

SUMMARY REPORT- TECHNICAL SPECIFICATIONS OF ENERGY PERFORMANCE CERTIFICATES DATA HANDLING: UNDERSTANDING THE VALUE OF DATA

DECEMBER 2020





eXTENDING the energy performance assessment and
certification schemes via a mOdular approach

Project acronym	X-tendo
Project name	eXTENDING the energy performance assessment and certification schemes via a mOdular approach
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Project duration	2019 – 2022
Website	www.X-tendo.eu

Deliverable no.	D4.3
Dissemination level	PU
Work package	WP4
Lead beneficiary	BPIE
Contributing beneficiary(ies)	TU Wien, ADENE
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Date	30.11.2020
File name	X-tendo_D4.3_final

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EXECUTIVE SUMMARY

The EPBD and its revisions in 2010 and 2018 strengthened the provisions relating to Energy Performance Certificates (EPCs) by setting out that the Member States have to provide information to owners and tenants on the purpose and objectives of EPCs, energy efficiency measures and supporting financial instruments through accessible and transparent advisory tools such as direct advice and one-stop-shops. The recent [Renovation Wave Communication](#) published by the European Commission in October 2020, suggested reinforcing existing EPC frameworks, including improving the data gathering, storage and overall quality.

This report is a summary of the previous X-tendo D4.2 report on "Description of X-tendo implementing partner's user needs and technical specifications regarding features of EPC databases, building logbooks, tailored recommendations, financing options and one-stop shops". It comprises a summarized description of the developed features, including the methods and technical specifications, main targets groups of the feature, good practice with other features and description on how the feature interacts with the others.

The set of EPC features discussed in this report do not involve additional building assessments tools, rather these are functions which can be built into certification regimes by better handling and using of EPC data – according to the figure 1 below, features 6 to 10. All these concepts and features will be further elaborated and tested during the forthcoming stages of the project.



Figure 1 - X-tendo features

The main objectives of the features are given in Figure 2. Each chapter is dedicated to one specific feature, describing the status quo, end-users' needs, and the potential for this feature to be further developed and implemented within the certain implementing countries. The first chapter is a short introduction followed by the outline of the role of EPC databases ([Chapter 2](#)), the logbook ([Chapter 3](#)) and tailored recommendations ([Chapter 4](#)), financing options ([Chapter 5](#)) and one-stop-shops ([Chapter 6](#)).

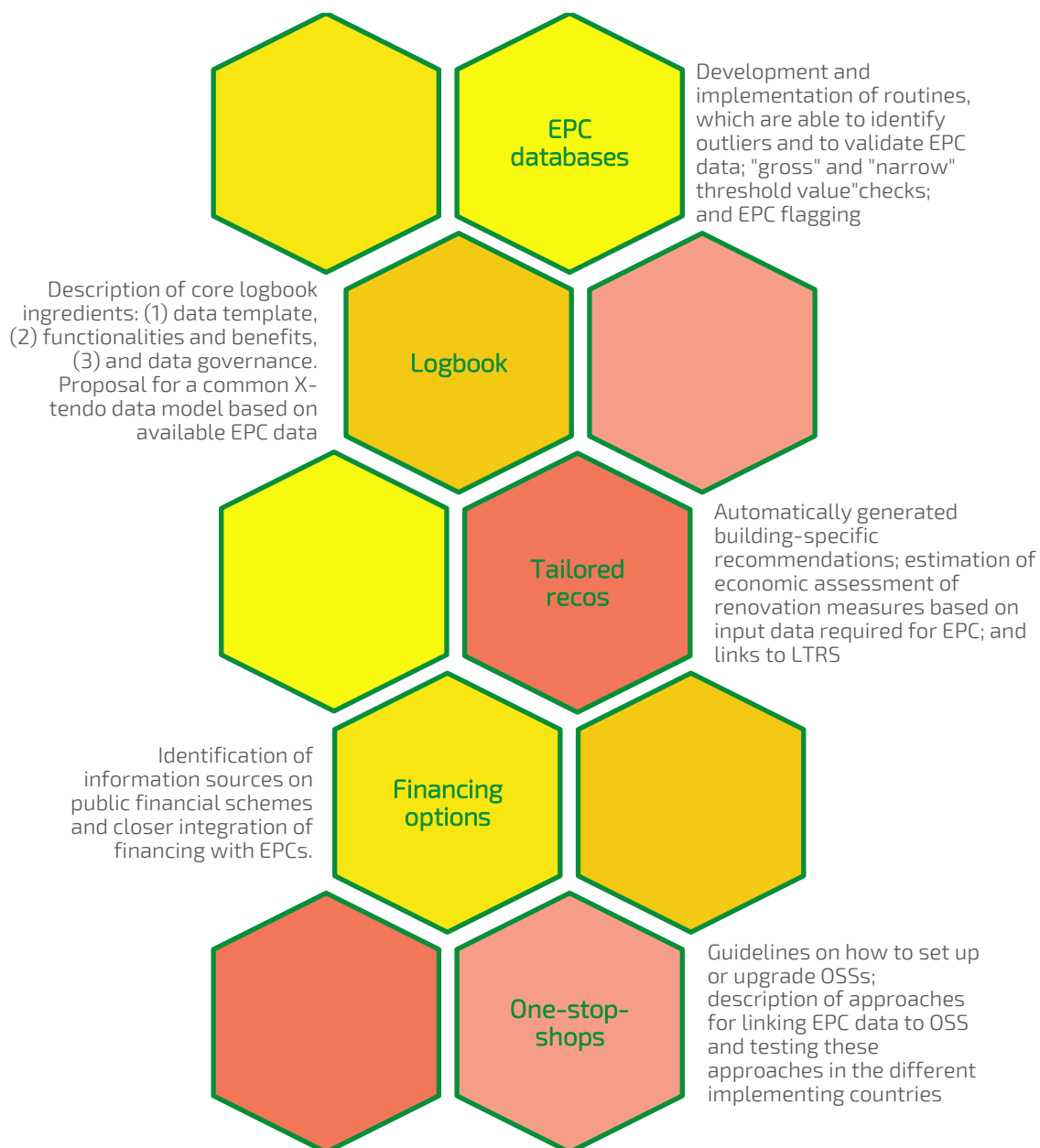


Figure 2 - The five "innovative handling of EPC data" features

1 INTRODUCTION

The energy performance certificates (EPCs) were first introduced in 2002 and provisions have been strengthened continuously since then. EPCs are the most widely available information documents on building energy performance across Europe. Despite their acknowledged limitation in terms of reliability, EPCs are an important measure providing market participants with relevant information to assess, benchmark and improve the energy performance of properties.

Underpinning the introduction of EPCs has been the belief that a property's energy profile is important to the property transaction process and will ultimately influence the behaviour by becoming a decision-making factor when comparing properties to buy or rent. Also, the intention was that this, in turn, will prompt decisions to renovate the property.

EPCs are more than just an information document and could become a powerful market tool to create demand for energy efficiency in buildings by providing recommendations for cost-effective and cost-optimal improvements. They can also become an effective instrument to map the energy performance of a country's building stock, create awareness about healthy buildings and monitor the impact of building policies or progress towards climate goals. Given their wide market penetration, they could likewise provide reliable benchmarks and eligibility criteria for financing building improvements.

EPCs thus promise to add value through multiple (innovative) uses. The main question out there is whether current EPCs are fulfilling these roles? X-tendo sets out to extend and improve current EPCs in order to fully bring to the front these additional functions.

This report outlines the X-tendo implementing partners needs and technical specifications regarding EPC databases, building logbooks, tailored recommendations, financing options and one-stop shops. It comprises a description of the implementing partners' needs and potential usage of EPC data. The set of EPC features discussed in this report do not involve additional building assessments tools and data collection, rather these are functions which can be built into certification regimes by better handling and using of EPC data. All these concepts and features will be further elaborated and tested during the forthcoming stages of the project.

2 EPC DATABASES



The EPC databases store all EPCs and underlying data, making it an important tool allowing public authorities to source building stock information and check compliance. Improving EPC databases includes aspects such as how to set up an EPC database, how to gather the data, how to establish the interoperability of different databases, and how to use data and extract relevant insights from it. Finally, ensuring the reliability and accuracy of the information stored in the database through quality assurance processes and data verification remains a key requirement common to all EPC schemes.

Why we develop this feature

The implementation of EPC database has, so far, been voluntary for Member States. Most Member States have now set up databases but the approaches vary from country to country. While some countries only collect the input data about the building or EPC (in part extracted, for example, from an XML file¹), others go further and perform the EPC calculation within the registry. Some Member States also store the detailed input data required to generate the EPC, while others collect a PDF copy of the certificate but no data. In all cases, it is highly desirable the database to store all EPC data and, preferably, facilitate easy access to relevant information.

The database has different potential uses, such as data mining, interoperability with other databases, as well as making certain information available to the market, including building owners, construction companies, real estate actors, public authorities, etc. The quality

¹ "Certification, Control system and Quality – 2018", epbd-ca.eu. <https://epbd-ca.eu/ca-outcomes/outcomes-2015-2018/book-2018/ct/certification-control-system-and-quality-update> (accessed on 10.08.2020)

assurance of the EPC databases can contribute significantly to improving trust in EPCs. The X-tendo project therefore develops a methodology that implements quality assurance routines in the implementing countries.

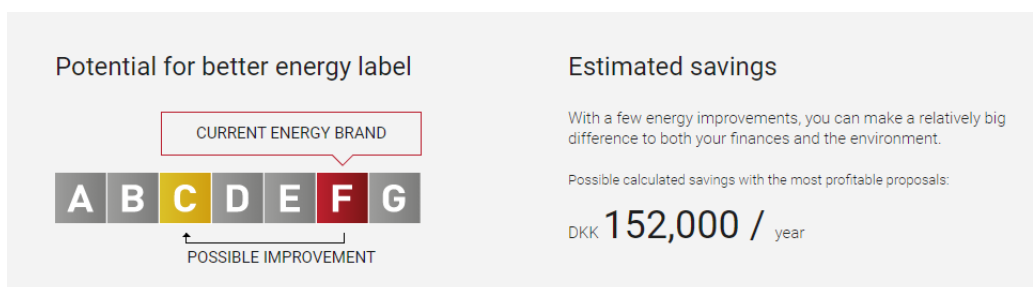
User needs and target groups of the feature

The methodology targets public authorities and/or institutions that manage national and regional EPC databases.

Good practice example

In **Denmark**, the DEA (Danish Energy Agency) is responsible for storing the EPCs, implementing quality assurance routines and managing interoperability with other databases. The Danish EPC database can be considered innovative as it makes the building-related data publicly available through a digital platform and offers the possibility for the end-use to compare their EPC rating with neighbours and get automated renovation suggestions including indicative energy savings and payback times.

Table 1 – Extract from the public Sparenergi.dk website, powered by building-related databases

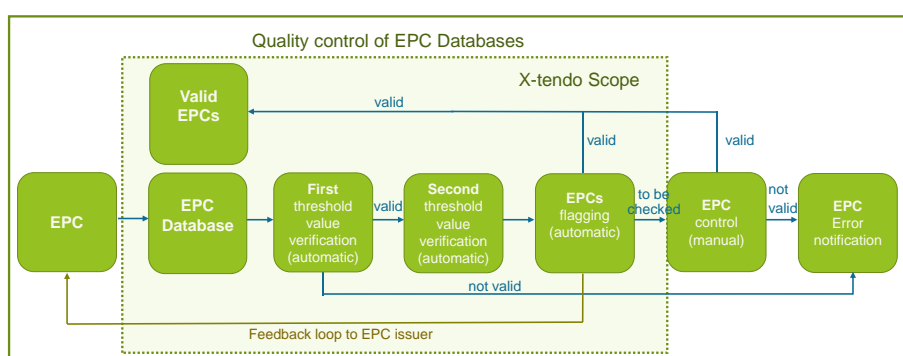


The Energy Saving Trust manages the EPC database which comprises more than 50% of dwellings in **Scotland**. The database became a powerful instrument for public authorities and it is being used to identify and target homes where renovation support is most urgently needed. The comprehensive EPC data has been integral to the development of a number of information resources, which are used to assist the work of Local Authorities and the Scottish Government, as well as advise homeowners on how to improve the energy efficiency of their homes. These innovative programmes enabled by the EPC database include, among others, the Home Energy Scotland, Home Energy Check and Large Scale Data Analysis: Home Analytics.

Methods and technical specifications

The proposed X-tendo methodology consists of a four-step approach, starting right after the EPC is being logged in the database:

1. First check: "gross" threshold value check
2. Second check: "narrow" threshold value check
3. EPC flagging: indication of inconsistencies per EPC
4. Feedback loop to energy auditor: identify and indicate commonly made mistakes, and communication to energy auditor training courses

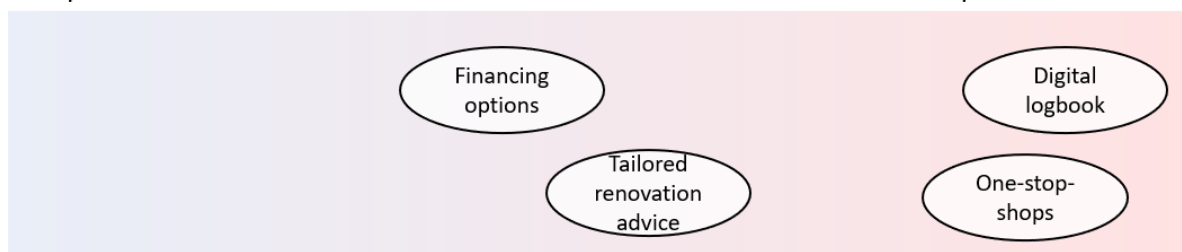


Interaction with other features

- EPC databases are highly relevant to features that provide and make use of building-related information to market players. The interaction with the logbook is especially important, as it is one of the tools that act as a gateway between various data sources and information users.
- As the frontrunner cases show, the next-generation EPC databases can enable better information-sharing, links with financing options and drive (public and private) one-stop-shops models.

Independent features

Interdependent features



3 LOGBOOK



The building logbook is a repository for building information. It acts as a single point of input, access, and visualisation of all the information associated with a building unit throughout its life cycle. It is a dynamic tool that allows a variety of data, information and documents to be recorded, accessed, enriched and organised under specific categories. It represents a record of major events and changes over a building's lifecycle, such as change of ownership, tenure or use, maintenance, refurbishment and other interventions. As such, it can include EPC data, administrative documents, plans, description of the land, the building and its surrounding, technical systems, traceability and characteristics of construction materials, performance data such as operational energy use, indoor environmental quality, smart building potential and lifecycle emissions.

Why we develop this feature

Over the buildings' lifespan, data is routinely collected by multiple stakeholders for various reasons as many decisions rely on the available data. However, the lack of a common approach and structure among stakeholders implies that useful data gets discarded, forgotten or it is not compatible with other stakeholders' systems. To avoid that this occurs, the building information should be made widely available, organised and easily accessible. The lack of an overarching data handling protocol shared across the built environment leads to information asymmetries, lack of transparency and trust, as well as higher risks for undertaking and financing building renovations.

The logbook has a significant opportunity to improve communication, trust and the business case for energy efficiency. It also has the potential to break down silos and improve the integration of the building sector value chain. Organised and shared data that can be re-used would not only reduce uncertainty but also the time and cost needed for collecting missing information. In this sense, building logbooks can reinforce the successful implementation of other X-tendo features.

Availability of granular performance and maintenance data in addition to EPCs could provide a more robust and reliable indication of energy performance and reduce performance gaps. The logbook can enhance the overview of the building stock at all levels, allow public authorities to better tailor various measures, set benchmarks and strategies, as well as monitor progress towards climate goals (i.e. through the national long-term renovation strategies).

User needs and target groups of the feature

The logbook brings a wide range of benefits to different actors involved in the building value chain, including homeowners, tenants, construction and real estate stakeholders, public authorities or financial institutions.



Good practice example

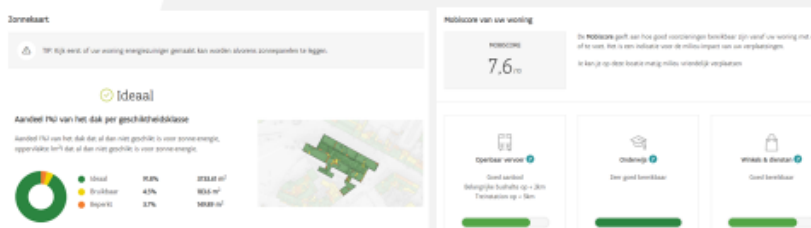
Woningpas (Flanders, BE) is a unique digital file of each individual building. The file can be retrieved by the building owner and by individuals who have been granted the access. The logbook features energy performance, renovation advice, the housing quality (such as stability, humidity, safety), data on the environment and in the future other building aspects such as durability, water, installations and building permits. The Woningpas will make it possible to track the evolution of each individual building. A first version of the Woningpas (Woningpas Light) was launched late 2018, followed by a series of upgrades in the following years.

1. Relevant data & advice



2. Relevant certificates

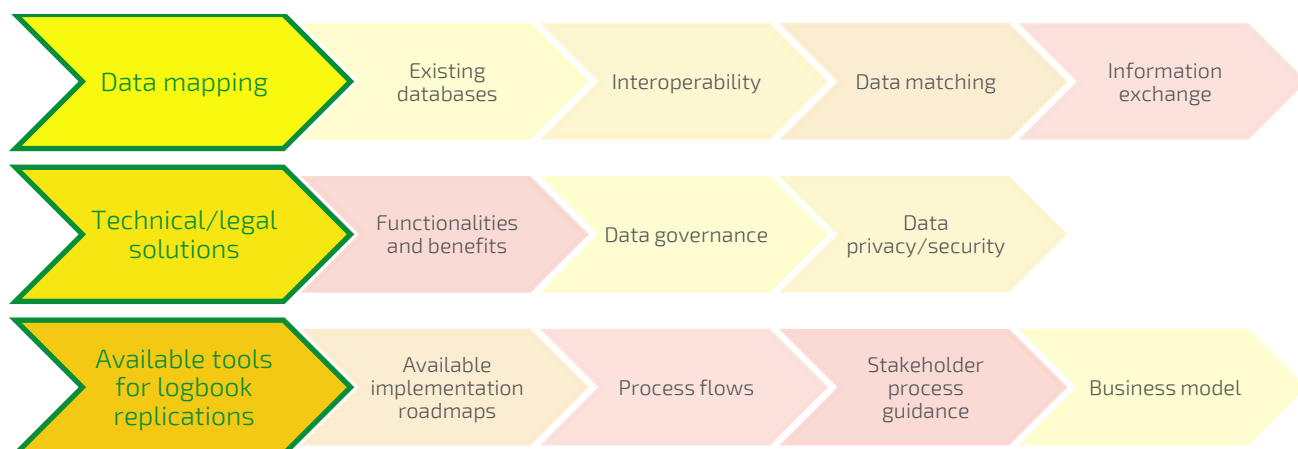
3. Maps of the surroundings



Methods and technical specifications

The X-tendo logbook methodology will include:

- Development of the **logbook data model**, including guidelines for the organisation of logbook data and protocols for data capturing.
- **Data mapping**: identification of potential data sources and guidelines to link relevant databases, i.e. Land Registry, EPC database, SRI and existing material passports.
- Clarifications of **data governance requirements** (both legal and technical, such as GDPR, IP rights, data access and storage)



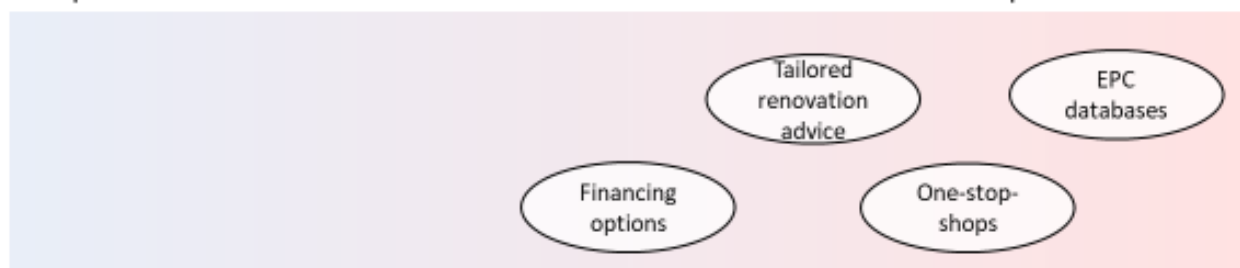
Interaction with other features

Logbooks are highly relevant to all other EPC features: they can act both as source of information for e.g. producing tailored recommendations or finding the most appropriate financing instrument, and as a storage of information hosting/linking to all other EPC features.

Interaction with EPC databases is particularly relevant as they are considered one of the most important initial sources of building information covering most of the data categories in the logbook.

Independent features

Interdependent features



4 TAILORED RECOMMENDATIONS



The EPC recommendations can be highly effective and trigger renovation works, if tailored to the needs of the building and its owner. The main objective of tailored recommendations is to provide building owners with information on the most appropriate renovation measures. The recommendations may have different degrees of detail. Recommendations that are more general are relevant when informing selling and buying transactions, while detailed recommendations are important for owners undertaking deep renovations. And, the main difference concerns the amount of information needed and adequate tool to generate the targeted recommendation.

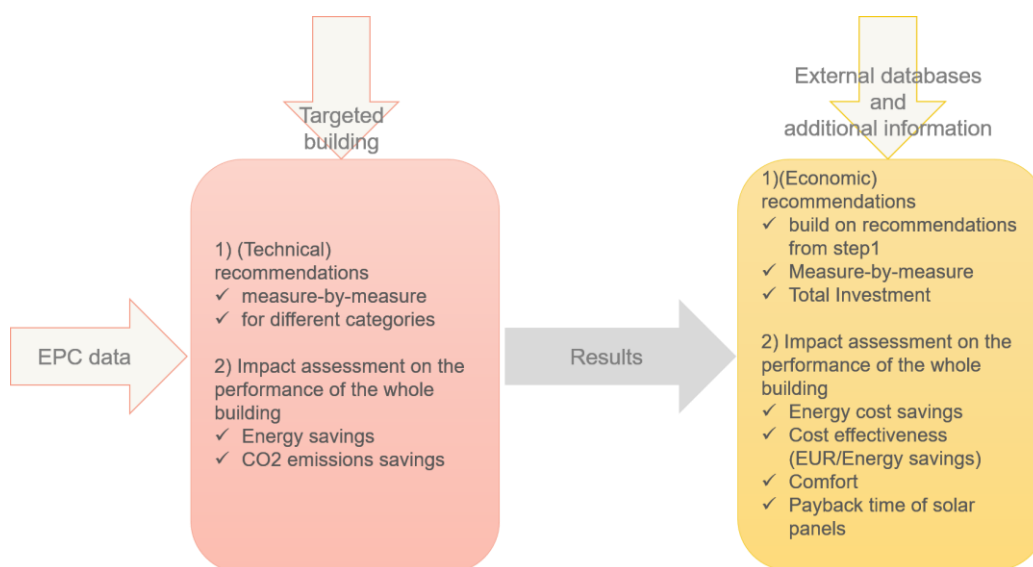
Why we develop this feature

The ambition of the X-tendo project is to improve on the current state of generic recommendations, which often only provide limited value to homeowners. The X-tendo methodology will demonstrate a method to automatically generate EPC recommendations, extending the current recommendations provided in the EPC schemes. Although the proposed recommendations will improve the existing status quo, they cannot fully replace professional advice. The methodology suggests an approach to align the EPC recommendations with the national long-term renovation strategies. This approach could enhance the quality of recommendations by ensuring that they are not only in line with building requirements, but also in line with the long-term energy and climate objectives.

User needs and target groups of the feature

The main target audience of the specific recommendations is the building owners, whereas the X-tendo methodology used to generate tailored recommendations is primarily aimed at public authorities responsible for managing the EPC schemes. The professionals involved in the EPC process is the secondary target group, as they will be the stakeholders adopting and using the proposed methodology.

The graphic below describes the overall approach of this feature.



Good practice example

Across the EU, a variety of tools and methods are in place for providing detailed and tailored recommendations.

- The Flemish research organisation VITO developed a tool which provides tailor-made recommendations based on the size of the house, family composition and the energy consumption of the residents.
- The Danish web platform BetterHome, a one-stop-shop solution, provides enhanced tailored recommendations both on technical improvements and personalised recommendations.
- In the UK, the creation of Dynamic Engine was born out of the need to provide customers with the ability to build an energy efficiency package that meets their personal needs, budget and objectives, i.e. tailored recommendations.

X-tendo will contribute by simplifying transparency, public access and ease of integration in existing EPC processes.

Methods and technical specifications

The proposed methodology is built on three pillars:

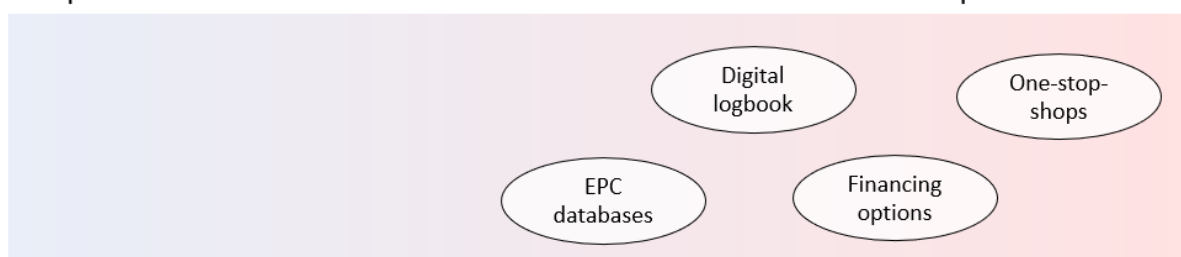
- 1) Enhancing current recommendations by additional building-specific measures taking into account co-benefits.
- 2) Integrating cost aspects and enabling calculation of the cost-effectiveness of the recommended measures.
- 3) Setting targeted values for recommendations to be in line with national long-term and climate strategies.

Interaction with other features

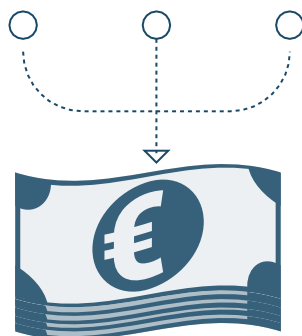
- Tailored recommendations interact directly with the features one-stop-shop and financing options. Linking tailored recommendation with one-stop-shops help homeowners with the execution of the renovation works. Links to financing options facilitate access to public and private incentives and support measures.
- The logbook can provide input data necessary to generate a tailored recommendation.
- Public authority may wish to design tailored financial options to support the most commonly provided tailored recommendations.

Independent features

Interdependent features



5 FINANCING SCHEMES



*The provision of sources of **information on financial support** alongside with the EPC and renovation recommendations can help persuade building users to undertake a renovation and push the energy efficiency market.*

Why we develop this feature

EPCs and related buildings data play a key role in facilitating access to financial instruments dedicated to energy efficiency improvements. EPCs can provide a market benchmark and clear eligibility criteria, as well as support financing decision-making and risk assessment. The provision of sources of information on financial support alongside with the EPC recommendations can help persuade building owners to undertake renovations. Furthermore, sharing EPC data between building owners/users, the construction and financial sectors will help to overcome market fragmentation and push the energy efficiency renovation market. Therefore, this feature seeks to identify information sources on public financial schemes that can be provided alongside the EPC, as well as more closely integrate financing schemes with EPCs.

User needs and target groups of the feature

The **financing options** feature will help to overcome existing market barriers faced by financing institutions and end-users, as well as increase the uptake of the existing financing schemes.

This X-tendo feature targets single and multi-family buildings both existing and new units. The developed recommendations in this feature may also be replicated for other buildings types, such as public, commercial or offices buildings. The recommendations and action

items put forward by X-tendo will aim at public authorities responsible for EPC certification and institutions operating the financial support schemes.

Good practice example

In Portugal, the EPC is used as a point of entry to check compliance with financial incentives, identify investment needs and potential energy savings. EPCs are a valuable instrument for financial institutions to assess the actual and future building performance targets, as well as the cost and type of energy efficiency improvement measures. Furthermore, the EPC is also a tool that facilitates communication between owners and financial institutions.

The below flowchart of the Portuguese case study illustrates the EPC integrated with a financial instrument ([IFRRU 2020](#)).

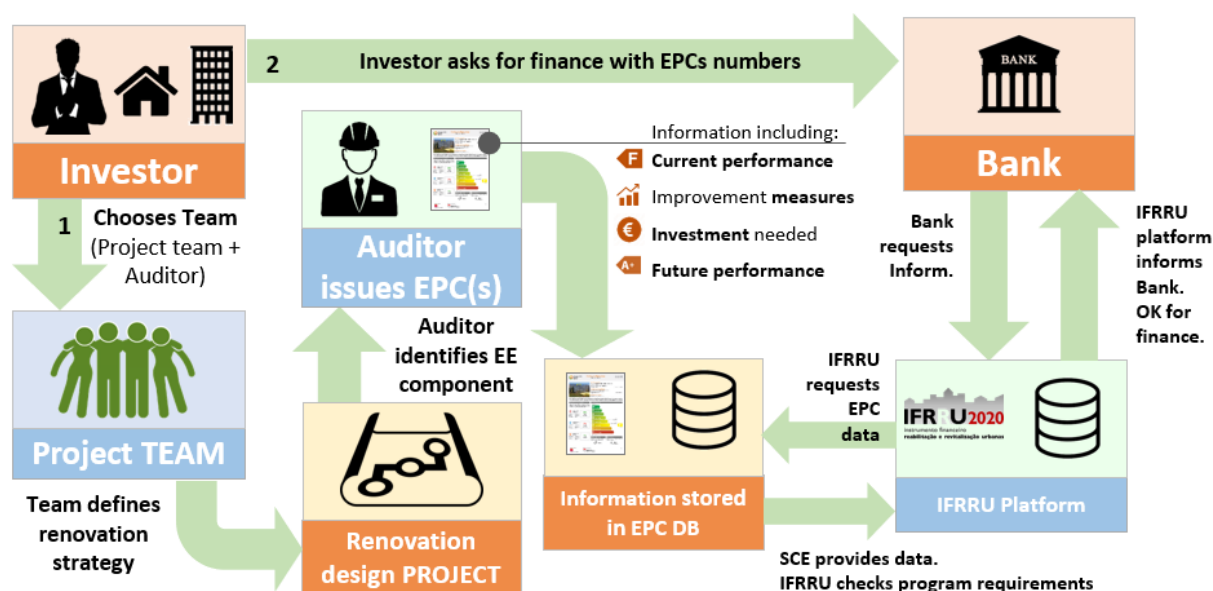


Figure 3 - Portuguese case study: EPC integrated into a financial instrument

Methods and technical specifications

To facilitate a closer alignment of EPCs and financing, as well as communication with building owners/users, the first step is to identify information sources on public financing schemes. It will be followed by an analysis looking at the extent EPC data can inform the most appropriate support scheme, financing conditions, risk assessment and due diligence.

To achieve the expected output, the following tasks should be carried out:

⦿ **Actions regarding EPCs:**

- Review methodologies used in the evaluation of energy performance of buildings
- Assess the level of interoperability between data sources
- Identify which kind of information is available in EPC databases
- Identify information relevant to financial mechanisms
- Detail how the improvement measures are evaluated and documented, including technical and financial viability as well as the type and scope of data recorded
- Identify any additional information needs.

⦿ **Actions regarding financial instruments:**

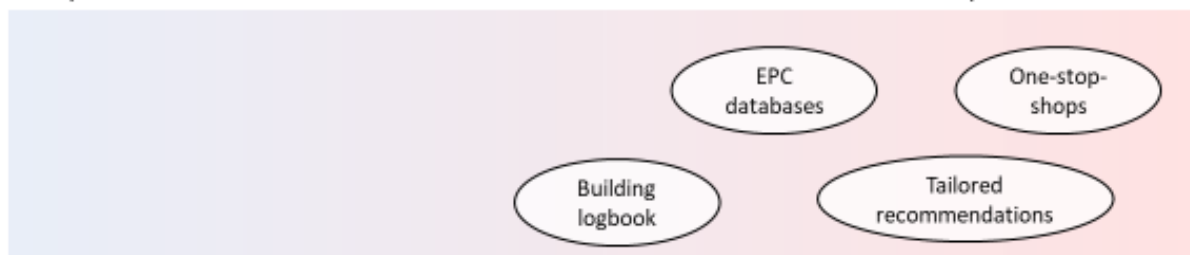
- Evaluate the types of mechanisms and available financing, including descriptions and classification of financing schemes
- Assess the focus of these mechanisms and their target audience
- Evaluate financing conditions and the type of data used to underwrite and monitor the investments
- Mapping the needs and barriers faced by financial institutions
- Analysis of existing financing schemes which are eligible upon a valid EPC
- Identify existing best practices in the use of financing related to EPC
- Identify recommendations on the use of EPCs and data in financing schemes.

Interaction with other features

- EPC databases and logbooks can be extremely useful to develop the most appropriate financing mechanisms as well as to support the risk assessment and financial due diligence.
- Tailored recommendations could be supported by specific financing options and the availability of finance could be included in the EPC;
- Available financing instruments must be available and easily accessible through one-stop-shops, whenever possible, with links to tailored recommendations provided within the EPC.

Independent features

Interdependent features



6 ONE-STOP-SHOP



One-stop-shops (OSS) are transparent and accessible advisory tools which incentivise building deep renovation by informing, motivating, as well as assisting the building owners right from the start until the end of process – also called as end-user journey.

Why we develop this feature

The concept of one-stop-shops (OSS) was introduced to overcome market fragmentation on both the demand and supply side by offering holistic, whole-value-chain renovation solutions. OSS can be defined as advisory tools to facilitate the access to financial mechanisms, benefits and support schemes, assist consumers concerning technical and financial issues and to guide them through their building renovation process. Putting these functionalities in practice is made easier by access to building information and EPC databases, as well as integration with other EPC features currently being developed.

User needs and target groups of the feature

One stop shops will primarily target residential buildings, but the feature may also be replicated for other buildings types, such as public and commercial buildings. The main target groups are homeowners, energy experts and service providers.

The feature will guide owners through whole building renovation journey, from checking the recommendations indicated in EPCs to the choice of service provider, available financial instruments, implementation and the evaluation of the entire process.

Good practice examples

Denmark

☉ [BedreBolig](#)

The BedreBolig OSS, managed by DEA, and based on a report and online portal, offers predefined renovation solutions to private homeowners and supports financial advisers to better inform their customers about the financing of energy improvement projects. By introducing the address of the property, the online portal provides the user with an EPC overview, list of potential measures (and related costs) and expected energy/cost savings. The offers rely partially on automated and customised services, allowing the future client to pre-inform the installers and pre-select the measures via the website and app. The homeowner is in direct relationship with the technical team and the interaction allows the tailoring of the exact package— both technical and financial —to the exact needs of the homeowner.

Portugal

☉ [Portal casA+](#)

The portal casA+, managed by ADENE, is based on an online portal and it aims to promote energy and water efficiency, cost and energy savings, and thermal comfort of homes. The Portuguese OSS's main goals are to provide detailed information to end-users about their homes, facilitate communication between the building owner and experts, encourage the end-user to improve his home, request proposals from services providers, access to the available financial support and tax incentives and the appropriate financing opportunities for the building owner, proceed with renovations and monitor the uptake of improvement measures.

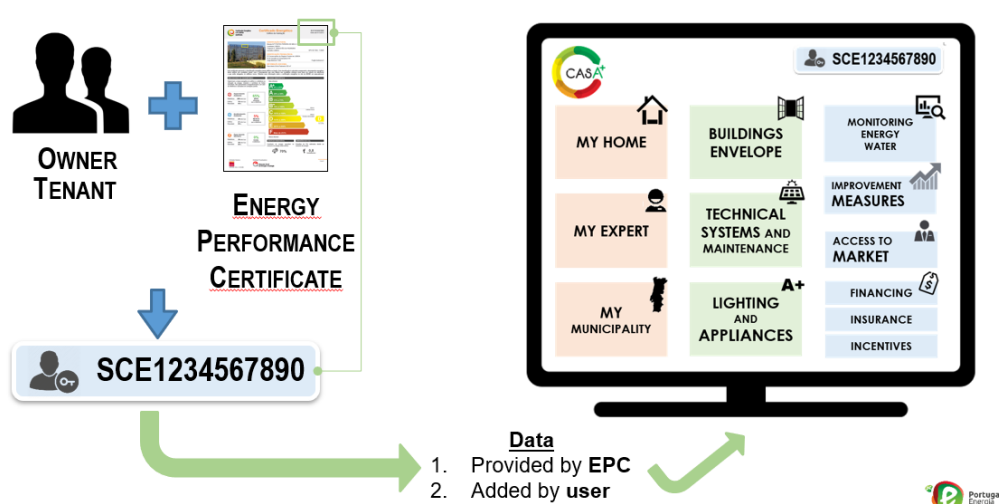


Figure 4 - Access to the Portuguese portal casA+

Methods and technical specifications

Approaches on how to link EPC data to OSS will be tested in the implementing countries (Denmark, Portugal, Romania and UK – Scotland) considering their existing EPC data, building stock renovation activities and needs.

The following tasks should be carried out:

⊙ **Actions under EPCs:**

- List Member States (MS) with EPC databases and identify which type of data is collected in EPC databases
- Produce an overview of methodologies used in the evaluation of energy performance of buildings
- Review interoperability status among databases
- Assess data availability in EPCs
- Identify information needs for OSS
- Detail how the improvement measures are evaluated and documented, including which type of data is recorded

⊙ **Actions under one-stop-shops:**

- Evaluate the types of existing OSS, including descriptions, functionalities, applicability and main target groups
- Assess the focus of these OSS and areas/sectors covered
- Evaluate which kind of information and criteria are the OSS based on and which type of data is used to access
- Map the needs and barriers faced by stakeholders
- Analyse compatibility with EPC data
- Identify existing best practices and flag projects
- Evaluate the potential business model and cost structure
- Identify recommendations on the use of EPCs and data in OSS

The X-tendo toolbox will comprise of guidelines on how to set up or upgrade OSS and link EPC data to boost the market.

Interaction with other features

- One-stop-shops can be looked at as the ultimate aggregator of EPC databases, logbooks, tailored recommendations and financial instruments
- Logbooks are part of the back end layer (data access layer) of one-stop-shops
- EPC databases provide entry and registration data for the one-stop-shops
- The availability of tailored recommendations will help end-users to decide and implement renovations

- One-stop-shops should include access to the available financial support and tax incentives.

Independent features

Interdependent features



7 CONCLUSIONS

This report summarised to the main objective of each the feature, the methods and technical specifications, good practice example and interaction with other features regarding features of EPC databases, building logbooks, tailored recommendations, financing options and one-stop shops. The following concepts and tools will be developed in the further activities of the X-tendo project:

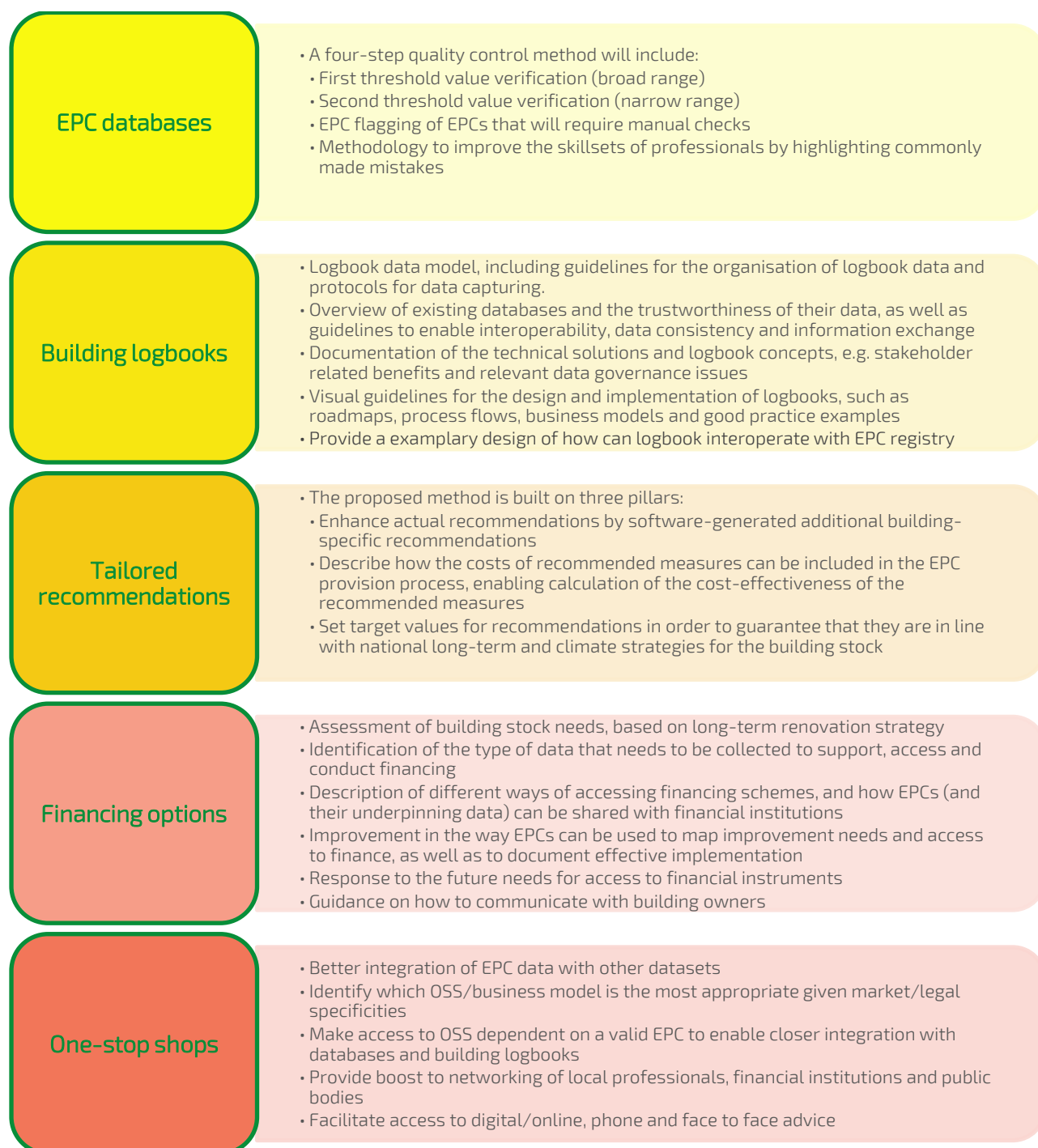


Figure 18 - Feature-by-feature overview of technical specifications and user needs



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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 845958.