

D4.2 Pilot's individual factsheets implemented, comparing U-CERT EPC-s with classic ones

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18/08/2021	1.0	Pablo CARNERO MELERO, IVE	-	Contributions from some of pending case studies
28/02/2022	2.0	Pablo CARNERO MELERO, IVE Borja PALLAS VÁZQUEZ, IVE	Kamen SIMEONOV, EnEffect	Including update in U-CERT EPC from D3.2

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¹ Name SURNAME, ORGANIZATION

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Introduction to U-CERT

Under the Energy Performance of Buildings Directive (EPBD), all EU countries have established independent energy performance certification systems supported by independent mechanisms of control and verification. These Energy Performance Certification (EPC) schemes have stood in the past as one of the most important sources of knowledge on the energy performance (EP) of the European building stock. However, there are still several barriers to overcome towards a widely supported and successful implementation of the Energy Performance Certificates (EPCs) as effective tools to support the revised EPBD [1]. One of the main obstacles is users' understanding and acceptance of EPCs, nowadays held back by the lack of user-friendliness, reliability – and therefore lack of credibility – and cost effectiveness. Another barrier is that some implementations of the certification and assessment schemes seem to be not fully compliant with EU legislation, which is necessary to instill trust in the market and to incite investments and to support decision making, both on new energy efficient buildings as on deep renovation. Moreover, EPCs often fail in evaluating the impact of innovative technical solutions on buildings' energy performances. Current calculation methods used in EPCs typically do not enable realistic prediction of performances of innovative technologies, so that building designers and EPCs assessors are led to miscalculate or even discard daring design options, thus hindering their market uptake.

Since 2017, there is a new opportunity as the EPCs can rely on the new set of EPB standards for their assessment methodology. These standards address the aforementioned challenges by proposing a holistic and modular approach. In principle, this modular approach can enable a step-by-step implementation, starting with the overarching EPB standard and other key modules. However, there is still a clear need for guidance and support with respect to the structure of the set of EPB standards and the application of individual standards or clusters of standards, both on a local and a national level. The standards and technical reports provide a lot of information, but based on the feedback received so far, it appears difficult to find or recognize the information that is searched for. Information must be made accessible and applicable for the Member States (MS) to support them in their investigation on how the EPB standards can be used.

Summarizing, current practices and tools of EPB Assessment and certification applied across Europe, clearly face several challenges [2]. To meet them they should become more reliable, by being compliant with EU legislation and facilitating convergence of EPCs across EU. They also should become more user-friendly, by offering support in decision making; and more cost-effective, increasingly reflecting the smart dimension of buildings and ensuring a technology neutral approach.

In this context is where the U-CERT project is developed.

Executive Summary

The U-CERT project is focused on introducing a next generation of user-centered EPCs to value buildings in a holistic and cost-effective manner by means of five measurable objectives:

- Stimulating and enabling the co-creation and implementation of the new generation of EPC Schemes with a wide based support.
- Enhancing the new certification schemes to be more practical, reliable, understandable, and desirable by a holistic and user-centered approach.
- Making the new certification schemes easily accessible for a wide range of users and stakeholders by the services of the EPB Center.
- Providing evidence of applicability and usefulness developed schemes by testing the U-CERT approach in selected cases.
- To foster the EU-wide uptake by motivating and activating EU interest groups and national certifying and standardization bodies.

Providing evidence of applicability and usefulness developed schemes (WP2, 3 and 5) by testing the U-CERT EPC approach, in selected cases is WP4's main contribution to U-CERT. Thus, the results and analyses of the realistic cases will be used as feedback for WP2, 3 and 5 to adjust and fine-tune the methodologies, tools, services and supporting business models. Therefore, study cases act as 'field labs' for testing and validating the use of the U-CERT's value proposition.

The general fitting of WP4 within U-CERT project is the following.

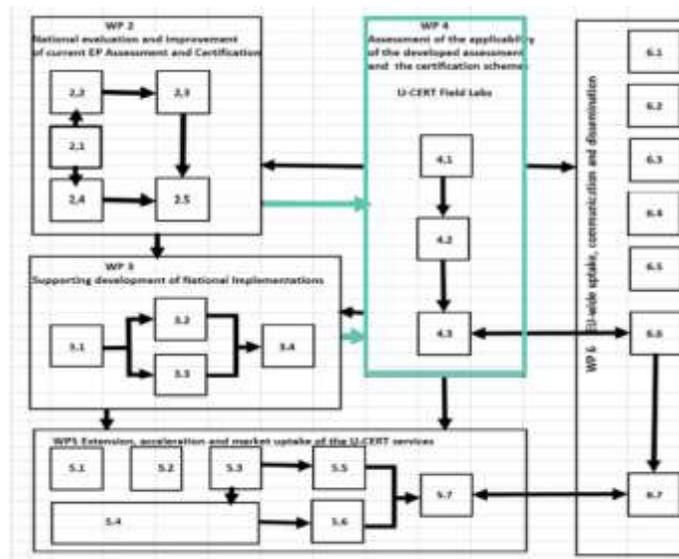


Figure 1. Synergies between Work Packages within U-CERT. Source: U-CERT's GA

As stated in U-CERT's Grant Agreement (GA), "the objective of WP4 is to test and demonstrate the methodology as developed in WP2 and WP3 through the practical implementation of the procedures by cases from 11 countries".

Thus, WP4 tasks are strongly intertwined with tasks from other WPs. The analysis of the state of the art regarding current EPC implementation in [Task 2.1](#) will provide the

baseline of knowledge of the different state of EPC development in U-CERT partner countries. [Task 2.2](#) will develop the methodology to assess users' perception about EPC schemes, providing valuable knowledge of the user needs and expectations towards next generation EPC schemes. Relevant inputs are also expected from [Task 2.4](#), and its review of holistic indicators for measured data inclusion in advanced EPC schemes. Moreover, the core of U-CERT EPC framework is to be developed in WP3, specially in [Task 3.1](#), with the development of converged set of national data sheets for the set of EPB standards, which should define the basic structure of U-CERT EPB Assessment. Also in [Task 3.2](#), where the main U-CERT indicators for next-generation EPCs will be defined. Furthermore, U-CERT methodology will have an echo in the U-CERT supporting tools development in WP5, which, in turn, may need to perform some testing in the case studies and, therefore, should also be accounted for in this protocol. It is within this framework that this deliverable is created.

This deliverable has been updated to reflect the latest developments in the methodology-developing WPs.

Definitions

The underlying document uses certain concepts which may be unfamiliar to the public and for EPB assessors without deep knowledge of the EPB standards.

For deeper knowledge of the terms and definitions used in the scope of energy performance calculations, refer to EN ISO 52000-1 section 3 [1], EN ISO 52016-1 section 3 [2], and EN ISO 52018-1 section 3 [3].

Introduction

Case Studies are the environments where U-CERT value propositions should be tested for applicability and user-friendliness. In the scope of this document, Case Studies' national EPCs will be compared against U-CERT's EPC. The comparison will be focused on the **presence of indicators** and on the **visual representation** of the elements of EPCs. U-CERT Calculated EPC for professionals, as presented in [Deliverable 3.2](#) [4], will be used as a benchmark for comparison with national EPCs, as collected in [Task 2.1](#).

This document contains the factsheets comparing each case study's national EPCs with the proposed template for U-CERT's EPC, as presented in [Deliverable 3.2](#) [4]. The comparison will cover the differences in **indicators** and general **visual design**. The scope will be on calculated EPB assessments, given it is the most extended procedure in U-CERT partner countries [5][6].

The procedure to create the factsheets has been the following:

1. Create the tabulation of all the indicators contained in the U-CERT Calculated EPC.
2. Using the previous tabulation as a base, each case study's EPC has been compared, indicator by indicator, against U-CERT's proposal.
3. According to the comparison, the following value has been given to each indicator:
 - **0**: not at all considered in the case study's EPC;
 - **1**: somehow considered in the case study's EPC, hence generating a descriptive comment;
 - **2**: considered in the case study's EPC in a similar way as in U-CERT's.
4. For each case study's EPC a general comment on how the visuals are dealt with is also provided.

Refer to [Annex I](#) for a compilation of each Case Study's national EPC, as obtained in the scope of [Task 2.1](#).

Refer to [Annex II](#) for a visual representation of U-CERT's EPC in its professional extended version for a Calculated EPB Assessment, as presented in [Deliverable 3.2](#).

Refer to [Annex III](#) for an introduction of the tabulation indicators contained in the U-CERT Calculated EPC, and a compilation of the comparative factsheets.

As exposed in [Deliverable 1.2](#), U-CERT has suffered some setbacks, which have prevented the project from providing the expected results in due time and proposed course. Apart from the already known (i.e., COVID-19 outbreak, lockdown, restrictions in mobility, etc.), the **lack of access to partner countries' National Annexes** has caused a delay in many methodology developing tasks. This has forced to take on **adaptation measures**, which have specially affected to U-CERT methodology development and, in turn, to case study testing.

Case Studies description

The case studies for the U-CERT project were selected when developing the proposal. Originally, they were a total of 15 from 11 different countries, representing different climatic conditions, building typologies, regulatory frameworks, official EPB assessment definitions, etc. They allow the project to test the consistency of the methodologies developed in a very mottled environment.

Table 1. U-CERT Case Studies

Case Study	Image	Name	Country	Category	Construction Year	Last renovation	EPC release Year	Heated area (m ²)
1		Larisa Nursing Home	The Netherlands	Residence for the elderly	2016	N/A	2013	6.627
2a		Entré Lindhagen Hus C	Sweden	Offices	2013	N/A	2018	21.244 ¹
2b		Hagaporten III	Sweden	Offices	2008	N/A	2019	33.265 ¹
3		J7B office building	Estonia	Offices	2018	N/A	2018	2.170 ²
4a		University	Hungary	Educational building	1877	2014	2018	2.243 ³

¹ Heated area, excluding heated garage.

² Net surface.

³ Undetermined.

4b		Budapest Office	Hungary	Offices		N/A	2019	997 ³
5a		Quart 33	Spain	Multi-family building	2009	N/A	2013	3.098 ⁴
5b		UMH Rectorate	Spain	Office	2008	2018	2017	8.520 ⁴
5c		IVE headquarters	Spain	Office	1970	2021	2021	482.41 ⁵
6a		Computer and Information Science, University of Ljubljana	Slovenia	Educational building	2014	N/A	2014	24.985 ⁶
6b		Faculty of Economics, University of Ljubljana	Slovenia	Educational building	1976	2014	2015	6.012
7		Apartment Building 21	Romania	Multi-family building	1983	2017	-	8.058 ⁵

⁴ Living spaces area.

⁵ Useful area.

⁶ This is the area for the whole building complex accounted for in the issued EPC. They are a total of 3 buildings with physical connection and shared heating and cooling technical systems. The specific surface of the Computer and Information Science building is 7.831 m².

8		Building 22, Campus Leonardo, Polimi	Italy	Educational building	1999	-	-	2.972 ³
9		Two-family house	Bulgaria	Two-family building	2002	2010	2020	320
10a		Médiathèque Michel Crépeau	France	Public library	1997	-	2020	9.200 ⁷
10b		Individual house	France	Single-family house	1974	N/A	2020	94 ⁷
11a		Green Lighthouse	Denmark	Office	2009	N/A	2012	972
11b		Home for Life	Denmark	Single-family house	2009	N/A	2010	191

Note that **some case studies have been modified from the ones listed in the proposal document**, and additional ones have also been included. The main reason behind this decision has been to grant higher quality data to the U-CERT testing phase. Some of the originally proposed buildings were no longer suitable to be used as “testbeds”, due to being unoccupied or to occupants being reluctant to provide data, mainly caused by the COVID-19 outbreak. The additional case studies have been included in [Table 1](#),

⁷ Gross floor area.

and marked in orange. In the event that they substituted a previous case study, the former has been marked in red.

With a view to easing the reading of the document, the tables referring to case studies details will omit the name of the buildings. The case study identification number, as stated in Table 1, will be used.

References

- [1] ISO/TC 163 and CEN/TC 371, "EN ISO 52000-1. Energy performance of buildings. Overarching EPB assessment. Part 1: General framework and procedures." 2017.
- [2] ISO/TC 163/SC2 and CEN/TC 89, "EN ISO 52016-1. Energy performance of buildings - Energy needs for heating and cooling, internal temperatures and sensible and latent heat loads - Part 1: Calculation procedures." 2017.
- [3] ISO/TC 163/SC2 and CEN/TC 89, "EN ISO 52018-1. Energy performance of buildings - Indicators for partial EPB requirements related to thermal energy balance and fabric features - Part 1: Overview of options." 2017.
- [4] P. Carnero Melero, D. Van Dijk, M. Spiekman, and G. Ana, "U-CERT - D3.2 Development of a set of user centred and effective overall and partial indicators, using SRI," 2021.
- [5] REHVA and U-CERT project partners, "U-CERT - D2.1 Report on implementation of EPC schemes in U-CERT partner countries," 2021.
- [6] IVE, "U-CERT - D4.1 Detailed common calculation and measurement protocols of U-CERT EPC-s," 2021.

I. Annex I. Case Studies' national EPCs

Each Case Study's national EPC was included in [Deliverable 2.1](#) [5]. The only case study missing from the ones outlined in [Table 1](#) is 10a, since the EPC is no longer available.

With a view to ensuring access to the information, a complete copy of such EPCs is provided together with this document.

II. Annex II. EPC report. U-CERT Calculated EPB Assessment

U-CERT's EPC report template according to U-CERT's Calculated EPB Assessment was included as Annex A in [Deliverable 3.2](#) [4].

With a view to ensuring access to the information, a complete copy of such EPC template is provided together with this document.

III. Annex III. Comparative factsheets

An introduction of the tabulation indicators contained in the U-CERT Calculated EPC, and a compilation of the comparative factsheets is provided together with this document.



OUR TEAM



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