from the interviews is that preservation policies are working quite well (or at least that there is a potential for them to work well if properly applied), but that they are disjoint from energy efficiency policies. This is expressed across all stakeholders involved in the planning process: owners, public authorities and practitioners. As a remedy there are several respondents suggesting the development of bespoke EE policies for HBs, and generally better strategic planning at the top level of policy making (including better integration of heritage and EE policies).

Achieving good results in energy retrofit of HBs is more costly and requires more time and resources than in standard buildings. This has to be acknowledged in EE policy, and there needs to be financial support, especially for high upfront costs. The challenge that both planning and implementation tend to take much longer in HBs is emphasized by professional owners.

Lack of knowledge among building owners about opportunities to make HBs energy efficient in ways that do not harm heritage significance. Improved communication about such opportunities is considered crucial.

Lack of consideration in policy about the specific building physics related aspects of HBs. Traditional constructions and traditional materials have characteristics that can make the application of standard interventions problematic. This has to be better accounted for mainly in EE policy.

Disagreement about the possibility to exempt HBs from demands of EP in the revised EPBD. There is disagreement within and across stakeholder groups whether or not it is a good idea to exempt historic buildings from demands on energy performance in the implementation of the

revised EPBD. There is however a strong agreement that nonflexible demands of EP on HBs is a bad idea. Suggestions to not exempt HBs are therefore made with the caveat that demands on EP must be flexible and take into account preservation of heritage values.

Need for a holistic perspective in the planning process. A one-sided focus on energy efficiency might have negative consequences for other aspects, such as economy, LCA and moisture risks. The risk for unintended consequences with a narrow focus on energy efficiency was mainly raised by the public authority group, probably because they have the task of balancing different policy objectives in decision-making.

4. Conclusions and Outlook

This report used a qualitative methodology combining comparisons of national policy frameworks in four European countries with structured interviews of stakeholders involved in the planning process of energy retrofit of historic buildings. The main conclusions are here presented in relation to the three research questions:

1. How are buildings protected (in terms of preservation), and what are the legislative frameworks and how are they used in practice?

Historic buildings across the four European countries studied in this report are protected through structured governance frameworks involving national, regional, and local authorities. Central governments provide overarching policies for heritage conservation, while regional and local authorities tend to manage the practical implementation. The multi-tiered heritage preservation systems aim to ensure that decisions are made with a balance between national priorities and local needs. The four governance systems resemble each other on an overarching level but vary in their degree of centralization, the extent of listing of historic buildings, and in the flexibility of to what degree modifications of historic buildings can be done.

The respondents were generally, in all four countries, positive about the design of heritage preservation policy. Criticism was mainly raised about the lack of integration of heritage and energy efficiency policy. Several respondents suggested the development of specific energy efficiency policies for historic buildings.

There was also agreement that energy retrofit of historic buildings is more costly and requires more time and resources than the retrofit of standard buildings. Public funding, especially for the high upfront costs, was perceived as important to increase the pace of energy retrofit and to achieve good quality results.

2. How are heritage values in the building stock considered in construction law, energy efficiency, and other national sustainability policies?

Protection of heritage values are considered in construction laws in the four studied countries, but their relationship with energy efficiency policies remains complex. While there is a strong recognition of the need to preserve heritage, this can sometimes clash with national policies promoting energy efficiency and sustainability.

All countries allow for exemptions for historic buildings from energy efficiency standards, recognizing that such demands might have a negative impact on heritage significance. In Spain and Poland, listed historic buildings may be exempt from meeting energy performance standards. Sweden allows deviations from energy requirements when they come into conflict with heritage values, and Scotland has similar provisions. The degree of flexibility varies somewhat across countries, and Poland seems to be the country with the strictest legislation of the four. A complicating aspect is that buildings can be protected by law in multiple ways. As an example, in Sweden there is an umbrella law that heritage values should be accounted for also in buildings that are not explicitly designated as historic buildings.

There was disagreement within and across stakeholder groups whether or not it is a good idea to exempt historic buildings from demands on energy performance in the implementation of the revised Energy Performance of Buildings Directive. There was however a strong agreement that demands of energy performance in historic buildings have to be flexible to some degree. Suggestions to not exempt historic buildings were always made with the caveat that demands on energy performance should be flexible and take into account preservation of heritage values.

Respondents pointed to a lack of consideration in policy about the specific building physics related aspects of traditional constructions. Traditional constructions and traditional materials have characteristics that can make the application of standard interventions problematic. This has to be better accounted for mainly in energy efficiency policy.

These observations implicate that the studied countries are not well prepared to deal with the stricter demands on energy performance laid out in the revised EPBD, and that there is uncertainty of how the directive is best implemented in relation to historic buildings.

3. How can policy lever/hinder other dimensions of sustainability in the renovation of historic buildings?

Several of the interviewees fear that a narrow focus on energy efficiency without considering other sustainability dimensions will lead to unintended negative consequences. For example, a strong emphasis on energy-saving measures might lead to the installation of modern materials or systems that are incompatible with traditional building methods, potentially causing moisture problems and structural damage. It is argued that energy retrofit of historic buildings requires a holistic approach to sustainability, taking into account life cycle assessments (LCA), material longevity, and the long-term economic viability of proposed interventions. The risk for unintended consequences with a narrow focus on energy efficiency was mainly raised by the public authority group, probably because they have the task of balancing different policy

objectives in decision-making.

Future outlook

This study is the first steppingstone for the further development of the FuturHist methodology. It confirms a number of key assumptions that make up the foundation of the project:

- The need for a holistic planning process of energy retrofits in historic buildings, where energy performance is one of several important objectives
- The potential to improve energy performance in officially designated buildings, as well as the need to consider heritage values in the wider building stock.
- The approach to develop tailored energy retrofit guidance for subsets of historic buildings

To achieve the goal of developing a methodology that is applicable to all countries included in the study, and in the long run for other countries within the EU, it is essential to understand the similarities and differences in policy and practice among these countries. It is within the area where similarities exist that a common methodology can become successful in terms of usefulness.

Future work will consist of combining the results of this interview study with the results of task 1.1 that identifies barriers to energy retrofit of historic buildings at different scales, and with 1.5 that maps current practice. Together these will make a solid foundation for the identification of Key Performance Indicators (task 1.6) that will be used in WP4 (Integrated Planning Toolkit) and WP6 (Scale-up), both in terms of replication (Task 6.1) and policymaking (Task 6.2).

5. References

CEN (2017), "Conservation of cultural heritage – guidelines for improving the energy performance of historic buildings TC 346, EN 16883:2017", Comité Européen de Normalisation (2017), Brussels

Herrera-Avellanosa, D., Haas, F., Leijonhufvud, G., Broström, T., Buda, A., Pracchi, V., & Troi, A. (2019). Deep renovation of historic buildings. *International Journal of Building Pathology and Adaptation*, 38(4). https://doi.org/10.1108/IJBPA-12-2018-0102

Kaliszuk-Wietecka, A., Firląg, S., Miszczuk, A., Terlikowski, W., & Węglarz, A. (2019). *Opracowanie dotyczące możliwości termomodernizacji budynków zabytkowych ze szczególnym uwzględnieniem docieplenia przegród pionowych*. Narodowy Instytut Dziedzictwa. https://nid.pl/wp-content/uploads/2021/11/Opracowanie-dot.-zasad-termomodernizacji-budynko%CC%81w-zabytkowych.pdf (Accessed: 25.09.2024)

Legnér, M., & Leijonhufvud, G. (2019). A legacy of energy saving: The discussion on heritage values in the first programme on energy efficiency in buildings in Sweden, c. 1974–1984. *The Historic Environment: Policy & Practice*, 10(1), 40–57. https://doi.org/10.1080/17567505.2018.1531646

Eriksson, P. (2021). Balancing Building Conservation with Energy Conservation-Towards differentiated energy renovation strategies in historic building stocks. Göteborg, Sweden. Doctoral thesis. ISBN 978-91-7963-072-0 https://gupea.ub.gu.se/handle/2077/68356 (accessed: 2024-09-30)

European Commission. *The Energy Performance of Buildings Directive*. https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en (Accessed: 2024-09-27)

European Commission. *The European Green Deal*. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/story-von-der-leyen-commission/european-green-deal_en (Accessed: 2024-09-27)

Leijonhufvud, G. L., Buda, A., & Broström, T. (2021, October). Assessing and enhancing EN 16883: 2017. In *IOP Conference Series: Earth and Environmental Science* (Vol. 863, No. 1, p. 012033). IOP Publishing. https://doi.org/10.1088/1755-1315/863/1/012033

Narodowy Instytut Dziedzictwa. (2024). *Standardy postępowania*. https://nid.pl/zasoby/zasoby-standardy-postepowania/ (Accessed: 25.09.2024)

Naturvårdsverket. (2024). *Sveriges Miljömål: Skyddad bebyggelse*.

https://www.sverigesmiljomal.se/miljomalen/god-bebyggd-miljo/skyddad-bebyggelse/ (Accessed: 2024-09-28)

Ornelas, C., Vázquez, I. B., & Guedes, J. P. M. (2016). The role of a systematic analysis of building codes to support an assessment methodology for built heritage. In *16th International Brick and Block Masonry Conference: "Masonry in a World of Challenges" - IB2MAC 2016*.

Palinkas, F. A., Horwitz, M. S., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health and Mental Health Services Research*, 42, 533–544. https://doi.org/10.1007/s10488-013-0528-y

Register of Immovable Monuments. (2024). *Otwarte Dane*. https://dane.gov.pl/en/dataset/1130 (Accessed: 25.09.2024)

Tanaka, K. (2011). Review of policies and measures for energy efficiency in the industry sector. *Energy Policy*, 39(10), 6532–6550. https://doi.org/10.1016/j.enpol.2011.07.058

Thuvander, L., Femenías, P., Mjörnell, K., & Meiling, P. (2012). Unveiling the process of sustainable renovation. *Sustainability*, 4(6), 1188–1213. https://doi.org/10.3390/su4061188

Webb, A. (2017). Energy retrofits in historic and traditional buildings: A review of problems and methods. *Renewable and Sustainable Energy Reviews*, 77, 748–759. https://doi.org/10.1016/j.rser.2017.01.145

Zestawienie danych statystycznych z krajowej ewidencji zabytków – zabytki nieruchome. (2024). *Otwarte Dane*. https://dane.gov.pl/pl/dataset/2629/resource/59092 (Accessed: 25.09.2024)

6. Annexes

Lists of interview questions for each stakeholder group

Abbreviations: PRA: Practitioner, PUB: Public Authority, PRO: Professional Owner, PRI: Private Owner

Question ID	Interview question	PRA	PUB	PRO	PRI
QROLE	What is your professional role in relation to energy retrofit of historic buildings? For how long have you been working in the field?	x	x	x	
QBARRIER	What are the main barriers to making historic buildings more energy efficient?	x	x	x	x
QTECH	Barriers can be divided into technical, regulatory, financial and social. Can you think of any technical barriers, and how important would they be? Technical barriers are challenges related to the specific needs of historic buildings because of their construction and the materials used. It can also be lack of competence regarding such needs.	x	x	x	x
QREG	Can you think of any regulatory barriers, and how important would they be? Regulatory barriers are related to policies in different sectors, as well as lack of information to stakeholders regarding such policies.	x	x	x	x
QECON	Can you think of any economic barriers, and how important would they be? Economic barriers are challenges to make energy retrofit projects financially viable for historic buildings.	x	x	x	x
QSOCIAL	Can you think of any social barriers, and how important would they be? Social barriers are related to attitudes and awareness related to energy retrofit in historic buildings.	x	x	x	x
QTARGET	FuturHist deals with the energy retrofit of historic buildings, what do you think about current renovation rate? Are we going to meet national/european targets?	x	x	x	
QPOLICY	How well does current policy related to energy retrofit work in practice? What are strengths and weaknesses with current policies?	x	x	x	x
QEXEMPT	There is a possibility in the EPBD to exempt listed historic buildings from demands on energy efficiency. What do you think about this option?	x	x	x	x

QSUST1	Can current policies on energy efficiency hinder other dimensions of sustainability?	x	x		
QSUST2	If yes, what can be done to avoid negative effects on other sustainability dimensions?	x	x		
QIMPROVE	In sum, what do you think could be improved at the level of policy-making regarding energy retrofit of historic buildings?	x	x		
QGUIDE	Are there guidelines/standards for the overall planning process of energy retrofit in historic buildings? How are they used?	x	x	x	
QASSESS	How are energy retrofit projects in historic buildings generally assessed? (both before and after implementation)	x	x	x	
QMONITOR	What is generally monitored in retrofit projects? What stages (before, during, after?) Do you have internal routines/guidelines?	x	x	x	
QREASONS	Have you done any major renovation in your building(s) in recent years? What was the main reasons for the renovation?			x	x
QPLANNING	Do you plan any major renovation in your building(s)? What are the main reasons?			x	x
QEE	What have you done to make your building(s) more energy efficient? Do you have plans for future actions?			x	x
QPRA1	Which guidelines/standards, tools/softwares, practices do you use for the different steps in the planning process as described below?	x			
QPRA2	Are there any guidelines/tools that you would like to be developed?	x			
QPRO1	Do you know of any case where the protection of heritage values came into conflict with aspirations of energy efficiency? Can you describe the case and how it unfolded?			x	
QPRI1	Why is it important to save energy in your building (if you think so)?				x
QPRI2	Have your ambitions to make the building more energy efficient come into conflict with the preservation of heritage values?				x
QPRI3	Are you aware of any subsidies that are relevant for the energy retrofit of historic buildings (in particular for HBs)? Can you get subsidies for energy efficiency measures? Have you applied for such subsidies?				x
QPRI4	Do you know where you could go to find good advice?				x

QPRI5	Is there any any kind or information (guidelines, best practice, etc) that you are missing (in relation to energy retrofit).				x
QPRI6	What do you monitor (IEQ, energy use) in your building? What stages (before, during, after?)				x
QPRI7	How do you use the monitoring data?				x
QPRI8	Would you like to monitor more and if so, why?				x
QLAST	This was the last question. Is there anything you would like to add (related to the themes we have discussed?)	x	x	x	x

Interview consent form

Interview Consent Form for FuturHist

Thank you for agreeing to be interviewed as part of the FuturHist project!

FuturHist is a research project co-funded by the European Union and the UK Research and Innovation where we:
- **research and test energy-efficient retrofit** interventions tailored to historic building typologies.
- **implement these solutions in real-life demonstration cases** in Poland, Spain, Sweden and the UK.
- **focus on innovative solutions** such as bio-based materials, internal insulation systems, window retrofits, HVAC, and RES integration.

The objective of this interview is to:
- explore barriers that different stakeholders face while going through the planning process of energy retrofit.
- understand current energy retrofit practices
- identify guidelines and tools used that are used in the planning process

Definition of terms used during the interview

Energy retrofit: All types of renovations where increased energy efficiency is a major goal. It refers to the entire renovation process, from planning to evaluation.

Historic building: Building of heritage significance. Includes also buildings that are not statutorily designated as cultural heritage ("i.e. listed buildings").

Planning process: The process of identifying the need for energy performance improvements and defining appropriate improvement measures that match the requirements for the building in question. It would cover all the steps of the proposed procedure of EN 16883 (from the client's intentions to the final decision), but not the implementation, monitoring or maintenance of the intervention afterwards.

Policy: Rules, regulations, guidelines, or official statements adopted by governments, organizations, or institutions to influence behavior, manage resources, or achieve specific objectives.

The interview will take approximately 1 h. You have the right to stop the interview or withdraw from the research at any time. You can request a copy of the transcript of the interview and make edits you feel necessary.

By signing this form you approve to the following:

- the transcript of the interview will be analysed by researchers involved in the FuturHist project
- access to the interview transcript will be limited to researchers within FuturHist and academic colleagues and researchers with whom we might collaborate as part of the research process
- any interview content that we publish will be anonymized so that you cannot be identified
- the recording will be deleted after the transcription is made
- that my words may be quoted directly
- all or part of the content may be used in academic papers, policy papers, news articles, on our website and in other media that we may produce

_____	_____
Participant	Researcher
_____	_____
Signature	Signature
Date	Date

futurhist.eu | linkedin.com/company/futurhist | youtube.com/@FuturHist-2024

FuturHist

Tailored intervention solutions for future-proofing historic buildings

At FuturHist, we research and test energy-efficient retrofit interventions tailored to historic building typologies. We implement these solutions in real-life demonstration cases in Poland, Spain, Sweden and the UK. We focus on innovative solutions such as bio-based materials, internal insulation systems, window retrofits, HVAC, and RES integration.

DURATION OF THE PROJECT: JANUARY 2024 – DECEMBER 2027

COORDINATOR

eurac research

Aalborg University

Junta de Andalucía Consejería de Fomento, Articulación del Territorio y Vivienda

Calchèra San Giorgio

Cracow University of Technology

ERIKarkitekter

Edinburgh World Heritage

holz manufaktur Rottweil

ICOMOS

INTBAU

natürlich bauen

Sendzimir Foundation

Svenska kyrkan Linköpings stift

universität innsbruck

University of Strathclyde Glasgow

Uppsala Universitet

white

Zarząd Budynków Komunalnych w Krakowie

Co-funded by the European Union

UK Research and Innovation

Co-funded by the European Union and the UK Research and Innovation. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Climate, Infrastructure and Environment Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.