SmarterEPC

D3.4 Integration of SRI into the EPC

Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.

Document Information

Project Grant Agreement	LIFE - 101121034	**Project Acronym**	SmarterEPC
Full Title	Smarter Energy Performance Certificates; Integrating smart readiness aspects into buildings energy certification and tools for market up-take. – Input Template		
Acknowledgment and disclaimer	Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor the granting authority can be held responsible for them.		

Work Package	WP3	**Title**	Development of Smarter EPC Platform towards EPC and SRI uptake
Deliverable	D3.4	**Title**	Integration of SRI into the EPC
Deliverable leader	Paris Fokaides (EUPHYIA)		
Other Authors	Nicky Pavlou (EUPHYIA), Theoklitos Klitou (EUPHYIA) R2MF, EPBC, R2MI		
Quality Reviewers	Caverion		

Date of Delivery	**Contractual**	30/11/2024	**Actual**	30/12/2024
Status	Version 2.0		Final	
Nature	Report (R)			
Dissemination level	Sensitive (SEN)			

Table of Contents

List of Figures

List of Tables

List of Acronyms and Abbreviations

Term	Description
a_1	First-order Heat Loss Coefficient
a_2	Second-order Heat Loss Coefficient
BACS	Building Automation and Control System
CERTH	Centre for Research and Technology-Hellas
CHP	Combined Heat and Power
Cm	Thermal Mass Capacity
CW	Cold Water
DHW	Domestic Hot Water
DR	Demand Response
DSM	Demand Side Management
EPBC	EPB Center
EPBD	Energy Performance of Buildings Directive
EPC	Energy Performance Certificate
EU	European Union
EUP	Euphyia-Tech Ltd (Cyprus)
EV	Electric Vehicle
HW	Hot Water
IAM	Incident Angle Modifier
IAQ	Indoor Air Quality
L_{Solar} (or T_vis)	Visible Transmittance (VT)
PVS	Photovoltaic System
R2MF	R2M Solution (France)
R2MI	R2M Solution (Italy)
RES	Renewable Energy Source
SFP	Specific Fan Power
SOC	State Of Charge
SRI	Smart Readiness Indicator
TABS	Thermally Activated Building Systems
TBS	Technical Building System
TES	Thermal Energy Storage
T_{Solar} (or g-value)	Solar Heat Gain Coefficient (SHGC) or g-value.
U-value	Thermal Transmittance
η_o	Collector Efficiency at Zero Temperature Difference

Executive Summary

This report, as part of the SmarterEPC project, presents the outcomes of integrating the Smart Readiness Indicator (SRI) into the Energy Performance Certificate (EPC). The initiative aims to harmonize the assessment of a building's energy efficiency and smart readiness, streamlining the certification process while aligning with European Union (EU) directives to foster energy sustainability and digital transformation.

Key efforts focused on aligning the data requirements and methodologies of EPC and SRI frameworks, identifying overlaps and gaps, and proposing a unified certification process. The project adopted a structured approach, combining literature review, data collection via custom templates, stakeholder workshops, and comparative analysis. This led to the creation of a preliminary joint EPC-SRI certificate design emphasizing clarity, user-friendliness, and adaptability to varied stakeholder needs.

The report highlights:

1. **Harmonization of Data Frameworks:** A detailed mapping of EPC and SRI data requirements uncovered key overlaps and unique elements, forming the basis for a unified certification structure.
2. **Visual Integration of Certification:** A prototype of the joint certificate was developed, incorporating modular, standardized, and user-centric design principles to ensure accessibility and compliance with EU standards.
3. **Stakeholder Engagement and Collaboration:** Workshops and interactive discussions facilitated alignment on data collection practices and methodological integration.
4. **Future Prospects:** The integration of SRI into EPC enables a comprehensive evaluation of building performance, supporting EU goals for smarter, more sustainable buildings.

This work represents a significant milestone in advancing the adoption of smart building technologies, enhancing decision-making for energy efficiency improvements, and fostering market uptake of combined certification tools.

1. Introduction

Buildings today are more than just structures; they are living spaces that need to be both energy-efficient and smart enough to meet modern demands. The SmarterEPC project is taking a big step toward making this a reality by integrating the Smart Readiness Indicator (SRI) with the Energy Performance Certificate (EPC). This new joint certificate is designed to give building owners, industry professionals, and policymakers a clear and complete picture of a building's performance—how energy-efficient it is and how ready it is to adopt smart technologies.

Traditionally, EPCs have focused on energy-related aspects like heating, cooling, and lighting. Meanwhile, the SRI evaluates how well a building can adapt to new technologies, improve comfort, and respond to the needs of its users or even the energy grid. By bringing these two assessments together, this project simplifies the process for users while supporting the European Union's goals for energy efficiency and sustainability.

This report is part of a larger effort to make this vision a reality. It explores how to align the EPC and SRI frameworks, tackles the technical challenges of combining them, and proposes ways to present the joint certificate in a user-friendly and visually appealing format. The ultimate aim is to create a tool that isn't just about compliance but also helps people make informed decisions about their buildings—whether it's improving energy efficiency or embracing smart technologies.

1.1 Scope and Objectives

The main goal of Task 3.4 in the SmarterEPC project is the comprehensive integration of the Smart Readiness Indicator (SRI) into the Energy Performance Certificate (EPC). This integration aims to enhance the capability of the EPC to include smart readiness aspects, facilitating a unified certification process that evaluates both energy performance and the smart readiness of buildings. This task is informed by a thorough literature review, drawing on the Energy Performance of Buildings Directive (EPBD) and relevant EU directives, which provide a legislative and methodological foundation for the integration process. To achieve these objectives, Task 3.4 was subdivided into two specific subtasks:

Subtask 3.4.1: This subtask focuses on identifying the overlaps and gaps in the data requirements for EPC and SRI. It involves collecting essential input data for both tools, assessing methodological differences, and proposing unified data structures and protocols.

Subtask 3.4.2: This subtask is dedicated to developing visual solutions for integrating the two certificates into a unified and user-friendly system. This includes designing a joint visual identity and interface for the combined certification.

This report presents the outcomes of Subtask 3.4.1, detailing the methodologies employed for data collection and analysis. It highlights the commonalities and differences between the EPC and SRI frameworks and proposes a structured pathway for their harmonization.

Additionally, it includes a preliminary draft of the joint certificate, consolidating the necessary information from both systems.

This work represents a significant step forward in the SmarterEPC project, advancing its mission to establish a comprehensive and unified building certification system. By integrating energy performance with smart readiness, the initiative supports the evolution of smarter, more sustainable buildings capable of meeting future demands in energy efficiency and technology integration.

1.2 Subtask Allocation Overview

This report presents an initial analysis of the integration of the Smart Readiness Indicator (SRI) into the Energy Performance Certificate (EPC), focusing on identifying overlaps and gaps in the data requirements for both systems. To accomplish Task 3.4 'The joint EPC and SRI certificate' (M8-M14, M28-M30), the task was divided into two subtasks, with specific responsibilities assigned to leaders and contributors, as shown in *Table 1.*

Table 1. Allocation of Subtasks and Responsibilities for Task 3.4 - The Joint EPC and SRI Certificate

Subtask	Timeline	Item	Partner
3.4.1	**M8 – M10**	**Overlaps and gaps of EPC and SRI input data**	**ALL**
		- Template with worked example for EPC + SRI Input data requirements	*EUP*
		- EPC Input data requirement	*R2MF, EPBC*
		- SRI Input data requirement	*EUP, R2MI*
		- Input data gaps and overlaps	*ALL*
3.4.2	**M11 – M14**	**Visual ID of Joint EPC + SRI Certificate**	**EUP, CERTH**

1.3 Introduction to Visual Integration

The integration of the SRI into the EPC represents a significant milestone in harmonizing building assessment tools across Europe. This joint certificate aims to provide a unified framework for assessing both the energy performance and smart readiness of buildings. The goal is not only to align methodologies but also to create a single document that communicates these assessments clearly and effectively to a wide range of stakeholders, including building owners, policymakers, and industry professionals.

A key objective of this integration is to ensure that the joint certificate is accessible, intuitive, and user-friendly. This is particularly important as the document will serve as both a technical reference for professionals and an informative tool for non-expert users. The visual design of the certificate plays a central role in achieving this objective, as it determines how the information is presented, understood, and utilized.

1.3.1 Overview of the Goal to Create a Joint Certificate

The primary goal of developing a joint EPC and SRI certificate is to bridge the gap between energy efficiency and smart readiness assessments, ensuring that building evaluations are comprehensive and forward-looking. Traditionally, the EPC has focused on energy performance, emphasizing aspects such as heating, cooling, lighting, and overall energy consumption. In contrast, the SRI evaluates a building's capability to integrate smart technologies, addressing factors like automation, connectivity, and adaptability to occupants' needs.

By integrating these two assessment tools into a single certificate, stakeholders can access a holistic view of a building's performance. This unified approach not only simplifies processes for end-users but also enhances decision-making by presenting a complete picture of a building's efficiency and readiness for future technological advancements. The joint certificate aligns with the European Union's objectives under the Energy Performance of Buildings Directive (EPBD) and related regulations, supporting the broader goals of sustainability, energy efficiency, and digital transformation.

The visual design of the joint certificate is crucial to achieving these goals. It must effectively integrate the distinct yet complementary metrics of EPC and SRI, presenting them in a coherent and organized manner. This ensures that users can quickly grasp the key insights, whether they are evaluating the building for compliance, investment, or operational purposes.

1.3.2 Importance of Visual Solutions for User-Friendly Design

Creating a user-friendly design for the joint certificate is not merely an aesthetic consideration but a functional necessity. Stakeholders engaging with the certificate include individuals with varying levels of expertise, from technical professionals to everyday building owners. A well-designed visual layout can bridge this knowledge gap by presenting complex data in a clear, accessible format.

1. **Clarity and Simplicity**

The joint certificate must prioritize clarity and simplicity. The information should be presented in a logical sequence, with distinct sections for energy performance and smart readiness scores. Visual elements, such as graphs, icons, and color coding, can be used to highlight key data points and differentiate between metrics. For example, a bar graph might illustrate energy consumption breakdowns, while a radar chart could visualize smart readiness scores across technical domains. These tools not only make the data more engaging but also help users identify trends and areas for improvement immediately.

2. **Usability Across Stakeholder Groups**

Different stakeholders use the certificate for diverse purposes. For instance, policymakers might focus on compliance with EU directives, while building owners may be more interested

in actionable insights for renovation or investment. A modular design approach ensures that the certificate can cater to these varied needs. Key information, such as overall scores, can be prominently displayed on the first page, while detailed data is organized in subsequent sections for those requiring in-depth analysis.

3. Alignment with EU Standards

To ensure broad applicability, the design must align with existing EU regulations and standards. This includes incorporating mandatory fields specified in regulations such as the EPBD and the SRI Delegated Regulation. Moreover, the design should allow for customization to reflect national requirements or additional stakeholder preferences, maintaining a balance between standardization and flexibility.

4. Enhancing User Engagement

A visually appealing certificate encourages engagement and interaction. By incorporating user-centric design elements, such as intuitive navigation and consistent formatting, the joint certificate can transform from a static document into a dynamic tool. For example, digital versions of the certificate might include interactive elements that allow users to explore specific metrics or simulate the impact of potential upgrades.

5. Promoting Transparency and Trust

Lastly, the visual solutions should promote transparency and trust. By presenting information in an open and straightforward manner, the certificate helps users make informed decisions. Clear labelling of scores, straightforward explanations of metrics, and links to supporting guidelines or methodologies further reinforce the credibility and utility of the joint certificate.

2. Methodology

This section describes the step-by-step methodology used to achieve the goals of Task 3.4. The process was carefully designed to gather, analyse, and align the necessary data for integrating EPC and SRI systems. It also focuses on creating clear visual solutions for a unified certificate and developing procedures to harmonize the two certification frameworks. By combining collaboration, analysis, and stakeholder engagement, this approach ensures practical and impactful outcomes for the joint certification process.

2.1 Aligning EPC and SRI Assessment Frameworks

The task focused on identifying overlaps and gaps between the Energy Performance Certificate (EPC) and Smart Readiness Indicator (SRI) processes, laying the groundwork for integrating these two assessment methodologies. A collaborative approach among the T3.4 partners ensured comprehensive and accurate data collection and refinement. The methodology comprised of three primary phases:

1. Data Collection

Templates for Structured Input:

Two custom-designed templates were created to streamline and standardize the data collection process:

- **EPC Input Template**: Designed to capture key data aligned with the European Performance of Buildings Directive (EPBD), including system types, control strategies, energy consumption, and efficiency metrics.
- **SRI Input Template**: Focused on metrics specified by the Smart Readiness Indicator guidelines, emphasizing system functionality, automation levels, and control strategies for heating, cooling, and lighting.

These templates were populated by the partners—**R2MF, EPBC, EUPHYIA, and R2MI**—who used data from their respective national frameworks.

Literature Review and Supplementary Data Sources:

A thorough literature review supported the data collection process, including:

- Relevant European Performance of Buildings Directive (EPBD) and EU directive guidelines.
- An analysis of the SRI calculation file (Excel format), which provided a structured foundation for identifying differences and synergies between EPC and SRI processes.

This dual approach of template-based data entry and literature review ensured that methodological differences were clearly understood, and critical input data was captured.

2. Round Table Discussions

Collaborative Refinement of Methodologies:
Round table discussions were planned to validate and refine the collected data. These discussions involved:

- Stakeholders addressing methodological differences identified during the data collection phase.
- Reviewing and harmonizing data collection practices to ensure all aspects of energy performance and smart readiness were comprehensively covered.

Expected Outcomes:

- Alignment of data collection practices and integration strategies across partners in the **SmarterEPC project**.
- Resolution of ambiguities and consensus-building on overlapping data requirements and procedural harmonization.

3. Data Analysis

Detailed Examination of Collected Data:
The collected data underwent a rigorous analysis to identify both overlaps and gaps in the requirements for EPC and SRI frameworks. Key activities included:

- **Comparative Analysis**: Cross-referencing data fields, system types, and control strategies to establish commonalities and differences.
- **Gap Identification**: Highlighting missing data, particularly in areas where EPC frameworks lack smart technology integration.

Proposal for Standardization:
Findings from the analysis were used to propose a unified data structure. This included:

- A standardized approach to data collection to ensure compatibility between EPC and SRI systems.
- Recommendations for ensuring interoperability between the two frameworks.

Analytical Tools Utilized:

- Validation checklists and comparative matrices to ensure methodological consistency.
- Statistical evaluation techniques to assess correlations and potential conflicts between EPC and SRI metrics.

The structured, collaborative methodology for Subtask 3.4.1 provided a robust foundation for integrating EPC and SRI systems. By emphasizing standardized data collection, stakeholder engagement, and rigorous analysis, the task ensured compatibility and interoperability between the two frameworks. This process aligns with the broader objectives of the **SmarterEPC project**, paving the way for a harmonized certification approach that reflects both energy performance and smart readiness across diverse European contexts.

2.1.1 Data Requirements and Correlation Analysis Framework

2.1.1.1 Necessary Conditions and Data for EPC and SRI

For both the Energy Performance Certificate (EPC) and the Smart Readiness Indicator (SRI), specific conditions and data are essential to ensure accurate calculation and utility. This section outlines the necessary data and conditions for each certificate, guiding the integration process within Task 3.4 of the SmarterEPC project.

a) Necessary Conditions and Data for Energy Performance Certificates (EPC)

To accurately assess the energy performance of buildings, the EPC requires comprehensive data across various domains. These data points ensure that the energy efficiency of the building is evaluated correctly, providing a solid foundation for recommendations and improvements. *Table 2.* summarizes the necessary conditions and data required for EPC assessments:

Table 2. Necessary Conditions and Data for Energy Performance Certificates (EPC)

Data/Condition	Description	References
Building Characteristics	Includes building geometry, area, volume, orientation, construction year, and materials.	Directive 2010/31/EU on the energy performance of buildings
HVAC Systems	Information on heating, ventilation, and air conditioning systems, including energy sources and efficiency.	ISO 52000-1:2017 (Energy performance of buildings)
Building Usage	Purpose of the building (residential, commercial, etc.), typical occupancy, and operational times.	Energy Performance of Buildings Directive (EPBD)
Insulation and Thermal Properties	Insulation levels, U-values of building envelope elements such as windows, doors.	EN ISO 6946:2017 (Building components and building elements)
Lighting Systems	Types of lighting, energy consumption, presence of energy-efficient technologies.	Energy Efficiency Directive 2012/27/EU
Energy Consumption Data	Historical energy usage, energy bills, or energy consumption calculated based on standard use.	ISO 50001:2018 (Energy management systems)

b) Necessary Conditions and Data for Smart Readiness Indicator (SRI)

The Smart Readiness Indicator (SRI) assesses a building's capability to adapt to occupants' needs and optimize its operations through smart technologies. *Table 3*. below, summarizes the necessary conditions and data required for SRI assessments:

Table 3. Necessary Conditions and Data for Smart Readiness Indicator (SRI)

Data/Condition	Description	References
Smart Technologies	Presence and integration of smart technologies and automation systems, including renewable energy integration.	Smart Readiness Indicator (SRI)
Building Automation and Control Systems (BACS)	Systems for environmental monitoring and control, responsiveness to grid demands.	Regulation EU 2018/844 (EPBD Amendment)
User Interfaces and Connectivity	User-friendly interfaces for smart control, connectivity enabling remote management.	EU Commission Staff Working Document on the SRI
Energy Efficiency through Smart Control	Contribution of smart systems to energy savings, predictive maintenance capabilities.	ISO 16484-2:2004 (Building automation and control systems)
Interoperability and Data Security	Compatibility with various devices and protocols, measures for data security.	ISO/IEC 27001:2013 (Information security management)
Impact on Occupant Comfort and Well-being	Features that improve comfort, health, and well-being, systems for environmental quality monitoring.	EN 15251:2007 (Indoor environmental input parameters)

2.1.1.2 Queries for Studying Correlation

To analyse the outcomes of the activity that collected EPC and SRI input data and to define the laps and overlaps in their input data, the following queries listed on *Table 4*, should be posed during future discussions with partners and stakeholders:

Table 4. Justification for Queries in Correlation Analysis and Integration

Query	Description	Justification	Reference
Common Data Elements	*What are the common data elements between EPC and SRI assessments? Identify the overlapping data points that influence both energy performance and smart readiness evaluations. This will help streamline data collection processes and reduce redundancy.*	Identifying overlapping data points is crucial for creating integrated assessment frameworks, as emphasized in the literature on building performance standards.	Link

Unique Data Requirements	*What are the unique data requirements for EPC and SRI? Determine the specific data points required by each system that are not covered by the other. This understanding is essential for identifying gaps and ensuring comprehensive data coverage.*	Understanding the specific data needs of each assessment system helps in addressing their unique characteristics and improving overall building performance evaluations.	Link
Methodological Differences	*How do the methodologies for data collection and analysis differ between EPC and SRI? Understanding these differences is crucial for developing a unified approach that accommodates both assessment systems.*	Exploring methodological differences is essential to reconcile diverse approaches and establish a unified assessment method.	Link
Bridging Data Gaps	*How can the gaps between the unique data requirements of EPC and SRI be bridged? Explore strategies for integrating unique data points from each system into a cohesive data structure that supports both certifications.*	Bridging data gaps ensures comprehensive coverage of building performance metrics, as supported by research on integrated building assessment frameworks.	Link
Impact of Smart Technologies on Energy Performance	*How do smart technologies assessed by SRI influence the energy performance metrics used in EPC? Investigate the direct and indirect impacts of smart technologies on energy efficiency to identify potential synergies.*	Investigating the influence of smart technologies on energy performance helps in understanding their benefits and optimizing their use in building assessments.	Link
Integration Feasibility	*What is the feasibility of integrating EPC and SRI assessments into a unified certification process? Assess the practical, technical, and regulatory considerations that must be addressed to develop a combined certification framework.*	Assessing the feasibility of integrating assessment systems is crucial for developing practical and effective certification processes.	Link

2.1.2 Data Collection Templates and Activity Overview

To facilitate the integration of the Smart Readiness Indicator (SRI) into the Energy Performance Certificate (EPC) framework, comprehensive data collection templates were developed for both EPC and SRI assessments. These templates were designed to capture all necessary input data required for each certification process, ensuring that all relevant aspects are considered. The following section introduces this activity and provides the templates that were distributed to Task 3.4 partners for completion. The results of this activity will be analysed in *Chapter 3: Results*.

2.1.2.1 Introduction to the Data Collection Activity

As part of Task 3.4, Subtask 3.4.1 aimed to identify the overlaps and gaps between the input data requirements for EPC and SRI. To achieve this, a collaborative data collection activity was organized, involving all partners in Task 3.4. The primary objective of this activity was to gather comprehensive and accurate data for both assessments, which would later be analysed to define the necessary conditions for their integration.

Two templates were developed to guide the data collection process, one for EPC input data and one for SRI input data. Each template included detailed fields to ensure that all relevant data points were captured. Additionally, a worked example was provided for each template to illustrate the type of information required.

2.1.2.2 Template for EPC Input Data Requirements

The EPC input data template captures detailed information about the energy performance characteristics of buildings. The template includes sections for various aspects of the building's heating system, heat distribution system, and thermal energy storage, among others:

Template and Worked Example for EPC Input Data Requirements: Indicative Example

Section	Data Field	Details	
Heating System	Heat Generation System	**Type:**	e.g., *Boiler, Heat Pump*
		Fuel Type:	e.g., Gas, Electricity
		Efficiency:	e.g., 90%
		Control Type:	e.g., *Manual, Automatic*
	Heat Distribution System	**Type:**	e.g., *Radiators, Underfloor Heating*
		Control Type:	e.g., *Thermostatic Valves, Central Thermostat*
	Heat Emission Control	**Type :**	e.g., *Individual Room Control, Central Control*

	Thermal Energy Storage	**Type:**	e.g., *Buffer Tank, Thermal Storage*
		Capacity:	e.g., *200 Liters*
	Heating Schedule	**Operating Hours:**	e.g., *6 AM - 10 PM*
		Set Temperatures:	e.g., *21°C*

Worked Example:

Section	**Data Field**	**Details**	
Heating System	**Heat Generation System**	**Type:**	Boiler
		Fuel Type:	Gas
		Efficiency:	85%
		Control Type:	Automatic
	Heat Distribution System	**Type:**	Radiators
		Control Type:	Thermostatic Valves
	Heat Emission Control	**Type:**	Individual Room Control
	Thermal Energy Storage	**Type:**	Buffer Tank
		Capacity:	150 Liters
	Heating Schedule	**Operating Hours:**	6 AM - 10 PM
		Set Temperatures:	21°C

2.1.2.3 Template for SRI Input Data Requirements

The SRI input data template is designed to capture information about the smart readiness aspects of buildings. The template includes sections for various smart technologies, building automation and control systems, and user interfaces and connectivity, among others. Below, is the template for SRI Input Data Requirements:

Template and Worked Example for SRI Input Data Requirements: Indicative Example

Section	**Data Field**	**Details**	
Heating (A2)	**Heat Generator Control**	**Type:**	e.g., *Constant Temperature*
	Heat Pump Control	**Type:**	e.g., *On/Off, Multi-stage*

	Sequencing of Heat Generators	**Type:**	e.g., *Priority Control, Dynamic Priority List*
	Thermal Energy Storage	**Type:**	e.g., *HW Storage Vessels*
	Control of Distribution Pumps	**Type:**	e.g., *No Automatic Control, Variable Speed Pump Control*
	Heat Emission Control	**Type:**	e.g., *Central Automatic Control, Individual Room Control with Communication)*
	Emission Control for TABS	**Type:**	e.g., *Advanced Central Automatic Control*
	Reporting Heating System Performance	**Type:**	e.g., *Current and Historical Performance Data*
	Flexibility and Grid Interaction	**Type:**	e.g., *Scheduled Heating System Operation, Flexible Grid-Controlled Heating System*

Worked Example:

Section	**Data Field**	**Details**	
Heating (A2)	**Heat Generator Control**	**Type:**	Variable Temperature Based on Load/Outdoor Temperature
	Heat Pump Control	**Type:**	On/Off
	Sequencing of Heat Generators	**Type:**	Dynamic Priority List
	Thermal Energy Storage	**Type:**	Time-Scheduled Storage
	Control of Distribution Pumps	**Type:**	Variable Speed Pump Control
	Heat Emission Control	**Type:**	Individual Room Control with Communication
	Emission Control for TABS	**Type:**	Advanced Central Automatic Control
	Reporting Heating System Performance	**Type:**	Current and Historical Performance Data
	Flexibility and Grid Interaction	**Type:**	Flexible Grid-Controlled Heating System

2.1.2.4 Workshop: Defining Data Requirements for EPC and SRI Assessments

The T3.4 Workshop focused on refining and standardizing data requirements for Energy Performance Certificate (EPC) and Smart Readiness Indicator (SRI) assessments. It addressed inconsistencies in how data fields are utilized across EU member states, emphasizing the need to align practices with EU regulations and improve the effectiveness of building performance evaluations. This initiative was part of the SmarterEPC project and involved active collaboration among partners.

The primary objective of the workshop was to resolve uncertainties regarding specific data fields present in SRI assessments but unclear in EPC evaluations. The workshop sought to clarify whether these fields are mandatory, optional but included, or entirely absent. To gather insights, an interactive online survey was conducted, inviting participants to provide open-ended responses. This survey explored how various data services are represented in national EPC schemes and their alignment with SRI assessments.

The workshop leveraged Mentimeter as an interactive platform to facilitate input through open-ended questions. Participants responded to 19 questions, systematically organized by SRI domains. These questions covered key areas such as heating, domestic hot water (DHW), cooling, ventilation, lighting, dynamic building envelopes, electricity, and monitoring and control. Each question aimed to assess how these services are addressed within EPC frameworks and to clarify whether the corresponding data fields are mandatory, optional, or absent. This structured approach provided a comprehensive understanding of current practices and highlighted gaps in EPC data requirements across different EU countries.

Figure 1 Mentimeter front page

Below is a list of questions from the workshop:

1. **Do EPC assessments include H-1c and H-1d services?** If yes, how is this data required?
2. **Is data for H-1f needed in EPC assessments?** If yes, how is it represented?
3. **Is reporting of H-3 mandatory in EPC assessments?** If yes, how is this data requested?
4. **Are controls for DHW storage (DHW-1a, DHW-1b, DHW-1d) required in EPC assessments?** If yes, how is this data represented?
5. **Is reporting of DHW-3 required in EPC assessments?** If yes, how is this data represented?
6. **Is C-1g required in EPC assessments?** If yes, how is this data represented?

7. **Does EPC assessment mandate reporting on Cooling System Performance (C-3)?** If yes, in what form is this data included or documented?
8. **Is control of supply airflow at room level (V-1a) included in EPC assessments?** If yes, how is this data required?
9. **Is control of airflow or pressure at air handler level (V-1c) required in EPC assessments?** If yes, how is it represented?
10. **Is control of supply air temperature at the air handling unit level (V-2d) required in EPC assessments?** If yes, how is it represented?
11. **Is control of lighting power based on daylight (L-2) considered in EPC assessments?** If yes, how is it represented?
12. **Is the service DE-2 required in EPC assessments?** If yes, how is this data represented?
13. **Is DE-4 considered in EPC assessments?** If yes, how is this data required?
14. **Is reporting of local electricity generation (E-2) required in EPC assessments?** If yes, how is this data represented?
15. **Is storage of locally generated electricity (E-3) considered in EPC assessments?** If yes, how is this data required?
16. **Must electricity consumption (E-12) be reported in EPC assessments?** If yes, in what way is this data represented?
17. **Does EPC assessment require runtime management of HVAC systems (MC-3)?** If yes, how is this data requested?
18. **Is occupancy detection (MC-9) for connected services required in EPC assessments?** If yes, how is this data represented?
19. **Do EPC assessments request reporting data on Technical Building Systems performance and energy use?** If yes, how is this data required?

2.2 Visual Solutions for Joint Certification

A key objective of Task 3.4 was to conceptualize visual solutions that merge EPC and SRI certificates into a single, user-friendly document. This section details the steps taken to draft a joint certificate that integrates the key elements of both systems:

Mandatory and Non-Mandatory Elements:

All mandatory and optional fields defined in EU guidelines (e.g., Regulation 1275/2024) were collected for both EPC and SRI. These elements included:

- **EPC Components:** Building Energy ratings, energy consumption and production breakdowns, carbon emission levels, and Building envelope and its systems breakdown.

Regarding SRI, the smart readiness scores for the three key smart readiness functionalities highlighted in Annex IA of Directive 2010/31/EU and in Delegated Regulation (EU) 2020/2155:

- **SRI Components:** Smart readiness scores, impact criteria and technical domain scores.

Preliminary Draft Development:

Based on the collected elements, a draft joint certificate was created to illustrate how the two systems could be visually integrated. The draft design included:

- A clear and intuitive layout for end-users, with distinct sections for energy performance and smart readiness scores.
- Graphical representations of the scores.

Design Principles:

The visual solutions prioritized usability and clarity:

- **Modularity:** The certificate design allows customization based on national requirements.
- **Standardization:** Consistent formatting and terminology ensure alignment with EU directives.
- **User-Centricity:** A focus on ease of understanding for stakeholders, including building owners, policymakers, and industry professionals.

2.2.1 Elements of the Joint Certificate

The joint Energy Performance Certificate (EPC) and Smart Readiness Indicator (SRI) certificate integrates mandatory and optional fields to provide a comprehensive evaluation of building performance. In light of **Regulation (EU) 2024/1275**, which establishes a new framework for mandatory indicators, the focus of the EPC elements has shifted towards capturing detailed energy performance and renovation data in line with the EU's ambitious climate and energy goals. These mandatory elements define the scope of the EPC component, ensuring alignment with national building renovation plans, as outlined in Article 3 of the Directive.

2.2.1.1 Mandatory Fields: EPC Components Defined by EU Guidelines

Directive 2024/1275 mandates specific indicators for national building stock reporting and renovation strategies. These indicators are categorized under distinct themes, forming the backbone of the EPC framework. They aim to standardize data collection and reporting, fostering transparency and comparability across Member States.

Energy Performance Metrics:

1. **Energy Performance Class**:
    - Indicates the building's overall energy efficiency level, typically represented on a scale (e.g., A to G), with "A" being the most efficient.
2. **Calculated Annual Primary Energy Use (kWh/(m²·y))**:
    - Represents the total energy required for the building's operation, including energy losses in production and transportation.
3. **Calculated Annual Final Energy Use (kWh/(m²·y))**:
    - Reflects the energy consumed directly by the building's systems (e.g., heating, cooling, lighting).
4. **Renewable Energy Produced On-site (%)**:
    - Specifies the percentage of total energy use covered by renewable energy sources generated on the property.
5. **Operational Greenhouse Gas Emissions ($kgCO_2/(m^2 \cdot y)$)**:
    - Measures the building's carbon footprint during its operational phase.
6. **Life-cycle Global Warming Potential (GWP)**:
    - If available, provides a broader assessment of the building's environmental impact, accounting for all phases of the building's life cycle (construction, operation, demolition).

Additional Mandatory Displayed Elements:

1. **Annual Primary and Final Energy Consumption (kWh or MWh)**:

- Quantifies the building's total yearly energy requirements for operation in absolute terms.

2. **Renewable Energy Production (kWh or MWh)**:
   - States the actual amount of energy generated from on-site renewable sources.
   - Includes information on the main energy carrier and the type of renewable energy source (e.g., solar, wind).
3. **Calculated Energy Needs (kWh/(m²·y))**:
   - Reflects the theoretical energy demand for heating, cooling, and other services based on standard conditions.
4. **Reactivity to External Signals**:
   - A Yes/No indication if the building can adapt its energy consumption in response to external signals (e.g., grid demand).
5. **Efficiency of Heat Distribution System**:
   - A Yes/No indication whether the heat distribution system operates at lower or more efficient temperature levels, enhancing overall efficiency.
6. **One-Stop Shop for Renovation Advice**:
   - Provides contact details for a centralized service offering guidance and support for energy efficiency improvements or renovations.

2.2.1.2 Optional Fields: Features Tailored for National and Stakeholder Preferences

In addition to mandatory indicators, **Directive 2024/1275** allows for optional fields, enabling Member States to customize the joint certificate based on national priorities and stakeholder needs. These fields enhance the certificate's versatility and relevance, particularly in addressing local climate conditions, market dynamics, and policy goals.

1. **Energy Use, Peak Load, Size of Generator/System, and Energy Carrier**:
   - Provides specific details for heating, cooling, domestic hot water, ventilation, and in-built lighting systems.
   - Includes information on the primary energy carrier (e.g., electricity, gas) and the type of system or generator used.
2. **Greenhouse Gas Emission Class**:
   - Indicates the classification of the building based on its greenhouse gas emissions.
3. **Carbon Removals**:

- Information on carbon sequestration or temporary storage of carbon within the building materials or on the property.

4. **Renovation Passport**:
    - A Yes/No indication of whether a renovation passport, which outlines a roadmap for energy efficiency improvements, is available.
5. **U-Values of Building Envelope**:
    - Average U-value for opaque elements (e.g., walls, roofs).
    - Average U-value for transparent elements (e.g., windows, glass facades).
    - Type of the most common transparent element (e.g., double-glazed windows).
6. **Overheating Risk**:
    - Results of any analysis conducted to assess the building's vulnerability to overheating, if available.
7. **Indoor Environmental Quality (IEQ) Monitoring and Controls**:
    - Presence of fixed sensors for monitoring indoor air quality parameters (e.g., temperature, humidity, CO_2 levels).
    - Presence of automated controls that respond to monitored IEQ levels.
8. **Electric Vehicle Recharging Points**:
    - Number and type of EV recharging points available on-site.
9. **Energy Storage Systems**:
    - Presence, type, and size (capacity in kWh) of energy storage systems on the property.
10. **System Lifespan and Adaptability**:
    - Expected remaining lifespan of heating, air-conditioning systems, and appliances.
    - Feasibility of adapting systems (heating, DHW, and air-conditioning) to operate at more efficient temperature settings.
11. **Metered Energy Consumption**:
    - Actual recorded energy usage, based on metered data.
12. **District Heating and Cooling Connection**:
    - Indication of a connection to a district heating/cooling network.
    - Feasibility of connecting to an efficient district heating/cooling system, if applicable.

13. **Local Energy and Carbon Factors**:
    - Local primary energy factors and associated carbon emission factors for district heating and cooling systems.
14. **Operational Fine Particulate Matter (PM2.5) Emissions**:
    - Data on fine particulate matter emissions generated during building operation.

Links to Other Initiatives:

1. **Smart Readiness Assessment**:
    - Yes/No indication of whether a Smart Readiness Indicator (SRI) assessment has been carried out.
    - The SRI value, if available.
2. **Digital Building Logbook**:
    - Yes/No indication of the presence of a Digital Building Logbook, which consolidates information about the building's performance and maintenance.

2.2.2 Design Principles

The design principles for the joint Energy Performance Certificate (EPC) and Smart Readiness Indicator (SRI) certificate prioritize modularity, standardization, and user-centricity. These principles ensure that the certificate is intuitive, informative, and adaptable, meeting the needs of diverse stakeholders, including building owners, policymakers, and energy professionals.

Emphasis on Modularity, Standardization, and User-Centricity

1. **Modularity**
   Modularity is at the heart of the joint certificate's design. This approach divides the document into distinct sections, each focusing on specific performance metrics, such as energy efficiency, smart readiness, and greenhouse gas emissions. The modular structure allows for:
    - **Flexibility in Presentation:** Sections can be customized or expanded to accommodate national or regional requirements without disrupting the overall format.
    - **Ease of Navigation:** Users can quickly locate relevant information, such as building scores or renovation recommendations, without needing to scan the entire document.

- **Scalability:** Additional modules, such as Life Cycle Assessments or renewable energy contributions, can be seamlessly integrated into the certificate in the future.

2. **Standardization**
   Standardization ensures consistency across Member States, enabling reliable comparisons of building performance. The design adheres to the requirements of **Directive (EU) 2024/1275 and Regulation (EU) 2155/2020 and 2156/2020**, emphasizing:

   - **Uniform Metrics and Terminology:** Standardized terms and indicators, such as energy performance classes and smart readiness domains, ensure clarity and uniformity.
   - **Harmonized Formats:** A consistent visual format across all certificates, including fonts, colours, and layout, enhances readability and reduces confusion.
   - **Alignment with EU Directives:** The design incorporates mandatory fields specified by the regulation while providing space for optional fields that reflect local needs.

3. **User-Centricity**
   A user-centric approach ensures the certificate is accessible and meaningful to a broad audience, regardless of technical expertise. Key elements include:

   - **Simplified Language:** The certificate avoids technical jargon, using plain language to explain performance scores and recommendations.
   - **Intuitive Layout:** Clear headings, well-organized sections, and visually distinct elements guide users through the document.
   - **Actionable Insights:** The certificate provides recommendations for improvements, such as energy-saving measures or smart technology upgrades, empowering users to take informed actions.

3. Results

This section presents the findings from the data collection activity conducted under Task 3.4, Subtask 3.4.1. The objective was to identify the overlaps and gaps in the input data requirements for the Energy Performance Certificate (EPC) and the Smart Readiness Indicator (SRI). The collected data is analysed to highlight commonalities and differences, and to propose a unified data framework for integrating the two certifications.

3.1 Overview of Collected Data

The data collection activity involved filling out the provided templates for EPC and SRI input data by all Task 3.4 partners. This collaborative effort ensured comprehensive and accurate data gathering. The data was organized and compared by the calculation method of SRI, into the nine domains and their characteristic functionality levels and details. The nine domains are:

- **Heating**
- **Hot Water**
- **Cooling**
- **Ventilation**
- **Lighting**
- **Dynamic Building Envelope**
- **Electricity**
- **Electric Vehicle**
- **Monitoring and Control**

The collected data is presented in sections 3.1.1 - 3.1.9.

3.1.1 Heating

Service	SRI		EPC
	Functionality levels	**Details**	**Input Data**
H-1a: Heat Emission Control	level 0	No automatic control	N/A - EPC assessments do not specifically require detailed control strategies for heat emission control devices. The focus is more on the overall energy efficiency of the heating system rather than specific emission controls. Example: *Not applicable.*
	level 1	Central automatic control	
	level 2	Individual room control	
	level 3	Individual room control with communication between controllers and to BACS	
	level 4	Individual room control with communication and occupancy detection	
H-1b: Emission Control for TABS (heating mode)	level 0	No automatic control	N/A - Detailed control of TABS in heating mode is not a specific requirement for EPC assessments. The primary concern is the energy efficiency and performance of the system. Example: *Not applicable*
	level 1	Central automatic control	
	level 2	Advanced central automatic control	
	level 3	Advanced central automatic control with intermittent operation and/or room temperature feedback control	
H-1c: Control of distribution fluid temperature (supply or return air flow or water flow). Similar function can be applied to the control of direct electric heating networks	level 0	Constant temperature control	Description: EPC assessments may require information on basic temperature settings for the distribution fluid (air or water) to evaluate the efficiency of the heating system. This includes data on supply and return temperatures. Nature of Data: Setpoint temperatures for supply and return fluid (air or water). Example*: "Supply Water Temperature Control - 55°C, Return Water Temperature Control - 45°C"*
	level 1	Outside temperature compensated control	
	level 2	Demand based control	
	level 0	No automatic control	

H-1d: Control of Distribution Pumps in Networks	level 1	On off control	Description: Information about the type of control for distribution pumps (such as variable speed or constant speed) is relevant for assessing the efficiency of the heating system in EPC assessments. Nature of Data: Type of control (e.g., variable speed, constant speed). Example: *"Pump Type: Variable Speed Control"*
	level 2	Multi-Stage control	
	level 3	Variable speed pump control (pump unit (internal) estimations)	
	level 4	Variable speed pump control (external demand signal)	
H-1f Thermal Energy Storage (TES) for building heating (excluding TABS)	level 0	Continuous storage operation	Description: EPC assessments may include details on thermal energy storage (TES) systems used for building heating. These systems store thermal energy for later use, helping to balance energy demand and improve overall energy efficiency by reducing peak heating loads. Nature of Data: Type of TES system (e.g., water tank, phase change materials), storage capacity, and control strategy (e.g., time-scheduled storage, load prediction-based storage). *Example* "Thermal Energy Storage System - Water tank with a storage capacity of 500 lit ers, utilizing time-scheduled storage to optimize heating efficiency and reduce peak demand by 20%."
	level 1	Time-scheduled storage operation	
	level 2	Load prediction-based storage operation	
	level 3	Heat storage capable of flexible control through grid signals (e.g. DSM)	
H-2a: Heat Generator Control (all except heat pumps)	level 0	Constant temperature control	Description: General type and efficiency information about heat generators are necessary for EPC assessments. This includes details about control types (e.g., on/off, modulation) and efficiency ratings. Nature of Data: Type of control (e.g., on/off, modulation), efficiency ratings. Example: *"Generator Control: On/Off, Efficiency: 90%"*
	level 1	Variable temperature control depending on outdoor temperature	
	level 2	Variable temperature control depending on the load (e.g. depending on supply water temperature set point)	
H-2b	level 0	On/Off-control of heat generator	Description: Information on the efficiency ratings and general operation

Heat generator control (for heat pumps)	level 1	Multi-stage control of heat generator capacity depending on the load or demand (e.g. on/off of several compressors)	data of heat pumps, such as the Coefficient of Performance (COP), is important for EPC assessments. Nature of Data: Type of control, Coefficient of Performance (COP). Example: *"Heat Pump Control: Demand-Based, COP: 3.5"*
	level 2		

	level 2	Central or remote reporting of current performance KPIs and historical data	efficiently and to identify opportunities for improvements. Nature of Data: Type of performance reporting system (e.g., central or remote reporting), performance metrics monitored (e.g., temperatures, energy usage), and historical data availability. Example: "Heating System Performance Reporting - Central reporting system monitoring current temperatures and energy usage, with historical data available for the past two years. Identified opportunities to improve efficiency by 10% based on performance trends.
	level 3	Central or remote reporting of performance evaluation including forecasting and/or benchmarking	
	level 4	Central or remote reporting of performance evaluation including forecasting and/or benchmarking; also including predictive management and fault detection	
H-4; Flexibility and Grid Interaction	level 0	No automatic control	N/A - EPC assessments do not typically address grid interaction capabilities for heating systems, as the primary focus is on the building's energy efficiency rather than its interaction with the electrical grid. Example: *Not applicable.*
	level 1	Scheduled operation of heating system	
	level 2	Self-learning optimal control of heating system	
	level 3	Heating system capable of flexible control through grid signals (e.g. DSM)	
	level 4	Optimized control of heating system based on local predictions and grid signals (e.g. through model predictive control)	

3.1.2 Domestic Hot water

Service	SRI		EPC
	Functionality level	**Details**	**Functionality level Details**
DHW-1a Control of DHW storage charging (with direct electric heating or integrated electric heat pu0mp)	level 0	Automatic control on / off	Description: EPC assessments may require information on how DHW systems are controlled, particularly focusing on temperature settings and control mechanisms for storage charging using direct electric heating or integrated electric heat pumps. Nature of Data: Temperature settings, control mechanisms for storage charging. Example: *"Storage Tank Temperature Control - 60°C for Electric Heating"*
	level 1	Automatic control on / off and scheduled charging enable	
	level 2	Automatic control on / off and scheduled charging enable and multi-sensor storage management	
	level 3	Automatic charging control based on local availability of renewables or information from electricity grid (DR, DSM)	
DHW-1b Control of DHW storage charging (using hot water generation)	level 0	Automatic control on / off	Description: EPC assessments may include details on the control systems for Domestic Hot Water (DHW) storage charging. These systems manage the charging of hot water storage tanks to ensure efficient generation and use of hot water, optimizing energy consumption. Nature of Data Type of control system (e.g., on/off control, temperature-based control), control strategy (e.g., time-scheduled charging, demand-based charging), and effectiveness. Example "Control of DHW Storage Charging - Temperature-based control system that charges the hot water storage tank based on demand. Utilizes time-scheduled charging to ensure availability during peak usage times and improve energy efficiency by 15%
	level 1	Automatic control on / off and scheduled charging enable	
	level 2	Automatic on/off control, scheduled charging enables and demand-based supply temperature control or multi-sensor storage management	
	level 3	DHW production system capable of automatic charging control based on external signals (e.g. from district heating grid)	

DHW-1d: Control of DHW storage charging (with solar collector and supplementary heat generation)	level 0	Manual selected control of solar energy or heat generation	Description: EPC assessments may require details on the control mechanisms for DHW storage charging, particularly when using solar collectors and supplementary heat generation, to evaluate system efficiency. Nature of Data: Temperature settings, control mechanisms. Example: *"Solar DHW Control - Storage Tank Temperature: 60°C, Supplementary Heating Activation: Below 50°C"*
	level 1	Automatic control of solar storage charge (Prio. 1) and supplementary storage charge	
	level 2	Automatic control of solar storage charge (Prio. 1) and supplementary storage charge and demand-oriented supply or multi-sensor storage management	
	level 3	Automatic control of solar storage charge (Prio. 1) and supplementary storage charge, demand-oriented supply and return temperature control and multi-sensor storage management	
DHW-2b: Sequencing in case of different DHW generators	level 0	Priorities only based on running time	N/A - EPC assessments do not typically require detailed sequencing control strategies for multiple DHW generators. The focus in EPC assessments is on the overall efficiency and energy consumption rather than the specific sequencing of different generators. Example: *Not applicable.*
	level 1	Control according to fixed priority list: e.g. based on rated energy efficiency	
	level 2	Control according to dynamic priority list (based on current energy efficiency, carbon emissions and capacity of generators, e.g. solar, geothermal heat, cogeneration plant, fossil fuels)	
	level 3	Control according to dynamic priority list (based on current AND predicted load, energy efficiency, carbon emissions and capacity of generators)	
	level 4	Control according to dynamic priority list (based on current AND predicted load, energy efficiency, carbon emissions, capacity of generators AND external signals from grid)	
DHW-3:	level 0	None	N/A -

Reporting domestic hot water performance	level 1	Indication of actual values (e.g. temperatures, submetering energy usage)	
	level 2	Actual values and historical data	
	level 3	Performance evaluation including forecasting and/or benchmarking	
	level 4	Performance evaluation including forecasting and/or benchmarking; also including predictive management and fault detection	

3.1.3 Cooling

Service	SRI		EPC
	Functionality level	**Details**	**Input Data**
C-1a: Cooling emission control	level 0	No automatic control	N/A - EPC assessments do not specifically require detailed control strategies for cooling emission devices. The focus is generally on the overall energy efficiency rather than specific control mechanisms.
	level 1	Central automatic control	
	level 2	Individual room control	
	level 3	Individual room control with communication between controllers and to BACS	
	level 4	Individual room control with communication and occupancy detection	
C-1b: Emission Control for TABS (cooling mode)	level 0	No automatic control	N/A - EPC assessments do not specifically require control of Thermally Activated Building Systems (TABS) in cooling mode. Like heating, the focus is on system efficiency rather than detailed emission controls.
	level 1	Central automatic control	
	level 2	Advanced central automatic control	
	level 3	Advanced central automatic control with intermittent operation and/or room temperature feedback control	
C-1c: Control of Distribution Network Chilled Water temperature (supply or return)	level 0	Constant temperature control	Description: EPC assessments may require information on basic temperature settings for the chilled water distribution network to evaluate system efficiency. Nature of Data: Setpoint temperatures for the chilled water system. Example: *"Chilled Water Supply Temperature Control - 7°C"*
	level 1	Outside temperature compensated control	
	level 2	Demand based control	
C-1d:	level 0	No automatic control	Description: Information on the type of control for distribution pumps is relevant for assessing system efficiency in EPC assessments.
	level 1	On off control	
	level 2	Multi-Stage control	

Control of Distribution Pumps in Networks	level 3	Variable speed pump control (pump unit (internal) estimations)	Nature of Data: Types of pump control, such as variable speed or constant speed control. Example: *"Variable Speed Pump Control for4 Chilled Water'*
	level 4	Variable speed pump control (external demand signal)	
C-1f: Interlock: Avoiding Simultaneous Heating and Cooling in the Same Room	level 0	No interlock	N/A - EPC assessments generally do not evaluate interlock mechanisms designed to prevent simultaneous heating and cooling. Their focus is on energy performance metrics rather than the operational specifics of such systems. Description: This pertains to overarching control strategies for cooling systems, aimed at optimizing performance based on demand. These strategies include fundamental control measures such as operational scheduling and basic system controls.
	level 1	Partial interlock (minimising risk of simultaneous heating and cooling e.g. by sliding setpoints)	
	level 2	Total interlock (control system ensures no simultaneous heating and cooling can take place)	
C-1g: Control of Thermal Energy Storage (TES) Operation	level 0	Continuous storage operation	Description: EPC assessments may include details on the control systems for Thermal Energy Storage (TES) operation. These systems manage the charging and discharging of thermal energy storage to optimize energy use, balance energy demand, and enhance overall energy efficiency. Nature of Data: Type of TES control system (e.g., on/off control, variable control), control strategy (e.g., time-scheduled operation, demand-based operation), and effectiveness. *Example* "Control of TES Operation - Variable control system with demand-based operation. The system charges the TES during off-peak hours and discharges during peak demand, improving energy efficiency by 20% and reducing peak load on the heating system.
	level 1	Time-scheduled storage operation	
	level 2	Load prediction-based storage operation	
	level 3	Cold storage capable of flexible control through grid signals (e.g. DSM)	
C-2a:	level 0	On/Off-control of cooling production	N/A - EPC assessments do not typically require detailed control strategies for

Generator Control for Cooling	level 1	Multi-stage control of cooling production capacity depending on the load or demand (e.g. on/off of several compressors)	cooling generators. EPC focuses more on the energy efficiency and consumption of the cooling systems rather than specific control strategies.
	level 2	Variable control of cooling production capacity depending on the load or demand (e.g. hot gas bypass, inverter frequency control)	
	level 3	Variable control of cooling production capacity depending on the load AND external signals from grid	
C-2b: Sequencing of Different Cooling Generators	level 0	Priorities only based on running times	N/A - EPC assessments do not typically require detailed sequencing control strategies for multiple cooling generators. The focus is on system efficiency rather than specific control strategies.
	level 1	Fixed sequencing based on loads only: e.g. depending on the generator's characteristics such as absorption chiller vs. centrifugal chiller	
	level 2	Dynamic priorities based on generator efficiency and characteristics (e.g. availability of free cooling)	
	level 3	Load prediction-based sequencing: the sequence is based on e.g. COP and available power of a device and the predicted required power	
	level 4	Sequencing based on dynamic priority list, including external signals from grid	
C-3: Report Information Regarding Cooling System Performance	level 0	None	N/A
	level 1	Central or remote reporting of current performance KPIs (e.g. temperatures, submetering energy usage)	

	level 2	Central or remote reporting of current performance KPIs and historical data	
	level 3	Central or remote reporting of performance evaluation including forecasting and/or benchmarking	
	level 4	Central or remote reporting of performance evaluation including forecasting and/or benchmarking; also including predictive management and fault detection	
C-4: Flexibility and Grid Interaction	level 0	No automatic control	N/A - EPC assessments do not typically cover grid interaction capabilities. The primary focus is on building energy efficiency, not interaction with the electrical grid.
	level 1	Scheduled operation of cooling system	
	level 2	Self-learning optimal control of cooling system	
	level 3	Cooling system capable of flexible control through grid signals (e.g. DSM)	
	level 4	Optimized control of cooling system based on local predictions and grid signals (e.g. through model predictive control)	

3.1.4 Ventilation

Service	SRI		EPC
	Functionality level	**Details**	**Functionality level Details**
V-1a: Supply airflow control at the room level	level 0	No ventilation system or manual control	Description: This involves controlling the airflow delivered to individual rooms to maintain comfort and efficiency. Nature of Data: Type and extent of airflow control at the room level. Example: *"Room-level Airflow Control - VAV System"*
	level 1	Clock control	
	level 2	Occupancy detection control	
	level 3	Central Demand Control based on air quality sensors (CO2, VOC, humidity, ...)	
	level 4	Local Demand Control based on air quality sensors (CO2, VOC,...) with local flow from/to the zone regulated by dampers	
V-1c: Airflow or pressure control at the air handler level	level 0	No automatic control: Continuously supplies of air flow for a maximum load of all rooms	Description: This includes controlling the airflow or maintaining pressure within the air handling units (AHUs) to optimize system efficiency. Nature of Data: Control strategies for air handler pressure or airflow. Example: *"Air Handler Pressure Control - 500 Pa"*
	level 1	On off time control: Continuously supplies of air flow for a maximum load of all rooms during nominal occupancy time	
	level 2	Multi-stage control: To reduce the auxiliary energy demand of the fan	
	level 3	Automatic flow or pressure control without pressure reset: Load dependent supplies of air flow for the demand of all connected rooms.	
	level 4	Automatic flow or pressure control with pressure reset: Load dependent supplies of air flow for the demand of all connected rooms (for variable air volume systems with VFD).	
V-2c: Heat Recover Control: Prevention of overheating	level 0	Without overheating control	N/A - EPC does not typically require detailed control of heat recovery systems specifically for preventing overheating. EPC primarily focuses on overall energy efficiency and heat recovery system effectiveness rather than
	level 1	Modulate or bypass heat recovery based on sensors in air exhaust	
	level 2	Modulate or bypass heat recovery based on multiple room temperature sensors or predictive control	

			specific overheating prevention controls.
V-2d Supply air temperature control at the air handling unit level	level 0	No automatic control	Description: EPC assessments may require information on controlling the supply air temperature from AHUs to ensure thermal comfort and efficiency. Nature of Data: Setpoint temperatures for supply air. Example: *"Supply Air Temperature Control - 22°C "*
	level 1	Constant setpoint: A control loop enables to control the supply air temperature, the setpoint is constant and can only be modified by a manual action	
	level 2	Variable set point with outdoor temperature compensation	
	level 3	Variable set point with load dependant compensation. A control loop enables to control the supply air temperature. The setpoint is defined as a function of the loads in the room	
V-3: Free Cooling with a mechanical ventilation System	level 0	No automatic control	N/A - Detailed control strategies for free cooling are not typically required in EPC assessments. EPC assessments focus on the overall energy performance of the building rather than specific cooling strategies.
	level 1	Night cooling	
	level 2	Free cooling: air flows modulated during all periods of time to minimize the amount of mechanical cooling	
	level 3	H,x- directed control: The amount of outside air and recirculation air are modulated during all periods of time to minimize the amount of mechanical cooling. Calculation is performed based on temperatures and humidity (enthalpy).	
V-6 Reporting Information regarding IAQ	level 0	None	N/A - EPC assessments generally do not require reporting on indoor air quality metrics specifically. The focus is primarily on energy efficiency and performance, rather than specific IAQ metrics, unless specifically mandated by additional local or national regulations.
	level 1	Air quality sensors (e.g. CO2) and real time autonomous monitoring	
	level 2	Real time monitoring & historical information of IAQ available to occupants	
	level 3	Real time monitoring & historical information of IAQ available to occupants + warning on maintenance needs or occupant actions (e.g. window opening)	

3.1.5 Lighting

Service	SRI		EPC
	Functionality level	**Details**	**Functionality level Details**
L-1a: Occupancy control for indoor lighting	level 0	Manual on/off switch	Description: EPC assessments may require information on the presence and type of occupancy control systems used for indoor lighting. This involves systems that automatically turn off or dim lights when spaces are unoccupied, contributing to energy efficiency. Nature of Data: Type of occupancy control system (e.g., occupancy sensors, timers), areas covered, and settings. Example: *"Occupancy Sensors in Office Areas - Lights automatically turn off after 5 minutes of no occupancy detection."*
	level 1	Manual on/off switch + additional sweeping extinction signal	
	level 2	Automatic detection (auto on / dimmed or auto off)	
	level 3	Automatic detection (manual on / dimmed or auto off)	
L-2: Control artificial Lighting Power based on Daylight Levels	level 0	Manual (central)	Description: EPC assessments may include details on systems that adjust artificial lighting levels based on the amount of natural daylight available. This control mechanism, known as daylight harvesting, reduces the need for artificial lighting and can significantly improve energy efficiency. Nature of Data: Type of daylight control system (e.g., dimmable lighting, automatic shading), control strategy, and effectiveness. Example: *"Daylight Harvesting System - Dimmable LED lights adjust based on daylight levels detected by sensors."*
	level 1	Manual (per room / zone)	
	level 2	Automatic switching	
	level 3	Automatic dimming	
	level 4	Automatic dimming including scene-based light control (during time intervals, dynamic and adapted lighting scenes are set, for example, in terms of illuminance level, different correlated colour temperature (CCT) and the possibility to change the light distribution within the space according to e. g. design, human needs, visual tasks)	

3.1.6 Dynamic Building Envelope

Service	SRI		EPC
	Functionality level	**Details**	**Input Data**
DE-1: Window Solar Shading Control	level 0	No sun shading or only manual operation	**Description:** EPC assessments may include details on systems that control window solar shading. This involves mechanisms that adjust shading devices based on solar exposure to reduce overheating and improve energy efficiency by minimizing the need for artificial cooling. **Nature of Data:** Type of solar shading control system (e.g., manual, automatic), control strategy (e.g., based on solar exposure, time of day), and effectiveness. *Example* "Window Solar Shading Control System - Automatic shading based on solar exposure detected by sensors. Reduces cooling load by 15%.
	level 1	Motorized operation with manual control	
	level 2	Motorized operation with automatic control based on sensor data	
	level 3	Combined light/blind/HVAC control	
	level 4	Predictive blind control (e.g. based on weather forecast)	
DE-2: Window Open/Closed control, Combined with HVAC System	level 0	Manual operation or only fixed windows	Not Specifically Required - EPC assessments do not usually include detailed control strategies for windows combined with HVAC systems. They focus more on the energy performance of the building envelope and HVAC systems separately. While such systems can enhance energy efficiency by leveraging natural ventilation, they are not a mandatory component for EPC calculations. The primary focus remains on the overall energy performance and efficiency of the building's systems.
	level 1	Open/closed detection to shut down heating or cooling systems	
	level 2	Level 1 + Automated mechanical window opening based on room sensor data	
	level 3	Level 2 + Centralized coordination of operable windows, e.g. to control free natural night cooling	
DE-4	level 0	No reporting	Not Specifically Required - EPC assessments generally do not require detailed reporting on the
	level 1	Position of each product & fault detection	

Reporting Information Regarding Performance of Dynamic Building Envelope Systems	level 2	Position of each product, fault detection & predictive maintenance	performance of dynamic building envelope systems. They focus on static metrics such as U-values, insulation types, and overall energy performance. While the directive encourages the use of innovative technologies and smart building systems to improve energy performance, it does not stipulate detailed performance reporting for such systems as a requirement for EPC assessments.
	level 3	Position of each product, fault detection, predictive maintenance, real-time sensor data (wind, lux, temperature…)	
	level 4	Position of each product, fault detection, predictive maintenance, real-time & historical sensor data (wind, lux, temperature…)	

3.1.7 Electricity

Service	SRI		EPC
	Functionality level	**Details**	**Input Data**
E-2: Reporting Information Regarding Local Electricity Generation	level 0	None	N/A
	level 1	Current generation data available	
	level 2	Actual values and historical data	
	level 3	Performance evaluation including forecasting and/or benchmarking	
	level 4	Performance evaluation including forecasting and/or benchmarking; also including predictive management and fault detection	
E-3: Storage of (Locally Generated) Electricity	level 0	None	Not Specifically Required - While energy storage systems are encouraged to enhance energy efficiency and grid stability, detailed reporting on these systems may not be explicitly mandated by the EPBD. The focus is on overall energy efficiency and self-consumption improvements.
	level 1	On site storage of electricity (e.g. electric battery)	
	level 2	On site storage of energy (e.g. electric battery or thermal storage) with controller based on grid signals	
	level 3	On site storage of energy (e.g. electric battery or thermal storage) with controller optimising the use of locally generated electricity	
	level 4	On site storage of energy (e.g. electric battery or thermal storage) with controller optimising the use of locally generated electricity and possibility to feed back into the grid	
E-4: Optimizing Self-consumption of Locally Generated Electricity	level 0	None	Not Specifically Required - EPC assessments generally do not focus on strategies for optimizing self-consumption of locally generated electricity.
	level 1	Scheduling electricity consumption (plug loads, white goods, etc.)	
	level 2	Automated management of local electricity consumption based on current renewable energy availability	
	level 3	Automated management of local electricity consumption based on current and predicted energy needs and renewable energy availability	

E-5: Control of Combined Heat and Power Plant (CHP)	level 0	CHP control based on scheduled runtime management and/or current heat energy demand	N/A - While EPC assessments might consider the presence and efficiency of a CHP plant, detailed control strategies for CHP operation are typically not required.
	level 1	CHP runtime control influenced by the fluctuating availability of RES; overproduction will be fed into the grid	
	level 2	CHP runtime control influenced by the fluctuating availability of RES and grid signals; dynamic charging and runtime control to optimise self-consumption of renewables	
E-8: Support of (Micro) Grid Operation Modes	level 0	None	N/A - EPC assessments do not typically address support for micro-grid operation modes or other advanced grid interactions. The focus remains on energy efficiency and self-consumption rather than grid operation support.
	level 1	Automated management of (building-level) electricity consumption based on grid signals	
	level 2	Automated management of (building-level) electricity consumption and electricity supply to neighbouring buildings (microgrid) or grid	
	level 3	Automated management of (building-level) electricity consumption and supply, with potential to continue limited off-grid operation (island mode)	
E-11 Reporting Information Regarding Energy Storage	level 0	None	N/A - Not Specifically Required: - EPC assessments generally do not require detailed reporting on energy storage systems.
	level 1	Current state of charge (SOC) data available	
	level 2	Actual values and historical data	
	level 3	Performance evaluation including forecasting and/or benchmarking	
	level 4	Performance evaluation including forecasting and/or benchmarking; also including predictive management and fault detection	
E-12 Reporting Information Regarding Electricity Consumption	level 0	None	Description: EPC assessments typically focus on providing an overall view of the building's energy consumption, including electricity. The reporting of electricity consumption helps to identify opportunities for improving energy
	level 1	reporting on current electricity consumption on building level	
	level 2	real-time feedback or benchmarking on building level	
	level 3	real-time feedback or benchmarking on appliance level	

	level 4	real-time feedback or benchmarking on appliance level with automated personalized recommendations	efficiency and reducing costs. While basic annual consumption data is mandatory, more detailed and real-time data reporting is not strictly required but can enhance the value of the assessment.

3.1.8 Electric Vehicle Charging

Service	**SRI**		**EPC**
	Functionality level	**Details**	**Input Data**
EV-15: EV Charging Capacity	level 0	not present	N/A - EPC assessments typically do not require information on the capacity of electric vehicle (EV) charging stations as it is not directly related to the building's overall energy performance.
	level 1	ducting (or simple power plug) available	
	level 2	0-9% of parking spaces has recharging points	
	level 3	10-50% or parking spaces has recharging point	
	level 4	>50% of parking spaces has recharging point	
EV-16: EV Charging Grid Balancing	level 0	Not present (uncontrolled charging)	N/A - EPC assessments do not usually consider grid balancing capabilities of EV charging infrastructure. They focus more on the building's energy consumption and efficiency.
	level 1	1-way controlled charging (e.g. including desired departure time and grid signals for optimization)	
	level 2	2-way controlled charging (e.g. including desired departure time and grid signals for optimization)	
EV-17	level 0	No information available	N/A - EPC assessments generally do not require detailed information on EV
	level 1	Reporting information on EV charging status to occupant	

EV Charging Information and Connectivity	level 2	Reporting information on EV charging status to occupant AND automatic identification and authorization of the driver to the charging station (ISO 15118 compliant)	charging infrastructure connectivity and communication capabilities.

3.1.9 Monitoring and Control

Service	SRI		EPC
	Functionality level	**Details**	**Input Data**
MC-3: Run Time Management of HVAC Systems	level 0	Manual setting	**Description:** This involves managing the operational schedules of HVAC systems to ensure efficient energy use. **Nature of Data:** Methods and schedules for managing HVAC runtime. **Example:** *"HVAC Runtime Scheduling"*
	level 1	Runtime setting of heating and cooling plants following a predefined time schedule	
	level 2	Heating and cooling plant on/off control based on building loads	
	level 3	Heating and cooling plant on/off control based on predictive control or grid signals	
MC-4: Detecting Faults of Technical Building Systems and Providing Support to the Diagnosis of these Faults `	level 0	No central indication of detected faults and alarms	**N/A** - EPC assessments typically do not include fault detection and diagnostics for technical building systems.
	level 1	With central indication of detected faults and alarms for at least 2 relevant TBS	
	level 2	With central indication of detected faults and alarms for all relevant TBS	
	level 3	With central indication of detected faults and alarms for all relevant TBS, including diagnosing functions	
MC-9: Occupancy Detection: Connected Services	level 0	None	**N/A** - EPC assessments do not generally require information on occupancy detection systems or connected services.
	level 1	Occupancy detection for individual functions, e.g. lighting	
	level 2	Centralised occupant detection which feeds into several TBS such as lighting and heating	
MC-13:	level 0	None	**N/A**

Central Reporting of TBS Performance and Energy Use	level 1	Central or remote reporting of realtime energy use per energy carrier	
	level 2	Central or remote reporting of real-time energy use per energy carrier, combining TBS of at least 2 domains in one interface	
	level 3	Central or remote reporting of real time energy use per energy carrier, combining TBS of all main domains in one interface	
MC-25: Smart Grid Integration	level 0	None - No harmonization between grid and TBS; building is operated independently from the grid load	**N/A** - EPC assessments do not typically cover the integration of building systems with smart grids.
	level 1	Demand side management possible for (some) individual TBS, but not coordinated over various domains	
	level 2	Coordinated demand side management of multiple TBS	
MC-28: Reporting Information Regarding Demand Side Management Performance And Operation	level 0	None	**N/A** - EPC assessments generally do not include detailed reporting on demand side management (DSM) performance.
	level 1	Reporting information on current DSM status, including managed energy flows	
	level 2	Reporting information on current/historical and predicted DSM status, including managed energy flows	
MC-29: Override of DSM Control	level 0	No DSM control	**N/A** - EPC assessments do not usually require information on the ability to override DSM controls.
	level 1	DSM control without the possibility to override this control by the building user (occupant or facility manager)	
	level 2	Manual override and reactivation of DSM control by the building user	

	level 3	Scheduled override of DSM control (and reactivation) by the building user	
	level 4	Scheduled override of DSM control and reactivation with optimised control	
MC-30: Single Platform that allows Automated Control & Coordination Between TBS and Optimization of Energy Flow Based on Occupancy, Weather and Grid Signals	level 0	None	**N/A** - EPC assessments do not cover the presence or functionality of such advanced control platforms.
	level 1	Single platform that allows manual control of multiple TBS	
	level 2	Single platform that allows automated control & coordination between TBS	
	level 3	Single platform that allows automated control & coordination between TBS + optimization of energy flow based on occupancy, weather and grid signals	

3.1.10 Outcomes Across Domains

1. **Heating**
    - **EPC Focus**: Overall energy efficiency rather than specific emission or control strategies.
    - **SRI Insights**: Detailed control functionalities, from basic to advanced (e.g., temperature regulation, pump controls, and dynamic heat storage management). Advanced functionalities like predictive management and grid interaction are more prominent in SRI.
2. **Domestic Hot Water (DHW)**
    - **EPC Focus**: General efficiency and control strategies for storage systems.
    - **SRI Insights**: Includes advanced control based on external signals, demand-based supply, and grid integration.
3. **Cooling**
    - **EPC Focus**: Emphasis on system efficiency over specific operational strategies.
    - **SRI Insights**: Advanced control mechanisms for distribution, interlocks to prevent simultaneous heating/cooling, and flexible grid-interactive operations.

4. **Ventilation**
    - **EPC Focus**: General ventilation efficiency and basic airflow controls.
    - **SRI Insights**: Advanced demand-based control, temperature compensation, free cooling strategies, and detailed reporting on air quality and system efficiency.
5. **Lighting**
    - **EPC Focus**: Basic controls for energy-efficient operation.
    - **SRI Insights**: Advanced functionalities like daylight harvesting, scene-based control, and occupancy detection for optimal energy usage.
6. **Dynamic Building Envelope**
    - **EPC Focus**: Static performance metrics (e.g., U-values).
    - **SRI Insights**: Predictive control of solar shading, HVAC-integrated window control, and real-time reporting for energy efficiency.
7. **Electricity**
    - **EPC Focus**: General energy consumption and generation data.
    - **SRI Insights**: Includes storage systems, optimized self-consumption, CHP plant integration, and smart grid functionalities.
8. **Electric Vehicle Charging**
    - **EPC Focus**: Basic infrastructure description (e.g., availability of charging points).
    - **SRI Insights**: Advanced grid-interactive charging and user-centric connectivity.
9. **Monitoring and Control**
    - **EPC Focus**: Minimal reporting requirements for building management systems.
    - **SRI Insights**: Advanced functionalities like predictive diagnostics, smart grid integration, and centralized reporting systems.

The collected data highlights a clear distinction between EPC and SRI focuses: EPC emphasizes general system efficiency and compliance, whereas SRI prioritizes advanced controls, dynamic interactions, and smart functionalities. SRI introduces innovative capabilities across domains, including predictive maintenance, grid interaction, fault detection, and the integration of renewable energy sources. These advancements demonstrate the potential for substantial improvements in energy efficiency, demand-side management, and occupant comfort through SRI-compliant systems.

3.2 Workshop

The workshop, held on September 11, 2024, was part of the SmarterEPC T3.4 initiative, focused on refining and standardizing data requirements for Energy Performance Certificate (EPC) and Smart Readiness Indicator (SRI) assessments. It aimed to identify overlaps and gaps in the data representation within EPC evaluations, ensuring alignment with the Energy Performance of Buildings Directive (EPBD) and relevant EU regulations.

The workshop gathered insights from partners regarding the inclusion, necessity, and representation of specific data fields across various EU national schemes. Feedback highlights include:

Q1. Do EPC assessments include H-1c and H-1d services? If yes, how is this data required? 5 4

- No, it is not used in EPC calculations in France actually
- As EPC is just based on predefined values specified in the design stage calculations, it doesn't consider the automation and controllability of these elements!
- It is not mandatory, but can be found in several EPCs in EU, accourding to natinal regulations. Data required as on/off automation.
- No it is not required (at least in Greece)

Q2. Is data for H-1f needed in EPC assessments? If yes, how is it represented? 3 3

- In Sweden for example this is considered and as far as I remember it is a checkbox (yes or no) and if yes you need to also indicate the volume of the storage.
- In France the presence of thermal energy storage for heating could be mentioned for office and collective residential buildings, but it is not mandatory
- The primary levels of SRI like continuous storage operation until load predictions have been already incorporated in many systems nowadays, but in EPC I am not sure if it is required.

Q3. Is reporting of H-3 mandatory in EPC assessments, and if so, how is this data requested? 3 3

- The focus of the EPC is on energy efficiency assessment and energy savings. The reporting of heating system performance to users is not considered as having an impact on these
- These elements are already reported in bills in several EU countries even with clarification on historical uses, but in EPC I am nit sure if they considered
- This is likely not included and doesn't improve the score of the EPC, however it is a prerequisite for those countries where measured EPCs are available or a musts

Q4. Are controls for DHW storage (DHW-1a, DHW-1b, DHW-1d) required in EPC assessments? If yes, how is this data represented?

4 4

In France only the type of DHW storage (if the DHW is produced by heat pump, gas boiler or solar) is mentioned into the EPC

They can be included on some occasions

Highly unlikely, although there are countries that have the DHW storage as checkbox and if yes then indicate volume.

They are common technologies that can be considered in several systems nowadays, but about EPC I am not sure if it concerns the controllability on the DHW storage

"Q5. Is reporting of DHW-3 required in EPC assessments, and if so, how is this data represented?"

4 4

Doesn't have an impact on the EPC score, although it's indirectly a prerequisite in countries where you also have measured EPCs (in some it's mandatory to have measured EPC after 2 years of operation)

Level 1 and 2 are common information that are considered in most water bills but it is common and I am not sure if they are mentioned in EPC

Readily information available, but not sure in mandatory in EPCs

The same as before for heating system reporting performance . The reporting of performance to users is considered not having impact on energy efficiency and energy savings. So, is not included in EPC

"Q6. Is C-1g required in EPC assessments, and if yes, how is this data represented?

3 3

This goes hand in hand with the DHW storage controls, so not rewarded. In some countries the TES is present as a checkbox (yes, no) and if yes required to indicate volume.

I do not believe this is a mandatory field in EPC. Seems like a more up-to-to-date item.

The storage capacity is something that can be considered in EPC like in Italy, but the controllability on this issue not

"Q7. Does EPC assessment mandate reporting on Cooling System Performance (C-3)? If so, in what form is this data included or documented?

4 4

In italy, most cooling systems already labeled with these information while they are not requested in EPC (particularly about the automation)

Ditto as Heating & DHW Systems Performance, not rewarded in EPC, just a prerequisite for measured EPCs (which are mandatory in some countries after 2 years of operation for new builts)

Especially for south Europe, due to ACs this is easily obtainable information. Not sure if it is mandatory in EPC, i don't believe so.

The same as before for heating system reporting performance service. The reporting of performance to users is considered not having impact on energy efficiency and energy savings. Not included in EPC

Q8. Is control of supply airflow at room level (V-1a) included in EPC assessments? If yes, how is this data required?

4 4

Likely not, even if heating & cooling is fully air based.

The air follow rate is mentioned in systems, while the control functionality that can be carried out with different sensors is out the scope of EPC.

No this is not required by EPC. This is a more elaborate metric, difficult to be obtained by the average resident, even if heating cooling is air-based solely.

This enters better in the scope of BACS, as air handlers are often controlled by BACS. So, it is not included into EPC assessment

Q9. Is control of airflow or pressure at air handler level (V-1c) required in EPC assessments? If yes, how is it represented?

3 3

Same as previous question, this is not required in EPC assessments.

they may only cosider about the air flow rate and they don't care about the automation on different levels. But it something that are already in most ventilation systems around Europe

Likely not, even if the entire space heating and/or colling is provided by an AHU. (too technically detailed information, other AHU controls would come first, although likely none are considered EPCs)

Q10. Is control of supply air temperature at the air handling unit level (V-2d) required in EPC assessments, and if so, how is it represented? 3 3

The Air Handling units are inside a BACS scope, as controlled by BACS. So, it is not included in the EPC assessments

As same as before. the contolability of the AHUs is not something that would be mentioned by EPC. while as the min required values are important it is not far-fetched to assume that it is mentioned

Likely not (again too technically detailed info.) and more so than the previous Q9 this is BaU for AHU (having it in the EPC wouldn't make a difference)

Q11. Is control of lighting power based on daylight (L-2) considered in EPC assessments, and if so, how is it represented? 3 3

Can only say that in some countries the EPC doesn't even include lighting, so likely this is not

It should be provided! so the least min level which is On/Off is required for sure. Only the consumption is important in EPC and not Control

It directly impacts the artificial lighting consumption, but, although it, I haver never seen that is was included in the EPC scope

Q12. Is the service DE-2 required in EPC assessments? If yes, how is this data represented? 3 3

The availability of the windows and they dimensions can be detected in the scanning step for the EPC, while the control on windows NO

Likely not, if in some countries yes it couldn't be more than a checkbox (yes, no) with minimal impact on the EPC assessment

It is not included in the EPC scope. The same answer as for other reporting performance services

Q13. Is DE-4 considered in EPC assessments? If yes, how is this data required? 2 2

NO

No :)

Q14. Is reporting of local electricity generation (E-2) required in EPC assessments? If yes, how is this data represented?

3 3

In some countries yes, usually installed capacity kW, but could be also kWh (standardised weather data)

It is not required, but Italy motivates this use of RES by puting in a lot of bonus. while it is not in EPC yet. the basic information (generation KWh) can be only provided in EPC. So not control

The general information (area occupied by PV, power, orientation, tilt) about local electricity generation as well the yearly generation (if available) are mentioned into the EPC in France. No data

Q15. Is storage of locally generated electricity (E-3) considered in EPC assessments? If yes, how is this data required?

3 3

In some countries yes, storage capacity kWH

The installation of battery is mentioned which is common when you have PV system, while the control on its performance is not mentioned in EPC

I don't believe this is part of EPC, in actual kWh. maybe on some rare occasions

Q16. Must electricity consumption (E-12) be reported in EPC assessments? If so, in what way is this data represented?

4 4

Only the consumption is mentioned in EPC. While, for example in Italy all electricity bills are also demonstrating the historical trends to the customers! So it is not something out of expectations

For countries with measured EPCs yes, kWh/(m2*year)

Yes in terms of kWh/m2

The yearly electricity consumption data are reported in the EPC in France. But there is no of information about a way of reporting of these data to final user

Q17. Does EPC assessment require run time management of HVAC systems (MC-3)? If yes, how is this data requested?

3 3

Not in EPC, but in several systems they already have these type of control functionalities

this is only indirectly included through the occupancy data (operational schedules) which for calculated EPCs is standardised in each country

Not in EPC, as it is mainly related to the BACS and associated BACS audits

Q18. Is occupancy detection (MC-9) for connected services required in EPC assessments, and if so, how is this data represented?

3 3

No :)

No

No, it is not required

Q19. Do EPC assessments request reporting data on Technical Building Systems performance and energy use? If yes, how is this data required?

3 3

This is similar to heating, DHW, cooling, performance Qs, the answers given there are relevant for this as well

Only net amount of consumptions. Not the reporting procedures

The same as before. EPC doesn't include any data about any reporting of performances

Workshop outcomes:

The workshop identified critical gaps and inconsistencies in how data is handled in EPC assessments across EU member states:

1. **Inconsistencies Across Countries:**
    - Data requirements and representation vary significantly, reflecting a lack of harmonization in EPC frameworks.
2. **Limited Scope of Mandatory Data:**
    - Most EPCs focus on basic energy consumption metrics, neglecting advanced data like controllability and automation.
3. **Missed Opportunities:**
    - Services with direct impacts on energy efficiency, such as lighting controls and runtime management, are often overlooked.
4. **Technical Complexity:**
    - Detailed data fields, such as supply air temperature control and airflow control, are deemed too technical for EPCs and are often associated with Building Automation and Control Systems (BACS).
5. **Alignment with SRI Goals:**

- Addressing gaps in data representation could help EPC frameworks align more closely with the goals of SRI assessments, enabling more robust building performance evaluations.

The workshop highlighted the pressing need for standardization and improvement in EPC data requirements to enhance their relevance for energy efficiency and smart readiness. Aligning practices across EU member states would improve the utility and detail of EPC assessments, making them more effective tools for evaluating building performance. Key recommendations include advocating for the consistent inclusion of critical data fields, such as HVAC and lighting system controllability, integrating more detailed technical and performance data into EPC frameworks, and developing unified guidelines to harmonize data requirements while ensuring compliance with EPBD regulations. By addressing these gaps, the workshop laid a strong foundation for advancing building performance assessments, enabling better decision-making, and supporting sustainability efforts across the EU.

3.3 Preliminary Design Overview

The proposed certificate combines the **Energy Performance Certificate (EPC)** and the **Smart Readiness Indicator (SRI)** into a unified framework, offering a comprehensive assessment of a building's energy efficiency and smart capabilities. This joint certification aims to streamline evaluation processes, providing a holistic view of a building's performance in both energy consumption and technological readiness.

The proposed **joint certificate for EPC and SRI** is designed as a concise two-page document, combining mandatory and optional elements to provide a comprehensive yet user-friendly overview of a building's energy performance and smart readiness.

The integrated certificate includes key **energy performance metrics**, such as the calculated annual primary and final energy use per square meter, the share of renewable energy produced on-site, and greenhouse gas emissions (operational and, if available, life-cycle GWP). It classifies the building's energy performance and emission levels on standardized scales, supporting compliance with nearly zero-energy or zero-emission building standards.

In parallel, the **Smart Readiness Indicator** evaluates the building's ability to optimize energy use, adapt to grid signals, and enhance occupant comfort and convenience. It incorporates technical domain scores for critical systems like heating, cooling, ventilation, lighting, and energy storage, alongside detailed insights into smart features, such as indoor air quality monitoring, automated controls, and EV charging capabilities.

3.3.1 Energy Performance certificate elements

This section represents the **Energy Performance Certificate (EPC)** component of the proposed joint EPC and Smart Readiness Indicator (SRI) certificate. It focuses on the EPC-related elements, which provide a comprehensive evaluation of a building's energy efficiency and

environmental performance. Below, we detail the key components and their significance in supporting energy performance analysis.

1. Building Identification and General Information

The EPC begins with general information about the building, providing essential context for the assessment:

- **Building ID and Name**: A unique identifier for the building.
- **Assessment Date**: The date on which the evaluation was conducted, ensuring the relevance of the data.
- **Assessor Details**: Includes the name of the certified professional conducting the assessment.
- **Building Characteristics**: Specifies the building type (residential/non-residential), usage (e.g., educational, office), location, net floor area, and year of construction.

2. Energy Performance Metrics

The EPC includes several core indicators of the building's energy performance:

- **Calculated Annual Primary Energy Use**: Measured in kWh/(m^2·y), this metric reflects the total energy required, including losses in energy generation and distribution.
- **Calculated Annual Final Energy Use**: Also measured in kWh/(m^2·y), this metric represents the energy consumed directly by the building systems, such as heating, cooling, and lighting.
- **Metered Energy Consumption**: Provides real-world consumption data in kWh/(m^2·y), offering insights into the building's operational performance.
- **Renewable Energy Production**: Indicates the percentage of the building's energy use covered by on-site renewable energy sources, promoting sustainability.
- **Carbon Dioxide Emissions Indicator**: Expressed in $kgCO_2$/(m^2·y), this metric highlights the building's contribution to greenhouse gas emissions, supporting alignment with environmental goals.

3. Energy Classification and Reference Standards

The certificate categorizes the building's energy performance using a standardized scale (e.g., A to G):

- **Building Energy Rating**: Visualized through a classification system, this rating allows stakeholders to quickly understand the building's energy efficiency.
- **Reference Values**: Benchmarks are provided for minimum energy performance standards, nearly zero-energy building requirements, and zero-emission building goals, offering a point of comparison to gauge compliance and future improvements.

4. Operational and System Metrics

The EPC also includes detailed insights into the building's energy systems and operational capabilities:

- **Annual Energy Consumption**: Presented in both kWh and MWh to quantify energy usage for primary and final energy.
- **Main Energy Carrier**: Specifies the type of energy source used (e.g., electricity, natural gas) and its role in supporting the building's energy needs.
- **Calculated Energy Needs**: Highlights the theoretical energy demand for services such as heating, cooling, and lighting, expressed in kWh/(m²·y).
- **System Features**:
    - Indicates whether the building has the capacity to react to external signals (e.g., grid demand).
    - Specifies whether the heat distribution system operates efficiently at low temperature levels.

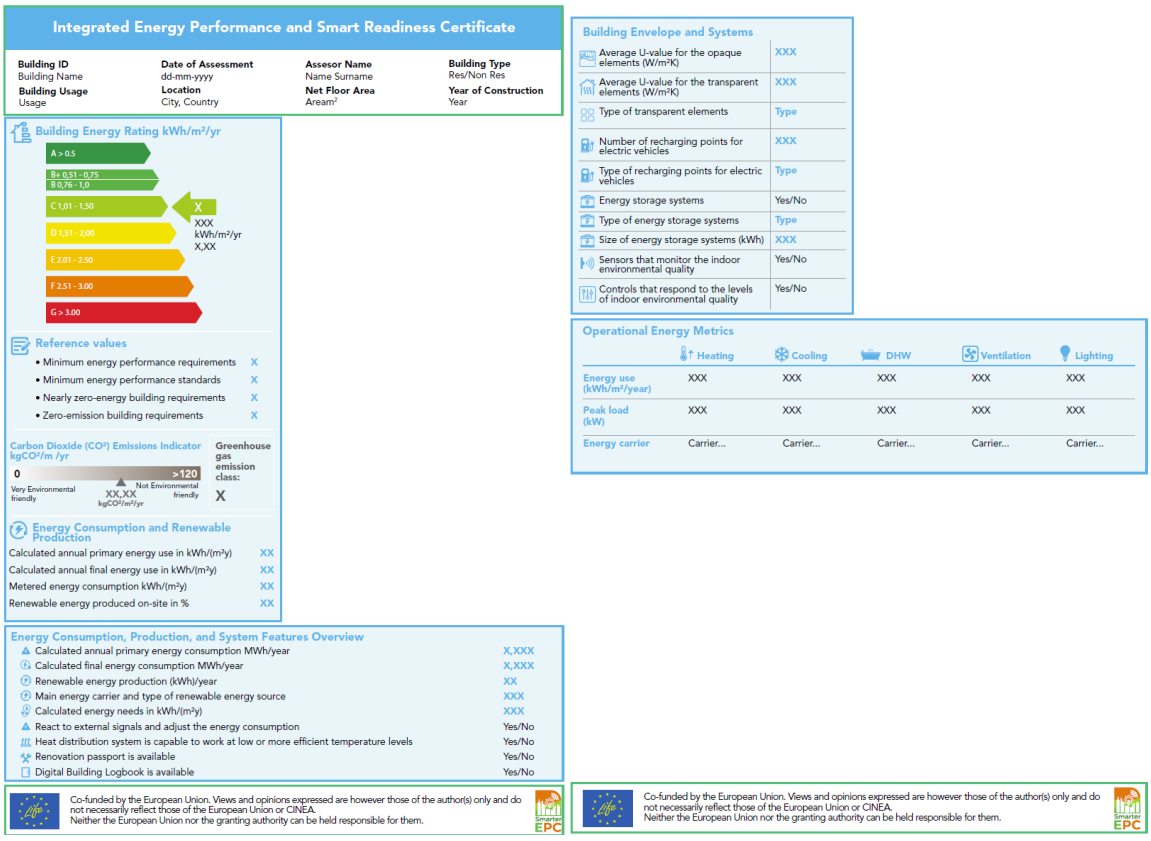


Figure 2 Energy Performance Certificate (EPC) elements of the Joint Certificate

5. Building Envelope and Additional Features

The EPC assesses the thermal performance and additional characteristics of the building envelope:

- **U-Values for Opaque and Transparent Elements**: Average thermal transmittance values for walls, roofs, and windows provide insight into the building's insulation quality.
- **Type of Transparent Elements**: For example, the presence of double-glazed windows is noted as an indicator of energy efficiency.
- **Overheating Risk**: Includes the results of any analysis on the building's vulnerability to overheating, if available.

6. Optional Features

The EPC also presents optional details for advanced assessment:

- **Renovation Passport**: Indicates whether a roadmap for energy-efficient renovation exists.
- **Digital Building Logbook**: Notes the availability of a comprehensive digital record for the building's performance and maintenance.
- **Energy Storage and EV Charging**: Details on the presence and specifications of energy storage systems and electric vehicle recharging points, supporting a transition to sustainable energy use.

3.3.2 Smart Readiness Indicator certificate elements

The attached document represents the **Smart Readiness Indicator (SRI)** component of the proposed joint EPC and SRI certificate. This section focuses exclusively on the SRI-related elements, which evaluate a building's ability to utilize smart technologies for energy efficiency, occupant comfort, and grid interaction. Below, the key components of the SRI are described.

1. Building Identification and General Information

The SRI section begins with basic details that identify the building and provide context for the smart readiness evaluation:

- **Building ID and Name**: A unique identifier for the assessed building.
- **Assessment Date**: Specifies when the SRI evaluation was conducted.
- **Assessor Information**: The name of the professional responsible for the evaluation.
- **Building Details**: Includes type (residential or non-residential), usage (e.g., educational, office), location, net floor area, and year of construction.

2. Smart Readiness Indicator Overview

The SRI evaluates the building's capacity to leverage smart technologies. Key aspects include:

- **Overall, SRI Score**: Expressed as a percentage and categorized into a class (e.g., A to G) to indicate the building's smartness level.
- **Primary Evaluation Criteria**:
    - **Optimizing Energy Efficiency and Performance**: Assesses the building's ability to improve energy usage through smart systems.
    - **Adapting to Signals from the Grid**: Evaluates flexibility in adjusting energy consumption based on grid demands.
    - **Adapting to Occupant Needs**: Measures responsiveness to user preferences and comfort requirements.

3. Impact Criteria

The SRI incorporates broader performance areas to assess the building's overall functionality and adaptability:

- **Energy Efficiency**: How effectively smart systems enhance energy performance.
- **Energy Flexibility and Storage**: The ability to manage energy storage and adjust to fluctuating demands.
- **Comfort and Convenience**: Evaluates how smart features improve occupant experience.
- **Health, Well-being, and Accessibility**: Assesses systems that enhance air quality, lighting, and accessibility for all users.
- **Maintenance and Fault Prediction**: Measures the building's capability for predictive maintenance through smart technologies.
- **Information to Occupants**: Reflects the availability of real-time data to occupants for informed decision-making.

4. Technical Domains

The SRI evaluates specific building systems for their smart readiness:

- **Heating, Cooling, and Domestic Hot Water**: These systems are assessed for their ability to adapt to energy-saving settings and user needs.
- **Ventilation and Lighting**: Includes advanced control systems to enhance energy efficiency and occupant comfort.
- **Dynamic Building Envelope**: Evaluates the use of adaptable building components such as smart shading or insulation.

- **Electricity and Energy Storage**: Focuses on the integration of energy management systems and renewable energy.
- **Electric Vehicle Charging**: Assesses the presence and functionality of charging infrastructure.
- **Monitoring and Control Systems**: Measures the capability to monitor and respond to energy and environmental conditions dynamically.

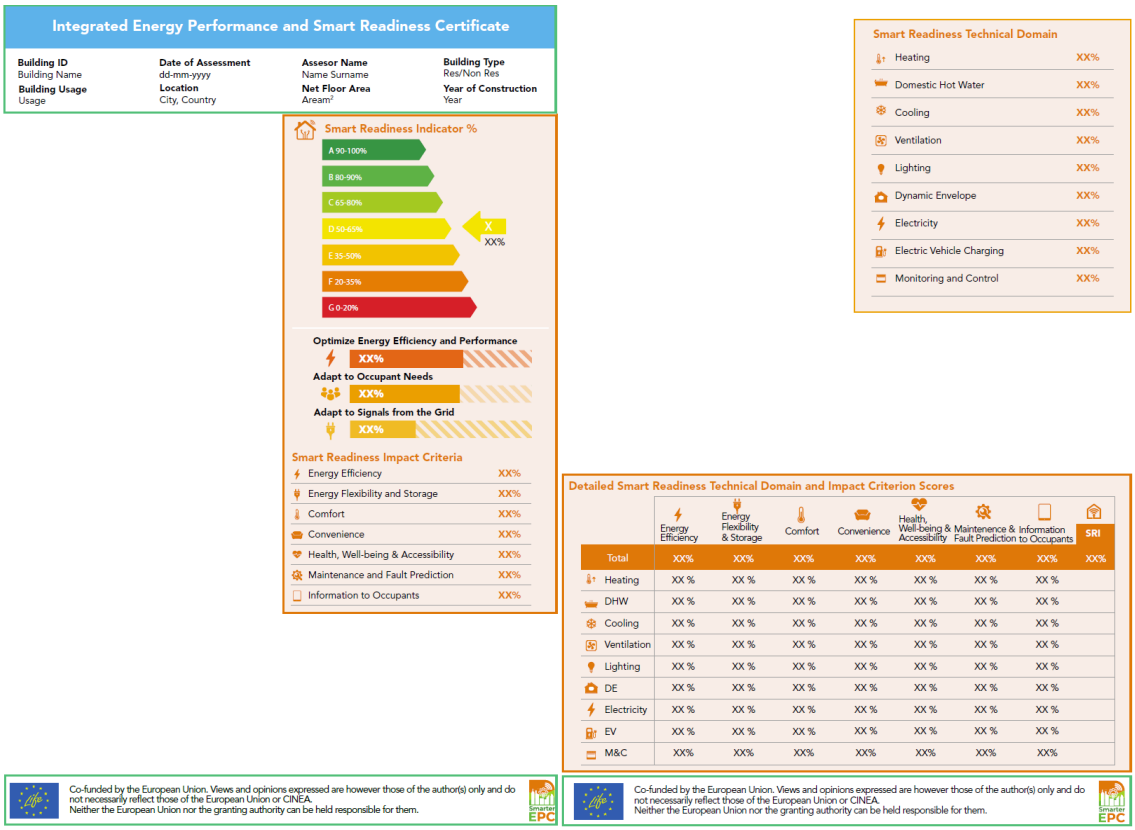


Figure 3 Smart Readiness Indicator (SRI) certificate elements of the Joint Certificate

5. Presentation of Results

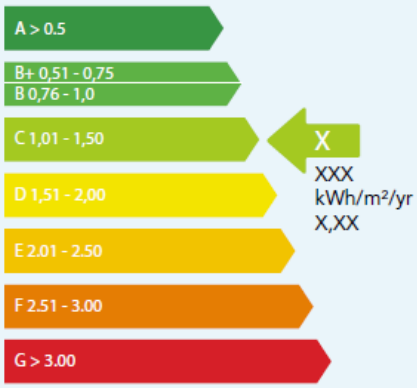
The SRI results are presented in an accessible format:

- **Classification Scale**: A visual representation of the overall score within a standard scale (A to G).
- **Criteria Scores**: Breakdown of scores across impact and technical domains to offer a detailed understanding of the building's smart readiness.

Integrated Energy Performance and Smart Readiness Certificate

Building ID Building Name	**Date of Assessment** dd-mm-yyyy	**Assesor Name** Name Surname	**Building Type** Res/Non Res
Building Usage Usage	**Location** City, Country	**Net Floor Area** Aream²	**Year of Construction** Year

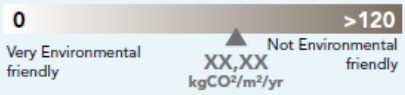
Building Energy Rating kWh/m²/yr



Reference values

- Minimum energy performance requirements X
- Minimum energy performance standards X
- Nearly zero-energy building requirements X
- Zero-emission building requirements X

Carbon Dioxide (CO^2) Emissions Indicator $kgCO^2/m$ /yr



Greenhouse gas emission class: X

Energy Consumption and Renewable Production

Calculated annual primary energy use in kWh/(m²y)	XX
Calculated annual final energy use in kWh/(m²y)	XX
Metered energy consumption kWh/(m²y)	XX
Renewable energy produced on-site in %	XX

Smart Readiness Indicator %

Optimize Energy Efficiency and Performance XX%

Adapt to Occupant Needs XX%

Adapt to Signals from the Grid XX%

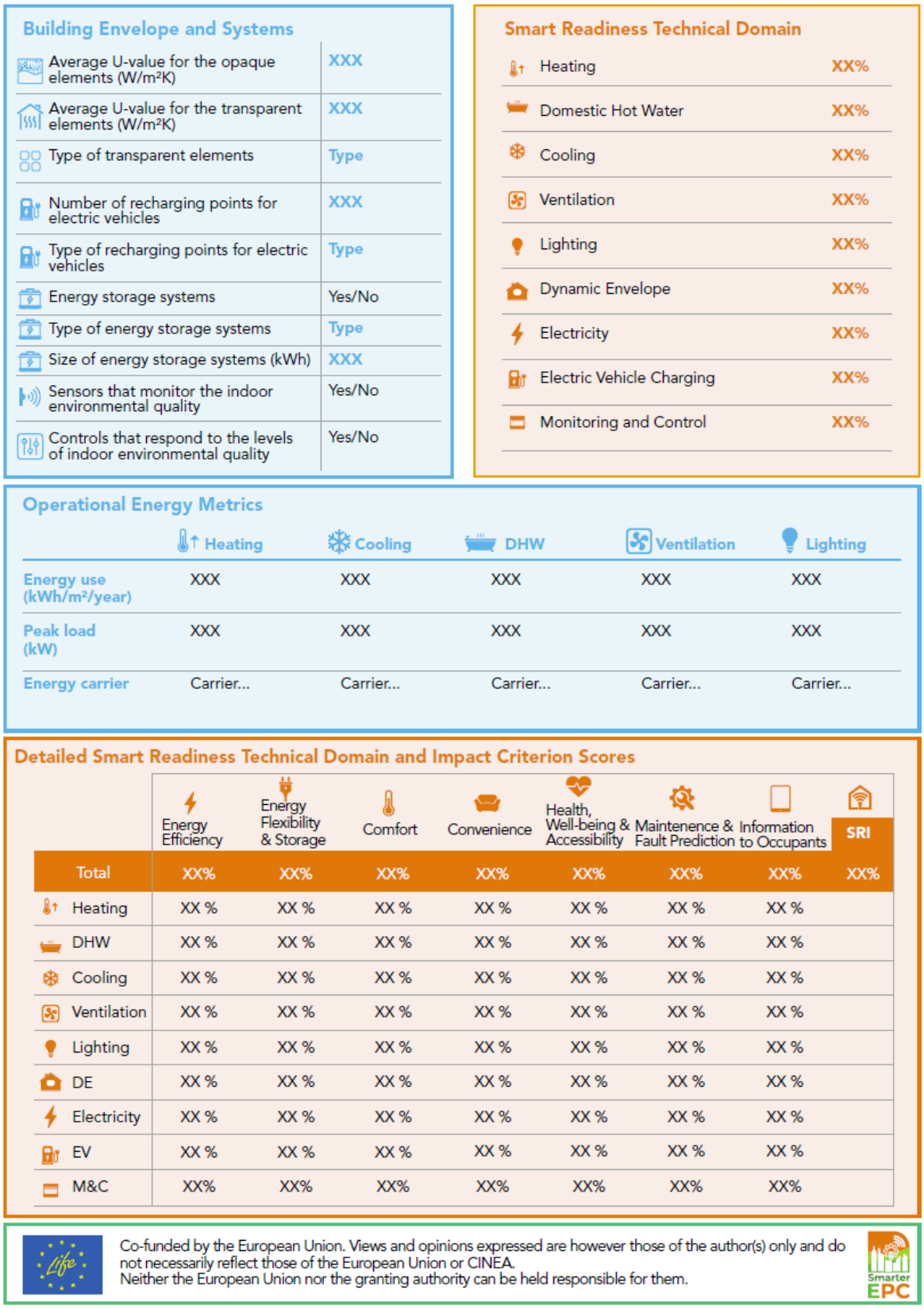
Smart Readiness Impact Criteria

Energy Efficiency	XX%
Energy Flexibility and Storage	XX%
Comfort	XX%
Convenience	XX%
Health, Well-being & Accessibility	XX%
Maintenance and Fault Prediction	XX%
Information to Occupants	XX%

Energy Consumption, Production, and System Features Overview

Calculated annual primary energy consumption MWh/year	X,XXX
Calculated final energy consumption MWh/year	X,XXX
Renewable energy production (kWh)/year	XX
Main energy carrier and type of renewable energy source	XXX
Calculated energy needs in kWh/(m²y)	XXX
React to external signals and adjust the energy consumption	Yes/No
Heat distribution system is capable to work at low or more efficient temperature levels	Yes/No
Renovation passport is available	Yes/No
Digital Building Logbook is available	Yes/No

Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA.
Neither the European Union nor the granting authority can be held responsible for them.



Building Envelope and Systems

Average U-value for the opaque elements (W/m²K)	XXX
Average U-value for the transparent elements (W/m²K)	XXX
Type of transparent elements	Type
Number of recharging points for electric vehicles	XXX
Type of recharging points for electric vehicles	Type
Energy storage systems	Yes/No
Type of energy storage systems	Type
Size of energy storage systems (kWh)	XXX
Sensors that monitor the indoor environmental quality	Yes/No
Controls that respond to the levels of indoor environmental quality	Yes/No

Smart Readiness Technical Domain

Heating	XX%
Domestic Hot Water	XX%
Cooling	XX%
Ventilation	XX%
Lighting	XX%
Dynamic Envelope	XX%
Electricity	XX%
Electric Vehicle Charging	XX%
Monitoring and Control	XX%

Operational Energy Metrics

	Heating	Cooling	DHW	Ventilation	Lighting
Energy use (kWh/m²/year)	XXX	XXX	XXX	XXX	XXX
Peak load (kW)	XXX	XXX	XXX	XXX	XXX
Energy carrier	Carrier...	Carrier...	Carrier...	Carrier...	Carrier...

Detailed Smart Readiness Technical Domain and Impact Criterion Scores

	Energy Efficiency	Energy Flexibility & Storage	Comfort	Convenience	Health, Well-being & Accessibility	Maintenence & Fault Prediction	Information to Occupants	SRI
Total	XX%	XX%	XX%	XX%	XX%	XX%	XX%	XX%
Heating	XX %	XX %	XX %	XX %	XX %	XX %	XX %	
DHW	XX %	XX %	XX %	XX %	XX %	XX %	XX %	
Cooling	XX %	XX %	XX %	XX %	XX %	XX %	XX %	
Ventilation	XX %	XX %	XX %	XX %	XX %	XX %	XX %	
Lighting	XX %	XX %	XX %	XX %	XX %	XX %	XX %	
DE	XX %	XX %	XX %	XX %	XX %	XX %	XX %	
Electricity	XX %	XX %	XX %	XX %	XX %	XX %	XX %	
EV	XX %	XX %	XX %	XX %	XX %	XX %	XX %	
M&C	XX%	XX%	XX%	XX%	XX%	XX%	XX%	

Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA.
Neither the European Union nor the granting authority can be held responsible for them.

Figure 4 Smarter EPC proposal for the Joint EPC-SRI Certificate

4. Conclusion

The integration of the Smart Readiness Indicator (SRI) into the Energy Performance Certificate (EPC) framework marks a significant advancement in building certification methodologies. This report underscores the successful integration of the Smart Readiness Indicator (SRI) into the Energy Performance Certificate (EPC), addressing the growing need for comprehensive and modernized building performance assessments. By aligning energy efficiency with smart readiness, this joint certification framework advances both the practical utility and strategic value of building certifications in Europe.

Key Findings and Achievements:

1. **Framework Harmonization**

   A critical milestone was the identification and resolution of overlaps and gaps between the data requirements and methodologies of EPC and SRI assessments. This harmonization effort has ensured the creation of a cohesive evaluation framework that bridges traditional energy performance metrics with modern technological capabilities.

2. **Comprehensive Data Collection and Alignment**

   The project successfully developed templates and conducted a detailed data collection process to capture the necessary inputs for both EPC and SRI systems. This approach not only addressed differences in data requirements but also ensured consistency with European Union (EU) directives and national practices.

3. **Enhanced Visual and Structural Design**

   The proposed joint certificate incorporates a modular design that is adaptable to varying national and regional needs while maintaining a standardized format. This user-friendly design ensures clarity for non-expert audiences and provides actionable insights for decision-makers in the building sector.

4. **Stakeholder-Centric Development**

   Active engagement with stakeholders, including policymakers, industry professionals, and building owners, has shaped the development of the joint certification framework. Workshops and interactive sessions have ensured that the final certificate addresses the diverse needs and expectations of its users.

The joint EPC and SRI certificate not only simplifies building certification processes but also supports broader sustainability and energy efficiency goals. By providing a comprehensive assessment of building performance, the joint certificate empowers stakeholders to make informed decisions regarding renovations, investments, and technology adoption.

Appendix 1 Input from R2MF - EPC Data

R2MF Contribution:

The EPC information is organised in the following categories:

- General building information, e.g., climate region, address, building type, etc.
- Building Envelope, e.g., roof insulation thickness, windows orientation, etc.
- Building Systems, e.g., heating, cooling, DHW, ventilation, lighting.
- Recommendations for improvement

Section	Data Field	Details	
Administrative and general data	General data	Building ID	Cadastral identification
		Address	
		Altitude/elevation, m	89
		Construction year	19XX or 20YY
		Type of building	e.g., Residential or Not residential
		Building usage	e.g., public building, office building, hospital, hotel etc.
		Building' floor area, m²	
		Gross building area, m²	
		Number of floors	3
		Average ceiling height, m	2.8
		Building owner	
		Number of occupants	
		Climate region/data	
		Fuel types/energy carriers used in building	e.g., Electricity, gas, wood
	Actual building state	Building state	e.g., Initial state, renovated
		Energy rate/class, (kWh/m²/yr)	e.g., 100 kWh/m²/yr, class C
		Total building energy consumption, (kWh/yr)	e.g., 100000 kWh/yr
		Emissions rate/class, (kgCO2/m²/yr)	e.g., 3 kgCO2/m²/yr, class A

		Total building use CO2 emissions, (kgCO2/yr)	e.g., 3000 kgCO2/yr
		Annual energy needs for Heating (kWh)	35000 kWh
		Annual energy needs for Cooling (kWh)	20000 kWh
		Annual energy needs for DHW (kWh)	4000 kWh
		Type of renewable energy generation, if presented	e.g., solar thermal production for DHW, PV panels on the roof, domestic wind turbine etc.
		Installed capacity of renewable energy generation, if presented	e.g. 30 m² of PV panels on the roof, total power 7 kWp
		Tilt, °	
	EPC audit	**Inspection date**	25/06/2024
		Name and enterprise of inspector	Mr/Mrs …
		Contact information	e.g., phone number, e-mail

Section	**Data Field**	**Details**	
Building envelope	**Geometry information**	**Building envelope area**	
		Building orientation	
	External wall	**Insulation Type:**	
		Insulation thickness:	
		Number of layers	
		Layer material:	
		Layer thermal conductivity:	
		Surface area:	
		U-value (W/m²*K):	
		R-Value (m²*K/W)	
	Roof	**Surface area:**	
		U-value (W/m²*K):	
		R-Value (m²*K/W)	
		Insulation thickness:	

	Ground	Surface area:	
		U-value (W/m²*K):	
	Door	Surface area:	
		U-value (W/m²*K):	
	Window	Type of windows:	
		Window orientation:	
		Type of frame	
		Surface area:	
		g-value:	
		U-value (frame) (W/m²*K):	
		U-value (glazing) (W/m²*K):	
		U-value (global) (W/m²*K):	
		Sun protection (shading)/Degree of automation:	e.g., motorised roller shutters on 50% of buildings (facades South and East)
	Thermal bridges	Type:	
		Position:	
		Length of thermal bridge (m):	
		Type of insulation:	
		Carpentry position:	
Section	**Data Field**	**Details**	
Heating System	Presence of heating system	Does the heating system present ?	Yes
	Heat Generation System	Type:	Boiler
		Fuel Type:	Gas
		Efficiency:	85%
		Control Type:	Automatic
		Nominal electric power (kW):	
		Nominal thermal power (kW):	
		Number of units installed	
		Year of installation	

	Heat Distribution System	**Type:**	Radiators
		Fluid distribution temperature, °C	
		Control Type:	Thermostatic Valves
	Heat Emission Control	**Type:**	Individual Room Control
		Year of installation	
		Heated area:	220 m2
	Thermal Energy Storage	**Type:**	Buffer Tank
		Capacity:	150 Litres
	Heating Schedule	**Operating Hours:**	6 AM - 10 PM
		Set Temperatures:	21°C
	Energy consumption and cost	**Final energy annual consumption (kWhef/yr):**	
		Primary energy annual consumption (kWhep/yr):	
		Cost of heating use (€):	
	GES emissions	**Estimation of GES emissions associated to heating system (kgCO2/yr):**	

Section	**Data Field**	**Details**	
Cooling System	**Presence of cooling system**	**Does the cooling or air conditioning system present?**	Yes
	Cool Generation System	**Type:**	Cooler
		Fuel Type:	electricity
		Efficiency:	85%
		Control Type:	Automatic
		Nominal electric power (kW):	
		Nominal thermal power (kW):	
		Number of units installed	
		Year of installation	
	Cool Distribution System	**Type:**	Cooling floor
		Fluid distribution temperature, °C	
		Control Type:	Thermostatic Valves
	Cool Emission Control	**Type:**	Individual Room Control
		Year of installation	
		Cooled area:	120 m2
	Thermal Energy Storage	**Type:**	Buffer Tank
		Capacity:	150 Litres

	Cooling Schedule	**Operating Hours:**	6 AM - 10 PM
		Set Temperatures:	25°C
	Energy consumption and cost	**Final energy annual consumption (kWhef/yr):**	
		Primary energy annual consumption (kWhep/yr):	
		Cost of Cooling use (€):	
	GES emissions	**Estimation of GES emissions associated to Cooling system (kgCO2/yr):**	

Section	**Data Field**	**Details**	
Ventilation	**Presence of mechanical ventilation system**	**Does the mechanical ventilation system present?**	Yes
	Ventilation System	**Type:**	
		Exposed facades:	
		Efficiency:	
		Control Type:	
	Ventilation Schedule	**Operating Hours:**	
		Set Temperatures:	
	Energy consumption and cost	**Final energy annual consumption (kWhef/yr):**	
		Primary energy annual consumption (kWhep/yr):	
		Cost of ventilation use (€):	
	GES emissions	**Estimation of GES emissions associated to ventilation system (kgCO2/yr):**	

Section	**Data Field**	**Details**	
Domestic Hot Water (DHW)	**Presence of DHW system**	**Does the DHW system present?**	Yes
	DHW Heat Generation System	**Type:**	Boiler
		Fuel Type:	Gas
		Efficiency:	85%
		Control Type:	Automatic
		Year of installation	

	DHW Heat Distribution System	**Type:**	Radiators
		Control Type:	Thermostatic Valves
		Pipes insulation	
	DHW Heat Emission Control	**Type:**	Individual Room Control
	Thermal Energy Storage	**Type:**	Buffer Tank
		Capacity:	150 Litres
	DHW Heating Schedule	**Operating Hours:**	6 AM - 10 PM
		Set Temperatures:	55°C
	Energy consumption and cost	**Final energy annual consumption (kWhef/yr):**	
		Primary energy annual consumption (kWhep/yr):	
		Cost of DHW use (€):	
	GES emissions	**Estimation of GES emissions associated to DHW system (kgCO2/yr):**	

Section	**Data Field**	**Details**	
Lighting	**Lamps**	**Type:**	
		Efficiency:	
		Control Type:	
		Total power:	
	Lighting Control	**Type:**	
	Energy consumption and cost	**Final energy annual consumption (kWhef/yr):**	
		Primary energy annual consumption (kWhep/yr):	
		Cost of lighting use (€):	
	GES emissions	**Estimation of GES emissions associated to lighting system (kgCO2/yr):**	

Appendix 2 Input from Euphyia - EPC Data

Categorization of EPC input data

To ensure a comprehensive and accurate EPC assessment, detailed input data is categorized into three main sections: General Building Information, Building Envelope, and Building Systems. These sections collectively provide the foundation for the zonal model methodology, facilitating a precise evaluation of each zone's energy performance.

1. Construction Elements

Section	Data Field	Details		
Construction Elements (Zonal)	**Walls**	Connect the zone to:		
		Exterior	e.g ✓	
		Strongly Ventilated Space	e.g ✓	
		Unheated Adjoining Space	e.g ✓	
		Conditioned Adjoining Space	e.g ✓	
		Underground	e.g ✓	
		Presence of Metal Cladding	e.g ✓	
		U-value:	0.18 – 0.60	**W/m²K**
		C_m :	60 - 250	**KJ/m²K**
	Roofs	**Exterior**	e.g ✓	
		Strongly Ventilated Space	e.g ✓	
		Unheated Adjoining Space	e.g ✓	
		Conditioned Adjoining Space	e.g ✓	
		Underground	e.g ✓	
		Presence of Metal Cladding	e.g ✓	
		U-value:	0.15 – 0.40	**W/m²K**
		C_m :	30 - 200	**KJ/m²K**
	Floors	**Exterior**	e.g ✓	
		Strongly Ventilated Space	e.g ✓	
		Unheated Adjoining Space	e.g ✓	
		Conditioned Adjoining Space	e.g ✓	
		Underground	e.g ✓	
		U-value:	0.20 – 0.50	**W/m²K**
		C_m :	30 - 150	**KJ/m²K**
	Doors			
		U-value:	0.80 – 3.00	**W/m²K**
		C_m :	30 - 100	**KJ/m²K**
	Glazing			
		U-value:	0.70 – 2.80	**W/m²K**
		T_{Solar} (or g-value):	0.20 – 0.80	
		L_{Solar} (or T_vis):	0.30 – 0.90	

2. Geometry

Section	Data Field	Details			
Geometry	General	Building orientation	0 ° – 315°		
		Zone height (Global):	Y.YY **m**		
		Building area:	YYY.YY **m²**		
	Zones	Building Type*:	e.g., *Dwelling, Office, Retail, Hotel, Hospital, School, Industrial, Warehouse, Leisure, Restaurant, Assembly, Laboratory, Healthcare*		
		Activity*:	e.g., *bedroom, bathroom, living room etc*		
		Zone Area:	YY.YY **m²**		
		HVAC System:	**Heating and mechanical cooling**		e.g ✓
			Heating only – other systems		e.g ✓
			Heating only – Electric resistance		e.g ✓
			Zones without HVAC system		e.g ✓
	Envelope	Zone:	e.g Manually predefined zone, on the 'Zones' data field		
		Type:	**Floor or Ceiling**		e.g ✓
			Roof		e.g ✓
			Wall		e.g ✓
		Construction	**Default construction of walls**		e.g ✓
			Manually defined construction from the 'Construction Elements' section		e.g Wall A
		Connects Space to:	**Exterior**		e.g ✓
			Strongly Ventilated Space		e.g ✓
			Unheated Adjoining Space		e.g ✓
			Conditioned Adjoining Space		e.g ✓
			Underground		e.g ✓
		Orientation:	**South**	e.g ✓	**North**
			South-East		**North-East**
			South-West		**North-West**
			West		**Horizontal**
			East		
		Envelope Area:	YY.YY **m²**		
	Doors	Assigned to manually predefined envelope	High Usage Entrance Doors		
			Personnel Doors		
			Vehicle Access Doors		
		Type:	**Highly Usage Entrance Doors**		e.g ✓
			Personnel Doors		

			Vehicles Access Doors	
		Construction:	**Default construction for doors**	e.g ✓
			Assigned to manually predefined door (section: Construction Elements)	e.g Door A
		Area:	Y.YY **m²**	
	Windows & Rooflights	**In Envelope:**	*e.g Envelop A* **(Assigned to manually predefined envelope)**	
		Glazing type:	Default glazing	e.g ✓
			Manually predefined glazing	e.g Window A
		Area (Projected**):**	Y.YY **m²**	
		Display Window	e.g ✓ or ✗	
		Shading System:	**External Solar Protection – Manually controlled**	e.g ✓
			External Solar Protection – with automatic control	e.g ✓
			All other cases	e.g ✓
		Transmission Factor	e.g 1	

*Geometry/Zone/Building Type & Activity							
1. Dwelling		**2. Office**		**3. Retail**		**4. Hotel**	
Bedroom	✓	Open Plan Office		Sales Area		Guest Room	
Bathroom		Private Office		Storage Area		Reception	
Living Room		Conference Room		Changing Room		Lobby	
Kitchen		Reception		Staff Room		Restaurant	
Dining Room		Break Room		Checkout Area		Bar	
Hallway		Storage Room		Display Area		Conference Room	
Utility Room		IT Room		Loading Area		Gym	
Garage		Toilet		Office		Spa	
Study/Office		Corridor		Toilet		Laundry Room	
						Kitchen	
						Storage Room	
						Office	

5. Hospital		**6. School**		**7. Industrial**		**8. Warehouse**	
Patient Room		Classroom		Production Area		Storage Area	
Operating Theatre		Laboratory		Workshop		Loading Bay	
Intensive Care Unit		Gym		Storage Area		Office	
Emergency Room		Library		Office		Staff Room	
Laboratory		Auditorium		Laboratory		Toilet	
Waiting Area		Cafeteria		Staff Room			
Office		Office		Loading Bay			
Pharmacy		Staff Room		Toilet			
Kitchen		Corridor					
Storage Room		Storage Room					
Toilet		Toilet					
Staff Room							
9. Leisure		**10. Restaurant**		**11. Assembly**		**12. Laboratory**	
Gym		Dining Area		Auditorium		Research Lab	
Swimming Pool		Kitchen		Conference Room		Clean Room	
Changing Room		Bar Area		Exhibition Hall		Office	
Sauna		Storage Room		Meeting Room		Storage Room	
Studio Room		Office		Lobby		Equipment Room	
Sports Hall		Toilet		Office		Staff Room	
Lounge Area				Storage Room		Toilet	
Office				Toilet			
Reception							
Toilet							
13. Healthcare							
Consultation Room							
Treatment Room							
Waiting Area							
Office							

Pharmacy				
Laboratory				
Storage Room				
Staff Room				
Toilet				

2.1 Geometry: Thermal Bridges

Thermal Bridges				
Junction	**Junctions Involving metal cladding**		**Junctions without Involving metal cladding**	
	User Psi W/mK		**User Psi W/mK**	
	Manual entry	**Default**	**Manual entry**	**Default**
Roof - Wall	e.g 0.4 – 0.6	**0.6**	e.g 0.1 – 0.2	**0.12**
Wall – Ground floor	e.g 0.7 – 1.2	**1.15**	e.g 0.2 – 0.4	**0.28**
Wall – Wall (corner)	e.g 0.2 – 0.3	**0.25**	e.g 0.05 – 0.15	**0.09**
Wall – Floor (not ground floor)	e.g 0.2 – 0.4	**0.07**	e.g 0.1 – 0.3	**0.18**
Lintel above window or door	e.g 1.0 – 1.3	**1.27**	e.g 0.3 – 0.6	**0.53**
Sill below window	e.g 0.8 – 1.2	**1.27**	e.g 0.1 – 0.3	**0.21**
Jamb at window or door	e.g 0.8 – 1.2	**1.27**	e.g 0.1 – 0.3	**0.2**

3. Building Systems

Data required per system:

Section	**Data Field**	**Details**		
Building Systems	**HVAC**	HEATING		
		Fireplace providing central heating		e.g ✓
		Central heating system,	**with water radiators**	e.g ✓
			with water convectors	e.g ✓
			with water floor heating	e.g ✓
			using air distribution	e.g ✓
		Other local room heaters,	**fanned**	e.g ✓
			unfanned	e.g ✓
		HEATING AND COOLING		

		Indoor packaged cabinet (VAV)				e.g ✓
		Fan coil systems				e.g ✓
		Water loop heat pump				e.g ✓
		Split or multi-split system				e.g ✓
		Single-room cooling system				e.g ✓
		Destratification fans (for specific zone)			**No**	e.g ✓
					Yes	e.g ✓
		Heat Source (for heating system)	**LTHW boiler**			e.g ✓
			MTHW boiler			e.g ✓
			HTHW boiler			e.g ✓
			Direct or storage electric heater			e.g ✓
			Heat pump:	**Air source**		e.g ✓
				Ground or water source		e.g ✓
			District heating			e.g ✓
			Grid Supplied Electricity			e.g ✓
		Fuel Type (for heating source)	**LPG**			e.g ✓
			Biogas			e.g ✓
			Diesel Oil			e.g ✓
			Biomass			e.g ✓
			Waste Heat			e.g ✓
			Smokeless Fuel (inc. Coke)			e.g ✓
			Dual Fuel Appliances (mineral + Wood)			e.g ✓
			Kerosene			e.g ✓
		System Efficiency (for heating source)	**Heat Generation (seasonal)**			e.g 0.65
			Radiant Efficiency			e.g 0.4
		SES Contribution	**Yes**			e.g ✓
			No			e.g ✓
		CHP	**Yes**			e.g ✓
			No			e.g ✓
	Ventilation	**Heat Recovery**	**No heat recovery**			e.g ✓
			Plate heat exchanger (Recuperator)			e.g ✓
			Heat-pipes			e.g ✓
			Thermal wheel			e.g ✓
			Run around coil			e.g ✓
		Zonal Ventilation Type	**Natural**			e.g ✓
			Mechanical supply/extract			e.g ✓
			Demand for high-pressure drop air treatment (based on activity)		**N/A**	e.g ✓
					No	e.g ✓
					Yes	e.g ✓
					Partial or Conditional	e.g ✓
			Local Mechanical Exhaust		**No**	e.g ✓
					Yes	e.g ✓
			Airflow Rate:		e.g If '✓', then:	

			Exhaust SFP	Default	e.g 1.5 W/L/s
				Manual Entry	e.g 0.3 – 3.4 W/L/s
			Extract system serving,	multiple spaces	e.g ✓
				single space	e.g ✓
		SFP	Default		e.g 1.5 W/L/s
			Manual entry		e.g 0.3 – 3.4 W/L/s
		Heat Recovery	No heat recovery		e.g ✓
			Plate heat exchanger (recuperator)		e.g ✓
			Heat-pipes		e.g ✓
			Thermal wheel		e.g ✓
			Run around coil		e.g ✓
			Efficiency (seasonal)	Default	e.g 0.6
				Manual entry	e.g 0.5 – 9.5
	Cooling System	Pack chiller type	Air-cooled		e.g ✓
			Water cooled		e.g ✓
			Remote condenser		e.g ✓
	HWS	Generator Type	Dedicated HW heater		e.g ✓
			Stand-alone water heater		e.g ✓
			Instantaneous hot water only		e.g ✓
			Instantaneous combi		e.g ✓
			Heat pump		e.g ✓
			Fireplace		e.g ✓
			Predefined HVAC system		e.g HVAC A
		Fuel	LPG		e.g ✓
			Biogas		e.g ✓
			Diesel Oil		e.g ✓
			Biomass		e.g ✓
			Waste Heat		e.g ✓
			Kerosene		e.g ✓
		Efficiency	Heat Generation (seasonal)		e.g 0.65
		Storage	No		e.g ✓
			Yes		e.g ✓
			Volume:		e.g 200L
			Losses:		e.g 100 MJ/Month
		Secondary Circulation	No		e.g ✓
			Yes		e.g ✓
			Pump power:		e.g 0.1 – 10 KW
			Losses:		e.g 2- 10 W/m
			Loop Length:		e.g 10 – 500 m
			Time Control	No	e.g ✓
				Yes	e.g ✓

		Deadleg length for a specific zone:				e.g 0.5 – 10 **m**
	Lighting (Zonal**)**	**Full lighting design**	**No**	**Yes**	**Total wattage**	**Design illuminance**
			e.g ✓	e.g ✓	e.g 100 – 300 **W**	e.g 300 **lux**
		Lighting Selected Without Calculation	**No**	**Yes**	**Lumens per circuit wattage**	
			e.g ✓	e.g ✓	e.g 50 **W**	
		Unavailable lighting parameters	**No**	**Yes**	**Lamb Type**	
			e.g ✓	e.g ✓	**Unknown**	e.g ✓
					Tungsten lamp	e.g ✓
					Metal halide	e.g ✓
					Fluorescent	e.g ✓
					Compact fluorescent	e.g ✓
					T8, T12, T5*	e.g ✓
					High pressure Na	e.g ✓
					High pressure Hg	e.g ✓
					LEDs	e.g ✓
		Air-Extracting Luminaires Fitted			**No**	**Yes**
					e.g ✓	e.g ✓
		Light controls	**Automatic daylight (**zonal**)**		e.g percentage area controlled is 30%	e.g ✓
			Manual (local**)**		e.g ✓	
			Photoelectric		e.g ✓	
					Switching	**Dimming**
					e.g ✓	e.g ✓
					TYPE	
					Addressable systems	**Stand-alone sensors**
					e.g ✓	e.g ✓
					PARASITIC POWER	
					Default	**0.52 W/m²**
					Manual Entry	e.g 0.01 – 0.3 **W/m²**
					OCCUPANCY SENSING	
					None	✓
					Auto On-Dimmed	✓
					Auto On-Off	✓
					Manually On-Dimmed	✓
					Manually On/ Auto - Off	✓
	SES	**Default HWS**				e.g ✓
		Manually defined HWS				e.g HWS A
		Orientation	**North**			e.g ✓
			North- East			e.g ✓
			East			e.g ✓
			South-East			e.g ✓
			South			e.g ✓

			South-West		e.g ✓
			West		e.g ✓
			North-West		e.g ✓
		Inclination	0 °		e.g ✓
			15 °		e.g ✓
			30 °		e.g ✓
			45 °		e.g ✓
			60 °		e.g ✓
			75 °		e.g ✓
			90 °		e.g ✓
		Contribution to Services	HW only		e.g ✓
			HW and space heating		e.g ✓
		Collector Parameters		Area:	e.g 6 m²
			Performance	DEFAULT VALUES	
				Unglazed	e.g ✓
				Flat Panel	e.g ✓
				Evacuated cube	e.g ✓
				MANUAL ENTRY	
				η_o:	e.g 0.6
				a_1:	e.g 0
				a_2:	e.g 0
				IAM:	e.g 0
	PVS	Type	Monocrystalline silicon		e.g ✓
			Polycrystalline silicon		e.g ✓
			Amorphous silicon		e.g ✓
			Other thin films		e.g ✓
				Area:	e.g 25 m²
		Orientation	North		e.g ✓
			North- East		e.g ✓
			East		e.g ✓
			South-East		e.g ✓
			South		e.g ✓
			South-West		e.g ✓
			West		e.g ✓
			North-West		e.g ✓
		Inclination	0 °		e.g ✓
			15 °		e.g ✓
			30 °		e.g ✓
			45 °		e.g ✓
			60 °		e.g ✓
			75 °		e.g ✓
			90 °		e.g ✓
	Wind Generators	Terrain Type	Smooth flat country		e.g ✓
			Farmland with boundary hedges		e.g ✓
			Suburban area		e.g ✓
			Urban with average building height>15m		e.g ✓
		Swept Area:	120 m²		
		Rotor diameter:	10675 m		

		Height:	15 **m**
		Power:	35 **KW**

Appendix 3 Input from R2MI - SRI Data

SRI Input Data Requirements Based on Method B:

Section	Data Field	Details
Heating	Heat emission control	*e.g., Central Automatic, Individual Room*
	Emission control for TABS	*e.g., Central Automatic, Advanced Central Automatic*
	Control of distribution fluid temperature (Same functionality for direct electric heating networks	*e.g., Outside Temperature Compensated, Demand Based*
	Control of distribution pumps in networks	*e.g., On/Off, Multi-Stage*
	Thermal Energy Storage (TES) for building heating (excluding TABS)	*e.g., Time-Scheduled, Load Prediction Based*
	Heat generator control (all except heat pumps)	*e.g., Variable Temperature (Outdoor), Variable Temperature (Load)*
	Heat generator control (for heat pumps)	*e.g., Multi-Stage (Load), Variable Control (Load)*
	Sequencing in case of different heat generators	*e.g., Fixed Priority, Dynamic Priority*
	Reporting Heating System Performance	*e.g., Current KPIs, Current & Historical KPIs*
	Flexibility and grid interaction	*e.g., Scheduled Operation, Self-Learning Optimal Control*
Domestic Hot Water	DHW storage charging control (with electric element or heat pump)	*e.g., Scheduled Charging, Scheduled Charging & Multi-Sensor Management*
	DHW storage charging control (using hot water generation)	*e.g., Automatic On/Off & Scheduled Charging, Automatic On/Off, Scheduled Charging & Demand-Based Supply or Multi-Sensor Management*
	DHW storage charging Control (with heat generation like solar collector)	*e.g., Automatic Solar & Supplementary Storage, Demand-Oriented Supply or Multi-Sensor Management*
	Sequencing in case of different DHW generators	*e.g., Fixed Priority, Dynamic Priority*
	Reporting DHW System Performance	*e.g., Actual Values, Actual & Historical Values*
Cooling	Cooling emission control	*e.g., Central Automatic Control, Individual Room Control*

	Emission control for TABS	*e.g., Central Automatic Control, Advanced Central Automatic Control*
	Temperature control of distribution network	*e.g., Outside Temperature Compensated, Demand-Based Control*
	Control of distribution pumps in networks	*e.g., On/Off Control, Multi-Stage Control*
	Avoiding simultaneous heating and cooling operation	*e.g., Partial Interlock, Total Interlock*
	Thermal Energy Storage (TES) control	*e.g., Time-Scheduled Storage Operation, Load Prediction-Based Storage Operation*
	Generator control for cooling	*e.g., Multi-Stage Cooling Production Control, Variable Cooling Production Control*
	Sequencing of different cooling generators	*e.g., Fixed Sequencing Based on Loads, Load Prediction-Based Sequencing*
	Report information regarding cooling system performance	*e.g., Reporting of Current KPIs, Reporting of Current and Historical KPIs*
	Flexibility and grid interaction	*e.g., Scheduled Cooling Operation, Self-Learning Optimal Cooling Control*
Ventilation	Supply air flow control at the room level	*e.g., Clock control, Occupancy detection control*
	Air flow or pressure control at the air handler level	*e.g., Continuous airflow, Multi-stage control*
	Heat recovery control: prevention of overheating	*e.g., Modulate or bypass heat recovery based on exhaust or room sensors, Modulate or bypass heat recovery based on room sensors or predictive control*
	Supply air temperature control at the air handling unit level	*e.g., Constant setpoint control for temperature, Variable set point*
	Free cooling with mechanical ventilation system	*e.g., Night cooling, Free cooling*
	Reporting information regarding IAQ	*e.g., Air quality sensors, Real-time & historical data*
Lighting	Occupancy control for indoor lighting	*e.g., Manual on/off switch, Automatic detection*
	Control artificial lighting power based on daylight levels	*e.g., Manual (per room / zone), Automatic switching*
Dynamic Building Envelope	Window solar shading control	*e.g., Manual sun shading, Motorized operation*
	Window open/closed control, combined with HVAC system	*e.g., Manual or fixed windows, Open/closed detection*
	Reporting information regarding performance of dynamic building envelope systems	*e.g., No reporting, Product position & fault detection*

Electricity	Reporting information regarding local electricity generation	*e.g., Current data, current and historical data*
	Storage of (locally generated) electricity	*e.g., On-site storage, on-site storage with grid-based controller*
	Optimizing self-consumption of locally generated electricity	*e.g., Scheduled consumption management, Automated consumption management with renewables*
	Control of combined heat and power plant (CHP)	*e.g., CHP runtime control with RES and grid optimization, Dynamic charging and runtime control for renewables*
	Support of (micro)grid operation modes	*e.g., Automated consumption management based on grid signals, Building-level electricity management including microgrid capabilities*
	Reporting information regarding energy storage	*e.g., SOC monitoring, Current and historical data availability*
	Reporting information regarding electricity consumption	*e.g., Electricity consumption reporting, Real-time building performance feedback*
Electric vehicle charging	EV Charging Capacity	*e.g., Not present, Simple power plug*
	EV Charging Grid balancing	*e.g., Not present, 1-way controlled charging*
	EV charging information and connectivity	*e.g., No information available, Reporting information on EV charging status to occupant*
Monitoring and control	Run time management of HVAC systems	*e.g., Manual setting, Runtime setting*
	Detecting faults of technical building systems and providing support to the diagnosis of these faults	*e.g., No central indication of detected faults and alarms, central indication*
	Occupancy detection: connected services	*e.g., None, Occupancy detection for individual functions*
	Central reporting of TBS performance and energy use	*e.g., None, Central or remote reporting of real-time energy use*
	Smart Grid Integration	*e.g., None - No harmonization between grid and TBS, Demand side management possible for (some) individual TBS*
	Reporting information regarding demand side management performance and operation	*e.g., None, Reporting information on current DSM status*
	Override of DSM control	*e.g., No DSM control, DSM control without the possibility to override this control by the building user*
	Single platform that automatically control & coordinate between TBS + optimization of energy flows	*e.g., Manual setting, Runtime setting of heating and cooling plants*

Appendix 4 Input from Euphyia - SRI Data

SRI Input Data Requirements

1. Heating

Section	METHOD		Data Field	Functionality level Details
	A	B		
Heating (A2)	X	X	**Heat Emission Control**	- Not Applicable
				- No Automatic Control
				- Central Automatic Control
				- Individual Room Control
				- **Individual Room Control with Communication:** **i.** between controllers and the BACS **ii.** and occupancy detection
		X	**Emission Control for TABS** (heating mode)	- Not Applicable
				- No Automatic Control
				- Central Automatic Control
				- Advanced Central Automatic Control
				- Advanced Central Automatic Control with intermittent operation and/or room temperature control
		X	**Control of Distribution Fluid Temperature** (supply or return airflow or water flow)	- Not Applicable
				- No Automatic Control
				- Outside temperature-compensated control
				- Demand-based control
		X	**Control of Distribution Pumps in Networks**	- Not Applicable
				- No Automatic Control
				- On/Off Control
				- Multi-Stage Control

				- **Variable speed control:** **i.** pump unit: internal estimations **ii.** external demand signal
	X		**Thermal Energy Storage (TES)**	- Not Applicable
				- None
				- HW Storage Vessels
				- HW Storage Vessels, controlled based on external signals (from BACS or grid)
		X	**Thermal Energy Storage (TES) for building heating** (excluding TABS)	- Not Applicable
				- Continuous storage operation
				- Time-scheduled storage operation
				- Load prediction-based storage operation
				- Heat storage capable of flexible control through grid signals
	X	X	**Heat Generator Control** (all except heat pumps)	- Not Applicable
				- Constant temperature control
				- **Variable temperature control depending:** **i.** on outdoor temperature **ii.** on the load
	X	X	**Heat Pump Control**	- Not Applicable
				- On/Off control of heat generator
				- Multi-stage control of heat generator capacity depending on the load or demand
				- Variable control of heat generator capacity depending on the load or demand
				- Variable control of heat generator capacity depending on the load and external signals from the grid
		X	**Sequencing of Heat Generators**	- Not Applicable
				- Priorities only based on running time
				- Control according to a fixed priority list

				- Control according to dynamic priority list: **i.** based on current energy efficiency, carbon emissions, and capacity of generators **ii.** based on current and predicted load, energy efficiency, carbon emissions, and capacity of generators **iii.** based on current and predicted load, energy efficiency, carbon emissions, and capacity of generators and external signals from the grid
	X	X	**Reporting Heating System Performance**	- Not Applicable
				- None
				- Central or remote reporting of: **i.** current performance KPIs **ii.** current performance KPIs and historical data
				- Central or remote reporting of: **i.** performance evaluation including forecasting and/or benchmarking **ii.** performance evaluation including forecasting and/or benchmarking, with predictive management and fault detection
		X	**Flexibility and Grid Interaction**	- Not Applicable
				- Scheduled Heating System Operation
				- Self-learning optimal control of heating system
				- Heating system cable of flexible control through grid signals
				- Optimized control of heating system based on local predictions and grid signals

2. Domestic Hot water

Section	Method		Data Field	Functionality level Details
	A	B		
Domestic Hot Water (A3)	X		**Control of DHW storage charging** (with direct electric heating or integrated electric heat pump)	- Not Applicable
				- Automatic control On/Off
				- Automatic control On/Off and: **i.** scheduled charging enable **ii.** scheduled charging enable and multi-sensor storage management
		X	**Control of DHW storage charging** (with direct electric heating or integrated electric heat pump)	- Not Applicable
				- Automatic control On/Off
				- Automatic control On/Off and: **i.** scheduled charging enable **ii.** scheduled charging enable and multi-sensor storage management
				- Automatic charging control based on local availability of renewables or information from the electricity grid
	X		**Control of DHW storage charging**	- Not Applicable
				- None
				- HW storage vessels available
				- Automatic charging control based on local availability of renewables or information from the electricity grid
		X	**Control of DHW storage charging**	- Not Applicable
				- Automatic control On/Off
				- Automatic control On/Off and: **i.** scheduled charging enable **ii.** scheduled charging enable, and demand-based supply temperature control or multi-sensor storage management
				- DHW production system capable of automatic charging control based on an external signal

		X	**Control of DHW storage charging** (with solar collector and supplementary heat generation)	- None
				- Manually selected control of solar energy or heat generation
				- Automatic control of solar storage charge (Prio. 1) and: **i.** supplementary storage charge **ii.** supplementary storage charge and demand-oriented supply or multi-sensor storage management **iii.** supplementary storage charge, demand-oriented supply and return temperature control, and multi-sensor storage management
		X	**Sequencing of different DHW generators**	- Not Applicable
				- Priorities only based on running time
				- Control according to a fixed priority list
				- Control according to a dynamic priority list: **i.** Based on current energy efficiency, carbon emissions, and capacity of generators **ii.** Based on current and predicted load, energy efficiency, carbon emissions, and capacity of generators **iii.** Based on current and predicted load, energy efficiency, carbon emissions, capacity of generators AND external signal from grid
	X	X	**Reporting domestic hot water performance**	- Not Applicable
				- None
				- Indication of actual values
				- Actual values and historical data
				- Performance evaluation forecasting and/or benchmarking
				- Performance evaluation forecasting and/or benchmarking; also including predictive management and fault detection

3. Cooling

Section	Method		Data Field	Functionality level Details
	A	B		
Cooling (A4)	X	X	**Cooling emission control**	- Not Applicable
				- No Automatic control
				- Central Automatic Control
				- Individual Room Control
				- **Individual Room Control with:** **i.** communication between controllers and the BACS **ii.** communication and occupancy detection
	X		**Generator Control for Cooling**	- Not Applicable
				- On/Off-control of cooling production
				- Multi-stage control of cooling production capacity depending on the load or demand
				- **Variable control of cooling production capacity depending on:** **i.** the load or demand **ii.** the load and external signals from the grid
		X	**Emission Control for TABS** (cooling mode)	- Not Applicable
				- No automatic control
				- Central automatic control
				- Advance central automatic control
				- Advance central automatic control with intermitted operation and/or room temperature feedback control
		X	**Control of Distribution Network Chilled Water temperature (supply or return)**	- Not Applicable
				- Constant temperature control
				- Outside temperature-compensated control
				- Demand-based control
		X	**Control of Distribution Pumps in Networks**	- Not Applicable
				- No automatic control

				- On/Off control
				- Multi-stage control
				- Variable-speed pump control: **i.** pump unit (internal) estimations **ii.** external demand signal
		X	**Interlock: Avoiding Simultaneous Heating and Cooling in the Same Room**	- Not Applicable
				- No interlock
				- Partial interlock
				- Total interlock
		X	**Control of Thermal Energy Storage (TES) Operation**	- Not Applicable
				- Continuous storage operation
				- Time-scheduled storage operation
				- Load prediction-based storage operation
				- Cold storage capable of flexible control through grid signals
		X	**General Control for Cooling**	- Not Applicable
				- On/Off-control cooing production
				- Multi-stage control of cooling production capacity depending on load or demand
				- Variable control of cooling production capacity depending on: **i.** the load or demand **ii.** the load and external signals from the grid
		X	**Sequencing of Different Cooling Generators**	- Not Applicable
				- Priorities only based on running time
				- Fixed sequencing based on load only
				- Dynamic priorities based on generator efficiency and characteristics
				- Load prediction-based sequence is based on e.g COP and available power of a device and the predicted required power
				- Sequencing based on dynamic priority list, including external signals from grid

	X	X	**Report Information Regarding Cooling System Performance**	- Not Applicable
				- None
				- **Central or remote reporting of:** **i.** Current performance KPIs **ii.** Current performance of KPIs and historical data **iii.** Performance evaluation including forecasting and/or benchmarking **iv.** Performance evaluation including forecasting and/or benchmarking also including predictive management and fault detection.
	X	X	**Flexibility and Grid Interaction**	- Not Applicable
				- No Automatic Control
				- Scheduled operation of cooling system
				- Self-learning optimal control of the cooling system
				- Cooling system capable of flexible control through grid signals
				- Optimized control of the cooling system based on local predictions and grid signals

4. Ventilation

Section	Method		Data Field	Functionality level Details
	A	B		
Ventilation (A5)	X	X	**Supply airflow control at the room level**	- Not Applicable
				- No ventilation system or manual control
				- Clock control
				- Occupancy detection control
				- Central Demand Control based on air quality sensors
				- Local Demand Control based on air quality sensors with local flow from/to the zone regulated by dampers
		X	**Airflow or pressure control at the air handler level**	- Not Applicable
				- No automatic control: Continuously supplies of airflow for a maximum load of all rooms
				- On/Off time control: Continuously supplies of airflow for a maximum load of all rooms during nominal occupancy time
				- Multi-stage control: To reduce the auxiliary energy demand of the fan
				- Automatic flow or pressure control without pressure reset: Load-dependent supplies of airflow for the demand of all connected rooms
				- Automatic flow or pressure control pressure reset: Load-dependent airflow supplies for the demand of all connected rooms for variable air volume systems with VFD.
		X	**Heat Recover Control: Prevention of overheating**	- Not Applicable
				- Without overheating control
				- Modulate or bypass heat recovery based on: **i.** sensors in air exhaust **ii.** multiple room temperature sensors or predictive control

		X	**Supply air temperature control at the air handling unit level**	- Not Applicable
				- No Automatic Control
				- Constant setpoint: A control loop enables control of supply air temperature, the setpoint is constant and can only be modified by a manual action
				- Variable set point with outdoor temperature compensation
				- Variable set point with load-dependent compensation. A control loop enables control of supply air temperature. The set point is defined as a function of the loads in the room.
		X	**Free Cooling with mechanical ventilation System**	- Not Applicable
				- No automatic control
				- On/Off control
				- Multi-stage control
				- **Variable-speed pump control:** **i.** pump unit (internal) estimations **ii.** external demand signal
	X	X	**Reporting Information regarding IAQ**	- Not Applicable
				- No automatic control
				- Night cooling
				- Free cooling: air flows modulated during all time periods to minimize the amount of mechanical cooling
				- H,x – directed control: The amount of outside air and recirculation air are modulated during all time periods to minimize the amount of mechanical cooling

5. Lighting

Section	Method		Data Field	Functionality level Details
	A	B		
Lighting (A6)	X	X	**Supply airflow control at the room level**	- Not Applicable
				- Manual On/Off switch
				- Manual On/Off switch + additional sweeping extinction signal
				- Automatic detection: **i.** auto on/dimmed or auto-off **ii.** manual on/ dimmed or auto-off
		X	**Control Airflow Lighting Power based on Daylight Levels**	- Not Applicable
				- Manual: **i.** central **ii.** per room or zone
				- Automatic switching
				- Automatic dimming
				- Automatic dimming with scene-based lighting control adjusts illuminance, colour temperature, and light distribution dynamically during set time intervals, adapting to design, human needs, and visual tasks.

6. Dynamic Building Envelope

Section	Method		Data Field	Functionality level Details
	A	B		
Dynamic Building Envelope (A7)	X	X	**Window Solar Shading Control**	- Not Applicable
				- No sun-shading or only manual operation
				- **Motorized operation with:** i. manual control ii. automatic control based on sensor data
				- Combined light/blind/HVAC control
				- Predictive blind control
		X	**Window Open/Closed control, Combined with HVAC System**	- Not Applicable
				- Manual operation or only fixed windows
				- Open/Closed detection to shut down heating or cooling systems
				- Level 1 + Automated mechanical window opening based on room sensor data
				- Level 2 + Centralized coordination of operable windows
	X	X	**Reporting Information Regarding Performance of Dynamic Building Envelope Systems**	- Not Applicable
				- No reporting
				- **Position of each product and:** **i.** Fault detection **ii.** Fault detection & predictive maintenance **iii.** Fault detection & predictive maintenance, real-time sensor data **iv.** Fault detection & predictive maintenance, real-time & historical sensor data

7. Electricity

Section	Method		Data Field	Functionality level Details
	A	B		
Electricity (A8)	X	X	**Reporting Information Regarding Local Electricity Generation**	- Not Applicable
				- None
				- Clock control
				- Current generation data available
				- Actual values and historical data
				- **Performance evaluation including:** **i.** forecasting and/or benchmarking **ii.** forecasting and/or benchmarking, including predictive management and fault detection
	X	X	**Storage of (**Locally Generated**) Electricity**	- Not Applicable
				- None
				- On-site storage of electricity
				- **On-site storage of energy:** **i.** with controller based on grid signals **ii.** with controller optimising the use of locally generated electricity **iii.** with controller optimising the use of locally generated electricity and the possibility to feed back into the grid
		X	**Optimizing Self-consumption of Locally Generated Electricity**	- Not Applicable
				- None
				- Scheduling electricity consumption
				- Automated management of local electricity consumption based on: **i.** current renewable energy availability **ii.** current and predicted energy needs and renewable energy availability
		X		- Not Applicable

			Control of Combined Heat and Power Plant (CHP)	- CHP control based on scheduled runtime management and/or current heat energy demand
				- **CHP runtime control influenced by the fluctuating availability:** i. of RES; overproduction will be fed into the grid **ii.** of RES and grid signals; dynamic charging and runtime control to optimise self-consumption of renewables
		X	**Support of (**Micro**) Grid Operation Modes**	- Not Applicable
				- None
				- **Automated management of (building-level) electricity consumption:** **i.** on grid signals **ii.** and electricity supply to neighbouring building (microgrid) or grid **iii.** and supply, with the potential to continue limited off-grid operation (island mode)
	X	X	**Reporting Information Regarding Energy Storage**	- Not Applicable
				- None
				- Current state of charge (SOC) data available
				- Actual values and historical data
				- **Performance evaluation including:** **i.** forecasting and/or benchmarking **ii.** forecasting and/or benchmarking; also including predictive management and fault detection
	X	X	**Reporting Information Regarding Electricity Consumption**	- Not Applicable
				- None
				- Reporting on current electricity consumption (building level)
				- **Real-time feedback or benchmarking on:** **i.** building level **ii.** appliance level **iii.** on appliance level with automated personalized recommendations

8. Electric Vehicle Charging

Section	Method		Data Field	Functionality level Details
	A	B		
Electric Vehicle Charging (A9)	X	X	eV Charging Capacity	- Not Applicable
				- Not present
				- Ducting (or simple power plug) available
				- **Parking Spaces Equipped with Recharging Points:** **i.** 0-9% of parking spaces have recharging points. **ii.** 10-15% of parking spaces have recharging points. **iii.** Over 50% of parking spaces have recharging points.
	X	X	eV Charging Grid Balancing	- Not Applicable
				- Not present
				- 1-way controlled charging
				- 2-way controlled charging
	X	X	eV Charging Information and Connectivity	- Not Applicable
				- No information available
				- **Reporting information on:** **i.** eV charging status to occupant **ii.** eV charging status to occupant and automatic identification and authorization of the charging station **(**ISO 15118**)**

9. Monitoring and Control

Section	METHOD		Data Field	Functionality level Details
	A	B		
Monitoring and Control (A10)		X	**Run Time Management of HVAC Systems**	- Not Applicable
				- Manual Setting
				- Runtime setting of heating and cooling plant following a predefined time schedule
				- Heating and Cooling plant On/Off control, based on: i. building loads ii. predictive control or grid signals
		X	**Detecting Faults of Technical Building Systems and Providing Support to the Diagnosis of these Faults `**	- Not Applicable
				- No central indication of faults and alarms
				- With central indication of faults and alarms: **i.** for at least 2 relevant TBS **ii.** far all relevant TBS **iii.** for all relevant TBS, including diagnosing functions
		X	**Occupancy Detection: Connected Services**	- Not Applicable
				- None
				- Occupancy detection for individual functions
				- Centralised occupant detection which feeds into several TBS such as lighting and heating
	X	X	**Central Reporting of TBS Performance and Energy Use**	- Not Applicable
				- None
				- Central or remote reporting of real-time energy use per: i. energy carrier ii. energy carrier, combining TBS of at least two domains in one interface iii. energy carrier, combining TBS of all main domains in one interface

	X	X	**Smart Grid Integration**	- Not Applicable
				- None – No harmonization between grid and TBS; building is operating independently from the grid load
				- Demand side management possible for (some) individual TBS, but not coordinated over various domains
				- Coordinated demand side management of multiple TBS
		X	**Reporting Information Regarding Demand Side Management Performance And Operation**	- Not Applicable
				- None
				- Time-scheduled storage operation
				- **Reporting information on**: **i.** current DSM status, including managed energy flows **ii.** current historical and predicted DSM status, including managed energy flows including managed energy flows
		X	**Override of DSM Control**	- Not Applicable
				- No DSM control
				- DSM control without the possibility to override this control by the building user
				- Manual override and reactivation of DSM control by the building user
				- Scheduled override of DSM control and reactivation: i. by the building user ii. with optimised control
	X	X	**Single Platform that allows Automated Control &**	- Not Applicable
				- None

			Coordination Between TBS and Optimization of Energy Flow Based on Occupancy, Weather and Grod Signals	**- Single platform that allows:** **i.** manual control of multiple TBS **ii.** automated control & coordination between TBS **iii**. automated control & coordination between TBS + optimization of energy flow based on occupancy, weather and grid signals.

Appendix 5 EPC Sample: Austria

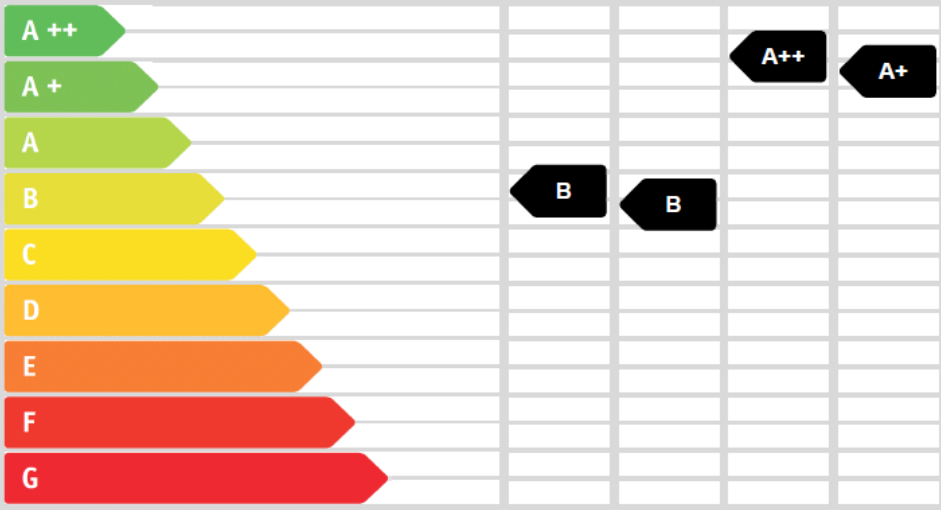
Energieausweis für Wohngebäude

OIB ÖSTERREICHISCHES INSTITUT FÜR BAUTECHNIK

OIB-Richtlinie 6
Ausgabe: April 2019

BEZEICHNUNG	MUSTERAUSWEIS		Umsetzungsstand	Planung
Gebäude(-teil)	Zone		Baujahr	2020
Nutzungsprofil	Einfamilienhäuser		Letzte Veränderung	2020
Straße	Bahnhofstrasse 8		Katastralgemeinde	Schladming
PLZ/Ort	8970	Schladming	KG-Nr.	67612
Grundstücksnr.	GNR112		Seehöhe	750 m

SPEZIFISCHER STANDORT-REFERENZ-HEIZWARMEBEDARF, PRIMARENERGIEBEDARF, KOHLENDIOXIDEMISSIONEN UND GESAMTENERGIEEFFIZIENZ-FAKTOR jeweils unter STANDORTKLIMA-(SK)-Bedingungen



HWB_{Ref}: Der **Referenz-Heizwärmebedarf** ist jene Wärmemenge, die in den Räumen bereitgestellt werden muss, um diese auf einer normativ geforderten Raumtemperatur, ohne Berücksichtigung allfälliger Erträge aus Wärmerückgewinnung, zu halten.

WWWB: Der **Warmwasserwärmebedarf** ist in Abhängigkeit der Gebäudekategorie als flächenbezogener Defaultwert festgelegt.

HEB: Beim **Heizenergiebedarf** werden zusätzlich zum Heiz- und Warmwasserwärmebedarf die Verluste des gebäudetechnischen Systems berücksichtigt, dazu zählen insbesondere die Verluste der Wärmebereitstellung, der Wärmeverteilung der Wärmespeicherung und der Wärmeabgabe sowie allfälliger Hilfsenergien.

HHSB: Der **Haushaltsstrombedarf** ist als flächenbezogener Defaultwert festgelegt. Er entspricht in etwa dem durchschnittlichen flächenbezogenen Stromverbrauch eines österreichischen Haushalts.

RK: Das **Referenzklima** ist ein virtuelles Klima. Es dient zur Ermittlung von Energiekennzahlen

EEB: Der **Endenergiebedarf** umfasst zusätzlich zum Heizenergiebedarf den Haushaltsstrombedarf, abzüglich allfälliger Energieerträge und zusätzlich eines dafür notwendigen Hilfsenergiebedarfs. Der Endenergiebedarf entspricht jener Energiemenge, die eingekauft werden muss (Lieferenergiebedarf).

f_{GEE}: Der **Gesamtenergieeffizienz-Faktor** ist der Quotient aus einerseits dem Endenergiebedarf abzüglich allfälliger Energieerträge und zuzüglich des dafür notwendigen Hilfsenergiebedarfs und andererseits einem Referenz-Endenergiebedarf (Anforderung 2007).

PEB: Der **Primärenergiebedarf** ist der Endenergiebedarf einschließlich der Verluste in allen Vorketten. Der Primärenergiebedarf weist einen erneuerbaren ($PEB_{ern.}$) und einen nicht erneuerbaren ($PEB_{n.ern.}$) Anteil auf.

CO_{2eq}: Gesamte dem Endenergiebedarf zuzurechnenden **äquivalenten Kohlendioxidemissionen** (Treibhausgase), einschließlich jener für Vorketten.

SK: Das **Standortklima** ist das reale Klima am Gebäudestandort. Dieses Klimamodell wurde auf Basis der Primärdaten (1970 bis 1999) der Zentralanstalt für Meteorologie und Geodynamik für die Jahre 1978 bis 2007 gegenüber der Vorfassung aktualisiert.

Alle Werte gelten unter der Annahme eines normierten Benutzerinnenverhaltens. Sie geben den Jahresbedarf pro Quadratmeter beheizter Brutto-Grundfläche an.

Dieser Energieausweis entspricht den Vorgaben der OIB-Richtlinie 6 „Energieeinsparung und Wärmeschutz" des Österreichischen Instituts für Bautechnik in Umsetzung der Richtlinie 2010/31/EU vom 19. Mai 2010 über die Gesamtenergieeffizienz von Gebäuden bzw. 2018/844/EU vom 30. Mai 2018 und des Energieausweis-Vorlage-Gesetzes (EAVG). Der Ermittlungszeitraum für die Konversionsfaktoren für Primärenergie und Kohlendioxidemissionen ist für Strom: 2013-09 – 2018-08, und es wurden übliche Allokationsregeln unterstellt.

1

Energieausweis für Wohngebäude

OIB ÖSTERREICHISCHES INSTITUT FÜR BAUTECHNIK

OIB-Richtlinie 6
Ausgabe: April 2019

GEBÄUDEKENNDATEN

Brutto-Grundfläche (BGF)	192,0 m²	Heiztage	179 d/a	Art der Lüftung	RLT mit WRG
Bezugsfläche (BF)	153,6 m²	Heizgradtage	4802 Kd/a	Solarthermie	
Brutto-Volumen (V_B)	576,0 m³	Klimaregion	ZA	Photovoltaik	
Gebäude-Hüllfläche (A)	432,0 m²	Norm-Außentemperatur	-13,4 °C	Stromspeicher	
Kompaktheit (A/V)	0,75 1/m	Soll-Innentemperatur	22,0 °C	WW-WB-System (primär)	kombiniert mit RH
charakteristische Länge(l_c)	1,33 m	mittlerer U-Wert	0,15 W/m²K	WW-WB-System (sekundär, opt.)	-
Teil-BGF		LEK_T-WERT	13,04	RH-WB-System (primär)	Fernwärme aus Heizwerk
Teil-BF		Bauweise	leicht	RH-WB-System (sekundär, opt.)	-
Teil-V_B					

WÄRME- UND ENERGIEBEDARF (Referenzklima)

		Ergebnisse		Nachweis über HEB Anforderungen	
Referenz-Heizwärmebedarf	$HWB_{Ref,RK}$ =	24,0 kWh/m²a	entspricht	$HWB_{Ref,RK,zul}$ =	39,0 kWh/m²a
Heizwärmebedarf	HWB_{RK} =	16,0 kWh/m²a			
Endenergiebedarf	EEB_{RK} =	69,4 kWh/m²a	entspricht	$EEB_{RK,zul}$ =	78,7 kWh/m²a
Gesamtenergieeffizienz-Faktor	$f_{GEE,RK}$ =	0,66	entspricht	$f_{GEE,RK,zul}$ =	0,80
Erneuerbarer Anteil	Fernwärme		entspricht	Punkt 5.2.3 a, b oder c	

WÄRME- UND ENERGIEBEDARF (Standortklima)

Referenz-Heizwärmebedarf	$Q_{h,Ref,SK}$ =	6 509 kWh/a	$HWB_{Ref,SK}$ =	33,9 kWh/m²a
Heizwärmebedarf	$Q_{h,SK}$ =	4 398 kWh/a	HWB_{SK} =	22,9 kWh/m²a
Warmwasserwärmebedarf	Q_{tw} =	1 472 kWh/a	WWWB =	7,7 kWh/m²a
Heizenergiebedarf	$Q_{h,Ref,SK}$ =	12 670 kWh/a	HEB_{SK} =	66,0 kWh/m²a
Energieaufwandszahl Warmwasser			$e_{AWZ,WW}$ =	4,02
Energieaufwandszahl Raumheizung			$e_{AWZ,RH}$ =	1,04
Energieaufwandszahl Heizen			$e_{AWZ,H}$ =	1,59
Haushaltsstrombedarf	Q_{HHSB} =	2 667 kWh/a	HHSB =	13,9 kWh/m²a
Endenergiebedarf	$Q_{EEB,SK}$ =	15 337 kWh/a	EEB_{SK} =	79,9 kWh/m²a
Primärenergiebedarf	$Q_{PEB,SK}$ =	24 635 kWh/a	PEB_{SK} =	128,3 kWh/m²a
Primärenergiebedarf nicht erneuerbar	$Q_{PEBn.em.,SK}$ =	6 652 kWh/a	$PEB_{n.em.,SK}$ =	34,6 kWh/m²a
Endenergiebedarf	$Q_{PEBem.,SK}$ =	17 983 kWh/a	$PEB_{em.,SK}$ =	93,7 kWh/m²a
äquivalente Kohlendioxidemissionen	$Q_{CO2eq,SK}$ =	1 440 kg/a	$CO_{2eq,SK}$ =	7,5 kg/m²a
Gesamtenergieeffizienz-Faktor			$f_{GEE,SK}$ =	0,58
Photovoltaik-Export	$Q_{PVE,SK}$ =		$PVE_{Export,SK}$ =	

ERSTELLT

GWR-Zahl		ErstellerIn	ESS-Villach
Ausstellungsdatum	08.Juni 2020	Unterschrift	
Gültigkeitsdatum	07.Juni 2030		
Geschäftszahl	GZ-11		

Die Energiekennzahlen dieses Energieausweises dienen ausschließlich der Information. Aufgrund der idealisierten Eingangsparameter können bei tatsächlicher Nutzung erhebliche Abweichungen auftreten. Insbesondere Nutzungseinheiten unterschiedlicher Lage können aus Gründen der Geometrie und der Lage hinsichtlich ihrer Energiekennzahlen von den hier angegebenen abweichen.

Version: AX3000 (20210609) 64 Bit V2021

Appendix 6 EPC Sample: Belgium

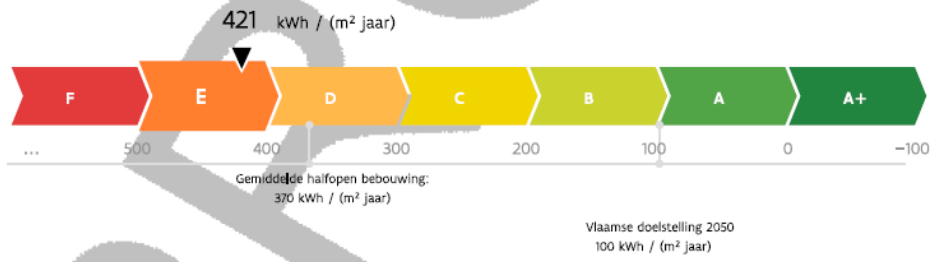
Energieprestatiecertificaat

Residentiële eenheid

Foto voorgevel

adres woning
woning, halfopen bebouwing | oppervlakte: 235 m²
certificaatnummer: yyyymmdd-000xxxxxxx-RES-1

Energielabel



De energiescore en het energielabel van deze woning zijn bepaald via een theoretische berekening op basis van de bestaande toestand van het gebouw. Er wordt geen rekening gehouden met het gedrag en het werkelijke energieverbruik van de (vorige) bewoners. Hoe lager de energiescore, hoe beter.

Verklaring van de energiedeskundige
Ik verklaar dat alle gegevens op dit certificaat overeenstemmen met de door de Vlaamse overheid vastgelegde werkwijze.

Datum:

Handtekening:

Naam energiedeskundige
EPxxxxx

Dit certificaat is geldig tot en met

Huidige staat van de woning

Om met uw woning te voldoen aan de energiedoelstelling, zijn er twee mogelijke pistes:

1 Inzetten op isolatie en verwarming

U isoleert elk deel van uw woning tot de doelstelling én u voorziet een energie-efficiënte verwarmingsinstallatie (warmtepomp, condenserende ketel, (micro-)WKK, efficiënt warmtenet of decentrale toestellen met een totaal maximaal vermogen van 15 W/m²).

OF

2 Energielabel van de woning

U behaalt een energielabel A voor uw woning(= energiescore van maximaal 100 kWh/(m² jaar)). U kiest op welke manier u dat doet: isoleren efficiënt verwarmen, efficiënt ventileren zonne-energie, hernieuwbare energie …

Daken

U = 0,20 W/(m²K)*

Doelstelling 0,24 W/(m²K)

Muren

U = 1,94 W/(m²K)*

Doelstelling 0,24 W/(m²K)

Vensters (beglazing en profiel)

U = 3,72 W/(m²K)*

Doelstelling 1,5 W/(m²K)

Beglazing

U = 2,80 W/(m²K)*

Doelstelling 1 W/(m²K)

Deuren, poorten en panelen

U = 3,64 W/(m²K)*

Doelstelling 2 W/(m²K)

Vloeren

U = 0,51 W/(m²K)*

Doelstelling 0,24 W/(m²K)

Verwarming

⊗ Centrale verwarming met niet-condenserende ketel

Uw energielabel:

421 kWh/(m² jaar) **E**

Doelstelling:

100 kWh/(m² jaar) **A**

⊗ De woning voldoet niet aan de energiedoelstelling 2050

Sanitair warm water

Aanwezig

Ventilatie

Te weinig ventilatievoorzieningen aanwezig

Koeling en zomercomfort

Kans op oververhitting

Luchtdichtheid

Niet bekend

Zonne-energie

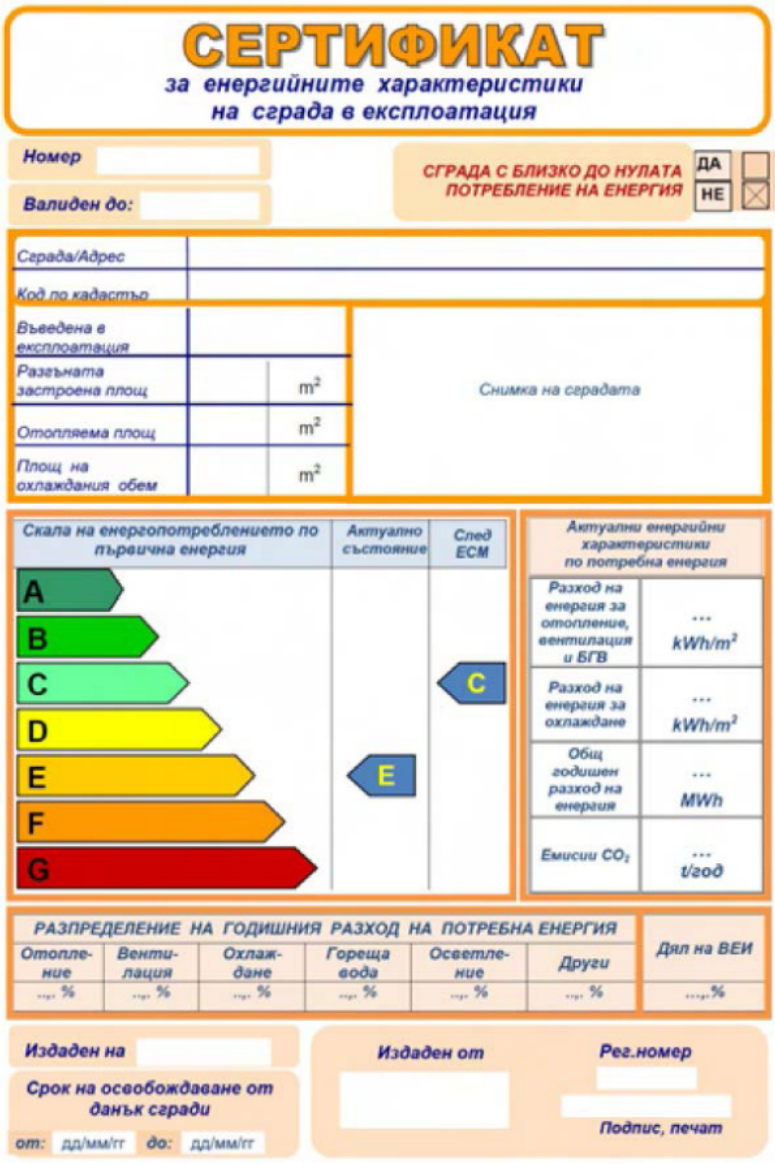
Geen zonneboiler of zonnepanelen aanwezig

* De **U-waarde** beschrijft de isolatiewaarde van daken, muren, vloeren, vensters … Hoe lager de U-waarde, hoe beter het constructiedeel isoleert.

Appendix 7 EPC Sample:Bulgaria

Annex

Bulgarian Energy Performance Certificate



СЕРТИФИКАТ

за енергийните характеристики на сграда в експлоатация

Номер	
Валиден до:	
СГРАДА С БЛИЗКО ДО НУЛАТА ПОТРЕБЛЕНИЕ НА ЕНЕРГИЯ	ДА ☐ НЕ ☒

Сграда/Адрес		
Код по кадастъра		
Въведена в експлоатация		
Разгъната застроена площ		m^2
Отоплявема площ		m^2
Площ на охлаждания обем		m^2

Снимка на сградата

Скала на енергопотреблението по първична енергия	Актуално състояние	След ЕСМ
A		
B		
C		C
D		
E	E	
F		
G		

Актуални енергийни характеристики по потребна енергия	
Разход на енергия за отопление, вентилация и БГВ	... kWh/m^2
Разход на енергия за охлаждане	... kWh/m^2
Общ годишен разход на енергия	... MWh
Емисии CO_2	... t/год

РАЗПРЕДЕЛЕНИЕ НА ГОДИШНИЯ РАЗХОД НА ПОТРЕБНА ЕНЕРГИЯ						Дял на ВЕИ
Отопление	Вентилация	Охлаждане	Гореща вода	Осветление	Други	
... %	... %	... %	... %	... %	... %	...%

Издаден на	Издаден от	Рег.номер
Срок на освобождаване от данък сгради		Подпис, печат
от: дд/мм/гг до: дд/мм/гг		

Appendix 8 EPC Sample: Croatia

ENERGETSKI CERTIFIKAT ZGRADE

prema *Pravilniku o energetskom pregledu zgrade i energetskom certificiranju* (NN _____)

Naziv zgrade

Naziv samostalne uporabne cjeline zgrade

Ulica i kućni broj | *Poštanski broj* | *Mjesto*

PODACI O ZGRADI	☐ nova ☐ postojeća ☐ rekonstrukcija		
Vrsta zgrade (prema *Pravilniku*)	odaberi vrstu zgrade prema Pravilniku iz padajućeg izbornika		
Vrsta zgrade prema složenosti tehničkih sustava	odaberi iz padajućeg izbornika		
Vlasnik / investitor			
k.č.br.		k.o.	
Ploština korisne površine grijanog dijela zgrade A_K		Godina izgradnje / rekonstrukcije	
Građevinska (bruto) površina zgrade [m^2]		Mjerodavna meteorološka postaja	
Faktor oblika f_0 [m^{-1}]		Referentna klima	

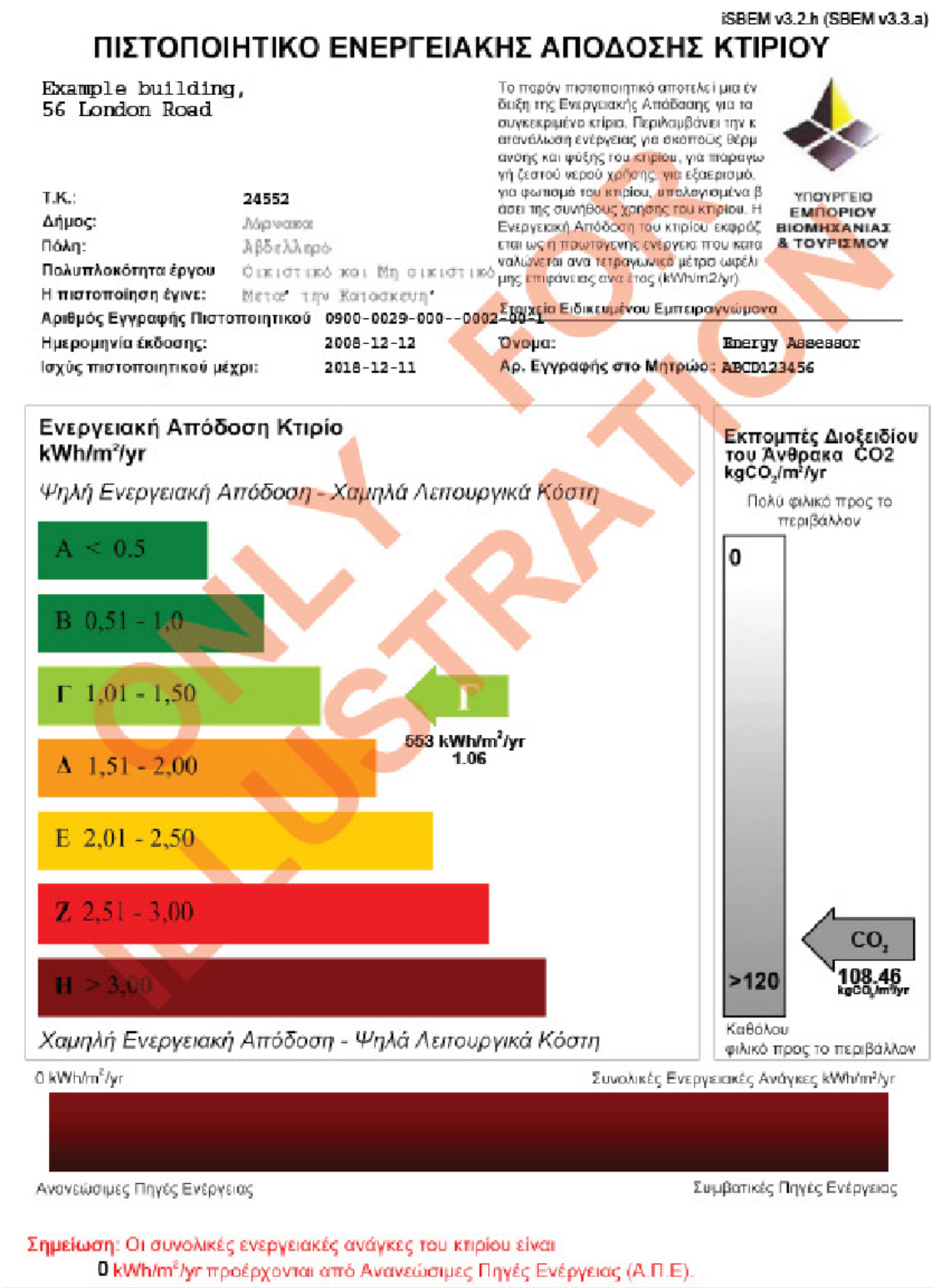
ENERGETSKI RAZRED ZGRADE	Specifična godišnja potrebna toplinska energija za grijanje $Q''_{H,nd}$ [kWh/(m^2a)]	Specifična godišnja primarna energija E_{prim} [kWh/(m^2a)]
	C	B
Specifična godišnja isporučena energija E_{del} [kWh/(m^2a)]		
Specifična godišnja emisija CO_2 [kg/(m^2a)]		
Upisati „nZEB" ako energetsko svojstvo zgrade (E_{prim}) zadovoljava zahtjeve za zgrade gotovo nulte energije propisane važećim TPRUETZZ	nZEB	

ROK VAŽENJA CERTIFIKATA / PODACI O OSOBI KOJA JE IZDALA ENERGETSKI CERTIFIKAT					
Oznaka energetskog certifikata		Datum izdavanja		Datum važenja	
Naziv ovlaštene pravne osobe				Registarski broj	
Ime i prezime imenovane osobe u ovlaštenoj pravnoj osobi ili ime i prezime ovlaštene fizičke osobe / vlastoručni potpis					

PODACI O OSOBAMA KOJE SU SUDJELOVALE U IZRADI ENERGETSKOG CERTIFIKATA				
Dio zgrade	Ime i prezime ovlaštene osobe	Naziv pravne osobe	Registarski broj	Vlastoručni potpis
Građevinski				
Strojarski				
Elektrotehnički				

ENERGETSKI CERTIFIKAT ZGRADE str. 1/4

Appendix 9 EPC Sample: Cyprus



iSBEM v3.2.h (SBEM v3.3.a)

ΠΙΣΤΟΠΟΙΗΤΙΚΟ ΕΝΕΡΓΕΙΑΚΗΣ ΑΠΟΔΟΣΗΣ ΚΤΙΡΙΟΥ

Example building,
56 London Road

Το παρόν πιστοποιητικό αποτελεί μια έν διείξη της Ενεργειακής Απόδοσης για τα συγκεκριμένο κτίρια. Περιλαμβάνει την κ ατανάλωση ενέργειας για σκοπούς θέρμ ανσης και ψύξης του κτιρίου, για παραγω γή ζεστού νερού χρήσης, για εξαερισμό, για φωτισμό του κτιρίου, υπολογισμένα β άσει της συνήθους χρήσης του κτιρίου. Η Ενεργειακή Απόδοση του κτιρίου εκφράζ εται ως η πρωταγενής ενέργεια που κατα ναλώνεται ανα τετραγωνικό μέτρο ωφέλι μης επιφάνειας ανα έτος (kWh/m2/yr)

ΥΠΟΥΡΓΕΙΟ ΕΜΠΟΡΙΟΥ ΒΙΟΜΗΧΑΝΙΑΣ & ΤΟΥΡΙΣΜΟΥ

Τ.Κ.:	24552
Δήμος:	Λάρνακα
Πόλη:	Αβδελλερό
Πολυπλοκότητα έργου	Οικιστικό και Μη οικιστικό
Η πιστοποίηση έγινε:	Μετα' την Κατασκευή'
Αριθμός Εγγραφής Πιστοποιητικού	0900-0029-000--0002-00-1
Ημερομηνία έκδοσης:	2008-12-12
Ισχύς πιστοποιητικού μέχρι:	2018-12-11

Στοιχείο Ειδικευμένου Εμπειρογνώμονα

Όνομα:	Energy Assessor
Αρ. Εγγραφής στο Μητρώο:	ABCD123456

Ενεργειακή Απόδοση Κτιρίο
kWh/m²/yr

Ψηλή Ενεργειακή Απόδοση - Χαμηλά Λειτουργικά Κόστη

A < 0.5
B 0,51 - 1,0
Γ 1,01 - 1,50
Δ 1,51 - 2,00
E 2,01 - 2,50
Z 2,51 - 3,00
H > 3,00

Γ
553 kWh/m²/yr
1.06

Χαμηλή Ενεργειακή Απόδοση - Ψηλά Λειτουργικά Κόστη

Εκπομπές Διοξειδίου του Άνθρακα CO2
kgCO₂/m²/yr

Πολύ φιλικό προς το περιβάλλον

0
>120

CO₂
108.46
kgCO₂/m²/yr

Καθόλου φιλικό προς το περιβάλλον

0 kWh/m²/yr — Συνολικές Ενεργειακές Ανάγκες kWh/m²/yr

Ανανεώσιμες Πηγές Ενέργειας — Συμβατικές Πηγές Ενέργειας

Σημείωση: Οι συνολικές ενεργειακές ανάγκες του κτιρίου είναι
0 kWh/m²/yr προέρχονται από Ανανεώσιμες Πηγές Ενέργειας (Α.Π.Ε).

Appendix 10 EPC Sample: Czech Republic

PRŮKAZ ENERGETICKÉ NÁROČNOSTI BUDOVY

vydaný podle zákona č. 406/2000 Sb., o hospodaření energií, a vyhlášky č. 264/2020 Sb., o energetické náročnosti budov

Ulice, číslo: Praha, 1
PSČ, místo: 10100, Praha
K.ú., parcelní č.: Praha (760668), 111
Typ budovy: Rodinný dům
Celková energeticky vztažná plocha: 65 m²

KLASIFIKAČNÍ TŘÍDA

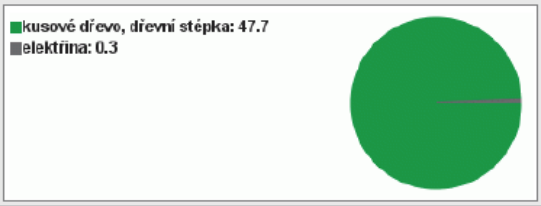
Primární energie z neobnovitelných zdrojů
kWh/(m²·rok)

Požadavek vyhlášky na energetickou náročnost

není stanoven

ROZDĚLENÍ DODANÉ ENERGIE

MWh/rok



UKAZATELE ENERGETICKÉ NÁROČNOSTI

Průměrný součinitel prostupu tepla budovy	0.99 W/(m²·K)	G
Měrná potřeba tepla na vytápění	345 kWh/(m²·rok)	
Celková dodaná energie	734 kWh/(m²·rok)	G
Vytápění	693 kWh/(m²·rok)	G
Chlazení		-
Nucené větrání		-
Úprava vlhkosti		-
Příprava teplé vody	37.1 kWh/(m²·rok)	D
Osvětlení	4.40 kWh/(m²·rok)	D

Energetický specialista: Ing. Michala Davidová
Osvědčení č.: 1341
Kontakt: info@enerco.cz

Ev. č. průkazu: 12345.0
Vyhotoveno dne: 07.07.2021
Podpis:

Appendix 11 EPC Sample: Denmark

Energistyrelsen

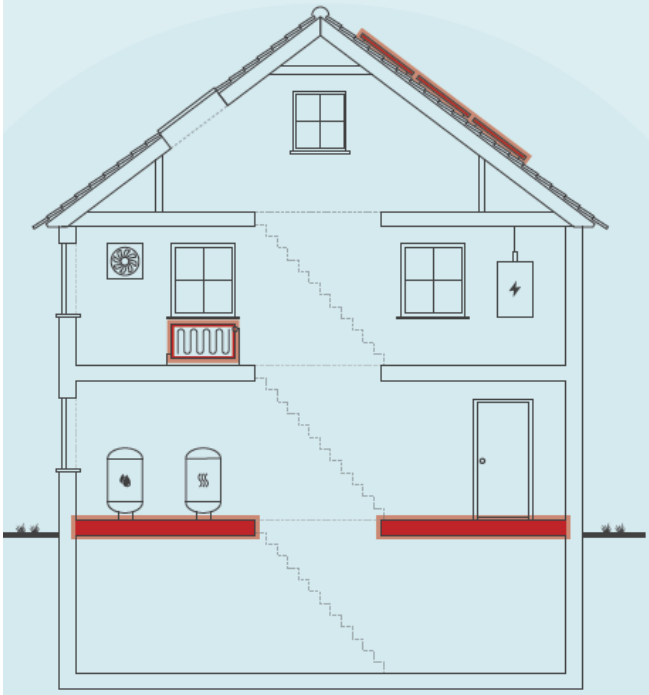
ENERGIMÆRKNINGSRAPPORT

ENERGIMÆRKE OG FORSLAG TIL ENERGIFORBEDRINGER

2022-153
Kystvej 224
9280 Storvorde

DIN BOLIG HAR ENERGIMÆRKE **E**

Du betaler hvert år **9.700 kr.** mere, end du behøver i energiudgifter*



Skitsen illustrerer en generisk bygning, baseret på bygningens karaktertræk. Ikonforklaring kan ses under afsnittet IKONFORKLARING.

ENERGIKONSULENTENS BEDSTE ANBEFALINGER

1 **Montage af termostatventiler, radiatorer**

Årlig besparelse:	3.200 kr.
Investering:	500 kr.

2 **Isolering af uisoleret gulv mod uopvarmet kælder med 100 mm isolering**

Årlig besparelse:	1.600 kr.
Investering:	5.000 kr.

3 **Montage af nye solceller**

Årlig besparelse:	4.200 kr.
Investering:	52.500 kr.

DIT ÅRLIGE BESPARELSESPOTENTIALE*

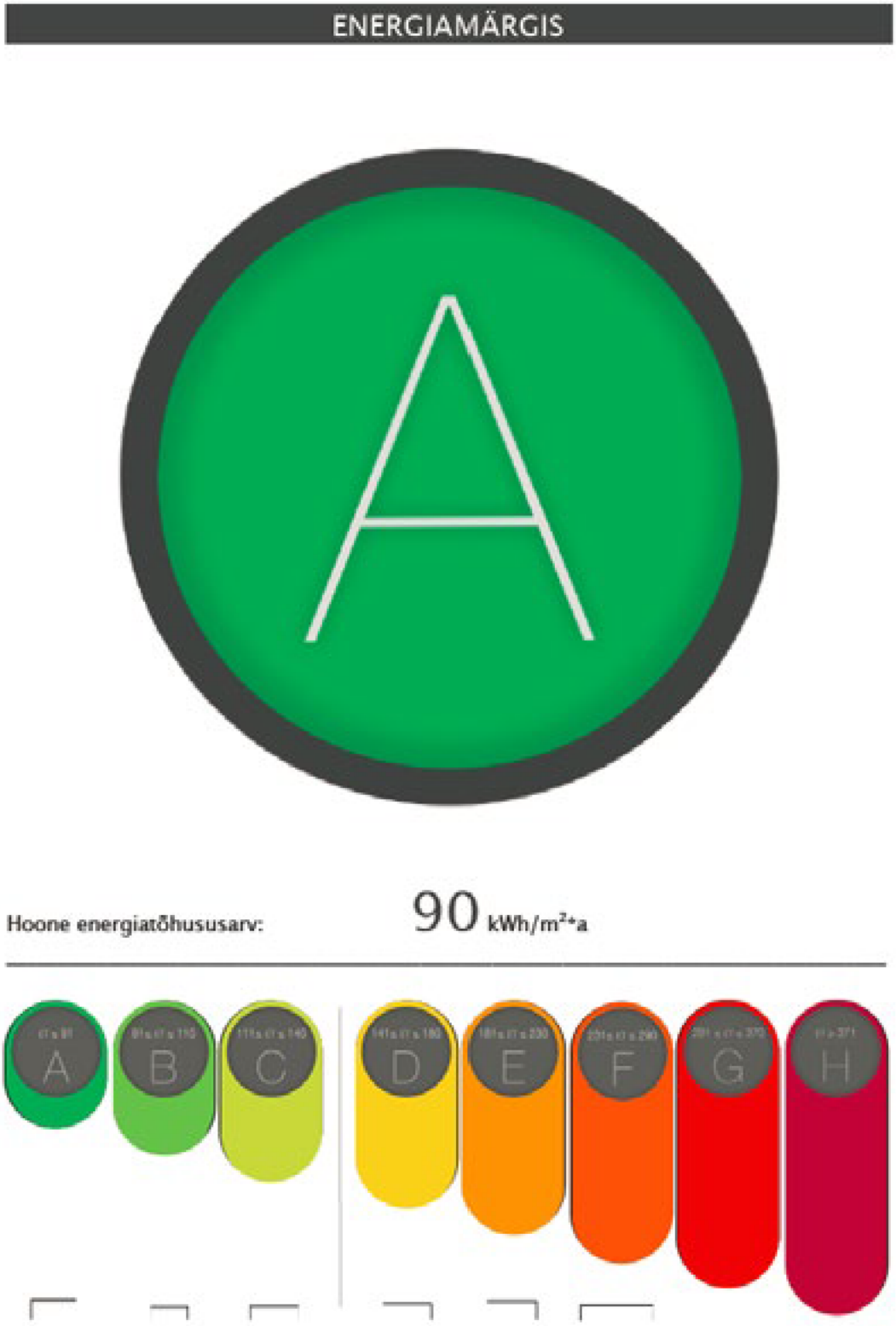
	I DAG	EFTER RENTABLE TILTAG	DU SPARER ÅRLIGT
Træpiller	38.400 kr.	32.900 kr.	5.500 kr.
El til andet	15.000 kr.	10.800 kr.	4.200 kr.
Overskud fra solceller	0 kr.	0 kr.	0 kr.
Samlet energiudgift	53.400 kr.	43.700 kr.	9.700 kr.
Samlet CO_2-udledning	1,00 ton	0,40 ton	0,60 ton

* Tallene er baseret på en standardiseret brug af bygningen. Se siden: FORMÅLET MED ENERGIMÆRKNINGEN.

FORBEDRING AF ENERGIMÆRKET VED GENNEMFØRSEL AF ALLE RENTABLE FORSLAG:

A 2020 | A 2015 | A 2010 | B | C | D | E | F | G

Appendix 12 EPC Sample: Estonia



Appendix 13 EPC Sample: Flanders new EPC design

Energieprestatiecertificaat

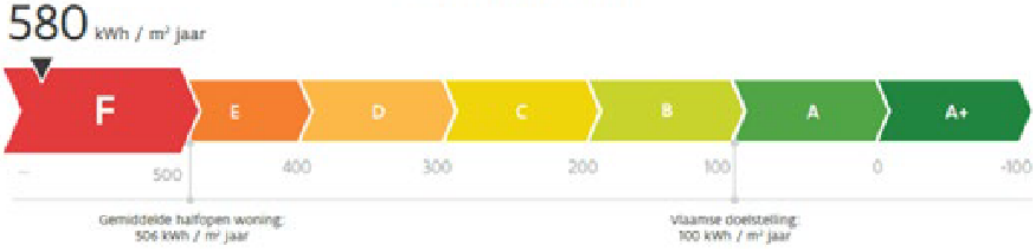
Bestaand gebouw met woonfunctie

Kasteelstraat 45, 2800 Mechelen

gezinswoning, halfopen bebouwing

certificaatnummer: 20090720-0000245710-0000000004-7

Energielabel



Appendix 14 EPC Sample: Italy

ATTESTATO DI PRESTAZIONE ENERGETICA DEGLI EDIFICI

CODICE IDENTIFICATIVO: xxxxxxxxxxxx VALIDO FINO AL: 31/12/2017

APE

DATI GENERALI

Destinazione d'uso

- [ ] Residenziale
- [X] Non residenziale

Classificazione D.P.R. 412/93: E.2 - Edificio adibito ad ufficio ed assimilabili

Oggetto dell'attestato

- [ ] Intero edificio
- [X] Unità immobiliare
- [ ] Gruppo di unità immobiliari

Numero di unità immobiliari di cui è composto l'edificio: nd

- [ ] Nuova costruzione
- [ ] Passaggio di proprietà
- [X] Locazione
- [ ] Ristrutturazione importante
- [ ] Riqualificazione energetica
- [ ] Altro: _____

Dati identificativi

Regione : Lazio
Comune : Roma (RM)
Indirizzo : xxxxxxx
Piano : x
Interno :
Coordinate GIS : 0.000 ; 0.000

Zona climatica : D
Anno di costruzione: fine '800 (stima)
Superficie utile riscaldata: 303.5 m²
Superficie utile raffrescata: 303.5 m²
Volume lordo riscaldato: 1272.7 m³
Volume lordo raffrescato: 1272.7 m³

Comune catastale	Roma (RM)			Sezione		Foglio	xxx	Particella	xx
Subalterni	da xx	a xx	da	a	da	a	da	a	
Altri subalterni									

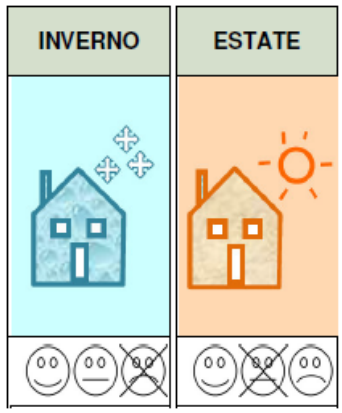
Servizi energetici presenti

- [X] Climatizzazione invernale
- [X] Climatizzazione estiva
- [ ] Ventilazione meccanica
- [X] Prod. acqua calda sanitaria
- [X] Illuminazione
- [ ] Trasporto di persone o cose

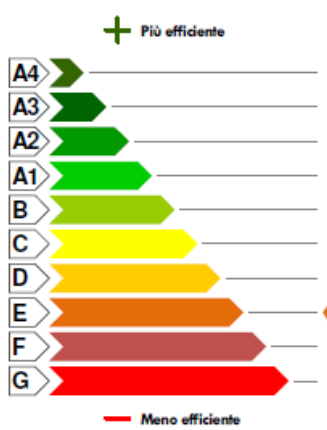
PRESTAZIONE ENERGETICA GLOBALE E DEL FABBRICATO

La sezione riporta l'indice di prestazione energetica globale non rinnovabile in funzione del fabbricato e dei servizi energetici presenti, nonché la prestazione energetica del fabbricato, al netto del rendimento degli impianti presenti.

Prestazione energetica del fabbricato



Prestazione energetica globale



EDIFICIO A ENERGIA QUASI ZERO [ ]

CLASSE ENERGETICA **E**

EPgl,nren **263.8** kWh/m² anno

Riferimenti

Gli immobili simili a questo avrebbero in media la seguente classificazione:

Se nuovi: B (106.4)

Se esistenti:

Appendix 15 EPC Sample: Portugal

Certificar é Valorizar
CERTIFICAÇÃO ENERGÉTICA DOS EDIFÍCIOS

Certificado Energético
Edifício de Habitação

SCE1234567890
Válido até 19-01-2015
Atualizado a 07-10-2015

IDENTIFICAÇÃO POSTAL
Morada AVª FONTES PEREIRA DE MELO, 51 A 51-G, 8º ESQ
Localidade LISBOA
Freguesia AVENIDAS NOVAS
Concelho LISBOA GPS 39.700000, -8.000000

IDENTIFICAÇÃO PREDIAL/FISCAL
5 ª Conservatória do Registo Predial de LISBOA
Nº de Inscrição na Conservatória 816
Artigo Matricial nº 898 Fração Autónoma K

INFORMAÇÃO ADICIONAL
Área útil de Pavimento 170,00 m²

Este certificado apresenta a classificação energética deste edifício ou fração. Esta classificação é calculada comparando o desempenho energético deste edifício nas condições atuais, com o desempenho que este obteria nas condições mínimas (com base em valores de referência ou requisitos aplicáveis para o ano assinalado) a que estão obrigados os edifícios novos. Saiba mais no site da ADENE em www.adene.pt.

INDICADORES DE DESEMPENHO

Determinam a classe energética do edifício e a eficiência na utilização de energia, incluindo o contributo de fontes renováveis. São apresentados comparativamente a um valor de referência e calculados em condições padrão.

Aquecimento Ambiente
Referência: 16 kWh/m².ano
Edifício: 18 kWh/m².ano
Renovável - %
12% MENOS eficiente que a referência

Arrefecimento Ambiente
Referência: 8,0 kWh/m².ano
Edifício: 5,0 kWh/m².ano
Renovável - %
38% MAIS eficiente que a referência

Água Quente Sanitária
Referência: 18 kWh/m².ano
Edifício: 20 kWh/m².ano
Renovável - %
11% MENOS eficiente que a referência

CLASSE ENERGÉTICA

Mais eficiente

Julho 2006 | Dezembro 2013 | Jan. 2016

A+ 0% a 25%
A 26% a 50%
B 51% a 75%
B- 76% a 100%
C 101% a 150%
D 151% a 200%
E 201% a 250%
F Mais de 251%

Mínimo Edifícios Novos: C
Mínimo Grandes Intervenções: 103%

ENERGIA RENOVÁVEL

Contributo de energia renovável no consumo de energia deste edifício.

0%

EMISSÕES DE CO_2

Emissões de CO_2 estimadas devido ao consumo de energia.

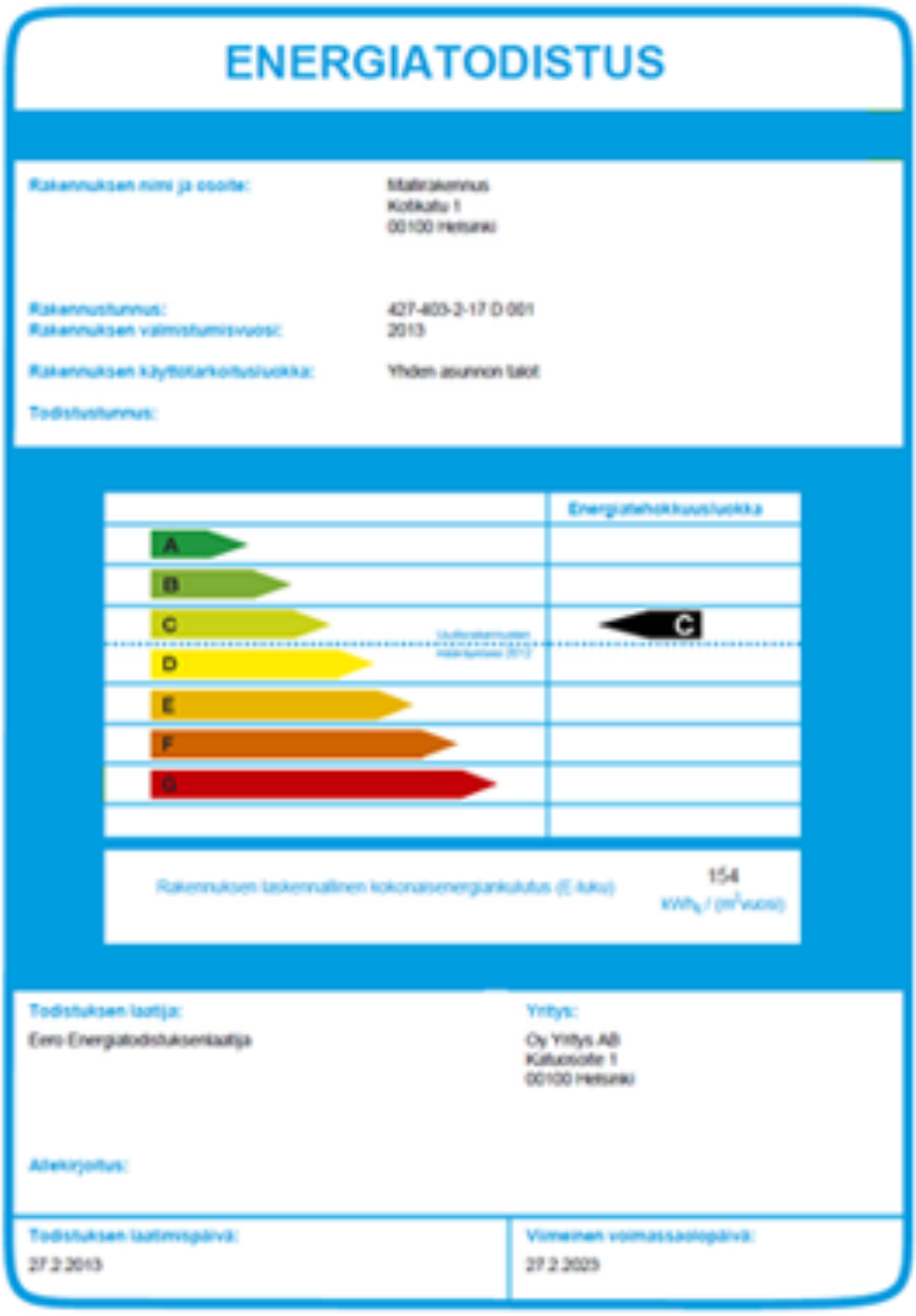
0,80 toneladas/ano

Entidade Gestora
adene
Agência para a Energia

Entidade Fiscalizadora
Direção Geral de Energia e Geologia

1 de 9

Appendix 16 EPC Sample: Finland



ENERGIATODISTUS

Rakennuksen nimi ja osoite: Mallirakennus
Kotikatu 1
00100 Helsinki

Rakennustunnus: 427-403-2-17 D 001
Rakennuksen valmistumisvuosi: 2013

Rakennuksen käyttötarkoitusluokka: Yhden asunnon talot

Todistustunnus:

	Energiatehokkuusluokka
A	
B	
C	C
D	
E	
F	
G	

Rakennuksen laskennallinen kokonaisenergiankulutus (E-luku) 154 kWh$_{E}$ / (m^{2}vuosi)

Todistuksen laatija:
Eero Energiatodistuksenlaatija

Yritys:
Oy Yritys Ab
Kalliosolle 1
00100 Helsinki

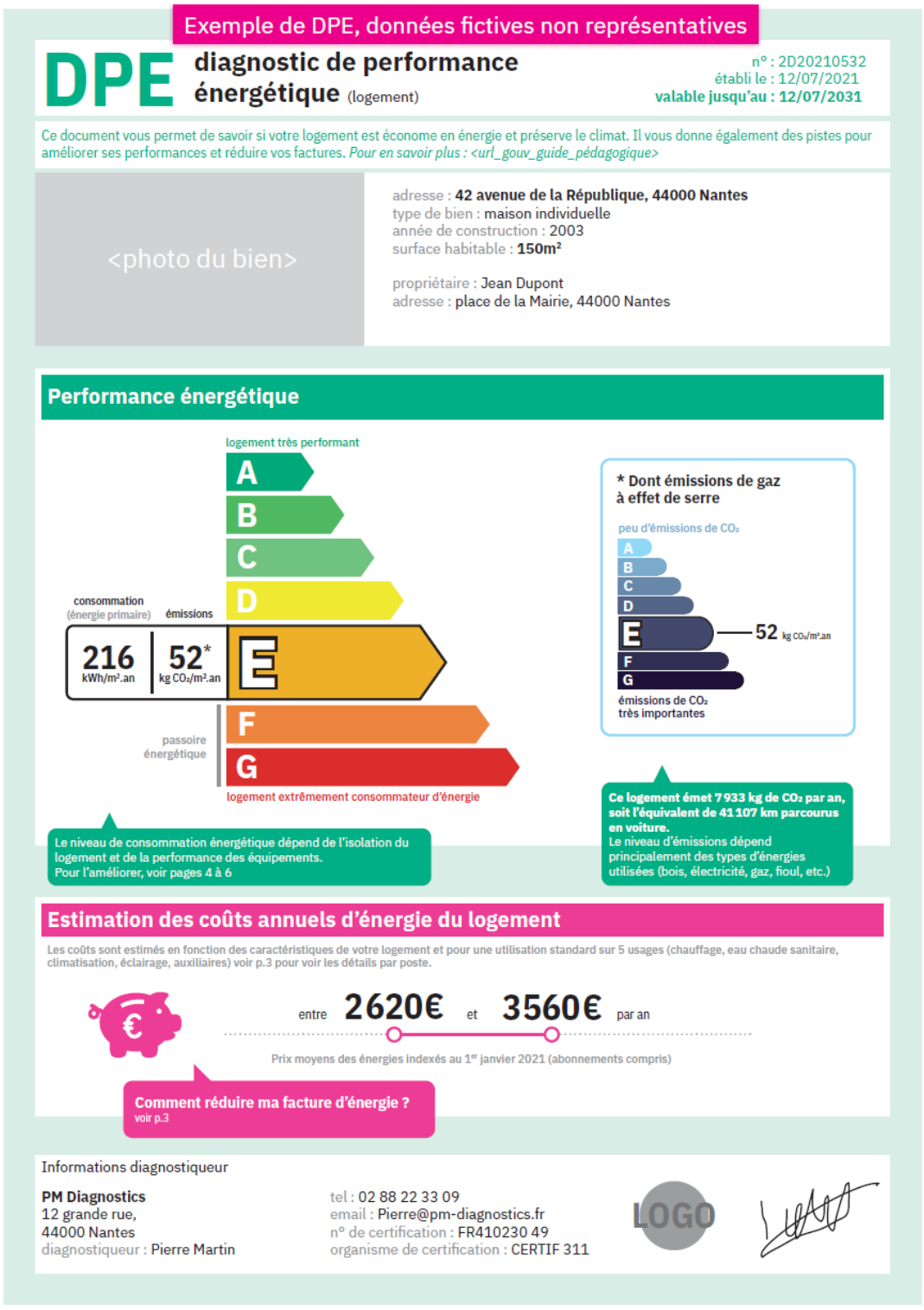
Allekirjoitus:

Todistuksen laatimispäivä: 27.2.2013

Voimainen voimassaolopäivä: 27.2.2023

Energiatodistus perustuu lakiin rakennuksen energiatodistuksesta (50/2013).

Appendix 17 EPC Sample: France



Exemple de DPE, données fictives non représentatives

DPE diagnostic de performance énergétique (logement)

n° : 2D20210532
établi le : 12/07/2021
valable jusqu'au : 12/07/2031

Ce document vous permet de savoir si votre logement est économe en énergie et préserve le climat. Il vous donne également des pistes pour améliorer ses performances et réduire vos factures. *Pour en savoir plus : <url_gouv_guide_pédagogique>*

<photo du bien>

adresse : **42 avenue de la République, 44000 Nantes**
type de bien : maison individuelle
année de construction : 2003
surface habitable : **150m²**

propriétaire : Jean Dupont
adresse : place de la Mairie, 44000 Nantes

Performance énergétique

logement très performant
A
B
C
D
consommation (énergie primaire) 216 kWh/m².an | émissions 52* kg CO₂/m².an
E
F
G
passoire énergétique
logement extrêmement consommateur d'énergie

Le niveau de consommation énergétique dépend de l'isolation du logement et de la performance des équipements.
Pour l'améliorer, voir pages 4 à 6

* Dont émissions de gaz à effet de serre

peu d'émissions de CO₂
A
B
C
D
E — 52 kg CO₂/m².an
F
G
émissions de CO₂ très importantes

Ce logement émet 7 933 kg de CO₂ par an, soit l'équivalent de 41 107 km parcourus en voiture.
Le niveau d'émissions dépend principalement des types d'énergies utilisées (bois, électricité, gaz, fioul, etc.)

Estimation des coûts annuels d'énergie du logement

Les coûts sont estimés en fonction des caractéristiques de votre logement et pour une utilisation standard sur 5 usages (chauffage, eau chaude sanitaire, climatisation, éclairage, auxiliaires) voir p.3 pour voir les détails par poste.

entre **2620€** et **3560€** par an

Prix moyens des énergies indexés au 1er janvier 2021 (abonnements compris)

Comment réduire ma facture d'énergie ?
voir p.3

Informations diagnostiqueur

PM Diagnostics
12 grande rue,
44000 Nantes
diagnostiqueur : Pierre Martin

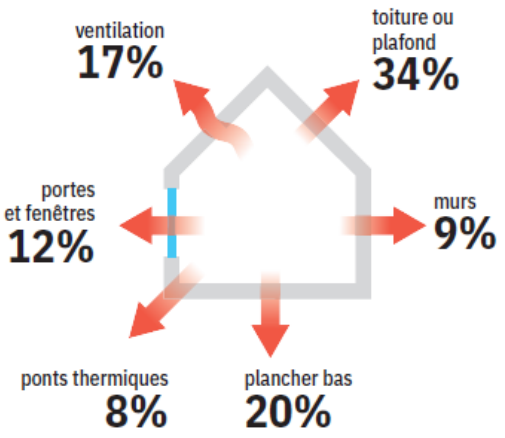
tel : 02 88 22 33 09
email : Pierre@pm-diagnostics.fr
n° de certification : FR410230 49
organisme de certification : CERTIF 311

LOGO

Exemple de DPE, données fictives non représentatives

DPE diagnostic de performance énergétique (logement) p.2

Schéma des déperditions de chaleur



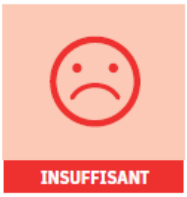
Performance de l'isolation

INSUFFISANTE | MOYENNE | BONNE | TRÈS BONNE

Système de ventilation en place

Ventilation mécanique contrôlée simple flux autoréglable.

Confort d'été (hors climatisation)*



INSUFFISANT | MOYEN | BON

Les caractéristiques de votre logement améliorant le confort d'été :

bonne inertie du logement

logement traversant

Pour améliorer le confort d'été :

Équipez les fenêtres de votre logement de volets extérieurs ou brise-soleil.

Faites isoler la toiture du bâtiment (rapprochez-vous de votre copropriété).

*Le niveau de confort d'été présenté ici s'appuie uniquement sur les caractéristiques de votre logement (la localisation n'est pas prise en compte).

Production d'énergies renouvelables

Ce logement n'est pas encore équipé de systèmes de production d'énergie renouvelable.

Diverses solutions existent :

pompe à chaleur

chauffe-eau thermodynamique

panneaux solaires photovoltaïques

panneaux solaires thermiques

géothermie

réseaux de chaleur vertueux

chauffage au bois

Exemple de DPE, données fictives non représentatives

DPE diagnostic de performance énergétique (logement) p.3

Montants et consommations annuels d'énergie

usage		consommation d'énergie (en kWh énergie primaire)	frais annuels d'énergie (fourchette d'estimation*)	répartition des dépenses
chauffage	fioul	22 500 (22 500 é.f.)	entre 1740€ et 2370€	67%
eau chaude sanitaire	électrique	8 625 (3 750 é.f.)	entre 750€ et 1030€	29%
refroidissement		0 (0 é.f.)	0€	0%
éclairage	électrique	690 (300 é.f.)	entre 60€ et 90€	2%
auxiliaires	électrique	690 (300 é.f.)	entre 60€ et 90€	2%
énergie totale pour les usages recensés :		32 505 kWh (26 850 kWh é.f.)	entre 2620€ et 3560€ par an	

Pour rester dans cette fourchette d'estimation, voir les recommandations d'usage ci-dessous

Ces chiffres sont donnés pour une température de chauffage de 19°, une climatisation réglée à 28° (si présence de clim), et une consommation d'eau chaude de 123ℓ par jour.

é.f. → énergie finale

* Prix moyens des énergies indexés au 1er janvier 2021 (abonnements compris)

⚠ Seules les consommations d'énergie nécessaires au chauffage, à la climatisation, à la production d'eau chaude sanitaire, à l'éclairage et aux auxiliaires (ventilateurs, pompes) sont prises en compte dans cette estimation. Les consommations liées aux autres usages (électroménager, appareils électroniques...) ne sont pas comptabilisées.

⚠ Les factures réelles dépendront de nombreux facteurs : prix des énergies, météo de l'année (hiver froid ou doux...), nombre de personnes dans le logement et habitudes de vie, entretien des équipements...

Recommandations d'usage pour votre logement

Quelques gestes simples pour maîtriser votre facture d'énergie :

Température recommandée en hiver → 19°

Chauffer à 19° plutôt que 21°,
c'est -15% sur votre facture **soit -308€ par an**

astuces
- → Diminuez le chauffage quand vous n'êtes pas là.
- → Chauffez les chambres à 17° la nuit.

Si climatisation, température recommandée en été → 28°

astuces
- → Fermez les fenêtres et volets la journée quand il fait chaud.
- → Aérez votre logement la nuit.

Consommation recommandée → 132ℓ/jour d'eau chaude à 40°

Estimation faite par rapport à la surface de votre logement (2-3 personnes). Une douche de 5 minute = environ 40ℓ.

54ℓ consommés en moins par jour,
c'est -29% sur votre facture **soit -365€ par an**

astuces
- → Installez des mousseurs d'eau sur les robinets et un pommeau à faible débit sur la douche.
- → Réduisez la durée des douches.

FAIRE TOUT POUR MA RÉNOV'

En savoir plus sur les bons réflexes d'économie d'énergie :
www.faire.gouv.fr/reduire-ses-factures-energie

Appendix 18 EPC Sample: Germany

ENERGIEAUSWEIS für Wohngebäude

gemäß den §§ 79 ff. Gebäudeenergiegesetz (GEG) vom [1]

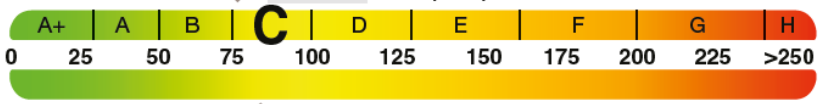
Berechneter Energiebedarf des Gebäudes Registriernummer: 2

Energiebedarf

Treibhausgasemissionen kg CO_2-Äquivalent /(m^2·a)

Endenergiebedarf dieses Gebäudes

kWh/(m^2·a)



kWh/(m^2·a)

Primärenergiebedarf dieses Gebäudes

Anforderungen gemäß GEG [2]

Primärenergiebedarf

Ist-Wert kWh/(m^2·a) Anforderungswert kWh/(m^2·a)

Energetische Qualität der Gebäudehülle H_T'

Ist-Wert W/(m^2·K) Anforderungswert W/(m^2·K)

Sommerlicher Wärmeschutz (bei Neubau) ☐ eingehalten

Für Energiebedarfsberechnungen verwendetes Verfahren

- ☐ Verfahren nach DIN V 18599
- ☐ Regelung nach § 31 GEG („Modellgebäudeverfahren")
- ☐ Vereinfachungen nach § 50 Absatz 4 GEG

Endenergiebedarf dieses Gebäudes [Pflichtangabe in Immobilienanzeigen] kWh/(m^2·a)

Angaben zur Nutzung erneuerbarer Energien

Nutzung erneuerbarer Energien[3]: ○ für Heizung ○ für Warmwasser

☐ **Nutzung zur Erfüllung der 65%-EE-Regel gemäß § 71 Absatz 1 in Verbindung mit Absatz 2 oder 3 GEG**

☐ Erfüllung der 65%-EE-Regel durch pauschale Erfüllungsoptionen nach § 71 Absatz 1,3,4 und 5 in Verbindung mit § 71b bis h GEG [3]

- ○ Hausübergabestation (Wärmenetz) (§ 71b)
- ○ Wärmepumpe (§ 71c)
- ○ Stromdirektheizung (§ 71d)
- ○ Solarthermische Anlage (§ 71e)
- ○ Heizungsanlage für Biomasse oder Wasserstoff/-derivate (§ 71f,g)
- ○ Wärmepumpen-Hybridheizung (§ 71h)
- ○ Solarthermie-Hybridheizung (§ 71h)
- ○ Dezentrale, elektrische Warmwasserbereitung (§ 71 Absatz 5)

☐ Erfüllung der 65%-EE-Regel auf Grundlage einer Berechnung im Einzelfall nach § 71 Absatz 2 GEG:

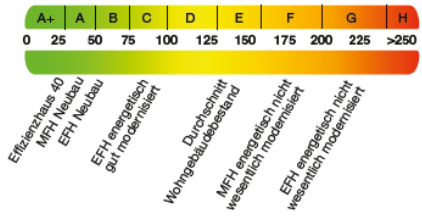
Art der erneuerbaren Energie:	Anteil Wärmebereitstellung [5]:	Anteil EE [6] der Einzelanlage:	Anteil EE [6] aller Anlagen [7]:
	%	%	%
	%	%	%
		Summe [8]:	%

☐ Nutzung bei Anlagen, für die die 65%-EE-Regel nicht gilt [9]:

Art der erneuerbaren Energie:	Anteil EE [10]:
	%
	%
Summe [8]:	%

☐ weitere Einträge und Erläuterungen in der Anlage

Vergleichswerte Endenergie [4]



Erläuterungen zum Berechnungsverfahren

Das GEG lässt für die Berechnung des Energiebedarfs unterschiedliche Verfahren zu, die im Einzelfall zu unterschiedlichen Ergebnissen führen können. Insbesondere wegen standardisierter Randbedingungen erlauben die angegebenen Werte keine Rückschlüsse auf den tatsächlichen Energieverbrauch. Die ausgewiesenen Bedarfswerte der Skala sind spezifische Werte nach dem GEG pro Quadratmeter Gebäudenutzfläche (A_N), die im Allgemeinen größer ist als die Wohnfläche des Gebäudes.

[1] siehe Fußnote 1 auf Seite 1 des Energieausweises
[2] nur bei Neubau sowie bei Modernisierung im Fall des § 80 Absatz 2 GEG
[3] Mehrfachnennungen möglich
[4] EFH: Einfamilienhaus, MFH: Mehrfamilienhaus
[5] Anteil der Einzelanlage an der Wärmebereitstellung aller Anlagen
[6] Anteil EE an der Wärmebereitstellung der Einzelanlage/aller Anlagen
[7] nur bei einem gemeinsamen Nachweis mit mehreren Anlagen
[8] Summe einschließlich gegebenenfalls weiterer Einträge in der Anlage
[9] Anlagen, die vor dem 1. Januar 2024 zum Zweck der Inbetriebnahme in einem Gebäude eingebaut oder aufgestellt worden sind oder einer Übergangsregelung unterfallen, gemäß Berechnung im Einzelfall
[10] Anteil EE an der Wärmebereitstellung oder dem Wärme-/Kälteenergiebedarf

ENERGIEAUSWEIS für Wohngebäude

gemäß den §§ 79 ff. Gebäudeenergiegesetz (GEG) vom [1]

Erfasster Energieverbrauch des Gebäudes

Registriernummer:

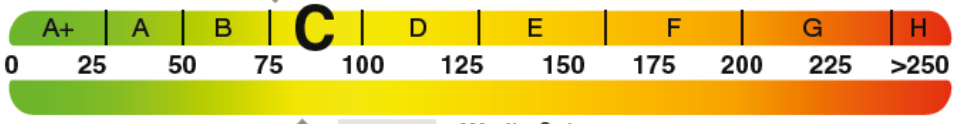
3

Energieverbrauch

Treibhausgasemissionen kg CO_2-Äquivalent /(m^2·a)

Endenergieverbrauch dieses Gebäudes

kWh/(m^2·a)



kWh/(m^2·a)

Primärenergieverbrauch dieses Gebäudes

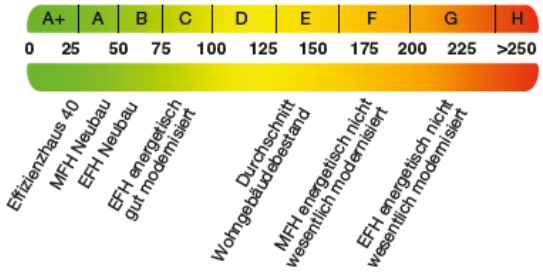
Endenergieverbrauch dieses Gebäudes [Pflichtangabe in Immobilienanzeigen] kWh/(m^2·a)

Verbrauchserfassung – Heizung und Warmwasser

Zeitraum von	Zeitraum bis	Energieträger [2]	Primärenergiefaktor	Energieverbrauch [kWh]	Anteil Warmwasser [kWh]	Anteil Heizung [kWh]	Klimafaktor

☐ weitere Einträge in Anlage

Vergleichswerte Endenergie [3]



Die modellhaft ermittelten Vergleichswerte beziehen sich auf Gebäude, in denen die Wärme für Heizung und Warmwasser durch Heizkessel im Gebäude bereitgestellt wird.
Soll ein Energieverbrauch eines an ein Wärmenetz angeschlossenen Gebäudes verglichen werden, ist zu beachten, dass hier normalerweise ein um 15 bis 30 % geringerer Energieverbrauch als bei vergleichbaren Gebäuden mit Kesselheizung zu erwarten ist.

Erläuterungen zum Verfahren

Das Verfahren zur Ermittlung des Energieverbrauchs ist durch das GEG vorgegeben. Die Werte der Skala sind spezifische Werte pro Quadratmeter Gebäudenutzfläche (A_N) nach dem GEG, die im Allgemeinen größer ist als die Wohnfläche des Gebäudes. Der tatsächliche Energieverbrauch eines Gebäudes weicht insbesondere wegen des Witterungseinflusses und sich ändernden Nutzerverhaltens vom angegebenen Energieverbrauch ab.

[1] siehe Fußnote 1 auf Seite 1 des Energieausweises
[2] gegebenenfalls auch Leerstandszuschläge, Warmwasser- oder Kühlpauschale in kWh
[3] EFH: Einfamilienhaus, MFH: Mehrfamilienhaus

Appendix 19 EPC Sample: Hungary

HITELES ENERGETIKAI TANÚSÍTVÁNY

ÖSSZESÍTŐ LAP HET- 0 3 2 1 5 5 4 8

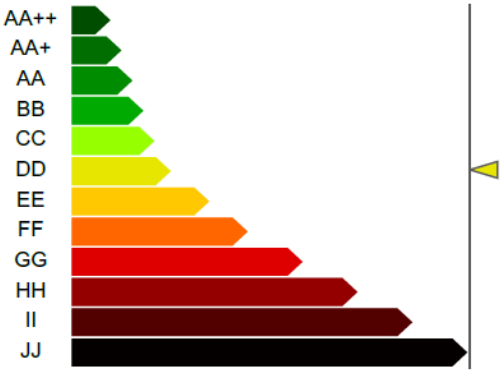
Épület (önálló rendeltetési egység)

Rendeltetés: Lakó- és szállásjellegű
Cím: Budapest
Példa utca 138. 4/69.
HRSZ: 41208/1/B/69
Az épület védettsége: Nem védett

Megrendelő

Név: Mintalakó Menta
Cím: Magyarország (HU)
Budapest
Példa utca 138. 4. emelet 69. ajtó

Energetikai minőség szerinti besorolás: DD



Korszerűt megközelítő

Energetikai adatok

Fűtött alapterület: 45,2 m²
Összesített energetikai jellemző:
-méretezett érték: 146,56 kWh/m²a
-követelményérték: 100 kWh/m²a
-a követelményérték százalékában: 146,56%

Korszerűsítési javaslat

Javasolt felújítások a költségoptimalizált követelményszint teljesítéséhez: a külső falak szigetelése 15 cm vastagban, bejárati ajtó max. U=1,45 W/m2K és az ablakok cseréje max. U=1,15 W/m2K hőátbocsátási tényezőjű nyílászáróra.

A javaslattal elérhető besorolás: CC

Megjegyzés

A tanúsítvány nem energiafogyasztási adatok alapján, hanem a 7/2006-os TNM. rendelet 3§ (1) bekezdésében részletezett számítás alapján készült. A tanúsítvány egyszerűsített számítási módszerrel készült.

Tanúsítás módszere: Épületrész, számítással

A tanúsítvány kiállításának oka:
ingatlan adásvétel

Tanúsító szakember adatai

Név: DR. KOVÁCS ÁKOS DOMONKOS
Cím: 1117 Budapest 11. ker.
Bercsényi utca 38. 4/7.
Telefon: +36303611248
Email: kovacs.akosdomonkos@gmail.com

Jogosultsági szám: TÉ 01-66327 (MMK)
Alátámasztó munkarész:
-kelte: 2019. szeptember 15.
-készítő szoftver megnevezése:
WinWatt 8.06 (2019. 7. 23.)
-azonosítója a tanúsítónál:
19056

Hiteles kiállítás dátuma 2019. szeptember 15.

Aláírás *(Pecsét helye)*

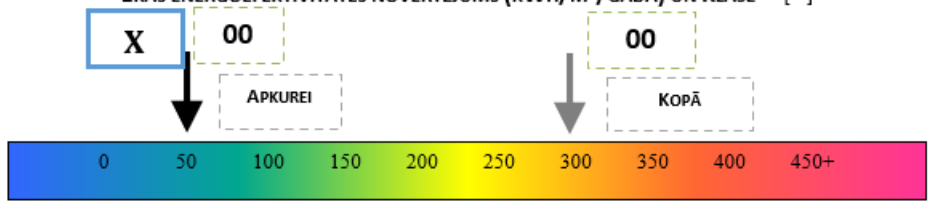
ORSZÁGOS ÉPÍTÉSÜGYI NYILVÁNTARTÁS, E-TANÚSÍTÁS - ET adatlap verzió 2.4.1 https://entan.e-epites.hu

Appendix 20 EPC Sample: Latvia

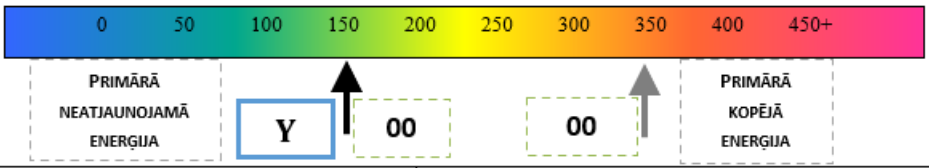
ĒKAS ENERGOSERTIFIKĀTS REĢISTRĀCIJAS NUMURS _____ [1] DERĪGS LĪDZ _____ [2]	[Vieta attēlam]

ĒKAS ENERGOSERTIFIKĀTA VEIDS	[3]		
OBJEKTA VEIDS	[4]		
ĒKAS VEIDS	[5]		
ADRESE	[6]		
ĒKAS DAĻA	[7]		
KADASTRA APZĪMĒJUMS	[8]		
ĒKAS RAKSTUROJUMS			
Būves gads [9]		Pārbūves gads [10]	
Stāvu skaits	___ virszemes, ___ pazemes, [-] mansards, [-] jumta stāvs		
Kopējā platība	_____ m^2	Aprēķina platība	_____ m^2
Aprēķina tilpums	_____ m^3	Vidējais stāva augstums	_____ m
ĒKAS ENERGOSERTIFIKĀTA PIELIETOJUMA VEIDS(I)	[11]		
ENERGOEFEKTIVITĀTES NOVĒRTĒJUMA VEIDS	[12]		
ĒKAS ENERGOSERTIFICĒŠANAS NOLŪKS	[13]		

ĒKAS ENERGOEFEKTIVITĀTES NOVĒRTĒJUMS (KWH/M^2/GADĀ) UN KLASE [14]



ĒKAS PRIMĀRĀS ENERĢIJAS NOVĒRTĒJUMS (KWH/M^2/GADĀ) UN KLASE



ĒKAS ENERGOEFEKTIVITĀTES RĀDĪTĀJI KWH/M^2 GADĀ			ĒKAS ATBILSTĪBA NORMATĪVO AKTU PRASĪBĀM VĒRTĒJUMS	
APKUREI		[15]	ĒKA ATBILSTĪBA GANDRĪZ NULLES ENERĢIJAS ĒKAS PRASĪBĀM	JĀ / NĒ
KARSTĀ ŪDENS SAGATAVOŠANAI			PASKAIDROJUMI PAR ATBILSTĪBU NORMATĪVO AKTU PRASĪBĀM	
MEHĀNISKAJAI VENTILĀCIJAI				
APGAISMOJUMAM				
DZESĒŠANAI				
PAPILDU			Oglekļa dioksīda emisijas novērtējums, t CO2/gadā	
KOPĀ			Oglekļa dioksīda emisijas novērtējums, kg CO2/m^2/gadā	

ĒKAS ENERGOSERTIFIKĀTA IZDEVĒJS	EKSPERTS [16]	PARAKSTS
	EKSPERTA SERTIFIKĀTA NUMURS [17]	
	DATUMS [18]	

ĒKAS TEHNISKIE RĀDĪTĀJI	
Ēkas ārējās virsmas laukums	m^2
Ēkas formas faktors (ārējās virsmas un aprēķina platības attiecība)	
Kompaktuma faktors (ārējās virsmas un tilpuma attiecība)	
Ārējo norobežojošo konstrukciju vidējais siltuma caurlaidības koeficients U_{vid}	_____ $W/(m^2 \times K)$
Ārējo norobežojošo konstrukciju vidējais normatīvais siltuma caurlaidības koeficients $U_{vid,max}$	_____ $W/(m^2 \times K)$
Ēkas norobežojošo konstrukciju īpatnējais siltuma zudumu koeficients H_T/A_{apr}	[19] ____ $W/(m^2K)$
Ēkas norobežojošo konstrukciju pieļaujamais īpatnējais siltuma zudumu koeficients $H_{T,max}/A_{apr}$	[20] ____ $W/(m^2K)$
Aprēķina iekštelpu temperatūra apkures novērtējumam	_____ °C
Aprēķina iekštelpu temperatūra dzesēšanas novērtējumam	_____ °C
Pieprasītās gaisapmaiņas rādītājs	[21]____ (n^{-1})
Ēkas ventilācijas īpatnējais siltuma zudumu koeficients H_{Ve}/A_{apr}	[22]____ $W/(m^2K)$
Ventilācijas siltuma zudumu atgūšana apkures periodā	[23] _____ %
Gaisa caurlaidības testa rādītājs	[24] _____

NOVĒRTĒJUMĀ IZMANTOTIE PRIMĀRĀS ENERĢIJAS FAKTORI UN CO_2 KOEFICIENTI					
Enerģijas patēriņa pakalpojums	Energonesējs un efektivitātes koeficients [25]	CO_2 emisijas faktors, $kgCO_2$/MWh	Primārās enerģijas faktors		
			neatjaunojamo energoresursu daļai (-)	atjaunojamo energoresursu daļai (-)	Kopējais (-)
Apkure					
Karstā ūdens sagatavošana					
Ventilācija					
Apgaismojums					
Dzesēšana					
Papildu					

ENERĢIJAS UZSKAITE UN SADALĪJUMS APKURES UN KARSTĀ ŪDENS SISTĒMĀS								
Kalendāra gads	Energonesējs			Apkurei			Karstā ūdens apgādei	
	Nosaukums	uzskaitītais daudzums		kWh	klimata korekcija*	kWh/m^2 gadā	kWh	kWh/m^2 gadā
		[26]	kWh					

PASKAIDROJUMI PAR ĒKA SARAŽOTO ENERĢIJU UN TĀS APJOMU

PIELIKUMI UN PIEVIENOTIE DOKUMENTI (dokumenta nosaukums, datums, numurs un lapu skaits): [27]

_____

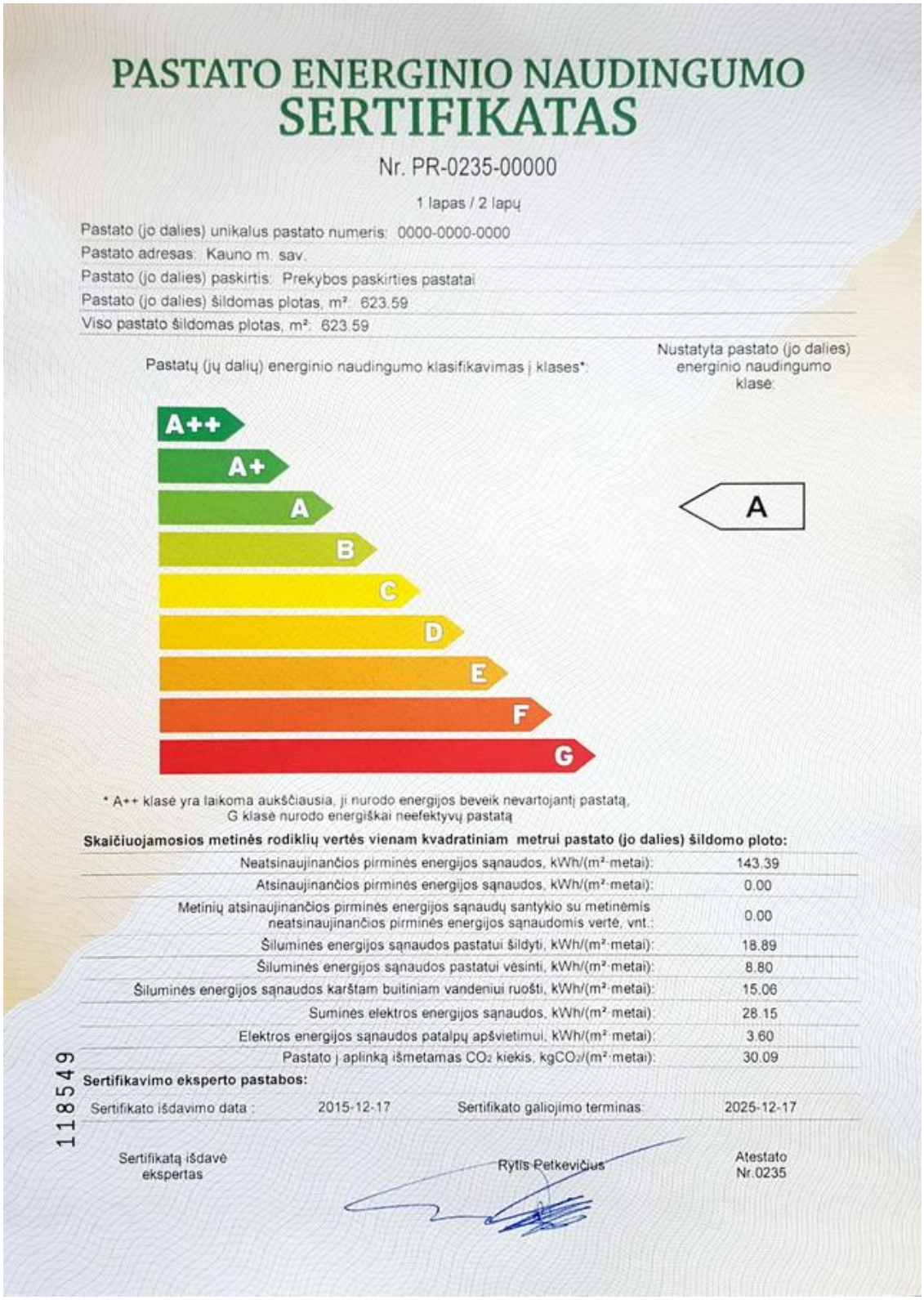
_____

NEATKARĪGA EKSPERTA APLIECINĀJUMS

Apliecinu, ka ēkas energosertifikāts sastādīts, nepieļaujot rīcību, kas manis paša, pasūtītāja vai citas personas interesēs varētu mazināt iegūto rezultātu pareizību, novērtējuma objektivitāti un ticamību.

ĒKAS ENERGOSERTIFIKĀTA IZDEVĒJS	EKSPERTS [28]	PARAKSTS
	EKSPERTA SERTIFIKĀTA NUMURS [29]	
	DATUMS [30]	

Appendix 21 EPC Sample: Lithuania



PASTATO ENERGINIO NAUDINGUMO SERTIFIKATAS

Nr. PR-0235-00000

1 lapas / 2 lapų

Pastato (jo dalies) unikalus pastato numeris: 0000-0000-0000

Pastato adresas: Kauno m. sav.

Pastato (jo dalies) paskirtis: Prekybos paskirties pastatai

Pastato (jo dalies) šildomas plotas, m²: 623.59

Viso pastato šildomas plotas, m²: 623.59

Pastatų (jų dalių) energinio naudingumo klasifikavimas į klases*:

Nustatyta pastato (jo dalies) energinio naudingumo klasė:

A++
A+
A
B
C
D
E
F
G

A

* A++ klasė yra laikoma aukščiausia, ji nurodo energijos beveik nevartojantį pastatą, G klasė nurodo energiškai neefektyvų pastatą

Skaičiuojamosios metinės rodiklių vertės vienam kvadratiniam metrui pastato (jo dalies) šildomo ploto:

Neatsinaujinančios pirminės energijos sąnaudos, kWh/(m²·metai):	143.39
Atsinaujinančios pirminės energijos sąnaudos, kWh/(m²·metai):	0.00
Metinių atsinaujinančios pirminės energijos sąnaudų santykio su metinėmis neatsinaujinančios pirminės energijos sąnaudomis vertė, vnt.:	0.00
Šiluminės energijos sąnaudos pastatui šildyti, kWh/(m²·metai):	18.89
Šiluminės energijos sąnaudos pastatui vėsinti, kWh/(m²·metai):	8.80
Šiluminės energijos sąnaudos karštam buitiniam vandeniui ruošti, kWh/(m²·metai):	15.06
Suminės elektros energijos sąnaudos, kWh/(m²·metai):	28.15
Elektros energijos sąnaudos patalpų apšvietimui, kWh/(m²·metai):	3.60
Pastato į aplinką išmetamas CO_2 kiekis, kgCO_2/(m²·metai):	30.09

Sertifikavimo eksperto pastabos:

Sertifikato išdavimo data: 2015-12-17 Sertifikato galiojimo terminas: 2025-12-17

118549

Sertifikatą išdavė ekspertas Rytis Petkevičius Atestato Nr.0235

Appendix 22 EPC Sample: Luxembourg

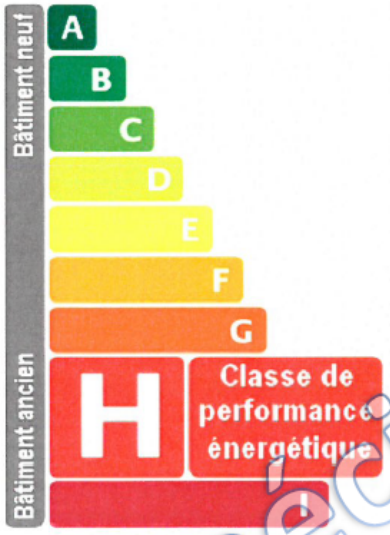
Passeport énergétique

Certificat de performance énergétique d'un bâtiment d'habitation 1/5

No. passeport	No. expert	Date d'établissement	Date d'expiration
P.20110108.1234.1.1.2	Ministère	08/01/2011	07/01/2021

Classe de performance énergétique

Besoins économes



Besoins élevés

Classe d'isolation thermique

H

Classe de performance énergétique
La classe de performance énergétique du bâtiment est déterminée en fonction du ***besoin en énergie primaire***. Le besoin en énergie primaire tient compte de ***l'enveloppe thermique*** ainsi que des ***installations techniques*** du bâtiment. De plus, il tient compte de ***l'aspect environnemental*** de la source d'énergie utilisée.

Classe d'isolation thermique
La classe d'isolation thermique est déterminée en fonction du ***besoin en chaleur de chauffage***. Le besoin en chaleur de chauffage tient compte de la ***qualité thermique*** des murs, toits, dalles et des fenêtres ainsi que du ***type de construction***, de la ***qualité d'exécution*** et de ***l'orientation*** du bâtiment.

Niveau de performance
Le classement s'effectue de A (meilleure classe) jusqu'à I (classe la plus mauvaise)
Maison passive (PH), classes ≤ A
Maison à basse cons. d'énergie (NEH), classes ≤ B
Maison à économie d'énergie (ESH), classes ≤ C

Informations concernant le bâtiment

Type de bâtiment	Logement unifamilial
Nombre de logements	1
Motif d'établissement	Enveloppe (exist.), chauffage (exist.)
Adresse (rue)	rue du Soleil, 1
Adresse (code postal/localité)	1234, Luxembourg
Année de construction bâtiment	1982
Année de construction installation chauffage	1982
Surface de référence énergétique	154,0 m²

Expert	***Propriétaire***
Direction Energie	
Jeanne Eau	Familie Sonnenklar
123, rue de l'Economie	1, rue de Soleil
L-1234 Luxembourg	L-4321 Luxembourg
Tel. 12345678	Tel. 87654321

Signature expert	***Lieu, Date***
J	Luxembourg, le 8 janvier 2011

Passeport énergétique

Certificat de performance énergétique d'un bâtiment d'habitation 2/5

No. passeport	*No. expert*	*Date d'établissement*	*Date d'expiration*
P.20110108.1234.1.1.2	Ministère	08/01/2011	07/01/2021

Classe de performance énergétique

besoin en énergie primaire (rapporté à An)

ce bâtiment atteint ...

472,5 kWh / (m²a)

Classe d'isolation thermique

besoin en chaleur de chauffage (rapporté à An)

ce bâtiment atteint ...

263,3 kWh / (m²a)

Classe de performance environnementale

émissions de CO_2 (rapportées à An)

ce bâtiment atteint ...

104,0 kg CO_2 / (m²a)

Besoin en énergie annuel et émissions de CO_2

Besoin en énergie primaire	**72 758**	kWh / a
Besoin en chaleur de chauffage (transmission et ventilation)	**40 547**	kWh / a
Emissions de CO_2	**16,0**	t CO_2 / a
Crédit en energie primaire de l'installation photovoltaïque	**0**	kWh / a

Le **besoin en énergie primaire** couvre les besoins en chaleur de chauffage et de préparation de l'eau chaude (rendement des installations techniques inclus) et tient compte de l'énergie supplémentaire requise pour le processus d'exploitation (production, extraction, transport, transformation, etc.) du vecteur énergétique utilisé.

Le **besoin en chaleur de chauffage** correspond à la quantité de la chaleur requise pour maintenir la température intérieure du bâtiment au niveau souhaité.

Les **émissions de CO_2** indiquent les gaz nuisibles au climat émis lors de la combustion d'énergies fossiles. Elles sont indiquées en tant qu'équivalents de CO_2. Cette valeur prend en compte à côté du CO_2 d'autres gaz nuisibles au climat (méthane,...) qui sont émis lors de l'obtention, du conditionnement et du transport de l'énergie. Plus les émissions de CO_2 engendrées par le conditionnement du bâtiment sont faibles, moins le bâtiment génère des nuisances au climat.

A_n représente la **surface de référence énergétique du bâtiment d'habitation** (généralement surface chauffée) en m².

Le **crédit d'énergie primaire** est égale à la partie efficace de l'électricité photovoltaïque dans le passeport énergétique.

Signature expert	*Lieu, Date*
	Luxembourg, le 8 janvier 2011

Appendix 23 EPC Sample: Malta

Malta Resources Authority | Ministeru ghar-Riżorsi u l-Affarijiet Rurali | Building Regulation Office Services Division

Certificate Reference Number:
D 0999 00007 2807/2009

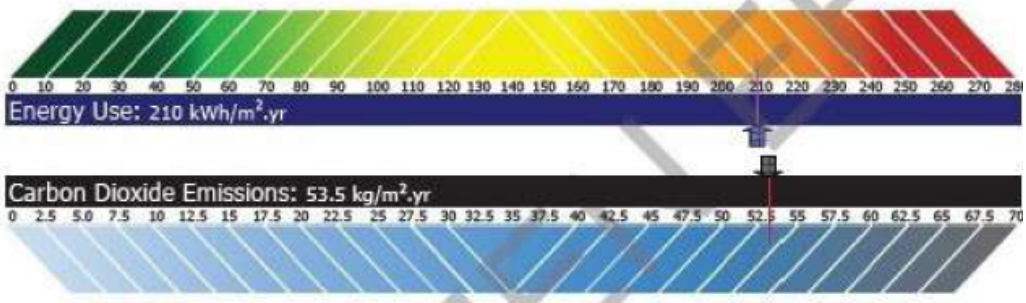
ENERGY PERFORMANCE CERTIFICATE OF DWELLINGS MALTA

Registration Date: 28 July 2009

Registered by the Malta Resources Authority in accordance with Legal Notice 261 of 2008

Rating type:
Asset

Building Type:
Flat / Apartment at Level 4



Property Details

Locality: Fgura

Street: Triq il-Ħalel

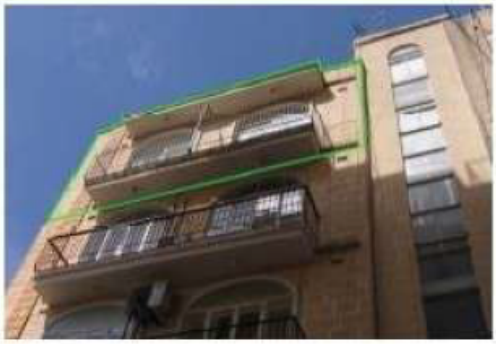
Property Name or No: No. 53, Flat 7
(Refer to site plan on page 2 for property co-ordinates)

MEPA Application No:
Not Applicable

Year of Major Renovation (where applicable):
Not Applicable

Useful Floor Area (m^2): 85

Photograph of property façade



Assessor Name: John Borg **Assessor Registration No:** 0999 **Assessor Signature & Stamp:**	**Expiry Date of Certificate** 27 July 2019 This certificate is valid for a maximum period of 10 years from the date of registration provided there are no construction, fittings, or equipment changes in the building during this period.

Appendix 24 EPC Sample: Netherlands

Energielabel woningen	Registratienummer	Datum registratie	Geldig tot	Status
	123456789	1-03-2024	1-03-2034	Definitief

Deze woning heeft energielabel A+++

Isolatie

1	Gevels	++
2	Gevelpanelen	n.v.t.
3	Daken	n.v.t.
4	Vloeren	++
5	Ramen	++
6	Buitendeuren	n.v.t.

Installaties

7	Verwarming	Warmtepomp
8	Warm water	Boosterwarmtepomp
9	Zonneboiler	Zonneboiler aanwezig
10	Ventilatie	Balansventilatiesysteem
11	Koeling	Geen koeling
12	Zonnepanelen	560 Wp

Verbeteradvies

Deze woning wordt niet verwarmd via een aardgasaansluiting

Warmtebehoefte in de wintermaanden	Risico op hoge binnentemperaturen in de zomermaanden	Aandeel hernieuwbare energie
Laag Gemiddeld Hoog	**Laag** Hoog	51,9 %

Toelichtingen en verbeteradviezen vindt u op pagina 2 en verder

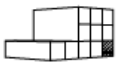
Over deze woning

Adres
Voorbeeldstraat 18
1234 AB Voorbeeldstad
BAG-ID: 0244010000004485

Detailaanduiding

Bouwjaar	2020
Compactheid	1,39
Vloeroppervlakte	75 m²

Woningtype
Hoekwoning onderste bouwlaag



Opnamedetails

Naam
Pieter Hendrik van Leeuwwardingen

Examennummer
99999

Certificaathouder
Janssen-De Vries Energielabelcerticaten en inspecties B.V.

Inschrijfnummer
123.45.678

KvK-nummer
12345678

Certificerende instelling
Energielabelcertificerende instelling b.v.

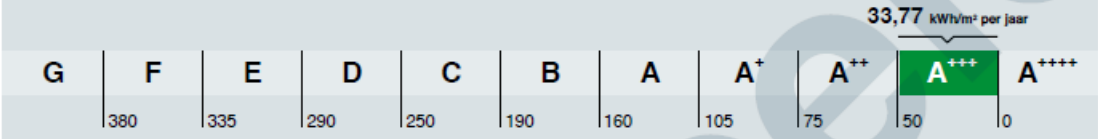
Soort opname
Detailopname

U kunt de geldigheid van dit energielabel controleren op www.ep-online.nl/ControlerenEchtheid

Toelichting bij dit energielabel

Voor uw woning is het energielabel bepaald. Dit label geeft aan hoe energiezuinig uw woning is. De energiezuinigheid wordt bepaald door de mate van isolatie en de energiezuinigheid van de installaties die nodig zijn voor verwarming, koeling, warm water en ventilatie. Ook de eventuele opbrengst van zonnepanelen wordt meegenomen in de berekening van het energielabel.

Hoe minder fossiele energie uw woning gebruikt, hoe beter uw energielabel. Hierbij is G het slechtste energielabel en A++++ het beste. Fossiele energie komt van kolen, olie en aardgas. **Uw woning gebruikt 33,77 kWh/m² fossiele energie per jaar. Dit komt overeen met 7,92 kg CO_2/m² per jaar.** De hoeveelheid fossiele energie die uw woning gebruikt, hangt af van de isolatie, de aanwezige installaties en de compactheid van uw woning. Hoe compacter een woning is, des te lager is de waarde voor de compactheid. Een compacte woning heeft relatief weinig buitenmuren en verliest daardoor minder energie. Het gebruik van hernieuwbare energie – denk aan zonnepanelen, zonneboilers en warmtepompen – vermindert ook de fossiele energie die u nodig hebt. Isolatie en hernieuwbare energie zijn nodig voor de transformatie naar een duurzame gebouwde omgeving tot 2050. Heeft u nog een aardgasaansluiting voor verwarming van uw woning, dan moet u zich voorbereiden op deze overgang. Op dit energielabel vindt u adviezen hoe u dit kunt doen.



Hoe is het energielabel berekend? Hierbij is uitgegaan van een gemiddeld aantal bewoners, gemiddeld bewonersgedrag en het gemiddelde Nederlandse klimaat. Het energiegebruik voor huishoudelijke apparatuur – zoals tv, wasmachine en koelkast – telt niet mee. Dit is omdat het energielabel alleen gaat over hoe energiezuinig de woning zelf is. Het energiegebruik op het energielabel is daarom niet hetzelfde als het elektriciteitsverbruik op uw energierekening.

Warmtebehoefte in de wintermaanden

Voldoet aan de Standaard voor woningisolatie?

ja nee

De warmtebehoefte is de hoeveelheid warmte die gemiddeld per jaar nodig is om uw woning voldoende warm te krijgen. Een woning die goed geïsoleerd en kierdicht is en een energiezuinig ventilatiesysteem heeft, heeft een lage warmtebehoefte. **De warmtebehoefte van uw woning is 35,78 kWh per vierkante meter vloeroppervlakte.** Bij een warmtebehoefte van maximaal 63 kWh per vierkante meter vloeroppervlakte voldoet de woning aan de Standaard voor woningisolatie. Uw woning is dan in veel gevallen klaar voor de overstap naar een duurzame warmtevoorziening die warmte levert op ongeveer 50 graden in de woning, zoals warmtepompen.

Risico op hoge binnentemperaturen in de zomermaanden

Het risico op hoge binnentemperaturen in uw woning in de zomermaanden is laag. Maatregelen zoals buitenzonwering, zonwerende beglazing en dakisolatie beperken het risico op hoge binnentemperaturen.

Aandeel hernieuwbare energie

Het aandeel hernieuwbare energie dat u benut voor uw woning, is 59,1%. Hernieuwbare energie is afkomstig uit zon, biomassa, buitenlucht en bodem. Zonnepanelen, zonneboilers, warmtepompen en biomassaketels vergroten het aandeel hernieuwbare energie.

Indicatie energierekening

Prijspeil december 2022

Onderstaande tabel geeft een indicatie van de energierekening per maand, gebaseerd op vergelijkbare woningen in Nederland. Uw energierekening wordt behalve door de energiezuinigheid van de woning ook door uw gedrag beïnvloed. Als u de verwarming veel aan hebt staan, veel warm water gebruikt en veel elektrische apparatuur in gebruik heeft, dan is uw energierekening hoger. Er is in de tabel daarom onderscheid gemaakt in laag, gemiddeld en hoog.

	G	F	E	D	C	B	A	A+	A++	A+++	A++++
Laag	€115	€110	€105	€100	€90	€80	€75	€70	€70	€65	€60
Gemiddeld	€170	€165	€160	€155	€140	€130	€120	€110	€110	€105	€100
Hoog	€250	€240	€235	€225	€205	€190	€175	€165	€160	€155	€150

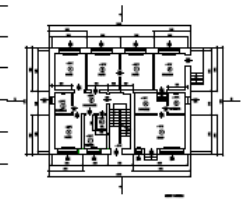
Appendix 25 EPC Sample: Poland

ŚWIADECTWO CHARAKTERYSTYKI ENERGETYCZNEJ
BUDYNKU

NUMER ŚWIADECTWA[1]	1

BUDYNEK OCENIANY

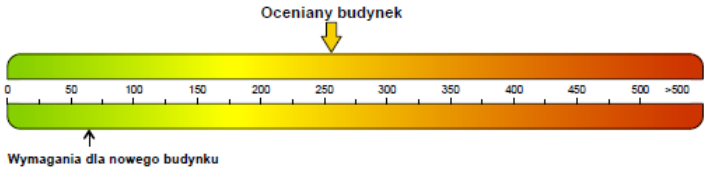
RODZAJ BUDYNKU [2]	Niski wielorodzinny
PRZEZNACZENIE BUDYNKU [3]	Wielorodzinny
ADRES BUDYNKU	Warszawa, ul. Płomyka 28
BUDYNEK, O KTÓRYM MOWA W ART 3 UST.2 USTAWY [4]	Nie
ROK ODDANIA DO UŻYTKOWANIA BUDYNKU [5]	1995
METODA WYZNACZANIA CHARAKTERYSTYKI ENERGETYCZNEJ [6]	Metoda obliczeniowa
POWIERZCHNIA POMIESZCZEŃ O REGULOWANEJ TEMPERATURZE POWIETRZA (POWIERZCHNIA OGRZEWANA LUB CHŁODZONA) A[m²] [7]	106,98
POWIERZCHNIA UŻYTKOWA [m²]	53,50
WAŻNE DO [8]	7 Sierpnia 2034
STACJA METEOROLOGICZNA, WEDŁUG KTÓREJ DANYCH OBLICZANA JEST CHARAKTERYSTYKA ENERGETYCZNA [9]	WARSZAWA - MOJA STACJA



OCENA CHARAKTERYSTYKI ENERGETYCZNEJ BUDYNKU [10]

WSKAŹNIK CHARAKTERYSTYKI ENERGETYCZNEJ	OCENIANY BUDYNEK	WYMAGANIA DLA NOWEGO BUDYNKU WEDŁUG PRZEPISÓW TECHNICZNO-BUDOWLANYCH
WSKAŹNIK ROCZNEGO ZAPOTRZEBOWANIA NA ENERGIĘ UŻYTKOWĄ	EU = 145,7 kWh/(m²·rok)	
WSKAŹNIK ROCZNEGO ZAPOTRZEBOWANIA NA ENERGIĘ KOŃCOWĄ [11]	EK = 229,6 kWh/(m²·rok)	
WSKAŹNIK ROCZNEGO ZAPOTRZEBOWANIA NA NIEODNAWIALNĄ ENERGIĘ PIERWOTNĄ [11]	EP = 256,0 kWh/(m²·rok)	EP = 65,0 kWh/(m²·rok)
JEDNOSTKOWA WIELKOŚĆ EMISJI CO_2	E_{CO2} = 0,048 t CO_2/(m²·rok)	
UDZIAŁ ODNAWIALNYCH ŹRÓDEŁ ENERGII W ROCZNYM ZAPOTRZEBOWANIU NA ENERGIĘ KOŃCOWĄ	U_{OZE} = 0,0 %	

WSKAŹNIK ROCZNEGO ZAPOTRZEBOWANIA NA NIEODNAWIALNĄ ENERGIĘ PIERWOTNĄ EP [kWh/(m²·rok)]



OBLICZENIOWA ROCZNA ILOŚĆ ZUŻYWANEGO NOŚNIKA ENERGII LUB ENERGII PRZEZ BUDYNEK [12]

SYSTEM TECHNICZNY	RODZAJ NOŚNIKA ENERGII LUB ENERGII	ILOŚĆ NOŚNIKA ENERGII LUB ENERGII	JEDNOSTKA/(m²·rok)
OGRZEWANIA	Gaz ziemny - wartość opałowa z RMŚ 12.09.2008.	18,456	m³
	Energia elektryczna.	1,290	kWh
PRZYGOTOWANIA CIEPŁEJ WODY UŻYTKOWEJ	Gaz ziemny - wartość opałowa z RMŚ 12.09.2008.	5,477	m³
	Energia elektryczna.	0,497	kWh
CHŁODZENIA			

SPORZĄDZAJĄCY ŚWIADECTWO

IMIĘ I NAZWISKO	Piotr Wereszczyński
NR WPISU DO WYKAZU [13]	007
DATA WYSTAWIENIA ŚWIADECTWA	7 Sierpnia 2024

PODPIS I PIECZĄTKA

Appendix 26 EPC Sample: Slovenia

ENERGETSKA IZKAZNICA STAVBE

Podatki o stavbi

Št. izkaznice: Velja do:

Identifikacijska oznaka stavbe,
posameznega dela ali delov stavbe:

Klasifikacija stavbe:
Leto izgradnje:
Naslov stavbe:

Kondicionirana površina stavbe A_k (m^2)
Parcelna št.:
Katastrska občina:

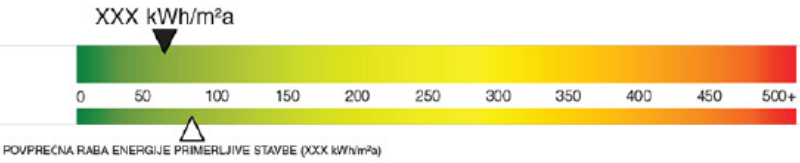
Vrsta izkaznice: merjena

Vrsta stavbe: nestanovanjska

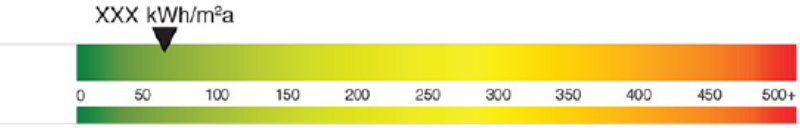
Naziv stavbe:*

fotografija stavbe (obvezno vstaviti)

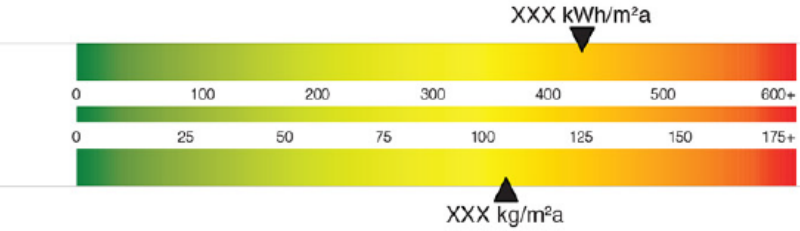
Dovedena energija



Dovedena električna energija



Primarna energija in Emisije CO_2



Izdajatelj

Izdajatelj d.o.o. (št. pooblastila)
Ime in podpis odgovorne osebe:
Opcija: elektronski podpis,
Datum izdaje:

Izdelovalec

Janez Novak (št. pooblastila)
Ime in podpis:
Opcija: elektronski podpis,
Datum izdaje:

Izdelovalec te energetske izkaznice s podpisom potrjujem, da ne obstaja katero od okoliščin iz Energetskega zakona (Ur.list RS 17/14), ki bi mi preprečevala izdelavo energetske izkaznice.

Energetska izkaznica stavbe je izdelana v skladu s Pravilnikom o metodologiji izdelave in izdaji energetske izkaznice stavbe in z Energetskim zakonom (Ur.list RS 17/14). list 1/6

ENERGETSKA IZKAZNICA STAVBE

Podatki o stavbi		**Vrsta izkaznice: merjena**
Št. izkaznice:	Velja do:	Vrsta stavbe: nestanovanjska

Podatki o stavbi

Koordinati stavbe (X,Y):

Energent dovedena	**Enote**	**Količina porabljenega energenta**	**Dovedena energija kWh/a**	**Primarna energija kWh/a**	**Emisije CO_2 kg/a**
ELKO	L				
UNP	m³, l, kg*				
Zemeljski plin	sm³*				
Daljinska toplota	kWh				
Lesna biomasa	kg				
Premog	kg				
Elektrika	kWh				
Skupaj					

Energent odvedena	**Enote**	**Količina porabljenega energenta**	**Dovedena energija kWh/a**	**Primarna energija kWh/a**	**Emisije CO_2 kg/a**
Odvedena elektrika (veter, kogeneracija, sonce)	kWh				
Odvedena toplota v stavbi (kogeneracija)	kWh				
Odvedena toplota v stavbi (drugo)	kWh				
Skupaj					

Dovedena energija se porablja za:	pripravo tople vode:
Dovedena električna energija vključuje energijo za:	ogrevanje
	toplo vodo
	prezračevanje
	razsvetljavo
	hlajenje

Appendix 27 EPC Sample: Spain

CERTIFICADO DE EFICIENCIA ENERGÉTICA DE EDIFICIOS

IDENTIFICACIÓN DEL EDIFICIO O DE LA PARTE QUE SE CERTIFICA:

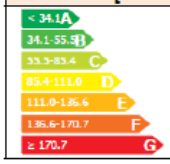
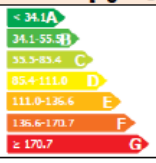
Nombre del edificio			
Dirección			
Municipio		**Código Postal**	
Provincia		**Comunidad Autónoma**	
Zona climática		**Año construcción**	
Normativa vigente (construcción / rehabilitación)			
Referencia/s catastral/es			

Tipo de edificio o parte del edificio que se certifica:	
☐ Edificio de nueva construcción	☐ Edificio Existente
☐Vivienda ☐Unifamiliar ☐Bloque ☐Bloque completo ☐Vivienda individual	☐Terciario ☐Edificio completo ☐Local

DATOS DEL TÉCNICO CERTIFICADOR:

Nombre y Apellidos		**NIF/NIE**	
Razón social		**NIF**	
Domicilio			
Municipio		**Código Postal**	
Provincia		**Comunidad Autónoma**	
e-mail:		**Teléfono**	
Titulación habilitante según normativa vigente			
Procedimiento reconocido de calificación energética utilizado y versión:			

CALIFICACIÓN ENERGÉTICA OBTENIDA:

CONSUMO DE ENERGÍA PRIMARIA NO RENOVABLE [kWh/m2.año]		EMISIONES DE DIÓXIDO DE CARBONO [$kgCO_2/m^2$·año]	
			

El técnico abajo firmante declara responsablemente que ha realizado la certificación energética del edificio o de la parte que se certifica de acuerdo con el procedimiento establecido por la normativa vigente y que son ciertos los datos que figuran en el presente documento, y sus anexos:

Fecha: ___/____/____

Firma del técnico certificador:

Anexo I. *Descripción de las características energéticas del edificio.*
Anexo II. *Calificación energética del edificio.*
Anexo III. *Recomendaciones para la mejora de la eficiencia energética.*
Anexo IV. *Pruebas, comprobaciones e inspecciones realizadas por el técnico certificador.*

Registro del Órgano Territorial Competente:_

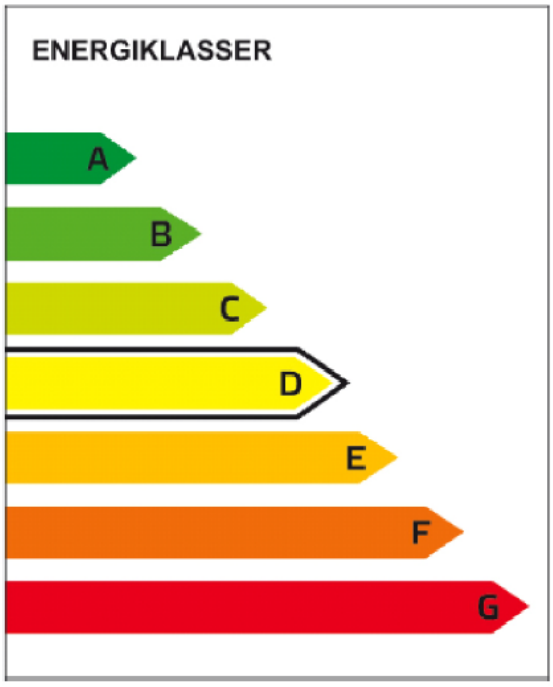
Appendix 28 EPC Sample: Sweden

sammanfattning av

ENERGIDEKLARATION

[redacted]

Nybyggnadsår: [redacted]
Energidekarations-ID: [redacted]



D

DENNA BYGGNADS ENERGIKLASS

Energiprestanda:
72 kWh/m² och år

Krav vid uppförande av ny byggnad [jan 2012]:
Energiklass C, 55 kWh/m² och år

Uppvärmningssystem:
Värmepump-frånluft (el)

Radonmätning:
Utförd

Åtgärdsförslag:
Har lämnats

Energideklarationen är utförd av:
[redacted]
[redacted], 2014-02-18

Energideklarationen är giltig till:
2024-02-18

Energideklarationen i sin helhet finns hos byggnadens ägare.

För mer information:
www.boverket.se/energideklaration

Sammanfattningen är upprättad enligt Boverkets föreskrifter och allmänna råd (2007:4) om energideklaration för byggnader.

Appendix 29 EPC Context according to Directive 1275/2024

1. On its front page, the energy performance certificate shall display at least the following elements:

a. the energy performance class;
b. the calculated annual primary energy use in kWh/(m2.y);
c. the calculated annual final energy use in kWh/(m2.y);
d. renewable energy produced on-site in % of energy use;
e. operational greenhouse gas emissions (kgCO2/(m2.y)), and the value of the life-cycle GWP, if available.

The energy performance certificate shall also display the following elements:

a. the calculated annual primary and final energy consumption in kWh or MWh;
b. renewable energy production in kWh or MWh; main energy carrier and type of renewable energy source;
c. the calculated energy needs in kWh/(m2.y);
d. a yes/no indication whether the building has a capacity to react to external signals and adjust the energy consumption;
e. a yes/no indication whether the heat distribution system inside the building is capable to work at low or more efficient temperature levels, where applicable;
f. the contact information of the relevant one-stop shop for renovation advice.

2. In addition, the energy performance certificate may include the following indicators:

a. energy use, peak load, size of generator or system, main energy carrier and main type of element for each of the uses: heating, cooling, domestic hot water, ventilation and in-built lighting;
b. the greenhouse gas emission class (if applicable);
c. information on carbon removals associated to the temporary storage of carbon in or on buildings;
d. a yes/no indication whether a renovation passport is available for the building;
e. the average U-value for the opaque elements of the building envelope;
f. the average U-value for the transparent elements of the building envelope;
g. type of most common transparent element (e.g. double-glazed window);
h. results of the analysis on overheating risk (if available);
i. the presence of fixed sensors that monitor the indoor environmental quality;
j. the presence of fixed controls that respond to the levels of indoor environmental quality;
k. number and type of recharging points for electric vehicles;
l. presence, type and size of energy storage systems;
m. expected remaining lifespan of the heating or air-conditioning systems and appliances, where applicable;
n. feasibility of adapting the heating system to operate at more efficient temperature settings;
o. feasibility of adapting the domestic hot-water system to operate at more efficient temperature settings;

p. feasibility of adapting the air-conditioning system to operate at more efficient temperature settings;
q. metered energy consumption;
r. whether there is a connection to a district heating and cooling network, and, if available, information about a potential connection to an efficient district heating and cooling system;
s. local primary energy factors and related carbon emission factors of the connected local district heating and cooling network;
t. operational fine particulate matter (PM 2,5) emissions.

The energy performance certificate may include the following links with other initiatives if these apply in the relevant Member State:

a. a yes/no indication whether a smart readiness assessment has been carried out for the building;
b. where available, the value of the smart readiness assessment;
c. a yes/no indication whether a Digital Building Logbook is available for the building.

Persons with disabilities shall have equal access to the information in energy performance certificates.