SERA

Institute for Sustainable Energy and Resources Availability

SUSANNE GEISSLER

Energy efficiency expert and CEO, SERA



TIMEPA



Setting the scene: Making use of data repositories for generating renovation roadmaps

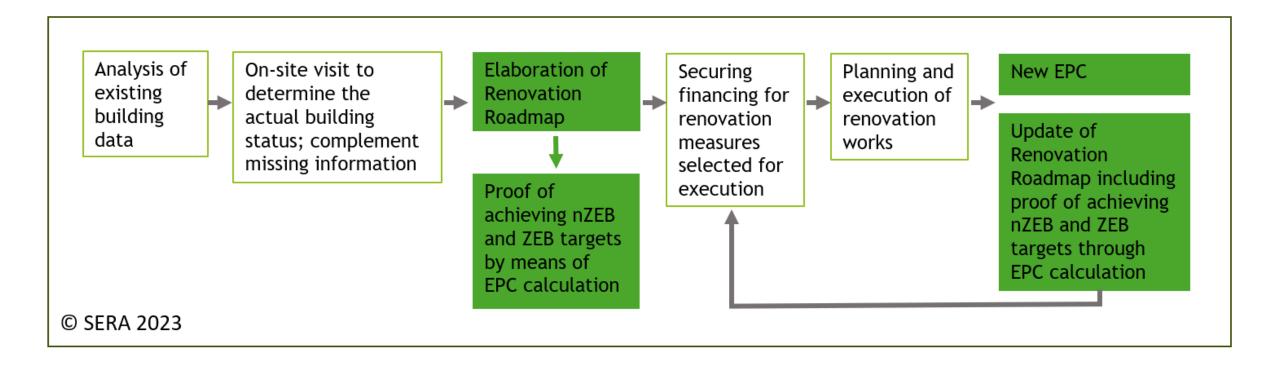
Requirements, scope and methods

Susanne Geissler and Bettina Sticher I SERA global GmbH, Vienna, Austria TIMEPAC International Workshop 21.11.2023

Next Generation EPC - TIMEPAC

- The energy performance certificate (EPC) contains recommendations for improving building energy efficiency, but these are often not specific enough and their implementation is unclear during the 10-year validity period of an EPC.
- In contrast, renovation roadmaps are tailored to a building and specify the necessary measures in the right order to achieve the nearly zero energy building standard in the medium term and the zero-emission building standard in the long term.
- → increase the renovation rate

Renovation Roadmap is part of the Renovation Passport: achieving the target of nZEB and zero-emission building



How to develop an effective Renovation Passport in an efficient way – Timepac guideline document

The TIMEPAC guideline supports the discussion in the following directions:

- Making use of data repositories
- Tracking the implementation of renovation measures

The TIMEPAC guideline was developed as follows:

- Renovation projects were assessed by the consortium partners based on the methodological approach of the BPIE study.
- Energy modelling and certification tools used in the partner countries and offered by project partner CYPE, were applied to create Renovation Roadmaps that include the different renovation steps and the energy performance achieved in each case.

Conclusions were drawn and based on the findings a guideline was developed.

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Coupling iBRoad2EPC with national software via API (work in progress)

MS EPC Software Include API processing in EPC software

Gathering data to send via API

> Feedback from API must be processed

iBRoad2EPC API

Automatic entry of relevant data from EPC calculation in iBRoad2EPC

Including input fields for iBRoad2EPC

New measure

Replacement of the windows

Replacement of all windows that are older than 10 years. If you replace the insulated your external walls, ask your energy adviser for possible thermal by ask if the minimum ventilation is guaranteed any longer. The new windows it long-lasting airtight manner. Foaming with installation foam is usually not s

Measure type

Specification

 $UW = 2,20 W/(m^2K)$

Name *		Client number		
p_test_09	✓			
Building type *		Building sub type *		
Residential building	✓ ∨	Multi-family bui	lding	/ ~
	Climate zone *		Environment *	
×	13 V2	✓ ∨	Rugosidade I - urbano	/ ~
		Tenure status		
× v	~ ~	Proprietário ocu	ipado	/ ~
A		onstructed in	Cooling system constructed i	n
ws without insulating or having and related risk of mould. Also be connected to the masonry in a	1999	○ ✓		÷
nt.	Project receiver		Recommendations addressed	d to
	h —		Proprietário do edifício	/ ~

Next step

How to develop an effective Renovation Passport in an efficient way

Making use of data repositories

Starting point = EPC | conventional or created by BIM | in terms of building data and energy performance. Renovation Roadmaps are drawn up taking into account additional data such as from on-site visits and energy bills. Example of building specific renovation roadmap:

Renovation roadmap (based on actual user profile and operational data, **EPC** information from energy advisory report: on-site visit and interview with owner) **Implementation** Building before **Implementation** Implementation of measure(s) renovation of measure(s) of measure(s) 5. Refurbishment of 1. Insulation of roof 3. Facade insulation 2. Installation of PV district heating 4. Change of windows connection and heat Heating/cooling Heating/cooling Heating/cooling dissipation system energy need energy consumption energy consumption [kWh/m2] [kWh/m2] [kWh/m2] Heating/cooling Type of energy carrier Type of energy carrier Type of energy carrier energy consumption [kWh/m2] Total primary energy Total primary energy Total primary energy Type of energy carrier need [kWh/m2] consumption [kWh/m2] consumption [kWh/m2] Total primary energy CO2 emissions [kg/m2] CO2 emissions [kg/m2] CO2 emissions [kg/m2] consumption [kWh/m2] **EPC** rating Investment cost: EUR/[m2] Investment cost: EUR/[m2] CO2 emissions [kg/m2] Investment cost: EUR/[m2] Updated EPC **Updated EPC** Updated EPC

Measures of a renovation stage are implemented, and an update of the EPC is made. The previous EPC status is "outdated", the current EPC provides the input into the updated Renovation Roadmap. Ensures that technological and regulatory changes are properly addressed Example of building specific updated renovation roadmap:

Outdated EPC status

Building before renovation

Heating/cooling energy demand [kWh/m2]

Energy carrier

Total primary energy demand [kWh/m2]

CO2 emissions [kg/m2]

EPC rating

EPC

Implementation of measure(s)

- 1. Insulation of roof ✓
- 2. Installation of PV ✓

Heating/cooling energy demand [kWh/m2]

Energy carrier

Total primary energy demand [kWh/m2]

CO2 emissions

[kg/m2]

Investment cost: EUR/[m2]

EPC rating

nZEB target / Major renovation target

Updated Renovation roadmap

Implementation of measure(s)

- 3. Facade insulation
- 4. Change of windows

Heating/cooling energy consumption [kWh/m2]

Energy carrier

Total primary energy consumption [kWh/m2]

CO2 emissions

[kg/m2]

Investment cost: EUR/[m2]

Implementation of measure(s)

Refurbishment of DH/DC connection and dissipation system

Heating/cooling energy consumption [kWh/m2]

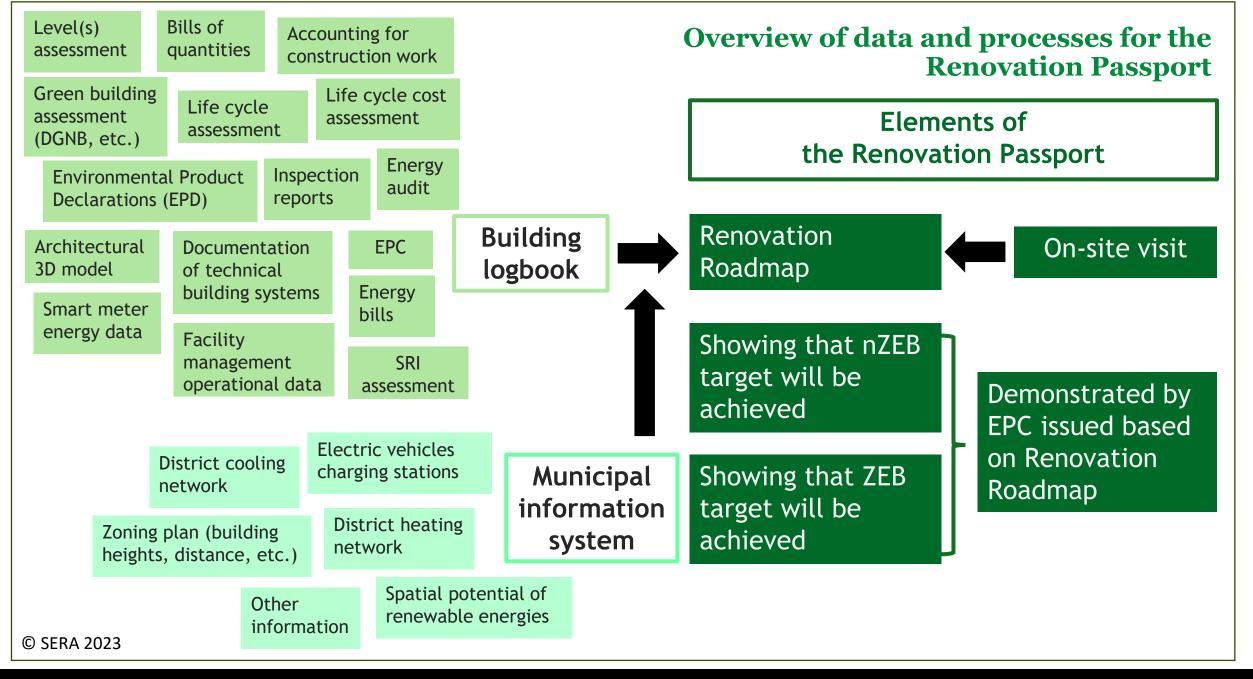
Energy carrier

Total primary energy consumption [kWh/m2]

CO2 emissions [kg/m2]

Investment cost: EUR/[m2]





Concept of a building logbook

- Example 1 The EPC database environment: EPCs, Renovation Passports and subsidy applications for a building are stored in the related specific account. The building owner uploads additional information, and give access to this information to third parties (example Province of Salzburg, Austria)
- Example 2 A BIM offering software:
 Level 3 BIM provides a possibility to store
 data at the same place and with the
 option of ensuring up-to-date
 information. Especially regarding
 renovations, there is an added value,
 namely the fact that the architectural
 model allows to show changes of area
 and volume that can occur as part of a
 renovation project (example CYPE
 BIMserver.center).

Creating an architectural model necessitates an initial investment of effort. Later, the use of the architectural model offers several advantages:

- Significant improvements regardig quality assurance, prevention of errors, it can be employed to accurately determine surface types, sizes, and materials used to calculate various indicators including those used for proving compliance with regulatory requirements.
- Avoids multiple data collections which are a source of error and a potential vulnerability to manipulation of assessment results.
- Provide a solution when it comes to produce an EPC for the entire building and EPCs for the individual building units at the same time.

How to develop an effective Renovation Passport in an efficient way

Tracking the implementation of measures

Example | Renovation passport in the province Salzburg, Austria | The path towards Nearly Zero Energy Building

Essentially, the recommendations in the EPC are replaced by the specific Renovation Passport. The implementation of a measure is linked to the updating of the EPC and to the updating of the Renovation Passport. Thus, by means of comparisons, the measures and the indicators can be tracked.

EPC existing buildings

EPC Renovation Roadmap

plan

Automatic check: Is the Renovation Roadmap available? Will requirements be achieved?

EPC renovation ----- EPC renovation ----- EPC existing completion Measures partly

implemented

Tracking the implementation of renovation measures with the EPC database

building

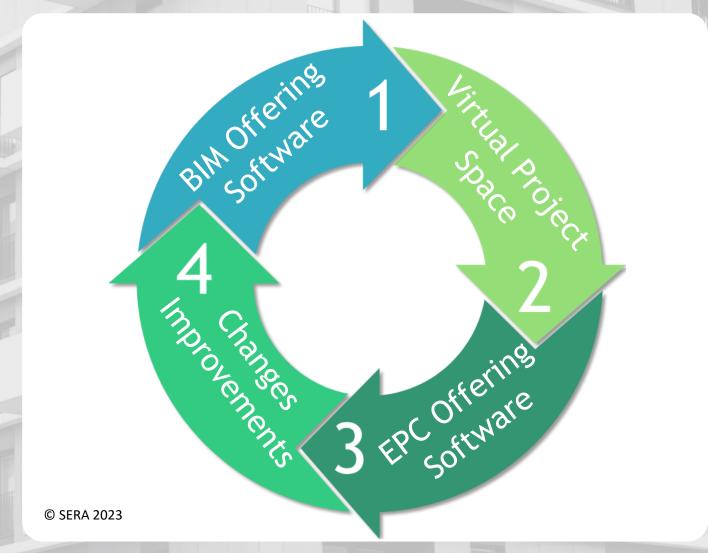
EPC RenovationThose measures implemented are not included any longer Roadmap

EPC existing building completion plan Measures partly implemented

A BIM based workflow to generate the Renovation Passport in connection with the EPC

- Enabling the implementation of changes to the building model in alignment with the Renovation Roadmap and the generation of a new EPC seamlessly
- BIM-based workflow can serve as an independent method for logging changes to the building, irrespective of the EPC database
- Tracking building refurbishment and verifying achievements

A BIM based workflow to generate the Renovation Passport in connection with the EPC



Energy audit reports

for tracking the evolution of building refurbishment

- Another possibility of tracing the evolution of building refurbishment is connected to energy audits and energy management systems.
- Energy audit reports contain recommendations how to improve the building's energy performance which can be further developed to form a Renovation Roadmap.
- If an energy management system is in place, it can be used for tracking building refurbishment and verifying achievements.

How to develop an effective Renovation Passport in an efficient way

Key issues

KEY ISSUES

To ensure an effective implementation of the Renovation Passport

- Keep cost of the Renovation Passport low by using data repositories.

 Professionals will use the data to be prepared for the on-site-visit. In this way, the site-visit will be most effective.
- Ensure latest information on the building status based on tracking the implementation of renovation measures. It is needed by ESCOs, real estate valuers, and for the national renovation plans.
- Enable the spatial reference of the information: A link to regional/municipal plans with information about spatial renewable energy potentials and details of the urban plans is especially important with a view to achieving the zero-emission target.
- Include financial information and a reference to the Taxonomy Regulation: Financial information should include a life cycle cost analysis and a statement how the renovation project would be rated against the criteria of sustainable investment according to Taxonomy Regulation.
- Make the Renovation Roadmap accessible for further renovation planning: It needs to be clear that the Renovation Passport does not substitute technical and construction planning, but offers the building owner and/or the facility manager an orientation to start such a process.



If you would like more information, please visit www.timepac.eu or contact us at

office@sera.global

Thanks for your attention!

