



# iBRoad training toolkit

Guidance for auditors in the iBRoad pilot countries

ifeu – Institut für Energie- und Umweltforschung Heidelberg  
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[www.ibroad-project.eu](http://www.ibroad-project.eu)



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## TOOLKIT OVERVIEW

The iBRoad Renovation Roadmap and Logbook are subjected to field testing in the so-called pilot countries, Bulgaria, Poland and Portugal. The aim is to test their practicality and manageability and feed the experiences of the participating energy auditors and building owners back into the tools for further adjustments. Fifteen to twenty buildings per pilot country are examined using the iBRoad tools in cooperation with professional energy auditors from the respective countries.

In a first step, the country partners attended a train-the-trainer seminar. This was arranged as an online webinar. It enabled the country partners to recruit energy auditors for the field tests. In a second step, the energy auditors were provided with comprehensive training before the field tests. They were trained through face-to-face seminars that each lasted one full day.

The training toolkit provided for this purpose contains all the information needed to issue the iBRoad and to perform the field tests:

- *Handbook for energy auditors – Guidance and advice on how to create an iBRoad Individual Building Renovation Roadmap and how to use the iBRoad Building Logbook* (Available from the iBRoad website). It explains the iBRoad tools' basic motivation, process, and technical detail specimen. It explains the Renovation Roadmap, the various audit steps and the individual approach to the customers' buildings and needs. Furthermore, it comprises a step-wise manual for the iBRoad Roadmap Assistant. It also guides the auditors through the creation of an iBRoad Logbook.
- *Presentation for the train-the-trainer seminar* (included here). The seminar deals with the organisation of the field tests and the auditors' training. It shows the requirements and time schedules. Additionally, it presents the functionalities of the live iBRoad Roadmap Assistant and Logbook tools and explains the evaluation procedure of the field tests.
- *Presentation for the auditors' training* (included here). During the training, both the iBRoad Roadmap and Logbook are presented to the auditors. Starting with the original motivation for the tools, the implementations are introduced and explained step-by-step. Finally, the questionnaires for the evaluation of the field tests are shown and the logistic approach of the evaluation is explained.
- The auditors receive two questionnaires, one for their own experiences and one for the homeowners' experience. The questionnaires are handed over during the auditors' training. However, in the true sense of the meaning, the questionnaires and their analyses are not part of the toolkit and are not part of this report. They will be displayed separately in the upcoming iBRoad report on *"The implementation and evaluation of iBRoad in the pilot countries"*, which will show the concept and results of the evaluation.
- After the training, the auditors have two months' time to examine the buildings and issue the iBRoad Roadmap and Logbook. During this time, the auditors have access to a telephone hotline in their country. The hotline is regarded as part of the toolkit as well.

After the evaluation of the field tests, the experiences of the participants shall influence the improvement of the toolkit. In the future, the toolkit should be adopted from various relevant chambers and associations in order to promote and support further training.



# Train-the-Trainer Seminar

 **iBRoad** Individual Building Renovation Roadmaps

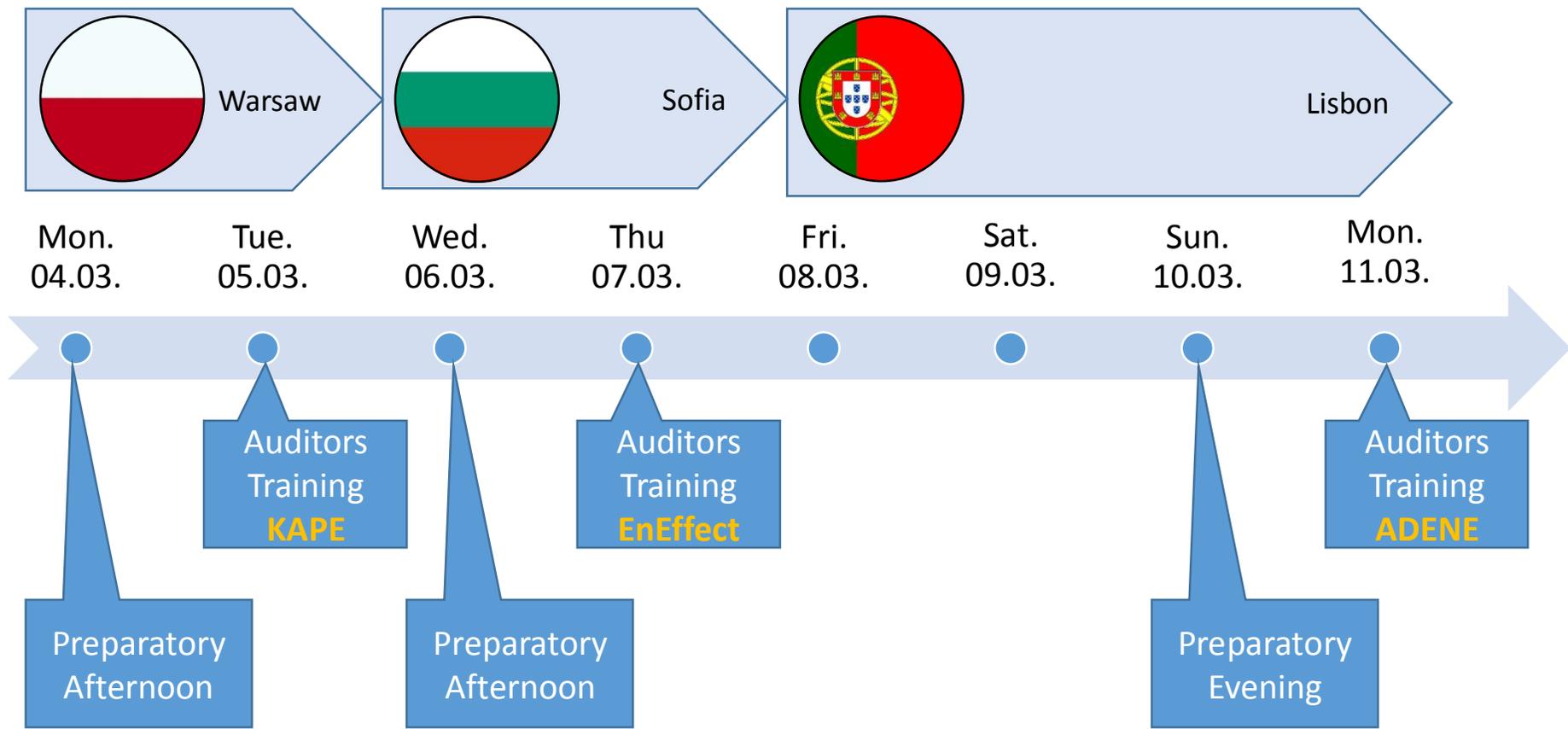


## ■ Agenda

- Organisation of the Field Test
- iBRoad Roadmap
- iBRoad Logbook
- Evaluation of the Field Test

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## ■ Auditors' Training Seminar

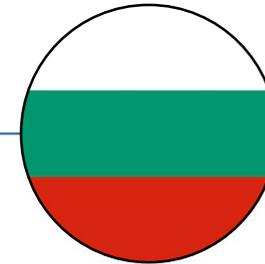
- 9:00 Welcome and Introduction
- 9:15 Why a Renovation Roadmap?  
What is the Renovation Roadmap?  
Steps to create a Renovation Roadmap
- 11:00 Coffee Break
- 11:20 Why a Logbook?  
What is the Logbook?  
Steps to create a Logbook
- 13:00 Lunch
- 13:45 Evaluation of the Field Test
- 14:30 Questions
- 15:15 End of the Seminar

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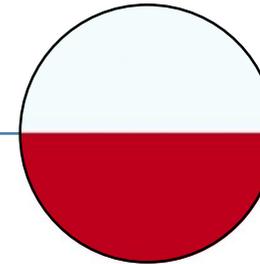


## What is needed for the Auditors' Training?

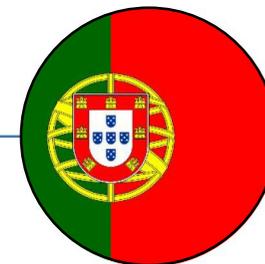
- Preparatory afternoon
- Ideally 10 experienced energy auditors or EPC issuers
- Suitable conference room with video beamer
- Presenter in the respective language
  - Presentation (ifeu)
  - Handbook (ifeu)
  - Printed by you (?)



Bulgaria



Poland

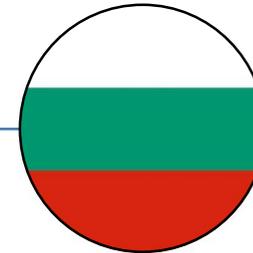


Portugal

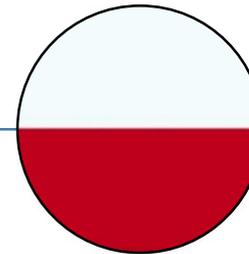


## What is needed during the field test?

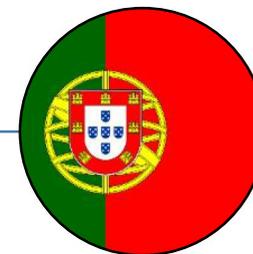
- Ideally 20 buildings with individual renovation demands
- Interested building owners
- National calculation software
- A telephone-hotline for remaining questions



Bulgaria



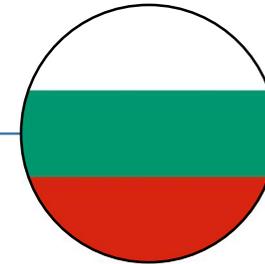
Poland



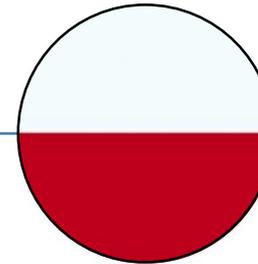
Portugal

## What is needed for the evaluation?

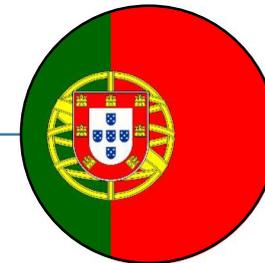
- Willingness from homeowners to answer a questionnaire in English
- Willingness from auditors to answer a questionnaire in English
  - Questionnaires (ifeu)
- A telephone-hotline for remaining questions



Bulgaria



Poland



Portugal



## Step by Step Plan

ENERGY CLASS	ENERGY CLASS	ENERGY CLASS
<b>F</b>	<b>D</b>	<b>A</b>
TODAY	WHEN BOILER NEEDS TO BE EXCHANGED	WHEN WINDOWS NEED TO BE EXCHANGED
YOUR BUILDING	RENOVATION STEP 1	RENOVATION STEP 2
	<b>WHAT TO DO?</b> <ul style="list-style-type: none"> <li>Improve the air permeability of the envelope</li> <li>Optimization control system</li> </ul>	<b>WHAT TO DO?</b> <ul style="list-style-type: none"> <li>Installation of a thermal insulating layer on top of concrete ground floor in contact with the ground</li> </ul>
	<b>INVESTMENT COSTS</b> 45555 €	<b>INVESTMENT COSTS</b> 44 €
	<b>COSTS FOR MAINTENANCE</b> 2457 €	<b>COSTS FOR MAINTENANCE</b> 44 €
<b>ENERGY BILL</b> 158 €/a	<b>ENERGY BILL</b> 144 €/a	<b>ENERGY BILL</b> 143 €/a





## Envelope Performance

		2019-02-11	2021-02-13	2027-02-13	...	2050
	Walls	<span style="color: red;">●</span>	<span style="color: green;">●</span>	<span style="color: green;">●</span>	...	<span style="color: green;">●</span>
	Roof	<span style="color: orange;">●</span>	<span style="color: orange;">●</span>	<span style="color: green;">●</span>	...	<span style="color: green;">●</span>
	Windows	<span style="color: orange;">●</span>	<span style="color: orange;">●</span>	<span style="color: orange;">●</span>	...	<span style="color: green;">●</span>
	Floor	<span style="color: red;">●</span>	<span style="color: red;">●</span>	<span style="color: red;">●</span>	...	<span style="color: green;">●</span>

- Start page
- My buildings
- Data Store  
Repository  
My documents &  
plans
- Building diagnosis
  - Overall Performance
  - Envelope Performance
  - Equipment Performance
  - Comfort Performance
  - Recommendations
- Alerts & Reminders
- Roadmaps



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- Evaluation of the Field Test
  - Energy Auditor Survey
  - Homeowner Survey
  - Country Partners Survey
  - Evaluation Report



- Energy Auditors Survey
  - Manageability (working with tools, effort for audit, ...)
  - Understanding (concept of iBRoad, colour coding, ...)
  - Customer's Perception (easy to understand, motivating, ...)



- Homeowners Survey
  - Building State
  - Renovations (in the past or planned for the future)
  - Understanding (concept of iBRoad, colour coding, ...)
  - Contentment with iBRoad (motivating, helpful, ...)



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°754045

- Country Partners Survey
  - Experience with Auditors (e.g. Training, Hotline, ...)
  - Tools (data transfer, national adaption, ...)
  - Next Steps

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## Auditors' Training Seminar

**Peter Mellwig**

**ifeu – Institut für Energie- und Umweltforschung**

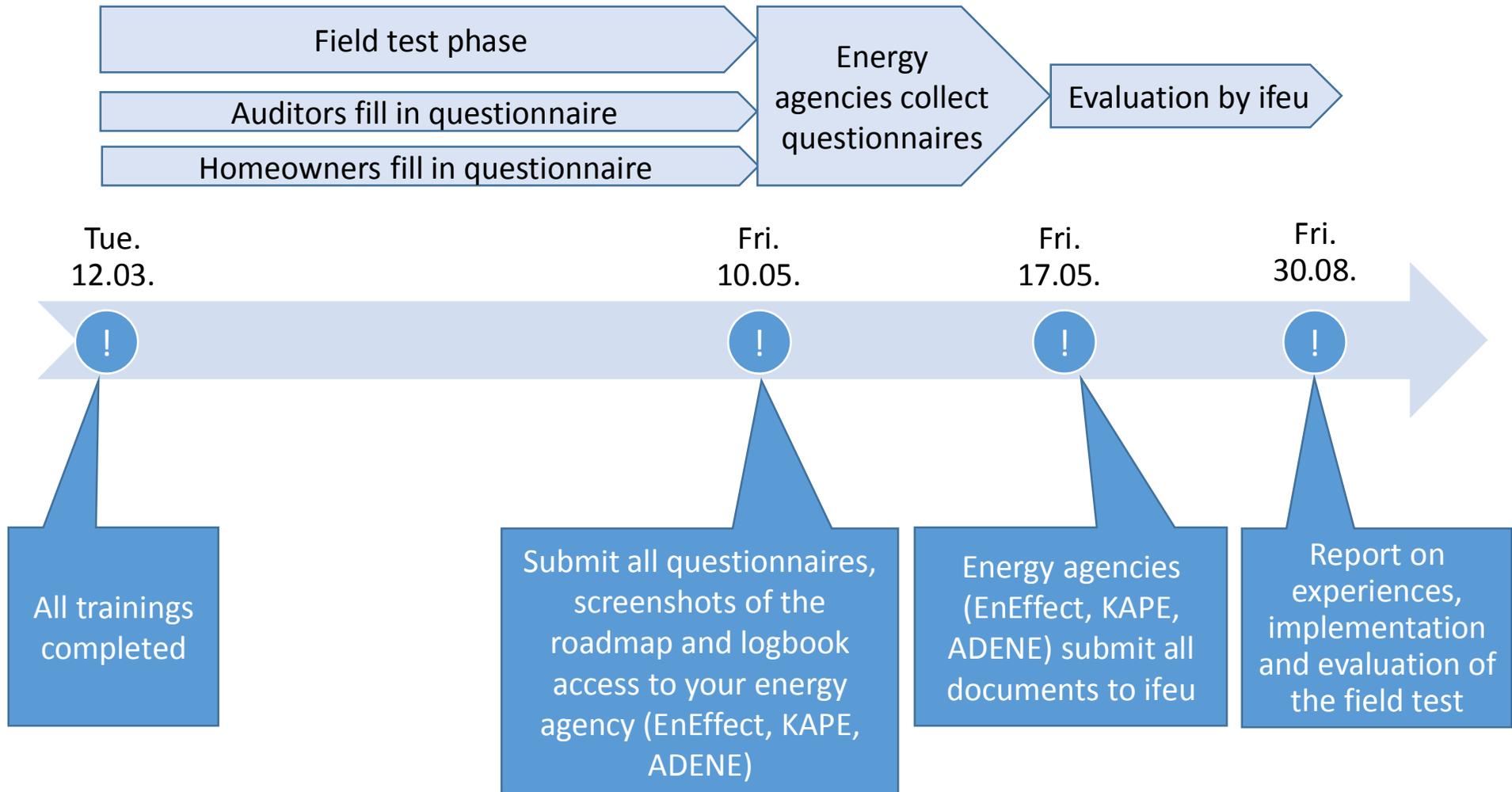
**Warsaw, Sofia, Lisbon, March 5<sup>th</sup> - 11<sup>th</sup> 2019**

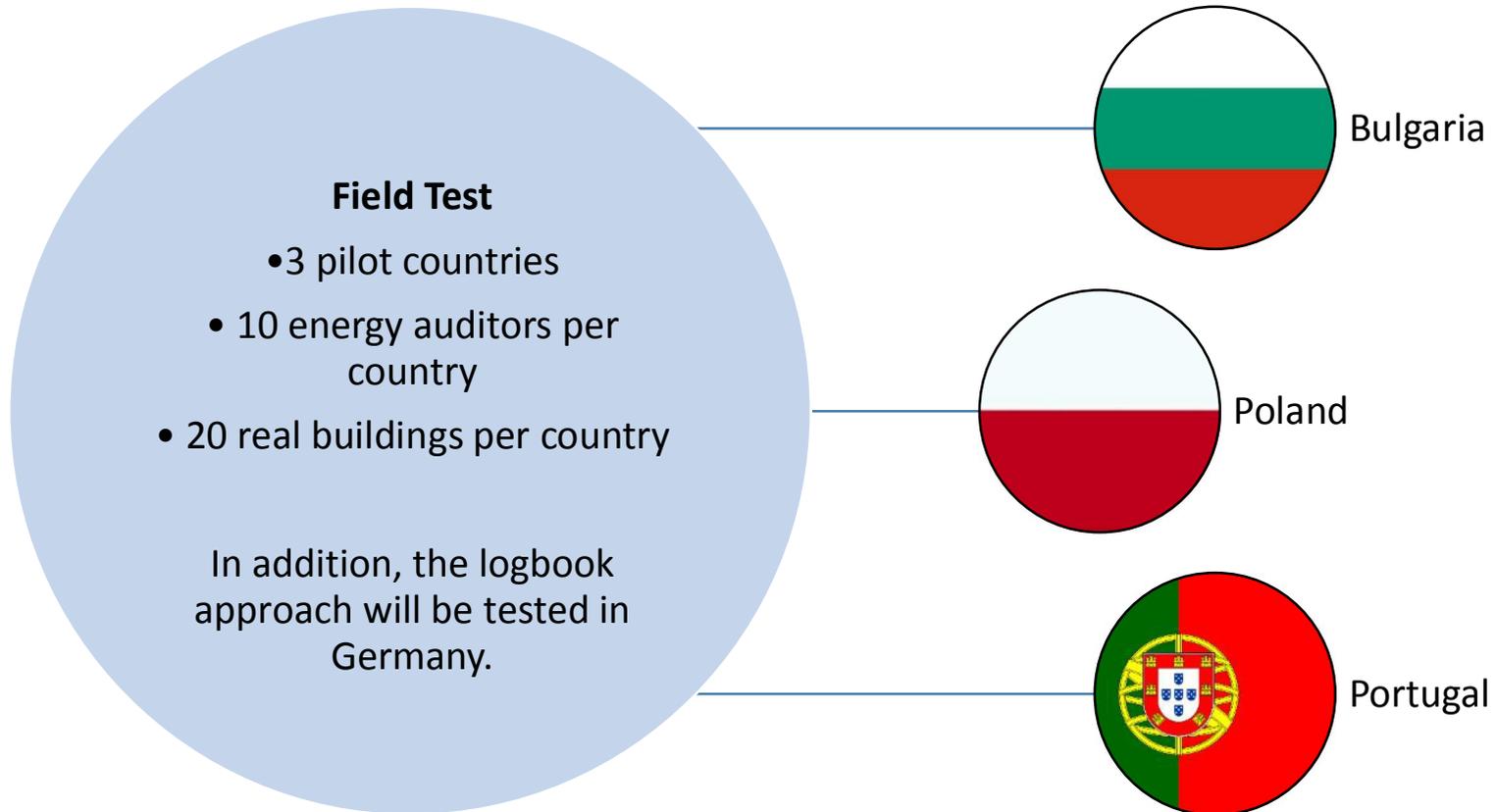


## ■ Auditors' Training Seminar

- 9:00 Welcome and Introduction
- 9:15 Why a Renovation Roadmap?  
What is the Renovation Roadmap?  
Steps to create a Renovation Roadmap
- 11:00 Coffee Break
- 11:20 Why a Logbook?  
What is the Logbook?  
Steps to create a Logbook
- 13:00 Lunch
- 13:45 Evaluation of the Field Test
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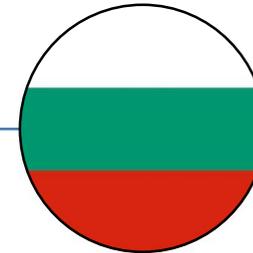




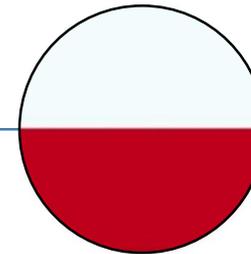


## Toolkit for the field test

- Online tool Roadmap Assistant
- Online tool Logbook
- Handbook for auditors
- Video tutorial for auditors
- Telephone-hotline in the national language



Bulgaria



Poland



Portugal

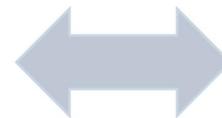
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## iBRoad Plan

Step by Step Plan

ENERGY CLASS	ENERGY CLASS	ENERGY CLASS
<b>F</b>	<b>D</b>	<b>A</b>
TODAY	WHEN BOILER NEEDS TO BE EXCHANGED	WHEN WINDOWS NEED TO BE EXCHANGED
YOUR BUILDING	RENOVATION STEP 1	RENOVATION STEP 2
	<b>WHAT TO DO?</b> <ul style="list-style-type: none"> <li>Improve the air permeability of the envelope</li> <li>Optimization control system</li> </ul>	<b>WHAT TO DO?</b> <ul style="list-style-type: none"> <li>Installation of a thermal insulating layer on top of concrete ground floor in contact with the ground</li> </ul>
	<b>INVESTMENT COSTS</b> 45555 €	<b>INVESTMENT COSTS</b> 44 €
	<b>COSTS FOR MAINTENANCE</b> 2407 €	<b>COSTS FOR MAINTENANCE</b> 44 €
<b>ENERGY BILL</b> 159 €/a	<b>ENERGY BILL</b> 144 €/a	<b>ENERGY BILL</b> 143 €/a



## iBRoad Logbook

		2019-02-11	2021-02-13	2027-02-13	2050
My buildings	Walls	●	●	●	●
	Roof	●	●	●	●
	Windows	●	●	●	●
	Floor	●	●	●	●

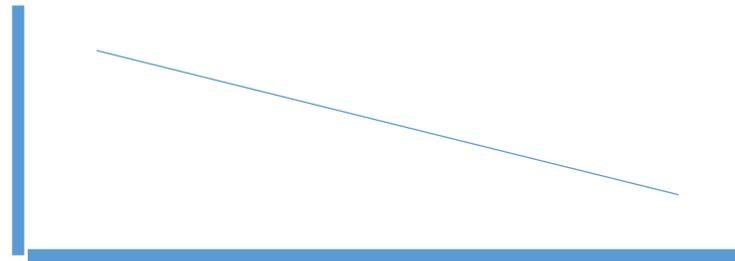


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1

building components have long life cycles – today, each renovation must contribute to the climate target



2

most renovations are implemented stepwise and not in one step. But also stepwise renovations should be deep and avoid lock-ins.

Step by Step Plan

ENERGY CLASS	ENERGY CLASS	ENERGY CLASS
F	D	A
TODAY	WHEN ROOFS NEED TO BE EXCHANGED	WHEN WINDOWS NEED TO BE EXCHANGED
YOUR BUILDING	RENOVATION STEP 1	RENOVATION STEP 2
	WHAT TO DO: • Improve the air permeability of the envelope • Optimization control system	WHAT TO DO: • Installation of a thermal insulating layer on top of concrete ground floor in contact with the ground
	INVESTMENT COSTS 26055 €	INVESTMENT COSTS 21 €
	COSTS FOR MAINTENANCE 207 €	COSTS FOR MAINTENANCE 24 €
ENERGY BILL 159 €/a	ENERGY BILL 144 €/a	ENERGY BILL 122 €/a





3

it takes an overarching plan to combine single renovation steps to a deep renovation



4

a long-term plan can consider the occasions (“trigger points”) in the homeowners’ lives



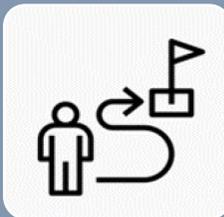
## What is the Renovation Roadmap?

Step by Step Plan

ENERGY CLASS	ENERGY CLASS	ENERGY CLASS
F	D	A
TODAY	WHEN BOILER NEEDS TO BE EXCHANGED	WHEN WINDOWS NEED TO BE EXCHANGED
YOUR BUILDING	RENOVATION STEP 1	RENOVATION STEP 2
	<b>WHAT TO DO?</b> <ul style="list-style-type: none"> <li>Improve the air permeability of the envelope</li> <li>Optimization control system</li> </ul>	<b>WHAT TO DO?</b> <ul style="list-style-type: none"> <li>Installation of a thermal insulating layer on top of concrete ground floor in contact with the ground</li> </ul>
	<b>INVESTMENT COSTS</b> 45655 €	<b>INVESTMENT COSTS</b> 44 €
	<b>COSTS FOR MAINTENANCE</b> 2467 €	<b>COSTS FOR MAINTENANCE</b> 44 €
<b>ENERGY BILL</b> 159 €/a	<b>ENERGY BILL</b> 144 €/a	<b>ENERGY BILL</b> 143 €/a



iBRoad Roadmap: diagnosis tool on building's performance providing stepwise renovation plan for buildings owners



### Purpose:

- development of a building renovation strategy
- definition of the targeted level of carbon savings together with the owner
- development of a customised stepwise renovation plan with reasonable and coordinated measures
- providing a long-term renovation overview



### Your tasks:

- support the homeowner in specifying his or her vision of the house and in visualising retrofit implementation strategies
- take into account intended uses, interests and wishes of inhabitants, capabilities of the homeowner and the individual building situation
- define reasonable renovation packages that contribute to the climate targets and which the homeowner agrees to realise



## Pages of the Renovation Roadmap

Current building state

Detailed renovation step

Roadmap overview

Detailed Roadmap

**iBRoad Plan** Home Roadmap Detailed Roadmap Your Building Renovation Steps Log out

### Current State

Your Building Today

ENERGY CLASS	Building Data	User Influence on Energy	Technical Details
<b>G</b>	<b>Year of Construction of the Building</b> 1994 <b>Building Type</b> Single Family House <b>Number of Floors</b> 3 <b>Number of Residential Units</b> 1 <b>Living Space Area</b> 250 m <sup>2</sup> <b>Previous Renovations</b>	<b>Hot Water Use Habits</b> several persons take a shower daily and take a bath at least once a week <b>Ventilation Use Habits</b> during heating period no window open for several hours per day	<b>Renewable Energies</b> 1594 <b>Energy Bill</b> 4021 €/a

**User Influence**

- Even your behaviour influences energy use. Here are some pointers to lower your total energy use.
- Reduce room temperature: Every degree less room temperature saves around 6% of heating energy. Usually 20 to 22 °C is sufficient in living rooms, 18 to 20 °C in the kitchen, 23 °C in the bathroom and 16 to 18 °C in the bedroom.
- Short and intensive ventilation: Brief window flutters provide fresh air, but they cool walls and rooms down. Correct intensive ventilation should be provided 2 to 3 times a day for about 4 to 5 minutes, with open windows and doors in all rooms. This ensures the necessary air exchange.
- Vent radiators: If radiators choke and do not warm up properly even though the thermostat is fully turned on, there is air in the radiator which wastes unnecessary energy. By regularly venting you save heating costs and consume less CO<sub>2</sub>.

### Details of the renovation Roadmap

#### Renovation Step 4

ENERGY CLASS	Measure
<b>A</b>	<b>Installation of a heat recovery unit</b>
<b>Renovation Step 4</b> 2024 - 2040	
<b>Primary Energy Demand</b> 100 kWh/m <sup>2</sup> a	
<b>Main Energy Source</b> Electricity	
<b>Final Energy Demand Main Source</b> 30 kWh/m <sup>2</sup> a	
<b>Final Energy Demand second Source</b> 15 kWh/m <sup>2</sup> a	
<b>Auxiliary Energy Source</b> Electricity	
<b>Final auxiliary Energy Demand</b> 15 kWh/m <sup>2</sup> a	
<b>Energy Bill</b> 1800 €/a	
<b>Carbon Emissions</b> 10 kg/m <sup>2</sup> a	
<b>Investment Costs for Renovation Step</b> 20000 €	
<b>Included Costs for Maintenance</b> 20000 €	
<b>Home of Incentives</b>	

**Improvement**  
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**Renovation Costs**  
20000 €

**Included Costs for Maintenance**  
20000 €

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#### Renovation Step 3

ENERGY CLASS	Measure
<b>B</b>	<b>Substitution of the heating system by a heating pump</b>
<b>Renovation Step 3</b> 2019 - 2024	
<b>Primary Energy Demand</b> 160 kWh/m <sup>2</sup> a	
<b>Main Energy Source</b> Natural Gas	
<b>Final Energy Demand Main Source</b> 150 kWh/m <sup>2</sup> a	
<b>Final Energy Demand second Source</b> 10 kWh/m <sup>2</sup> a	
<b>Auxiliary Energy Source</b> Electricity	
<b>Final auxiliary Energy Demand</b> 10 kWh/m <sup>2</sup> a	
<b>Energy Bill</b> 2700 €/a	
<b>Carbon Emissions</b> 20 kg/m <sup>2</sup> a	
<b>Investment Costs for Renovation Step</b> 25000 €	
<b>Included Costs for Maintenance</b> 25000 €	
<b>Home of Incentives</b>	

**Improvement**  
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**Renovation Costs**  
25000 €

**Included Costs for Maintenance**  
25000 €

**Home of Incentives**

**Previous Steps Benefits**

- Aesthetics**  
Refurbishment of the facade. Thus optimal improvement of the building.
- Improved architectural Quality and Prestige of the Building
- Health**  
The renovation measures reduce the amount of moisture entering your room.
- Reduction of Indoor Humidity, Mold and Bacteria
- Noise Protection**  
There will be new windows with better sound insulation.
- Reduction of Noise intrusions
- Thermal Comfort**  
The temperature at the walls increases, so that they obtain a higher comfort.
- Reduction of Draught, Chilling and Cold
- Additional Benefits**  
Indoor Air Quality  
Regulated ventilation improves the quality of your indoor space.
- High indoor air quality



### Detailed Renovation Roadmap

Step by Step Plan

	ENERGY CLASS	ENERGY CLASS	ENERGY CLASS	ENERGY CLASS	ENERGY CLASS
	<b>G</b>	<b>E</b>	<b>D</b>	<b>B</b>	<b>A</b>
	<b>Your Building</b> Moment of delivery	<b>Renovation Step 1</b> When Boiler need to be exchanged	<b>Renovation Step 2</b> 2019 - 2024	<b>Renovation Step 3</b> 2019 - 2025	<b>Renovation Step 4</b> 2025 - 2040
<b>Measure</b>		• Add a thermal solar system	• External Wall Insulation	• Substitution of the old window • Heat insulation	• Installation of a heat recovery unit • Substitution of the heating system by a heating pump
<b>Primary Energy Demand</b>	250 kWh/m <sup>2</sup> a	216 kWh/m <sup>2</sup> a	160 kWh/m <sup>2</sup> a	100 kWh/m <sup>2</sup> a	30 kWh/m <sup>2</sup> a
<b>Main Energy Source</b>	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Electricity
<b>Final Energy Demand Main Source</b>	200 kWh/m <sup>2</sup> a	150 kWh/m <sup>2</sup> a	150 kWh/m <sup>2</sup> a	80 kWh/m <sup>2</sup> a	30 kWh/m <sup>2</sup> a
<b>Final Energy Demand second Source</b>	0 kWh/m <sup>2</sup> a	15 kWh/m <sup>2</sup> a	15 kWh/m <sup>2</sup> a	15 kWh/m <sup>2</sup> a	15 kWh/m <sup>2</sup> a
<b>Auxiliary Energy Source</b>	Electricity	Electricity	Electricity	Electricity	Electricity
<b>Final auxiliary Energy Demand</b>	10 kWh/m <sup>2</sup> a	15 kWh/m <sup>2</sup> a	15 kWh/m <sup>2</sup> a	15 kWh/m <sup>2</sup> a	15 kWh/m <sup>2</sup> a
<b>Energy Bill</b>	4000 €/a	2700 €/a	1800 €/a	1100 €/a	300 €/a
<b>Carbon Emissions</b>	40 kg/m <sup>2</sup> a	30 kg/m <sup>2</sup> a	20 kg/m <sup>2</sup> a	10 kg/m <sup>2</sup> a	10 kg/m <sup>2</sup> a
<b>Investment Costs for Renovation Step</b>	10000 €	25000 €	25000 €	20000 €	20000 €
<b>Included Costs for Maintenance</b>	10000 €	25000 €	20000 €	20000 €	20000 €
<b>Home of Incentives</b>	Incentives 3000 €	Incentives 0 €	Incentives 10000 €	Incentives 10000 €	Incentives 0 €
<b>Changed Comforts</b>	Changed Comforts	Changed Comforts	Changed Comforts	Changed Comforts	Changed Comforts

## Current Building State

### Current State

#### Your Building Today



House\_side 1



Hous\_side 2



House\_side 3



House\_side 4

ENERGY CLASS	Building Data	User Influence on Energy	Technical Data
G	<b>Year of Construction of the Building</b> 1994	<b>Attendance Time</b>	<b>Renewable Energies</b>
	<b>Building Type</b> Single Family House	<b>Hot Water Use Habits</b> several persons take a shower daily and take a bath at least once a week	<b>Year of Construction of the Heating System</b> 1994
	<b>Number of Floors</b> 3	<b>Ventilation Use Habits</b> during heating period one window open for several hours per day	<b>Energy Bill</b> 4600 €/a
	<b>Number of Residential Units</b> 1		
	<b>Living Space Area</b> 250 m <sup>2</sup>		
	<b>Previous Renovations</b>		

### User Influence

Even your behaviour influences energy use. Here are some pointers to lower your total energy use.



Reduce room temperature: Every degree less room temperature saves around 6 % of heating energy. Usually 20 to 22 °C is sufficient in living rooms, 18 to 20 °C in the kitchen, 23 °C in the bathroom and 16 to 18 °C in the bedroom.



Short and intensive ventilation: Tilted windows hardly provide fresh air, but they cool walls and rooms down. Correct intensive ventilation should be provided 2 to 3 times a day for about 4 to 5 minutes, with open windows and doors in all rooms. This ensures the necessary air exchange.



Vent radiators: If radiators chortle and do not warm up properly even though the thermostat is fully turned on, there is air in the radiator which wastes unnecessary energy. By regular venting you save heating costs and consume less CO<sub>2</sub>.

## Current Building State

### Current State

#### Your Building Today



House\_side 1



Hous\_side 2



House\_side 3



House\_side 4

<p>ENERGY CLASS</p> <p><b>G</b></p>	<p><b>Building Data</b></p> <p><b>Year of Construction of the Building</b></p> <p>1994</p> <p><b>Building Type</b></p> <p>Single Family House</p> <p><b>Number of Floors</b></p> <p>3</p> <p><b>Number of Residential Units</b></p> <p>1</p> <p><b>Living Space Area</b></p> <p>250 m<sup>2</sup></p> <p><b>Previous Renovations</b></p>	<p><b>User Influence on Energy</b></p> <p><b>Attendance Time</b></p> <p><b>Hot Water Use Habits</b></p> <p>several persons take a shower daily and take a bath at least once a week</p> <p><b>Ventilation Use Habits</b></p> <p>during heating period one window open for several hours per day</p>	<p><b>Technical Data</b></p> <p><b>Renewable Energies</b></p> <p><b>Year of Construction of the Heating System</b></p> <p>1994</p> <p><b>Energy Bill</b></p> <p>4600 €/a</p>
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## Current Building State

### User Influence



Even your behaviour influences energy use. Here are some pointers to lower your total energy use.

Reduce room temperature: Every degree less room temperature saves around 6 % of heating energy. Usually 20 to 22 C° is sufficient in living rooms, 18 to 20 C° in the kitchen, 23 C° in the bathroom and 16 to 18 C° in the bedroom.



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Vent radiators: If radiators chortle and do not warm up properly even though the thermostat is fully turned on, there is air in the radiator which wastes unnecessary energy. By regular venting you save heating costs and consume less CO<sub>2</sub>.

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## Detailed Renovation Step

### Details of the renovation Roadmap

#### Renovation Step 4

ENERGY CLASS	
<b>A</b>	
<b>Renovation Step 4</b> 2035 - 2040	
<b>Primary Energy Demand</b>	100 kWh/m <sup>2</sup> a
<b>Main Energy Source</b>	Electricity
<b>Final Energy Demand Main Source</b>	30 kWh/m <sup>2</sup> a
<b>Final Energy Demand second Source</b>	15 kWh/m <sup>2</sup> a
<b>Auxiliary Energy Source</b>	Electricity
<b>Final auxiliary Energy Demand</b>	15 kWh/m <sup>2</sup> a
<b>Energy Bill</b>	900 €/a
<b>Carbon Emissions</b>	10 kg/(m <sup>2</sup> a)
<b>Investment Costs for Renovation Step</b>	26000 €
<b>Included Costs for Maintenance</b>	26000 €
<b>Name of Incentives</b>	

Measure	Installation of a heat recovery unit
<b>Improvement</b>	Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eimod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet citta kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.
<b>Technical Details</b>	Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eimod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet citta kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.
<b>Renovation Costs</b>	8000 €
<b>Included Costs for Maintenance</b>	8000 €

Measure	Substitution of the heating system by a heating pump
<b>Improvement</b>	Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eimod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet citta kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.
<b>Technical Details</b>	Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eimod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet citta kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.
<b>Renovation Costs</b>	18000 €
<b>Included Costs for Maintenance</b>	18000 €

#### Previous Steps Benefits

##### Aesthetics

Refurbishment of the facade, thus optical improvement of the building.

Improved architectural Quality and Prestige of the Building

##### Health

The renovation measures reduce the amount of moisture entering your room.

Reduction of indoor Humidity, Mold and Toxins

##### Noise Protection

There will be new windows with better sound insulation.

Reduction of Noise Immissions

##### Thermal Comfort

The temperature at the walls increases, so that they obtain a higher comfort.

Reduction of Draught, Overheating and Cold

#### Additional Benefits

##### Indoor Air Quality

Regulated ventilation improves the quality of your indoor space.

High indoor Air Quality



## Detailed Renovation Step

ENERGY CLASS
A
<b>Renovation Step 4</b> 2035 - 2040
<b>Primary Energy Demand</b> 100 kWh/m <sup>2</sup> a
<b>Main Energy Source</b> Electricity
<b>Final Energy Demand Main Source</b> 30 kWh/m <sup>2</sup> a
<b>Final Energy Demand second Source</b> 15 kWh/m <sup>2</sup> a
<b>Auxiliary Energy Source</b> Electricity
<b>Final auxiliary Energy Demand</b> 15 kWh/m <sup>2</sup> a
<b>Energy Bill</b> 900 €/a
<b>Carbon Emissions</b> 10 kg/(m <sup>2</sup> a)
<b>Investment Costs for Renovation Step</b> 26000 €
<b>Included Costs for Maintenance</b> 26000 €
<b>Name of Incentives</b>

Measure	Installation of a heat recovery unit
<b>Improvement</b>	Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.
<b>Technical Details</b>	Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.
<b>Renovation Costs</b>	8000 €
<b>Included Costs for Maintenance</b>	8000 €
	Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

Measure	Substitution of the heating system by a heating pump
<b>Improvement</b>	Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.
<b>Technical Details</b>	Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.
<b>Renovation Costs</b>	18000 €
<b>Included Costs for Maintenance</b>	18000 €
	Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.



## Detailed Renovation Step

### Previous Steps Benefits

#### Aesthetics



Refurbishment of the facade, thus optical improvement of the building.

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#### Health



The renovation measures reduce the amount of moisture entering your room.

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#### Noise Protection



There will be new windows with better sound insulation.

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The temperature at the walls increases, so that they obtain a higher comfort.

Reduction of Draught, Overheating and Cold

### Additional Benefits

#### Indoor Air Quality



Regulated ventilation improves the quality of your indoor space.

High indoor Air Quality



## Roadmap Overview

### Step by Step Plan

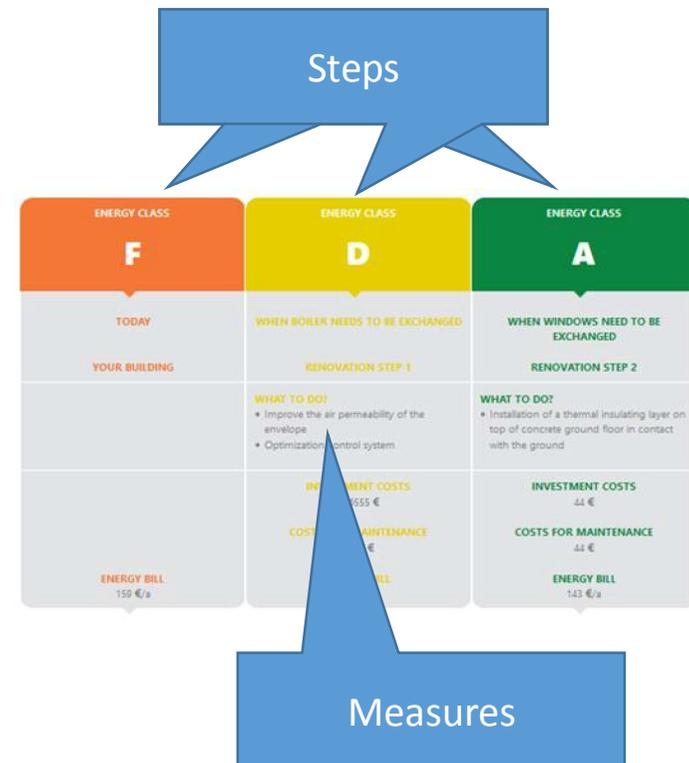
ENERGY CLASS	ENERGY CLASS	ENERGY CLASS
<b>F</b>	<b>D</b>	<b>A</b>
TODAY	WHEN BOILER NEEDS TO BE EXCHANGED	WHEN WINDOWS NEED TO BE EXCHANGED
YOUR BUILDING	RENOVATION STEP 1	RENOVATION STEP 2
	<b>WHAT TO DO?</b> <ul style="list-style-type: none"> <li>• Improve the air permeability of the envelope</li> <li>• Optimization control system</li> </ul>	<b>WHAT TO DO?</b> <ul style="list-style-type: none"> <li>• Installation of a thermal insulating layer on top of concrete ground floor in contact with the ground</li> </ul>
	<b>INVESTMENT COSTS</b> 45655 €	<b>INVESTMENT COSTS</b> 44 €
	<b>COSTS FOR MAINTENANCE</b> 2487 €	<b>COSTS FOR MAINTENANCE</b> 44 €
<b>ENERGY BILL</b> 159 €/a	<b>ENERGY BILL</b> 144 €/a	<b>ENERGY BILL</b> 143 €/a

## Renovation Step

- Renovation steps are the core of the Roadmap
- E.g. you may plan to renovate a building in 3 steps
- You can add as many steps as you like

## Renovation Measure

- Renovation measures refer to only one component
- One renovation step can comprise several measures
- E.g. in step 1 you may combine the measures
  - insulation of the walls
  - exchange of windows and
  - replacement of heating boiler



## Detailed Renovation Roadmap

### Step by Step Plan

## Detailed Roadmap

	ENERGY CLASS <b>G</b>	ENERGY CLASS <b>E</b>	ENERGY CLASS <b>D</b>	ENERGY CLASS <b>B</b>	ENERGY CLASS <b>A</b>
	<b>Your Building</b> Moment of delivery	<b>Renovation Step 1</b> When Boiler needs to be exchanged	<b>Renovation Step 2</b> 2025 - 2030	<b>Renovation Step 3</b> 2030 - 2035	<b>Renovation Step 4</b> 2035 - 2040
Measures		<b>Measures</b> • Add a thermal solar system	<b>Measures</b> • External Wall insulation	<b>Measures</b> • Substitution of the old windows • Roof insulation	<b>Measures</b> • Installation of a heat recovery unit • Substitution of the heating system by a heating pump
Energy Use	<b>Primary Energy Demand</b> 250 kWh/m <sup>2</sup> a	<b>Primary Energy Demand</b> 210 kWh/m <sup>2</sup> a	<b>Primary Energy Demand</b> 160 kWh/m <sup>2</sup> a	<b>Primary Energy Demand</b> 100 kWh/m <sup>2</sup> a	<b>Primary Energy Demand</b> 100 kWh/m <sup>2</sup> a
	<b>Main Energy Source</b> Natural Gas	<b>Main Energy Source</b> Natural Gas	<b>Main Energy Source</b> Natural Gas	<b>Main Energy Source</b> Natural Gas	<b>Main Energy Source</b> Electricity
	<b>Final Energy Demand Main Source</b> 200 kWh/m <sup>2</sup> a	<b>Final Energy Demand Main Source</b> 200 kWh/m <sup>2</sup> a	<b>Final Energy Demand Main Source</b> 150 kWh/m <sup>2</sup> a	<b>Final Energy Demand Main Source</b> 80 kWh/m <sup>2</sup> a	<b>Final Energy Demand Main Source</b> 30 kWh/m <sup>2</sup> a
	<b>Final Energy Demand second Source</b> 0 kWh/m <sup>2</sup> a	<b>Final Energy Demand second Source</b> 15 kWh/m <sup>2</sup> a	<b>Final Energy Demand second Source</b> 15 kWh/m <sup>2</sup> a	<b>Final Energy Demand second Source</b> 15 kWh/m <sup>2</sup> a	<b>Final Energy Demand second Source</b> 15 kWh/m <sup>2</sup> a
	<b>Auxiliary Energy Source</b> Electricity	<b>Auxiliary Energy Source</b> Electricity	<b>Auxiliary Energy Source</b> Electricity	<b>Auxiliary Energy Source</b> Electricity	<b>Auxiliary Energy Source</b> Electricity
	<b>Final auxiliary Energy Demand</b> 30 kWh/m <sup>2</sup> a	<b>Final auxiliary Energy Demand</b> 15 kWh/m <sup>2</sup> a	<b>Final auxiliary Energy Demand</b> 15 kWh/m <sup>2</sup> a	<b>Final auxiliary Energy Demand</b> 15 kWh/m <sup>2</sup> a	<b>Final auxiliary Energy Demand</b> 15 kWh/m <sup>2</sup> a
	<b>Energy Bill</b> 4600 €/a	<b>Energy Bill</b> 2300 €/a	<b>Energy Bill</b> 1800 €/a	<b>Energy Bill</b> 1100 €/a	<b>Energy Bill</b> 900 €/a
CO <sub>2</sub>	<b>Carbon Emissions</b> 40 kg/(m <sup>2</sup> a)	<b>Carbon Emissions</b> 30 kg/(m <sup>2</sup> a)	<b>Carbon Emissions</b> 20 kg/(m <sup>2</sup> a)	<b>Carbon Emissions</b> 10 kg/(m <sup>2</sup> a)	<b>Carbon Emissions</b> 10 kg/(m <sup>2</sup> a)
Costs		<b>Investment Costs for Renovation Step</b> 10000 €	<b>Investment Costs for Renovation Step</b> 2500 €	<b>Investment Costs for Renovation Step</b> 25000 €	<b>Investment Costs for Renovation Step</b> 26000 €
		<b>Included Costs for Maintenance</b> 15000 €	<b>Included Costs for Maintenance</b> 20000 €	<b>Included Costs for Maintenance</b> 40000 €	<b>Included Costs for Maintenance</b> 26000 €
Subsidies		<b>Name of Incentives</b> KWK	<b>Name of Incentives</b>	<b>Name of Incentives</b> KWK	<b>Name of Incentives</b>
		<b>Incentives</b> 5000 €	<b>Incentives</b> 0 €	<b>Incentives</b> 10000 €	<b>Incentives</b> 0 €
Comfort Changes		<b>Changed Comforts</b>	<b>Changed Comforts</b> 	<b>Changed Comforts</b> 	<b>Changed Comforts</b> 

## Detailed Roadmap

	ENERGY CLASS <b>G</b>	ENERGY CLASS <b>E</b>	ENERGY CLASS <b>D</b>	ENERGY CLASS <b>B</b>	ENERGY CLASS <b>A</b>
	<b>Your Building</b> Moment of delivery	<b>Renovation Step 1</b> When Boiler needs to be exchanged	<b>Renovation Step 2</b> 2025 - 2030	<b>Renovation Step 3</b> 2030 - 2035	<b>Renovation Step 4</b> 2035 - 2040
Measures		<b>Measures</b> <ul style="list-style-type: none"> <li>Add a thermal solar system</li> </ul>	<b>Measures</b> <ul style="list-style-type: none"> <li>External Wall insulation</li> </ul>	<b>Measures</b> <ul style="list-style-type: none"> <li>Substitution of the old windows</li> <li>Roof insulation</li> </ul>	<b>Measures</b> <ul style="list-style-type: none"> <li>Installation of a heat recovery unit</li> <li>Substitution of the heating system by a heating pump</li> </ul>
	Energy Use	<b>Primary Energy Demand</b> 250 kWh/m <sup>2</sup> a	<b>Primary Energy Demand</b> 210 kWh/m <sup>2</sup> a	<b>Primary Energy Demand</b> 160 kWh/m <sup>2</sup> a	<b>Primary Energy Demand</b> 100 kWh/m <sup>2</sup> a
<b>Main Energy Source</b> Natural Gas		<b>Main Energy Source</b> Natural Gas	<b>Main Energy Source</b> Natural Gas	<b>Main Energy Source</b> Natural Gas	<b>Main Energy Source</b> Electricity
<b>Final Energy Demand Main Source</b> 200 kWh/m <sup>2</sup> a		<b>Final Energy Demand Main Source</b> 200 kWh/m <sup>2</sup> a	<b>Final Energy Demand Main Source</b> 150 kWh/m <sup>2</sup> a	<b>Final Energy Demand Main Source</b> 80 kWh/m <sup>2</sup> a	<b>Final Energy Demand Main Source</b> 30 kWh/m <sup>2</sup> a
<b>Final Energy Demand second Source</b> 0 kWh/m <sup>2</sup> a		<b>Final Energy Demand second Source</b> 15 kWh/m <sup>2</sup> a	<b>Final Energy Demand second Source</b> 15 kWh/m <sup>2</sup> a	<b>Final Energy Demand second Source</b> 15 kWh/m <sup>2</sup> a	<b>Final Energy Demand second Source</b> 15 kWh/m <sup>2</sup> a
<b>Auxiliary Energy Source</b> Electricity		<b>Auxiliary Energy Source</b> Electricity	<b>Auxiliary Energy Source</b> Electricity	<b>Auxiliary Energy Source</b> Electricity	<b>Auxiliary Energy Source</b> Electricity
<b>Final auxiliary Energy Demand</b> 30 kWh/m <sup>2</sup> a		<b>Final auxiliary Energy Demand</b> 15 kWh/m <sup>2</sup> a	<b>Final auxiliary Energy Demand</b> 15 kWh/m <sup>2</sup> a	<b>Final auxiliary Energy Demand</b> 15 kWh/m <sup>2</sup> a	<b>Final auxiliary Energy Demand</b> 15 kWh/m <sup>2</sup> a
<b>Energy Bill</b> 4600 €/a		<b>Energy Bill</b> 2300 €/a	<b>Energy Bill</b> 1800 €/a	<b>Energy Bill</b> 1100 €/a	<b>Energy Bill</b> 900 €/a



## Detailed Roadmap

CO <sub>2</sub>	<b>Carbon Emissions</b> 40 kg/(m <sup>2</sup> a)	<b>Carbon Emissions</b> 30 kg/(m <sup>2</sup> a)	<b>Carbon Emissions</b> 20 kg/(m <sup>2</sup> a)	<b>Carbon Emissions</b> 10 kg/(m <sup>2</sup> a)	<b>Carbon Emissions</b> 10 kg/(m <sup>2</sup> a)
Costs		<b>Investment Costs for Renovation Step</b> 10000 €	<b>Investment Costs for Renovation Step</b> 2500 €	<b>Investment Costs for Renovation Step</b> 25000 €	<b>Investment Costs for Renovation Step</b> 26000 €
		<b>Included Costs for Maintenance</b> 15000 €	<b>Included Costs for Maintenance</b> 20000 €	<b>Included Costs for Maintenance</b> 40000 €	<b>Included Costs for Maintenance</b> 26000 €
Subsidies		<b>Name of Incentives</b> KWK	<b>Name of Incentives</b>	<b>Name of Incentives</b> KWK	<b>Name of Incentives</b>
		<b>Incentives</b> 5000 €	<b>Incentives</b> 0 €	<b>Incentives</b> 10000 €	<b>Incentives</b> 0 €
Comfort Changes		<b>Changed Comforts</b>	<b>Changed Comforts</b>  	<b>Changed Comforts</b>  	<b>Changed Comforts</b> 

## Five steps to create a Renovation Roadmap





- **Purpose of the on-site visit**

- Data acquisition of **technical** building state
  - Geometry, components, heating, DHW, cooling, ...
  - Strengths and weaknesses of the building
- Note **preferences** of the homeowners
  - Currently (too cold, too hot, ...)
  - For the future (specific requirements, time slots, ...)



## Checklist for the on-site visit (in the handbook)

### Checklist for the on-site visit

- ✓ What does the homeowner feel disturbing about his/her current living situation?
- ✓ Is it mostly too warm or too cold in the house?
- ✓ Will there be changes in the living situation with regard to the building or are changes foreseeable (e. g. child birth, children moving out, grandparents moving in etc.)?
- ✓ What are the homeowner's and habitants' preferences in comfort?
- ✓ What kind of measures does the homeowner plan to undertake anyway?
- ✓ What measures is the homeowner interested in anyway?
- ✓ Is a certain system technology preferred by the homeowner?
- ✓ Which renewable energy source is the homeowner interested in?
- ✓ Does the owner face a problem with moisture or mould?
- ✓ Is the ambient air polluted or is there a lot of noise outside?
- ✓ Are there foreseeable occasions, when future renovation steps can be carried out preferably concerning the living situation of the owner or user or periods in which renovation is inappropriate?
- ✓ Are there weak points in the building that require rapid action?
- ✓ Are there any measures that lead to major improvements with little effort?
- ✓ Are there any measures that can be carried out at any time without preconditions?
- ✓ Which components and systems of the building will soon reach the end of their life cycle? Which components and systems can probably be used longer?
- ✓ Which components and systems should be renovated simultaneously for physical or technical reasons, even if their life span has not reached the end yet?
- ✓ In which technically useful order should the components and systems be renovated?

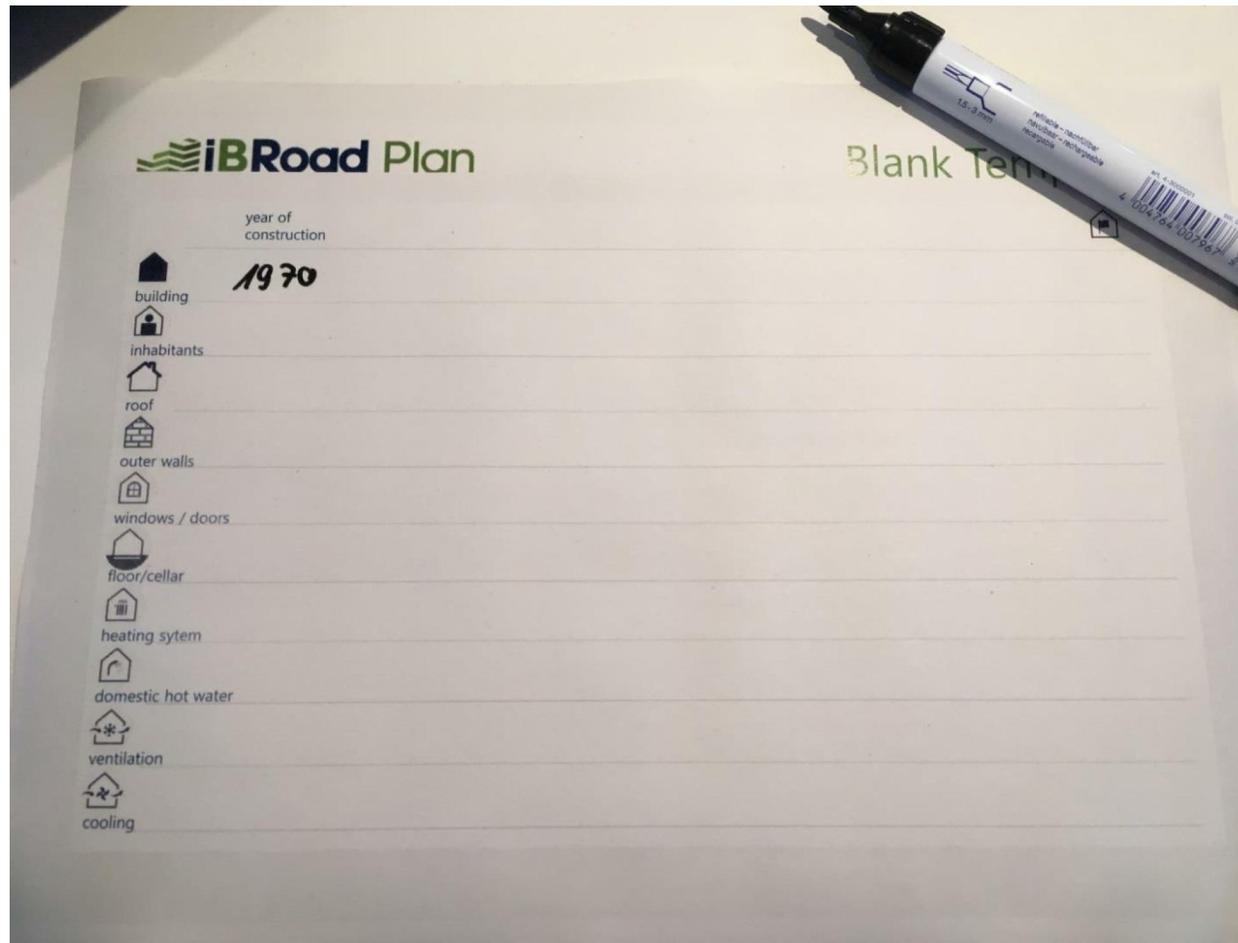


During the on-site visit, you can use the “Blank Template” to develop a first sketch of the Roadmap together with the homeowner.

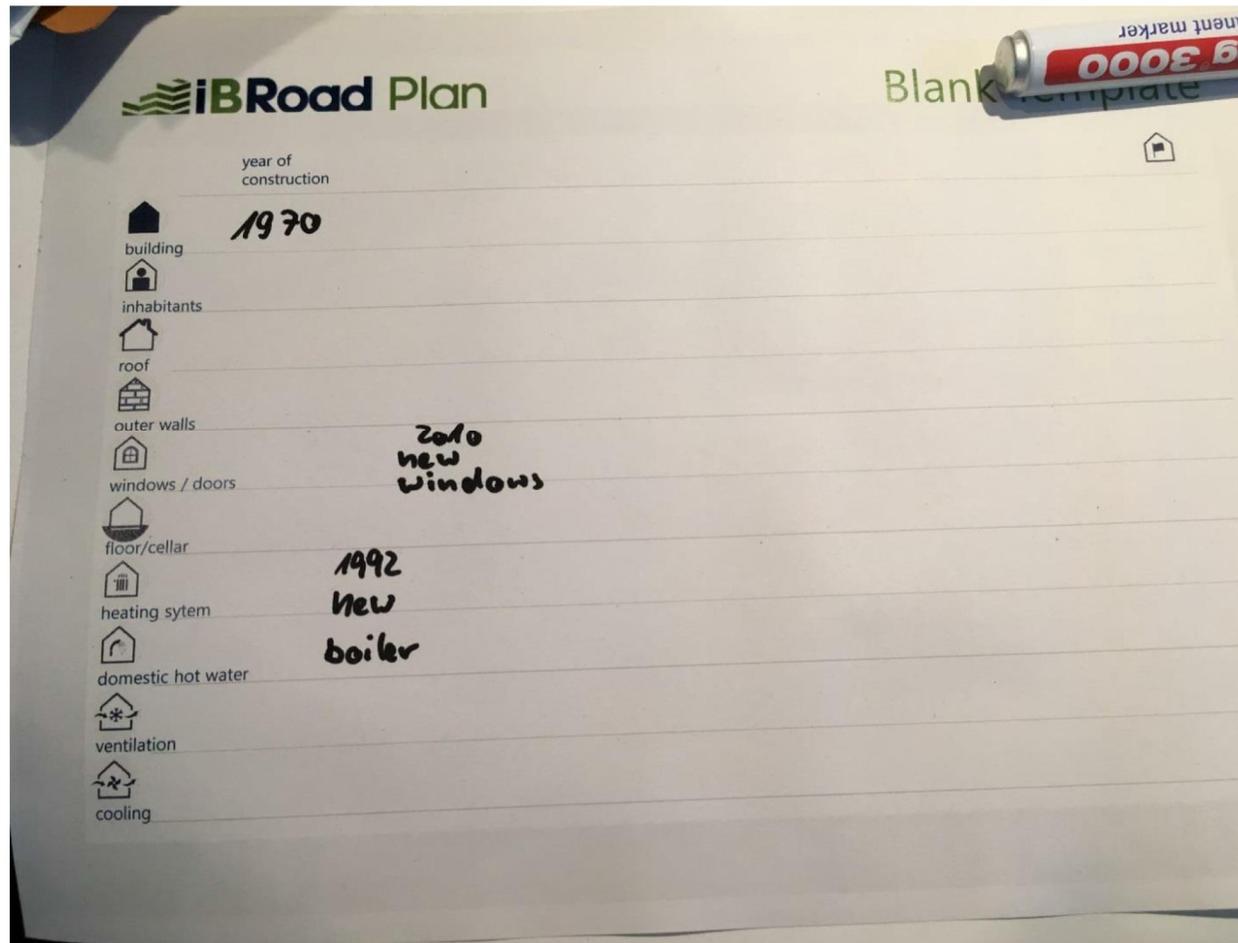
 Blank Template

	year of construction	
	building	
	inhabitants	
	roof	
	outer walls	
	windows / doors	
	floor/cellar	
	heating sytem	
	domestic hot water	
	ventilation	
	cooling	

Start with the year of construction of the building



Enter past renovation measures that refer to energy demand

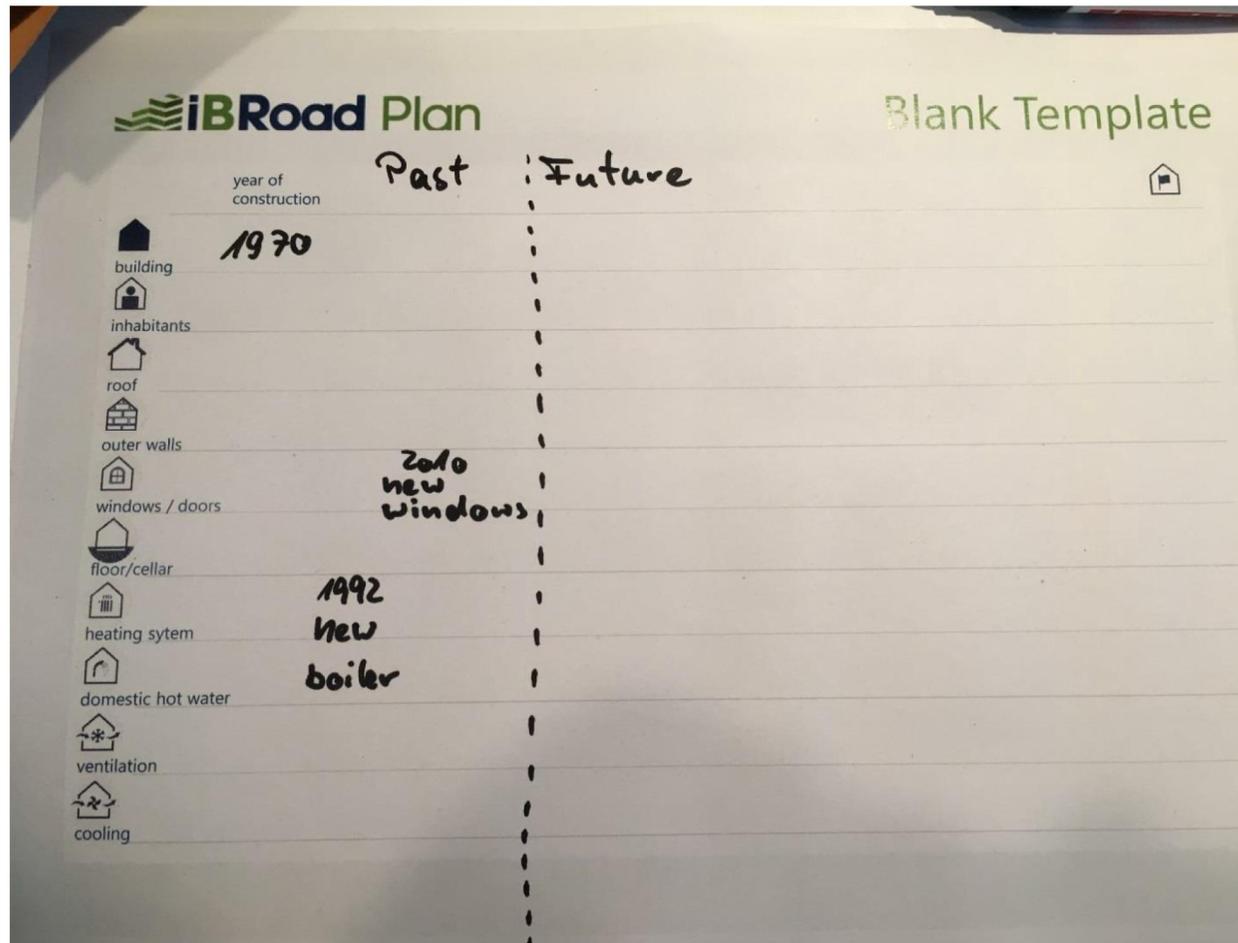


The image shows a handwritten form titled "iBRoad Plan" on lined paper. The form lists various building components and renovation measures. A red marker is visible at the top right of the page.

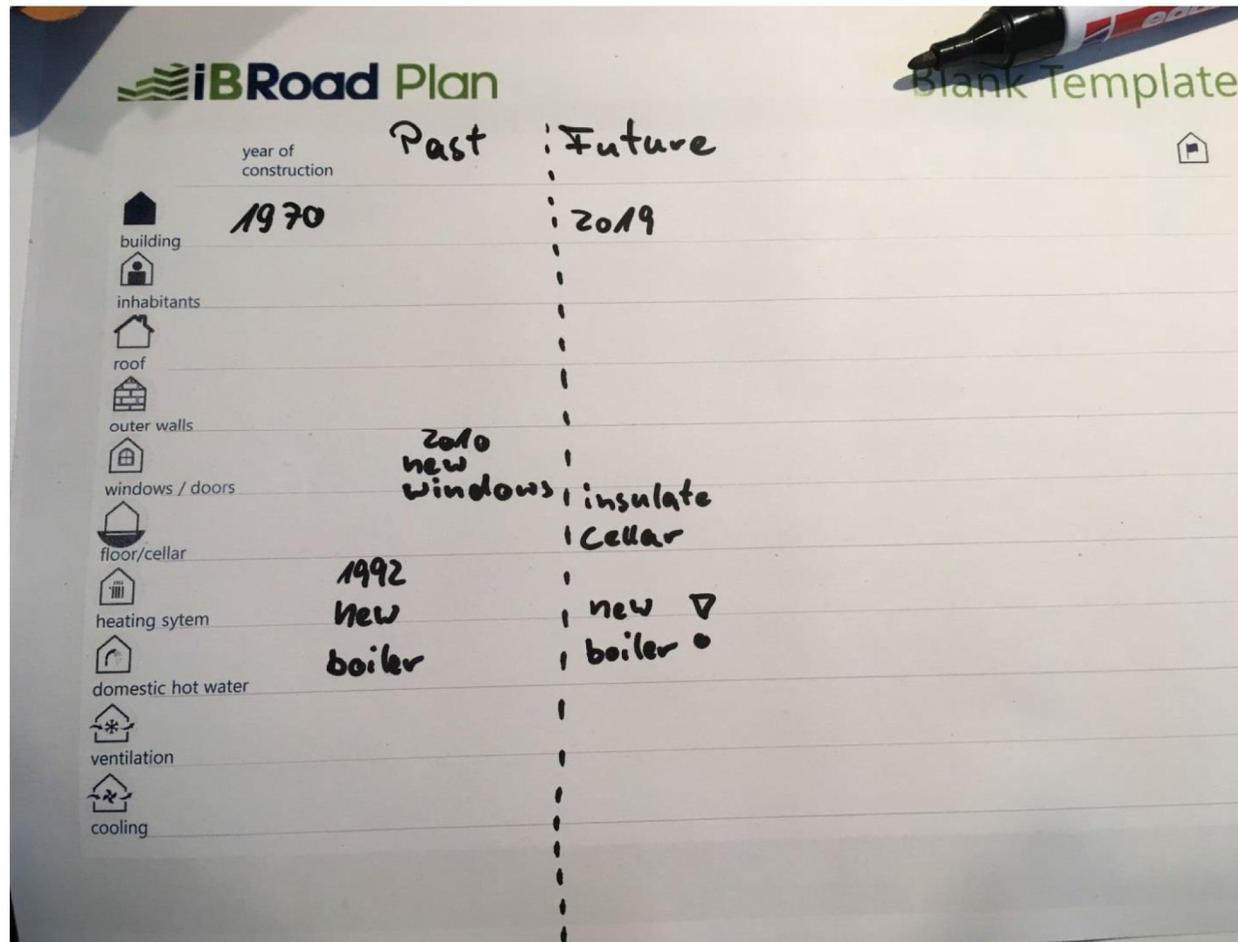
Category	Year	Measure
year of construction	1970	
building		
inhabitants		
roof		
outer walls		
windows / doors	2010	new windows
floor/cellar		
heating system	1992	new boiler
domestic hot water		
ventilation		
cooling		



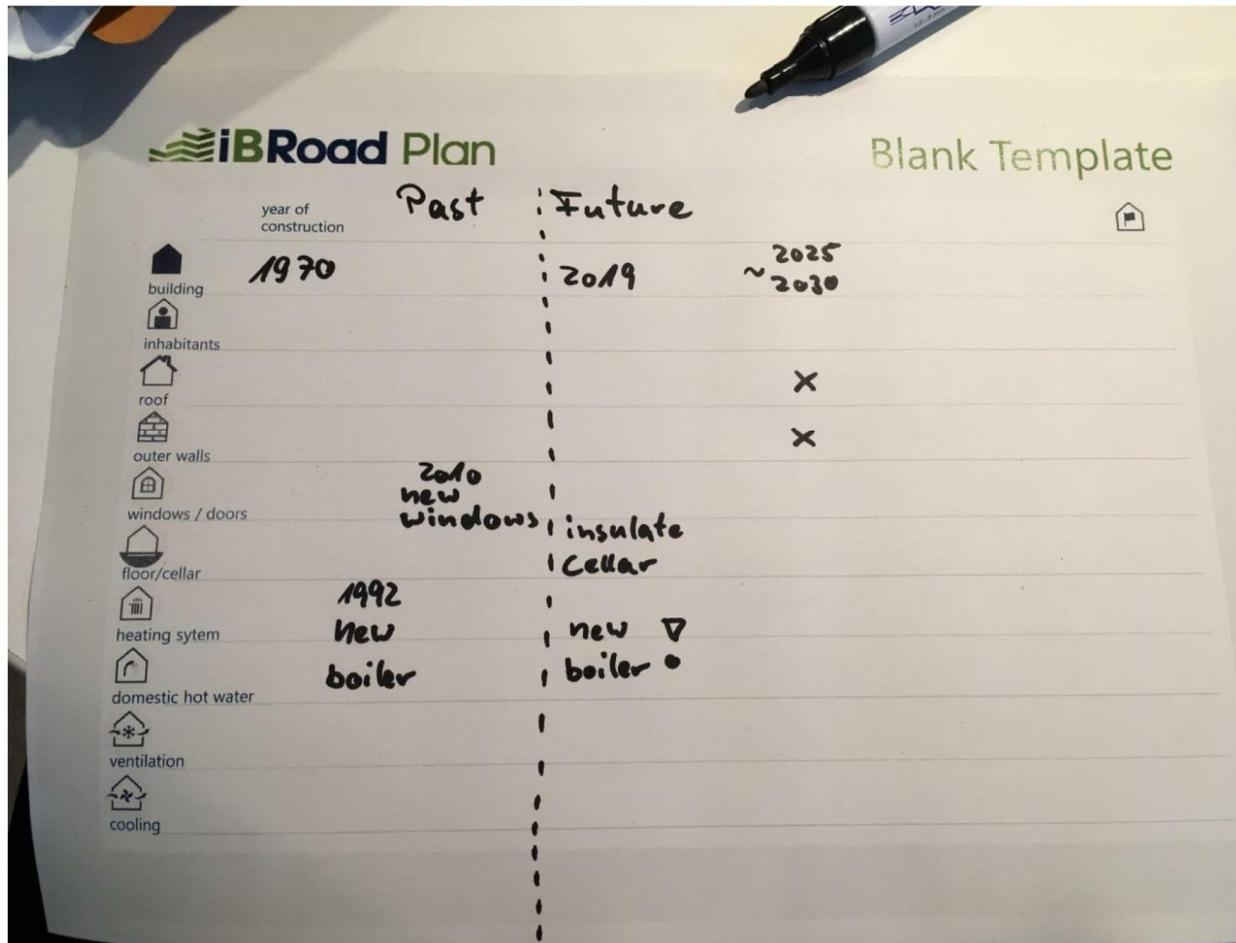
Now you can start planning the future



You can start with pending measures or measures that are easy to implement.



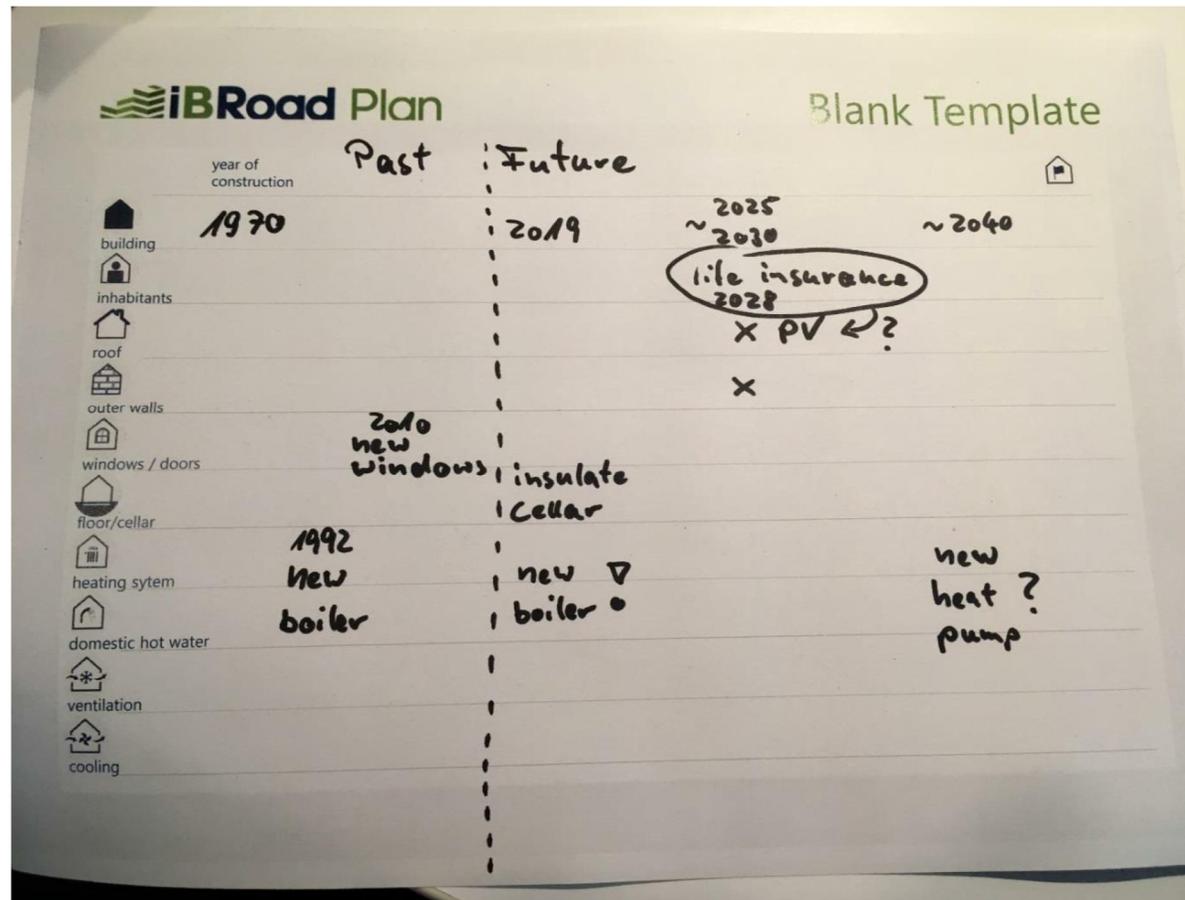
When will the life span of components expire and maintenance be needed anyway?



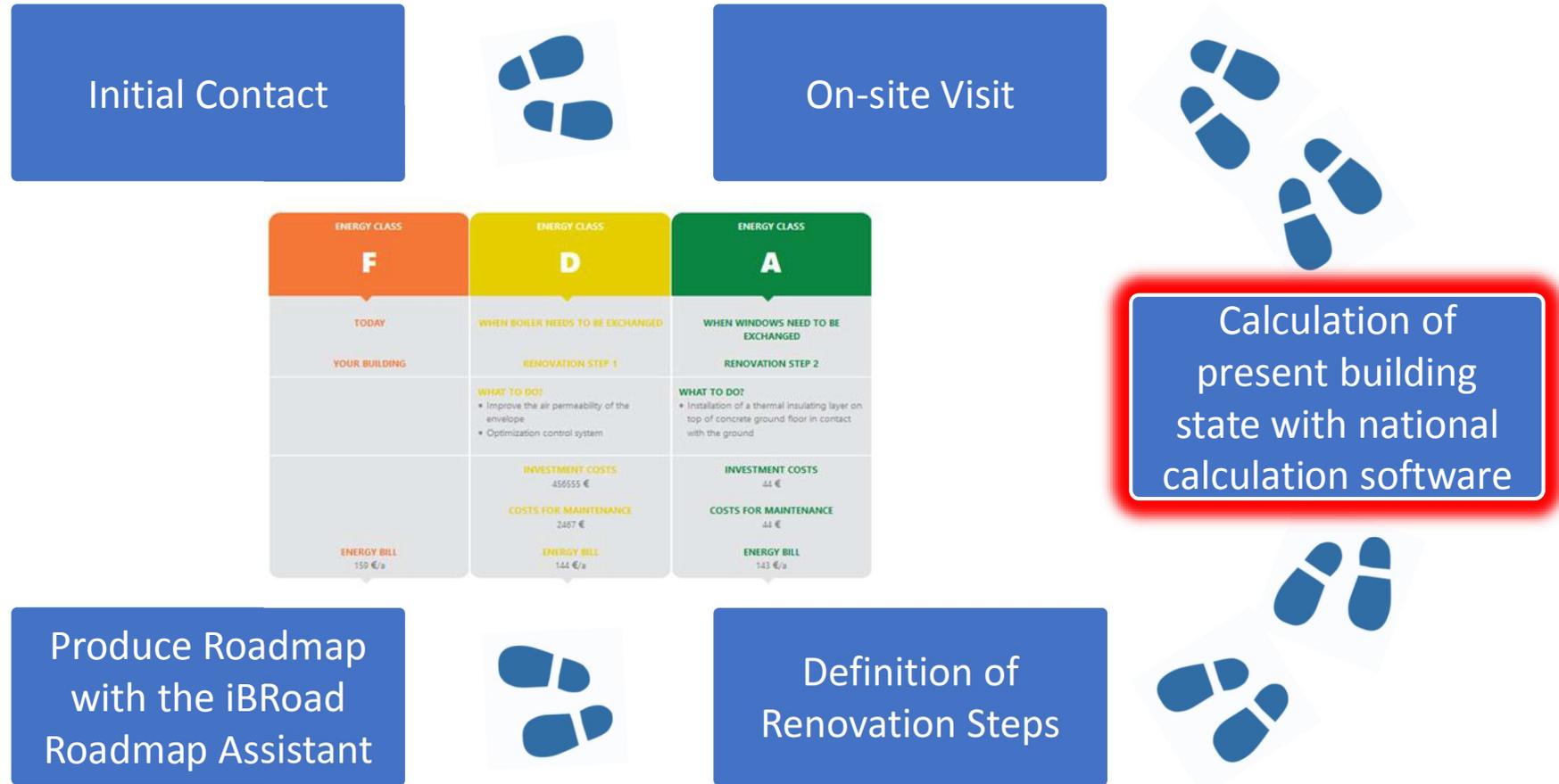
Even new components will need to be exchanged one day.  
Depending on the considered period this might be interesting.

iBRoad Plan		Blank Template		
year of construction	Past	Future		
building	1970	2019	~2025 ~2030	~2040
inhabitants				
roof			X	
outer walls			X	
windows / doors	2020 new windows	insulate cellar		
floor/cellar				
heating system	1992 new boiler	new boiler		new heat? pump
domestic hot water				
ventilation				
cooling				

Maybe there will be occasions in the life of the homeowner that influence the measures.



## Five steps to create a Renovation Roadmap





## Tasks of the Calculation of present building state with national calculation software

- Enter building envelop (surface areas, u-values)
- Enter heating, hot water, ventilation, cooling
- Calculate final energy demand, primary energy demand (same as EPC calculation)
- Calculate energy cost or copy energy cost from bill

- ENSI EAB Software for Energy Auditing of Buildings

Bulgaria



- Audytor OZC
- ArCADia Thermo BuildDesk Energy Certificate
- ENSI Profitability

Poland

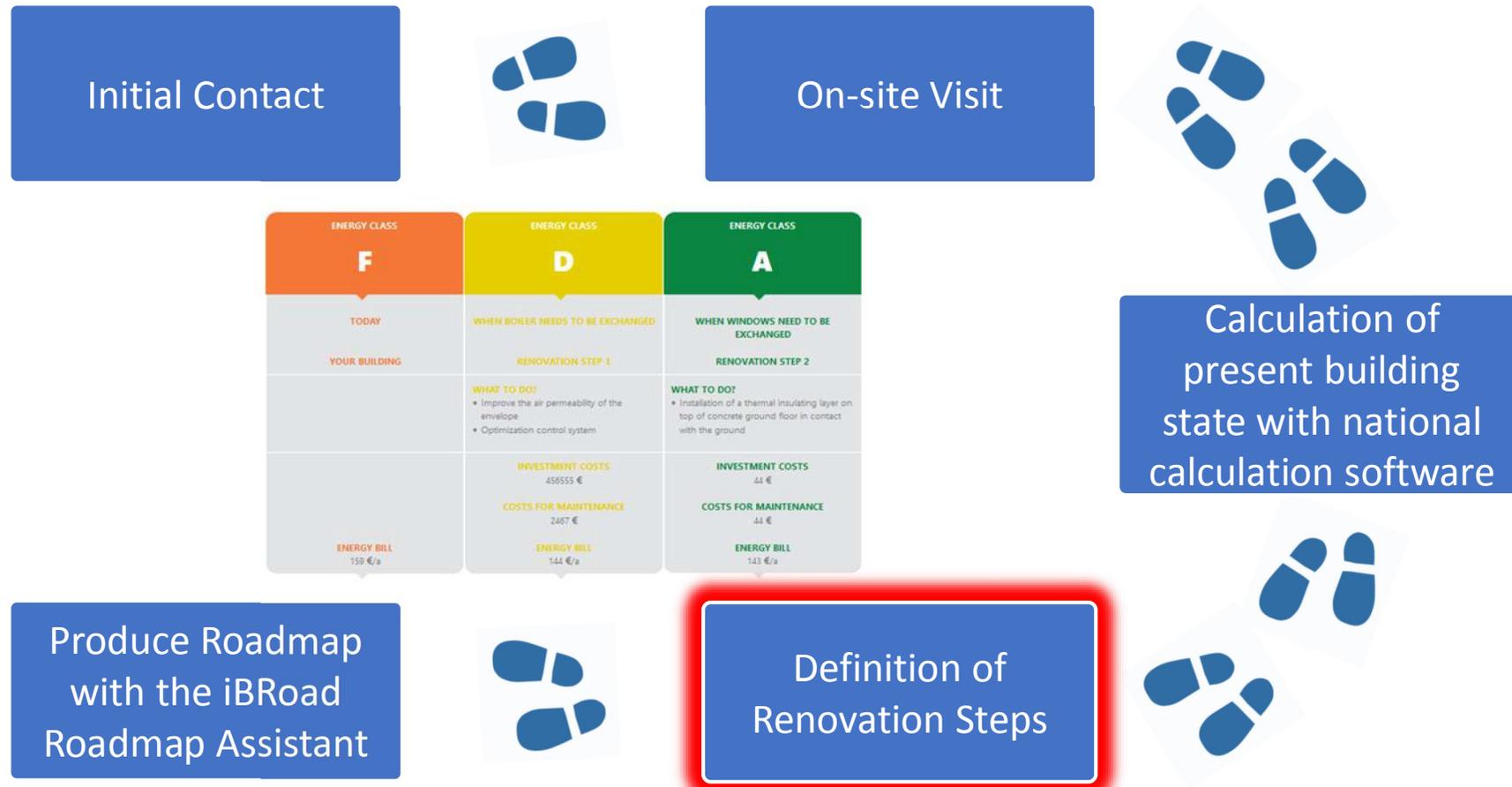


- Energy Plus,
- ESP-r

Portugal

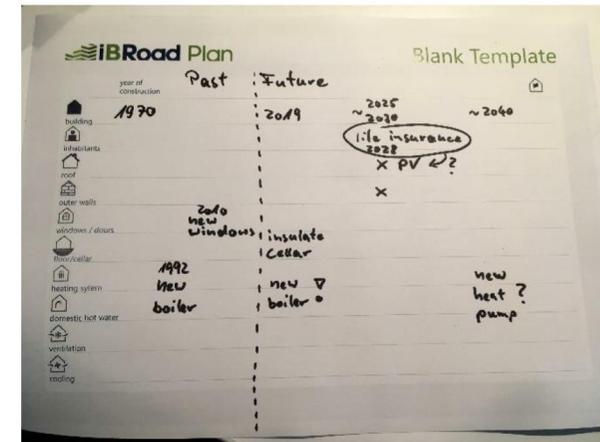


## Five steps to create a Renovation Roadmap

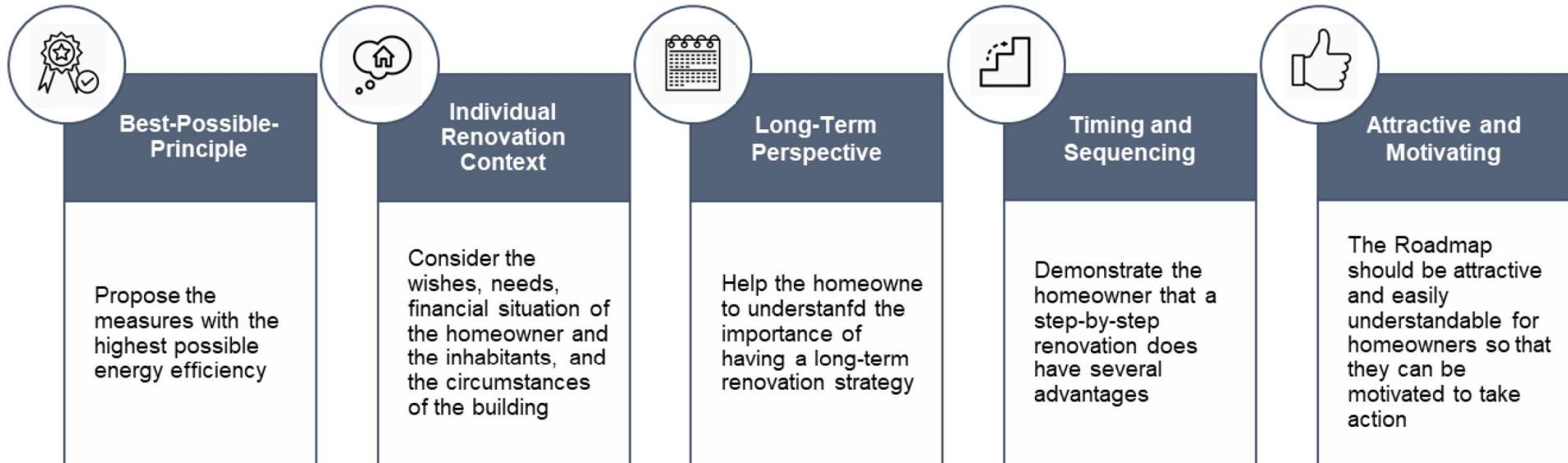




- Guiding questions to define Renovation Steps
- Can the owner implement measures that are **independent** from the age of a building component (e.g. insulation of the cellar ceiling, )?
- Are there measures that provide considerable energy **savings at low investment cost**?
- Do the owners complain about specific **comfort** aspects, e.g. draught or summer heat?
- Are there components that need to be renovated or exchanged **anyway** in the near future?
- When will components need maintenance in the future according to their specific **life span**?
- Are there technical needs that require a specific **order** of renovations? Some renovations are much easier if they are combined.



## Guiding Principles for Establishing the Roadmap



## Guiding Principles for Establishing the Roadmap (1/5)

### Best Possible Principle



**You should propose the measures with the highest possible energy efficiency.**

Every building is unique. Therefore, it is not possible to formulate a universal target that applies to all buildings. However, the target of a nearly climate-neutral building stock must be fulfilled. Thus, you should pursue and propose the measures with the highest possible energy efficiency, taking into account the circumstances of the building and the preferences or financial capabilities of the owner - importantly, "best possible" does not mean "no matter how expensive".

## Guiding Principles for Establishing the Roadmap (2/5)

### Individual Renovation Context



**Consider the wishes, needs, financial situation of the homeowner, and the circumstances of the building in the renovation process.**

Assessing the homeowners' or family's situation today and how it is expected in the future is essential: this includes, for instance, financial opportunities, comfort requirements, living space changes, or family planning (e.g. having a baby, children moving out or grandparents moving in).

Also you need to consider the circumstances of the respective building, e.g.: Are there weaknesses in the building requiring immediate or rapid action? Are there measures that lead with little effort to major improvements?

## Guiding Principles for Establishing the Roadmap (3/5)

### Long-Term Perspective



**Help the homeowner to understand the importance of having a long-term renovation strategy**

It is important to pursue a long-term renovation strategy in order to avoid lock-in effects, i.e., energy savings which are not going to be realised due to unambitious and insufficiently stringent energy requirement targets for buildings, building elements and equipment.

## Guiding Principles for Establishing the Roadmap (4/5)

### Timing and Sequencing of Actions



#### A step-by-step renovation does have several advantages

Often, renovations cannot be carried out in a single operation so that many buildings are only renovated partially. In many cases, the financial situation of the homeowner does not allow comprehensive refurbishment at once. However, a step-by-step renovation does not mean that it is not as good as a renovation at once. In contrast, early replacement of components can also lead to economic losses. A step-by-step renovation, however, is also possible with limited budget. Summarising, also a step-by-step modernisation leads to the final goal, if each renovation step is well planned and takes into account every next step.

## Guiding Principles for Establishing the Roadmap (5/5)

### Attractive and Motivating



**The Roadmap should be attractive and easily understandable for the users so that they can be motivated to take action.**

The Roadmap needs to be attractive and easily understandable for homeowners in order to motivate them to take action. Therefore, make sure that you use, for instance, pictures whenever appropriate to illustrate specific situations and pay attention to comprehensibility. Building owners have to be guided throughout the Roadmap process and receive clear indications so that they can take action without getting lost.



After the renovation steps are defined you have to calculate them in your national software

- Make a copy or variant of the current building state and rename it to `renovation step 1`
- Change the respective components that should be renovated in step 1
- Make a copy of `renovation step 1`, rename it to `renovation step 2` and change the components that should be renovated in step 2
- Proceed in this way for all renovation steps

• ENSI EAB Software for Energy Auditing of Buildings

Bulgaria



• Audytor OZC  
• ArCADia Thermo BuildDesk  
• Energy Certificate  
• ENSI Profitability

Poland



• Energy Plus,  
• ESP-r

Portugal



## Five steps to create a Renovation Roadmap



- **Transferring the data to the Renovation Roadmap**
- The Roadmap Assistant is an online tool to produce the Roadmap in a standardised layout



- The Roadmap Assistant produces an online link, which you can pass over to the homeowner. With this link the homeowner can see the Roadmap.

Link: <https://ibroad.blue-planet.be/>

Authentifizierung erforderlich ×

 <https://ibroad-logbook.blue-planet.be> verlangt einen Benutzernamen und ein Passwort. Ausgabe der Website: "Application"

Benutzername:

Passwort:



- Link: <https://ibroad.blue-planet.be/>

### Log in

Email

Password

Remember me

- For the roadmap we have specific email addresses with which you can log in.
  - [user\\_1@mail.com](mailto:user_1@mail.com)
  - [user\\_2@mail.com](mailto:user_2@mail.com)
  - [user\\_3@mail.com](mailto:user_3@mail.com)
  - ...
- The password for your account will be provided to you directly.

Welcome to the iBRoad Roadmap Assistant!  
What is iBRoad and what is the iBRoad Roadmap Assistant?

**Welcome**

Create current Building State

**Current Building State**

**Steps Overview**

Detail of the Renovation - Renovation Step 1

**Measure Overview**

**Create new Roadmap**

New Renovation Step

**Renovation Step**

User Influence

**User Influence**

Building Address

**Building Details**

Edit Measure

**Edit Measure**

## Roadmap Assistant in general

### Building Address

Street:  Number:  Postal Box:

Municipality:  Zip Code:  Country:

### Building Facts

Subtitle:  

Subtitle:  

Subtitle:  

Subtitle:  

Number of Residential Units:  Building Type:

Living Space Area:

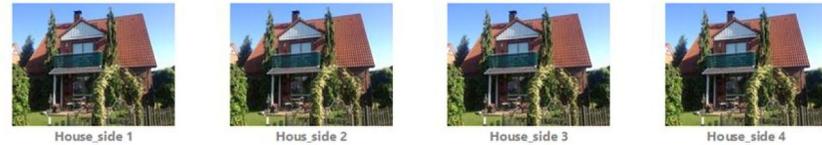
Year of Construction of the Heating System:  Year of Construction:

Number of Floors:

Here you can edit the data ...

### Current State

#### Your Building Today



<b>ENERGY CLASS</b>  	<b>Building Data</b> <b>Year of Construction of the Building</b> 1994 <b>Building Type</b> Single Family House <b>Number of Floors</b> 3 <b>Number of Residential Units</b> 1 <b>Living Space Area</b> 250 m <sup>2</sup> <b>Previous Renovations</b>	<b>User Influence on Energy</b> <b>Attendance Time</b> several persons take a shower daily and take a bath at least once a week <b>Hot Water Use Habits</b> <b>Ventilation Use Habits</b> during heating period one window open for several hours per day	<b>Technical Data</b> <b>Renewable Energies</b>  <b>Year of Construction of the Heating System</b> 1994 <b>Energy Bill</b> 4600 €/a
--	--	--	---

#### User Influence



- Even your behaviour influences energy use.
- Reduce room temperature: Every degree less than 20 to 22 °C is sufficient in living rooms, 18 to 20 °C in the bedroom.
- Short and intensive ventilation: Tilted windows and doors should be provided in all rooms. Correct intensive ventilation should be provided in all rooms. This ensures the necessary air exchange.
- Vent radiators: If radiators chortle and do not warm up properly even though the thermostat is fully turned on, there is air in the radiator which wastes unnecessary energy. By regular venting you save heating costs and consume less CO<sub>2</sub>.

... that is shown in the Renovation Roadmap



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°754045

## Current building state

**Current State**

**Your Building Today**

**ENERGY CLASS**

**G**

**Building Data**

- Year of Construction of the Building: 1990
- Building Type: Single Family House
- Number of Floors: 5
- Number of Residential Units: 1
- Living Space Area: 206 m<sup>2</sup> of Previous Renovations

**User Influence**

- Enter your behavior influences energy use. Here are some pointers to lower your total energy use.
- Reduce room temperature: Every degree less raises temperature rises around 5-6% of heating energy. Usually 20 to 22 °C is sufficient in living rooms, 18 to 20 °C in the kitchen, 23 °C in the bathroom and 16 to 18 °C in the bedrooms.
- Shut and minimize ventilation: Third window being provided fresh air, but they cool walls and doors down. Current intensive ventilation should be provided 2 to 3 times a day for about 4 to 5 minutes, with open windows and doors in all rooms. This ensures the necessary air exchange.
- Vent radiators: If radiators choke and do not warm up entirely even though the thermostat is fully turned on, there is air in the radiator which wastes unnecessary energy. By regularly venting you save heating costs and consume less CO<sub>2</sub>.

## Detailed renovation step

**Details of the renovation Roadmap**

**Renovation Step 4**

ENERGY CLASS	Message	Realization of a heat recovery unit
<b>A</b>	<b>Improvement</b> Lowers space-heating air losses, construction walling gaps, and eliminates unwanted energy production of boilers or district heating substation unit, and district ventilation. It also sets an account of public dust delivery at its release. See the heat gatekeeping, see the technical services and lower space-heating air losses.	Lowers space-heating air losses, construction walling gaps, and eliminates unwanted energy production of boilers or district heating substation unit, and district ventilation. It also sets an account of public dust delivery at its release. See the heat gatekeeping, see the technical services and lower space-heating air losses.
<b>Renovation Step 4 2035 - 2040</b>	<b>Technical Details</b>	Lowers space-heating air losses, construction walling gaps, and eliminates unwanted energy production of boilers or district heating substation unit, and district ventilation. It also sets an account of public dust delivery at its release. See the heat gatekeeping, see the technical services and lower space-heating air losses.
<b>Primary Energy Demand 100 kWh/m<sup>2</sup>a</b>	<b>Renovation Costs</b>	Lowers space-heating air losses, construction walling gaps, and eliminates unwanted energy production of boilers or district heating substation unit, and district ventilation. It also sets an account of public dust delivery at its release. See the heat gatekeeping, see the technical services and lower space-heating air losses.
<b>Main Energy Source Electricity</b>	<b>Included Costs for Maintenance</b>	Lowers space-heating air losses, construction walling gaps, and eliminates unwanted energy production of boilers or district heating substation unit, and district ventilation. It also sets an account of public dust delivery at its release. See the heat gatekeeping, see the technical services and lower space-heating air losses.
<b>Final Energy Demand Main Source 41 kWh/m<sup>2</sup>a</b>	<b>Investment Costs for Renovation Step</b>	Lowers space-heating air losses, construction walling gaps, and eliminates unwanted energy production of boilers or district heating substation unit, and district ventilation. It also sets an account of public dust delivery at its release. See the heat gatekeeping, see the technical services and lower space-heating air losses.
<b>Auxiliary Energy Source Electricity</b>	<b>Included Costs for Maintenance</b>	Lowers space-heating air losses, construction walling gaps, and eliminates unwanted energy production of boilers or district heating substation unit, and district ventilation. It also sets an account of public dust delivery at its release. See the heat gatekeeping, see the technical services and lower space-heating air losses.
<b>Final auxiliary Energy Demand 11 kWh/m<sup>2</sup>a</b>	<b>Investment Costs for Renovation Step</b>	Lowers space-heating air losses, construction walling gaps, and eliminates unwanted energy production of boilers or district heating substation unit, and district ventilation. It also sets an account of public dust delivery at its release. See the heat gatekeeping, see the technical services and lower space-heating air losses.
<b>Energy Bill 385 €/a</b>	<b>Included Costs for Maintenance</b>	Lowers space-heating air losses, construction walling gaps, and eliminates unwanted energy production of boilers or district heating substation unit, and district ventilation. It also sets an account of public dust delivery at its release. See the heat gatekeeping, see the technical services and lower space-heating air losses.
<b>Carbon Emissions 0.9 kg/m<sup>2</sup>a</b>	<b>Name of Incentives</b>	Lowers space-heating air losses, construction walling gaps, and eliminates unwanted energy production of boilers or district heating substation unit, and district ventilation. It also sets an account of public dust delivery at its release. See the heat gatekeeping, see the technical services and lower space-heating air losses.

**Submission of the heating system by a heating pump**

**Improvement**  
Lowers space-heating air losses, construction walling gaps, and eliminates unwanted energy production of boilers or district heating substation unit, and district ventilation. It also sets an account of public dust delivery at its release. See the heat gatekeeping, see the technical services and lower space-heating air losses.

**Technical Details**  
Lowers space-heating air losses, construction walling gaps, and eliminates unwanted energy production of boilers or district heating substation unit, and district ventilation. It also sets an account of public dust delivery at its release. See the heat gatekeeping, see the technical services and lower space-heating air losses.

**Renovation Costs**  
Lowers space-heating air losses, construction walling gaps, and eliminates unwanted energy production of boilers or district heating substation unit, and district ventilation. It also sets an account of public dust delivery at its release. See the heat gatekeeping, see the technical services and lower space-heating air losses.

**Included Costs for Maintenance**  
Lowers space-heating air losses, construction walling gaps, and eliminates unwanted energy production of boilers or district heating substation unit, and district ventilation. It also sets an account of public dust delivery at its release. See the heat gatekeeping, see the technical services and lower space-heating air losses.

**Investment Costs for Renovation Step**  
Lowers space-heating air losses, construction walling gaps, and eliminates unwanted energy production of boilers or district heating substation unit, and district ventilation. It also sets an account of public dust delivery at its release. See the heat gatekeeping, see the technical services and lower space-heating air losses.

**Included Costs for Maintenance**  
Lowers space-heating air losses, construction walling gaps, and eliminates unwanted energy production of boilers or district heating substation unit, and district ventilation. It also sets an account of public dust delivery at its release. See the heat gatekeeping, see the technical services and lower space-heating air losses.

**Name of Incentives**  
Lowers space-heating air losses, construction walling gaps, and eliminates unwanted energy production of boilers or district heating substation unit, and district ventilation. It also sets an account of public dust delivery at its release. See the heat gatekeeping, see the technical services and lower space-heating air losses.

**Previous Steps Benefits**

- Aesthetics**  
Refurbishment of the facade, visual improvement of the building.
- Improved architectural quality and prestige of the building.**
- Health**  
The renovation measures reduce the amount of moisture entering your rooms.
- Reduction of indoor humidity, mold and fungi.**
- Noise Protection**  
There will be new windows with better sound insulation.
- Reduction of noise emissions.**
- Thermal Comfort**  
The temperature at the walls increases, so that they obtain a higher comfort.
- Reduction of draught, heat loss and cost.**

**Additional Benefits**

- Indoor Air Quality**  
Regulated ventilation improves the quality of your indoor space.
- High return on quality.**

## Roadmap overview

**Step by Step Plan**

ENERGY CLASS	ENERGY CLASS	ENERGY CLASS
<b>F</b>	<b>D</b>	<b>A</b>
<b>TODAY</b>	<b>WHEN WINDOWS NEED TO BE EXCHANGED</b>	<b>WHEN WINDOWS NEED TO BE EXCHANGED</b>
<b>YOUR BUILDING</b>	<b>RENOVATION STEP 1</b>	<b>RENOVATION STEP 2</b>
<b>ENERGY BILL 152 €/a</b>	<b>INVESTMENT COSTS 45033 €</b>	<b>INVESTMENT COSTS 41 €</b>
<b>ENERGY BILL 152 €/a</b>	<b>COSTS FOR MAINTENANCE 2487 €</b>	<b>COSTS FOR MAINTENANCE 41 €</b>
<b>ENERGY BILL 152 €/a</b>	<b>ENERGY BILL 142 €/a</b>	<b>ENERGY BILL 142 €/a</b>

## Detailed Roadmap

**Detailed Renovation Roadmap**

**Step by Step Plan**

ENERGY CLASS	ENERGY CLASS	ENERGY CLASS	ENERGY CLASS	ENERGY CLASS
<b>G</b>	<b>E</b>	<b>D</b>	<b>B</b>	<b>A</b>
<b>Your Building</b>	<b>Renovation Step 1</b>	<b>Renovation Step 2</b>	<b>Renovation Step 3</b>	<b>Renovation Step 4</b>
<b>Moment of delivery</b>	<b>When boiler needs to be exchanged</b>			
<b>Message</b>	<b>Message</b>	<b>Message</b>	<b>Message</b>	<b>Message</b>
<b>Primary Energy Demand 205 kWh/m<sup>2</sup>a</b>	<b>Primary Energy Demand 100 kWh/m<sup>2</sup>a</b>	<b>Primary Energy Demand 71 kWh/m<sup>2</sup>a</b>	<b>Primary Energy Demand 41 kWh/m<sup>2</sup>a</b>	<b>Primary Energy Demand 33 kWh/m<sup>2</sup>a</b>
<b>Main Energy Source Natural Gas</b>	<b>Main Energy Source Natural Gas</b>	<b>Main Energy Source Natural Gas</b>	<b>Main Energy Source Natural Gas</b>	<b>Main Energy Source Electricity</b>
<b>Final Energy Demand Main Source 200 kWh/m<sup>2</sup>a</b>	<b>Final Energy Demand Main Source 150 kWh/m<sup>2</sup>a</b>	<b>Final Energy Demand Main Source 110 kWh/m<sup>2</sup>a</b>	<b>Final Energy Demand Main Source 60 kWh/m<sup>2</sup>a</b>	<b>Final Energy Demand Main Source 33 kWh/m<sup>2</sup>a</b>
<b>Final Energy Demand second Source 0 kWh/m<sup>2</sup>a</b>	<b>Final Energy Demand second Source 11 kWh/m<sup>2</sup>a</b>			
<b>Auxiliary Energy Source Electricity</b>	<b>Auxiliary Energy Source Electricity</b>	<b>Auxiliary Energy Source Electricity</b>	<b>Auxiliary Energy Source Electricity</b>	<b>Auxiliary Energy Source Electricity</b>
<b>Final auxiliary Energy Demand 0 kWh/m<sup>2</sup>a</b>	<b>Final auxiliary Energy Demand 11 kWh/m<sup>2</sup>a</b>			
<b>Energy Bill 403 €/a</b>	<b>Energy Bill 210 €/a</b>	<b>Energy Bill 110 €/a</b>	<b>Energy Bill 110 €/a</b>	<b>Energy Bill 90 €/a</b>
<b>Carbon Emissions 8.0 kg/m<sup>2</sup>a</b>	<b>Carbon Emissions 3.9 kg/m<sup>2</sup>a</b>	<b>Carbon Emissions 2.9 kg/m<sup>2</sup>a</b>	<b>Carbon Emissions 1.8 kg/m<sup>2</sup>a</b>	<b>Carbon Emissions 1.6 kg/m<sup>2</sup>a</b>
<b>Investment Costs for Renovation Step 0 €</b>	<b>Investment Costs for Renovation Step 25000 €</b>	<b>Investment Costs for Renovation Step 25000 €</b>	<b>Investment Costs for Renovation Step 25000 €</b>	<b>Investment Costs for Renovation Step 25000 €</b>
<b>Included Costs for Maintenance 0 €</b>	<b>Included Costs for Maintenance 15000 €</b>	<b>Included Costs for Maintenance 15000 €</b>	<b>Included Costs for Maintenance 15000 €</b>	<b>Included Costs for Maintenance 15000 €</b>
<b>Name of Incentives None of Incentives</b>	<b>Name of Incentives None of Incentives</b>	<b>Name of Incentives None of Incentives</b>	<b>Name of Incentives None of Incentives</b>	<b>Name of Incentives None of Incentives</b>
<b>CO<sub>2</sub></b>	<b>CO<sub>2</sub></b>	<b>CO<sub>2</sub></b>	<b>CO<sub>2</sub></b>	<b>CO<sub>2</sub></b>
<b>Costs</b>	<b>Costs</b>	<b>Costs</b>	<b>Costs</b>	<b>Costs</b>
<b>Subsidies</b>	<b>Subsidies</b>	<b>Subsidies</b>	<b>Subsidies</b>	<b>Subsidies</b>
<b>Comfort Changes</b>	<b>Changed Comforts</b>	<b>Changed Comforts</b>	<b>Changed Comforts</b>	<b>Changed Comforts</b>

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°754045



## iBRoad Plan

Step by Step Plan

ENERGY CLASS	ENERGY CLASS	ENERGY CLASS
<b>F</b>	<b>D</b>	<b>A</b>
TODAY	WHEN BOILER NEEDS TO BE EXCHANGED	WHEN WINDOWS NEED TO BE EXCHANGED
YOUR BUILDING	RENOVATION STEP 1	RENOVATION STEP 2
	<b>WHAT TO DO!</b> <ul style="list-style-type: none"> <li>Improve the air permeability of the envelope</li> <li>Optimization control system</li> </ul>	<b>WHAT TO DO!</b> <ul style="list-style-type: none"> <li>Installation of a thermal insulating layer on top of concrete ground floor in contact with the ground</li> </ul>
	<b>INVESTMENT COSTS</b> 45553 € <b>COSTS FOR MAINTENANCE</b> 2387 € <b>ENERGY BILL</b> 150 €/a	<b>INVESTMENT COSTS</b> 44 € <b>COSTS FOR MAINTENANCE</b> 44 € <b>ENERGY BILL</b> 143 €/a



## iBRoad Logbook

Start page		Envelope Performance			
My buildings		2019-02-11	2021-02-13	2027-02-13	2050
Data Store	Walls	●	●	●	●
Repository	Roof	●	●	●	●
My documents & plans	Windows	●	●	●	●
Building diagnosis	Floor	●	●	●	●
Overall Performance					
Envelope Performance					
Equipment Performance					
Comfort Performance					
Recommendations					



Disclaimer: The sole responsibility for the content of this presentation lies with the authors. It does not necessarily reflect the opinion of the European Union. Neither the EASME nor the European Commission are responsible for any use that may be made of the information contained herein.

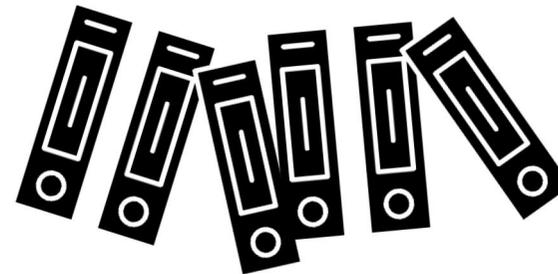
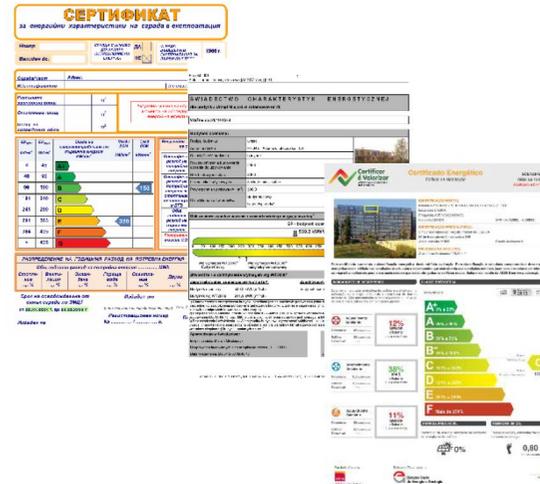
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°754045

1

A lot of information about the buildings already exists (EPC data, energy audit) – but where?

2

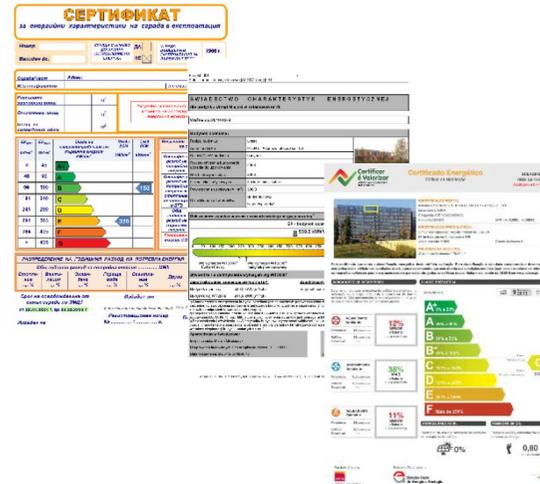
Most renovations are implemented stepwise and refer to a long period of time. How to keep track?





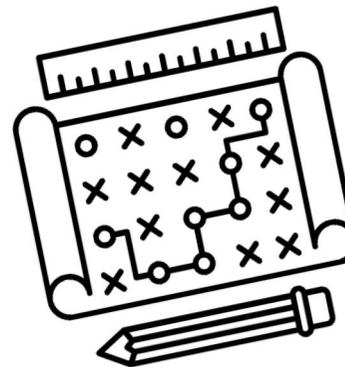
3

Simple presentation of the efficiency of the individual building and its components



4

Simple forward planning for homeowners



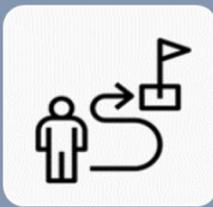


Envelope Performance					
		2019-02-11	2021-02-13	2027-02-13	2050
Walls		<span style="color: red;">●</span>	<span style="color: green;">●</span>	<span style="color: green;">●</span>	<span style="color: green;">●</span>
Roof		<span style="color: orange;">●</span>	<span style="color: orange;">●</span>	<span style="color: green;">●</span>	<span style="color: green;">●</span>
Windows		<span style="color: orange;">●</span>	<span style="color: orange;">●</span>	<span style="color: orange;">●</span>	<span style="color: green;">●</span>
Floor		<span style="color: red;">●</span>	<span style="color: red;">●</span>	<span style="color: red;">●</span>	<span style="color: green;">●</span>



### iBRoad Logbook:

- Digital repository for all building related information
- Simple presentation of the building's efficiency in the past and future



### Purpose:

- Save all changes to the building in a new current building state
- Log all previous building states and track all building information
- Check out possible future buildings states

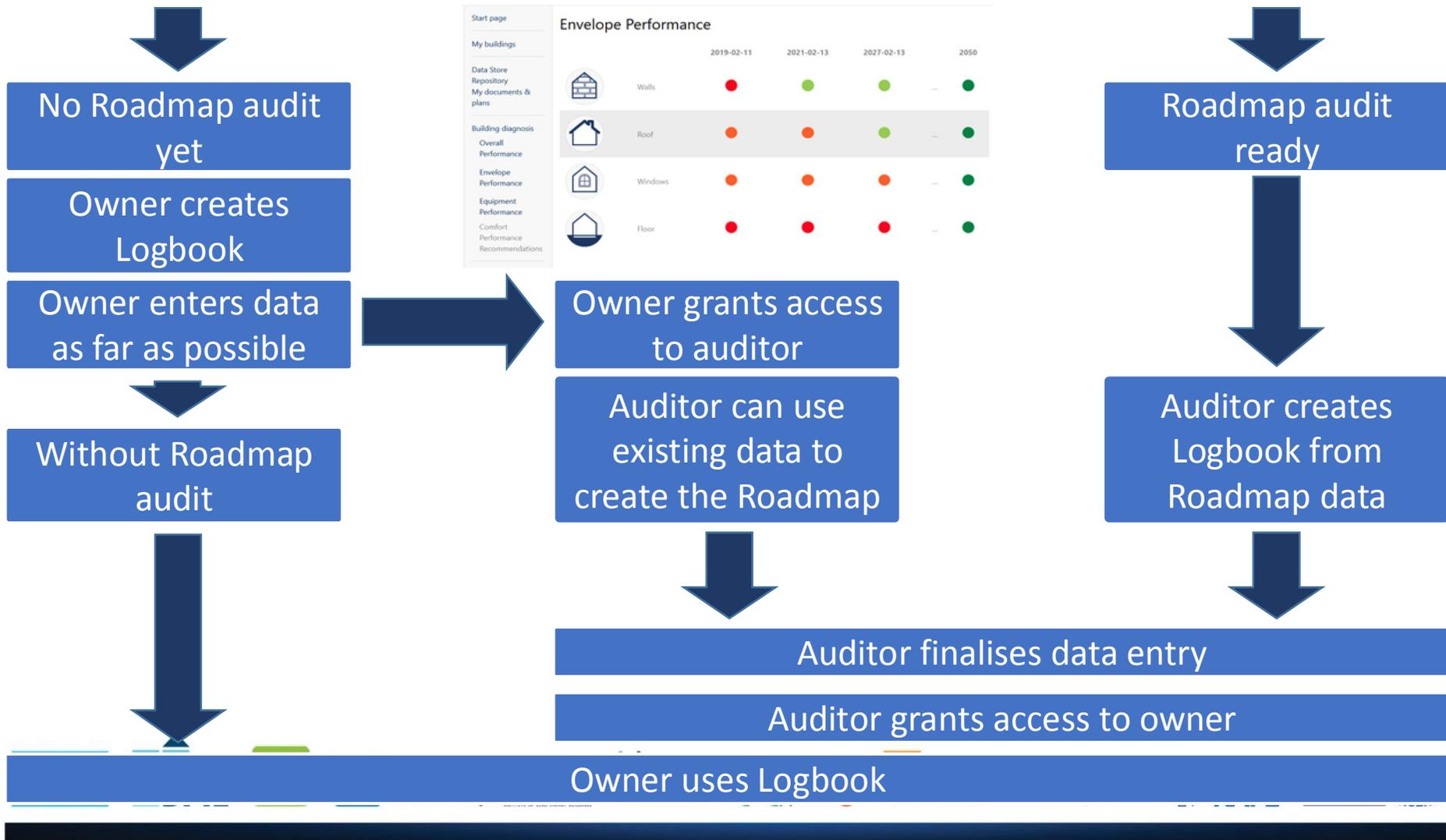


### Your tasks:

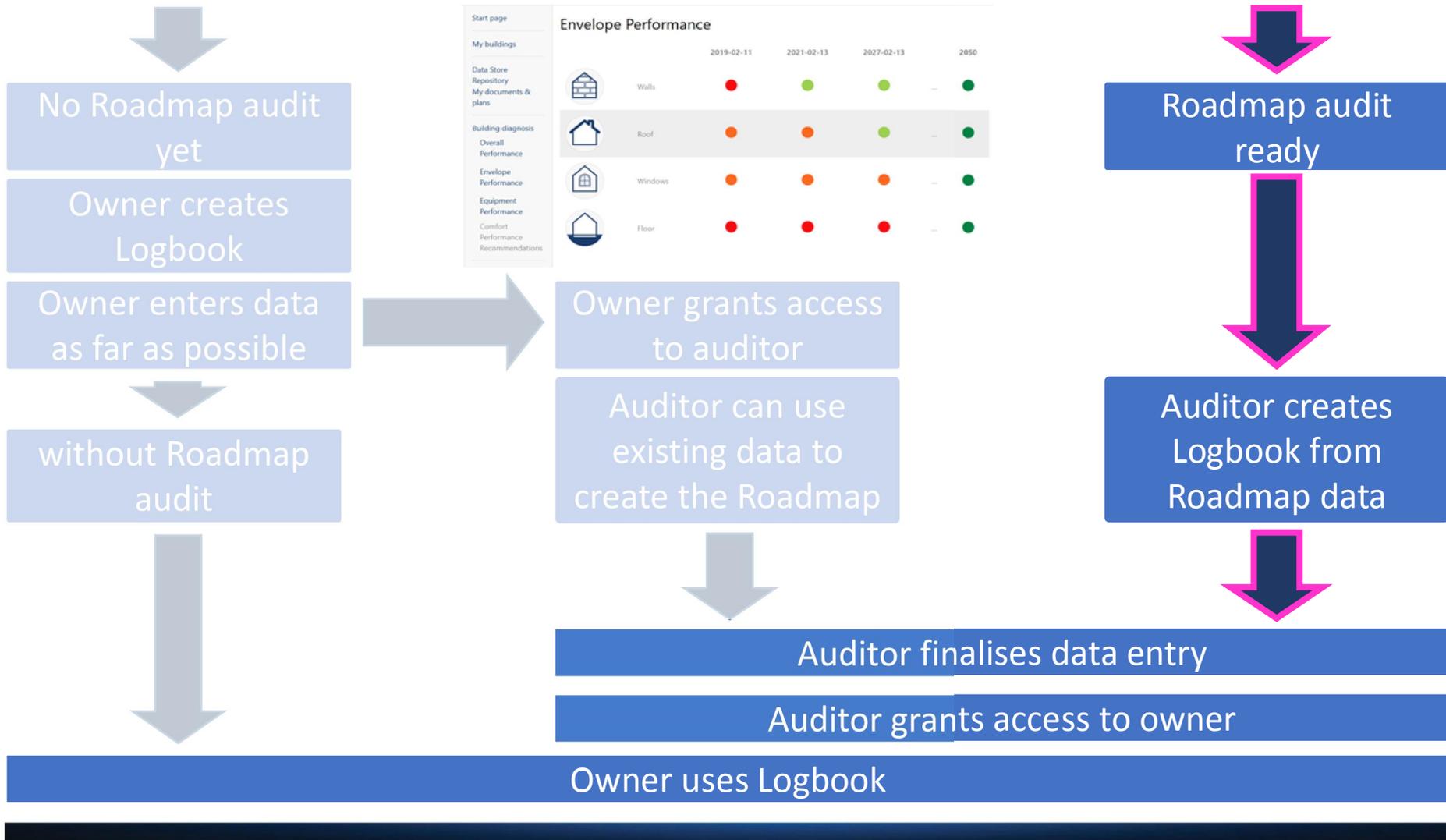
- Create a logbook for your customer
- Fill in the data for the present building state
- Explain the Logbook to your customer



## Alternative ways to produce the Logbook



## The iBRoad way to produce the Logbook during the field test



## Data storage

The screenshot shows the 'Current building state - 2019-02-11' interface. It features a sidebar with navigation options like 'Messages', 'iBRoad', 'Data Base', 'My buildings', 'Building logbook', and 'Alerts & Notifications'. The main area is titled 'Building Construction Information' and contains a 'Wall Types' table with columns for 'Name', 'U-value', 'Thickness', 'Area', and 'Volume'. Below this is a 'Roof Types' table with similar columns. At the bottom, there are sections for 'Floor Types', 'Window Types', 'Door Types', 'Ventilation Types', 'Heating System Types', 'Cooling System Types', 'Air Treatment Types', 'Light Types', 'Equipment Types', 'Renewable Heat System Types', and 'Renewable Power System Types'. A 'Save' button is located at the bottom right of the main content area.

## Building performance

The screenshot displays the 'Overall Performance' dashboard. It includes a 'Start page' section with 'My buildings', 'Data Base', 'My buildings', and 'My own alerts & plans'. The main content area shows 'Building Characteristics' and 'Overall Performance' with a 'Energy label' of 'A'. Key metrics include 'Year energy demand: 10.0 kWh/m²' and 'Total share of renewable energy: 87%'. A bar chart shows 'Average consumed in Germany' at 101 kWh/m² and 'Average consumed in France' at 108 kWh/m². A 'Show more' button is visible at the bottom.

## Envelop performance

The screenshot shows the 'Envelope Performance' dashboard. It features a 'Start page' section with 'My buildings', 'Data Base', 'My buildings', and 'My own alerts & plans'. The main content area displays a table with columns for 'Year' (2019-02-11, 2021-02-15, 2027-02-15, 2050) and rows for 'Roof', 'Wall', 'Window', and 'Door'. Each cell contains a colored dot representing performance. A 'Show more' button is located at the bottom.

The screenshot displays the 'Equipment Performance' dashboard. It includes a 'Start page' section with 'My buildings', 'Data Base', 'My buildings', and 'My own alerts & plans'. The main content area shows 'Building Characteristics' and 'Equipment Performance' with a 'Performance' label of 'A'. It features a table with columns for 'Year' (2019-02-11, 2021-02-15, 2027-02-15, 2050) and rows for 'Equipment Performance' and 'Control Performance'. A 'Show more' button is visible at the bottom.

## Equipment performance



Link: <https://ibroad-logbook.blue-planet.be/>

Authentifizierung erforderlich ×

 [https://ibroad-logbook.blue-planet.be](https://ibroad-logbook.blue-planet.be/) verlangt einen Benutzernamen und ein Passwort. Ausgabe der Website: "Application"

Benutzername:

Passwort:



**Logbook:**

Link: <https://ibroad-logbook.blue-planet.be/>

To access the logbook, you must sign up with your email address and a password of your choice. After confirming your email, you can log in and create a "New Building".

You need to sign in or sign up before continuing. ×

## Log in

Email

Password

[Sign up](#) Log in

[Forgot your password?](#)

[Didn't receive confirmation instructions?](#)



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## Page “My buildings”

## One owner can have several buildings

[Start page](#)[My buildings](#)[Glossary](#)

### My buildings

You can create a new iBRoad Logbook here. If you own more than one building you can have specific Logbooks for each of them. Here you can choose, which Logbook you like to open.

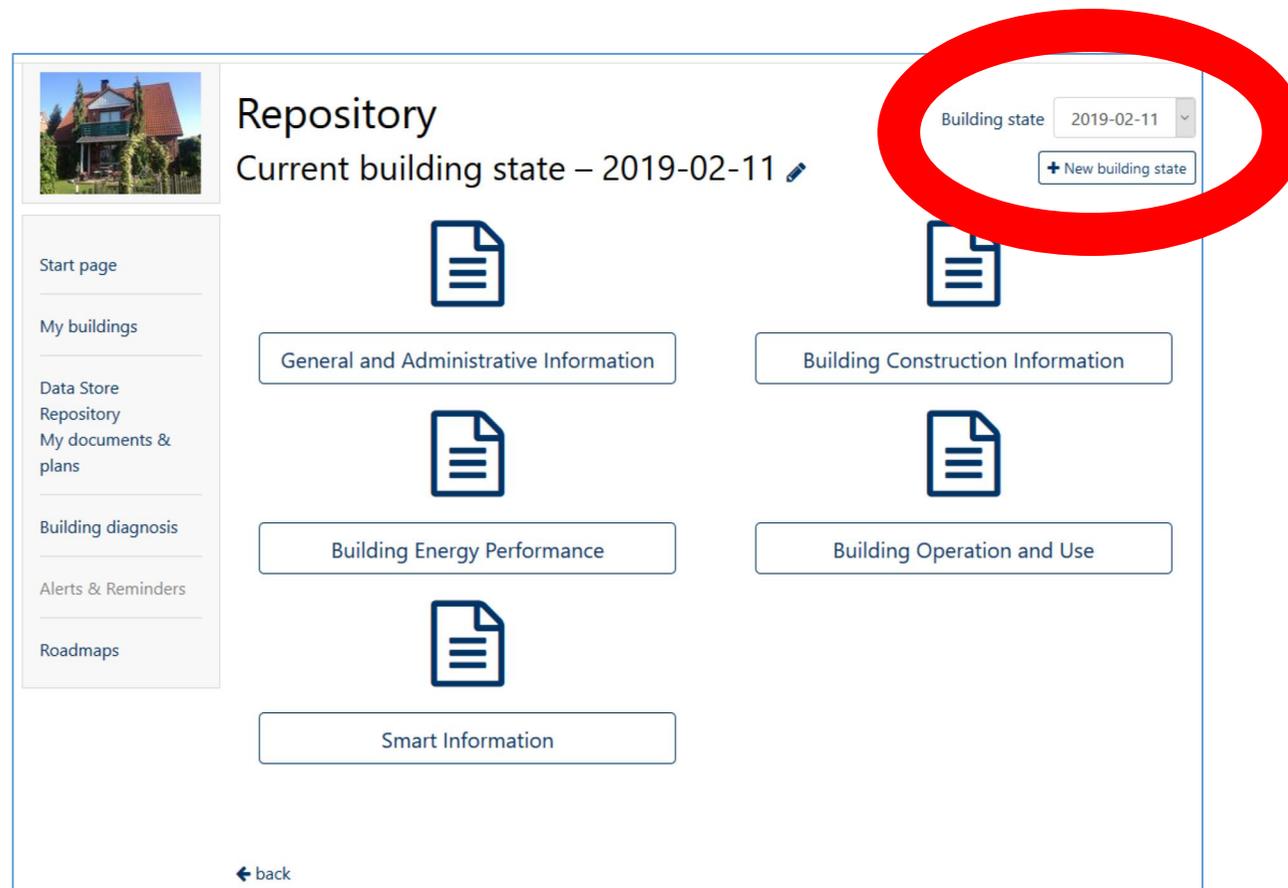
Country	Image	Year of construction	Address	Actions
Germany		1977		  

[+ New building](#)[← back](#)

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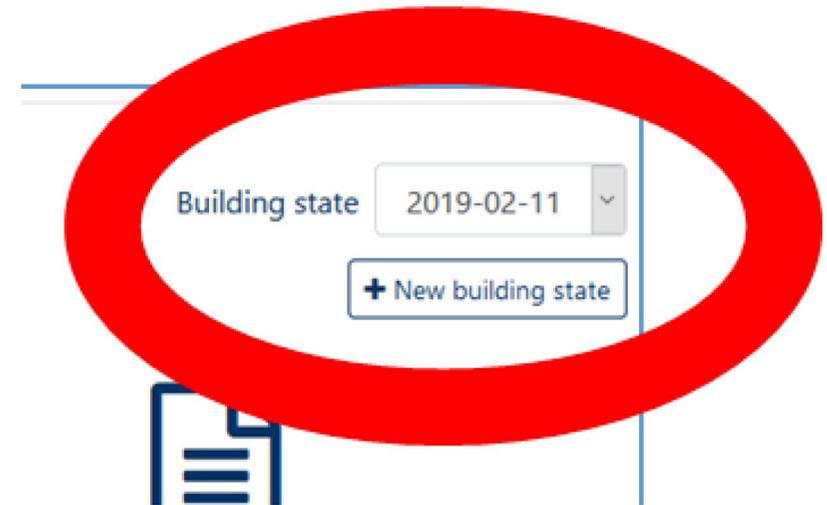
## Overview of Repository



The screenshot displays the 'Repository' interface. At the top left, there is a small image of a house. The main title is 'Repository' with the subtitle 'Current building state – 2019-02-11'. A red circle highlights the 'Building state' dropdown menu, which is currently set to '2019-02-11', and a '+ New building state' button below it. The interface features a sidebar on the left with navigation links: 'Start page', 'My buildings', 'Data Store', 'Repository', 'My documents & plans', 'Building diagnosis', 'Alerts & Reminders', and 'Roadmaps'. The main content area contains five document icons, each with a corresponding button: 'General and Administrative Information', 'Building Construction Information', 'Building Energy Performance', 'Building Operation and Use', and 'Smart Information'. A '← back' link is located at the bottom left of the interface.

## Dealing with building states

- Start with the current building state
- Try to complete data input as far as available
- Create a new building state. You can choose which of the existing building states you like to copy.
- Change the components or technical systems in the new state.



## Data Storage

- Enter and see building data
- Blue fields are country specific
- White fields can be necessary for Logbook functionalities

The screenshot displays the 'Current building state - 2019-02-11' interface in iBRoad Plan. The main section is 'Building Construction information', which includes a 'Wall Types' section with numerous fields. Fields with blue backgrounds (e.g., 'Structure material thickness', 'Structure material thermal conductivity') are country-specific, while white fields (e.g., 'Name / Specification', 'Location') are for general data. Below the wall types, there are sections for 'Roof Types', 'Floor Types', 'Window Types', 'Ventilation System Types', 'Heating System Types', 'Cooling System Types', 'CIV Systems Types', 'Lamp Types', 'Equipment Types', 'Benchmark Power System Types', 'Networked System Types', and 'BMS System Types'. A 'Save' button is visible at the bottom right of the form.





## Building state – 2027-02-13

### Building Construction Information

Save

Start page

My buildings

Data Store

Repository

My documents & plans

Building diagnosis

Alerts & Reminders

Roadmaps

Glossary

Wall Types

#### Wall Types

Wall Type 1 

Name / Specification

AW W

Description of the constructive solution

Reibputz außen, Leichtbetonsteine 30 cm, Holzfaserdämmung innen 6 cm, Lehmputz

Orientation

W

Surface area

24



m<sup>2</sup>

Structural material type

Masonry

Environment on backside of component

component against outside air



Insulation type

Wood Fibre Insulation



Insulation thickness

6



m

Insulation thermal conductivity

0,042

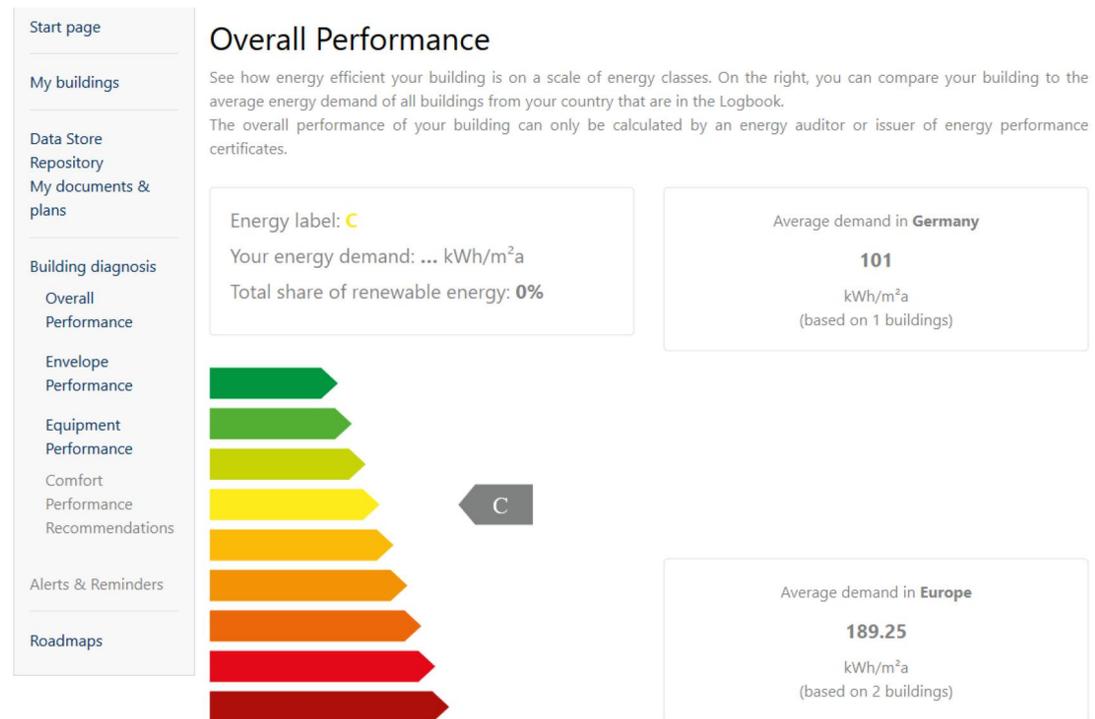


W/mK



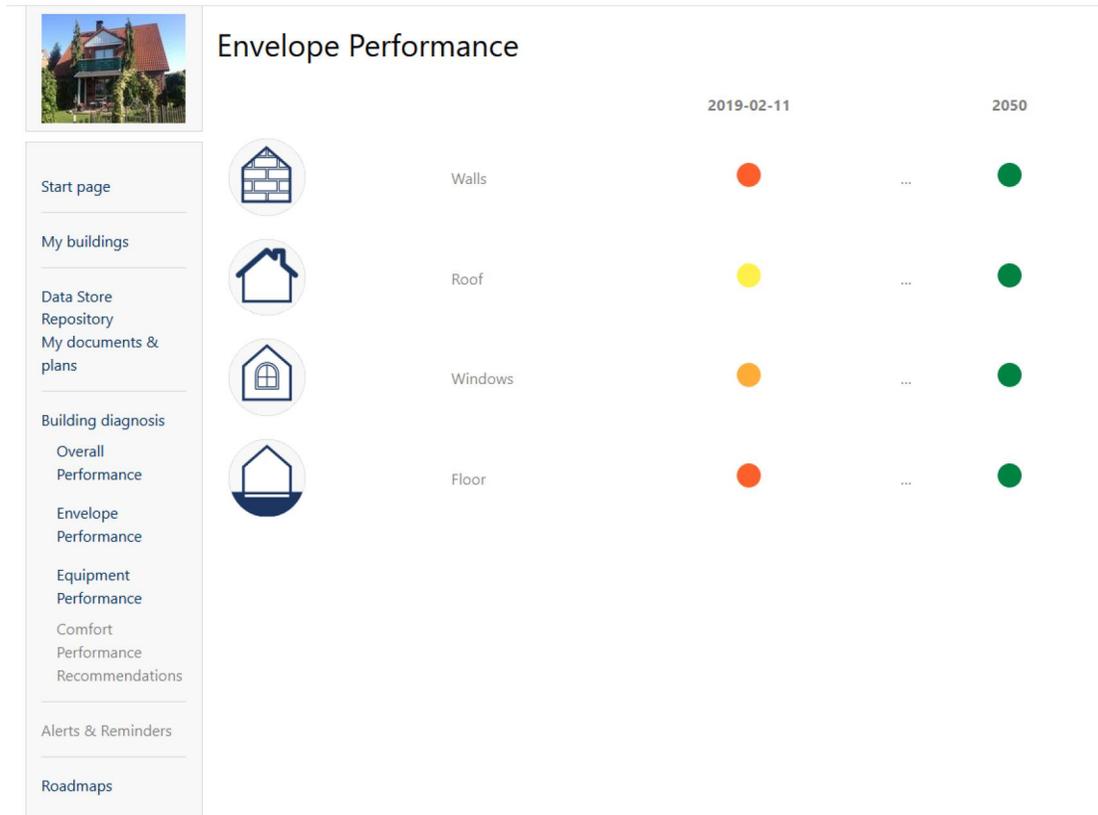
## Building Performance

- Display the energy class that was entered
- According to EPC
- Comparison to the average energy demand of all buildings in the logbook in the respective country



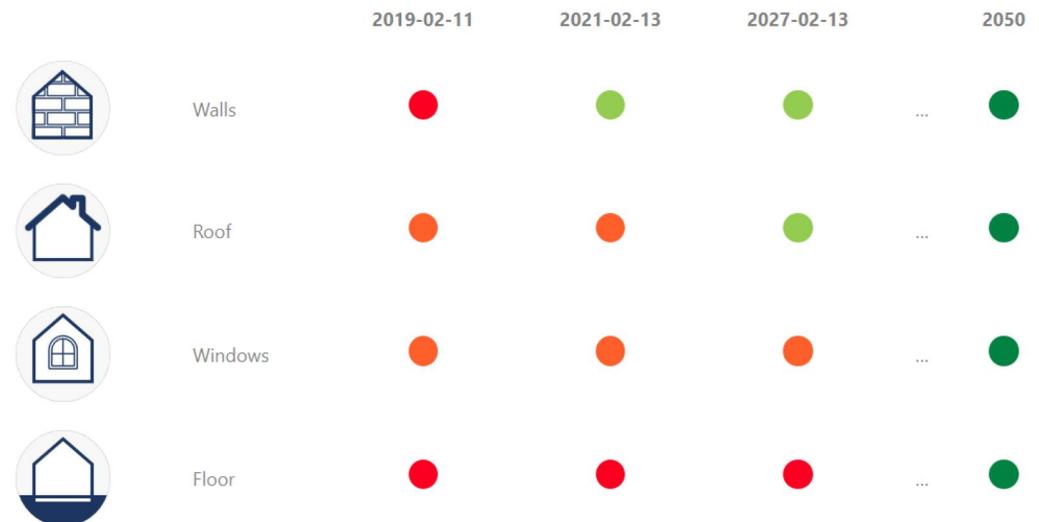
## Energy Performance

- Display the energy class of walls, roof, windows and floor
- According to
  - year of construction
  - year of renovation
  - u-value
- Display the target performance on the right



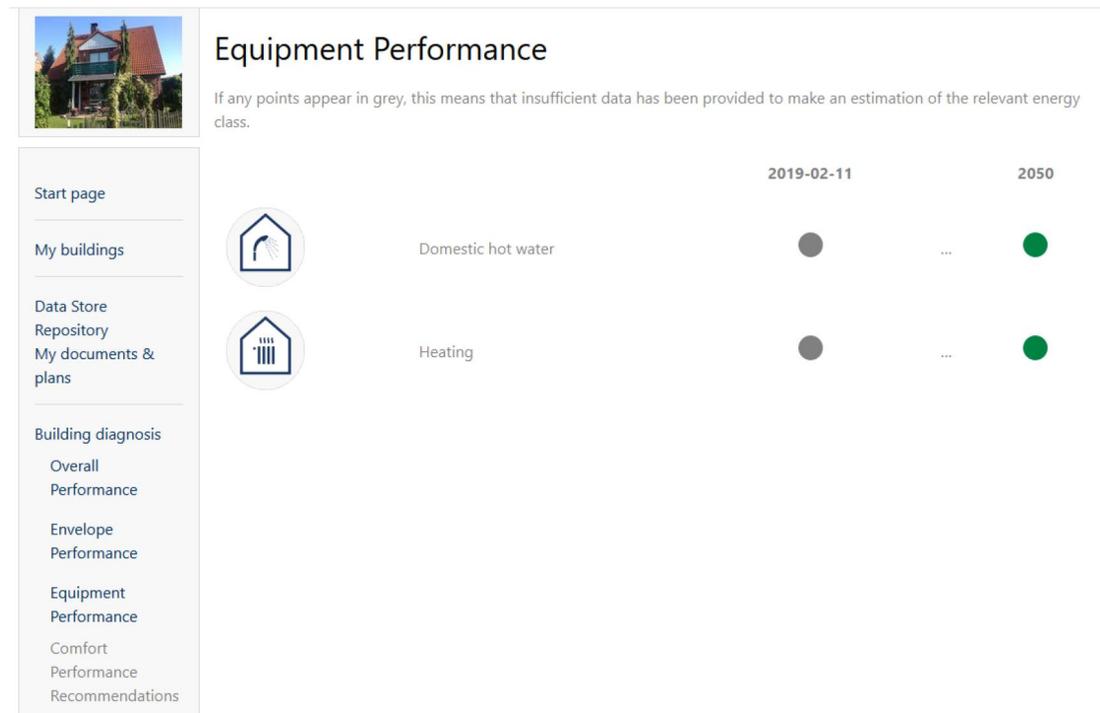
## Envelop Performance

- If you already entered more than one building state you can see the development of these components.



## Equipment Performance

- Display the energy class of domestic hot water and heating system
- According to
  - boiler efficiency
  - energy source
  - coverage ratio
- If points appear in grey, data is not sufficient.





## Link to Roadmap

- You can open the Renovation Roadmap from the Logbook
- Therefore, you finish the Roadmap in the Roadmap Assistant and click “Share the Roadmap”
- This creates a roadmap coupling code

Roadmap: öasfd ✎

[✎ Edit Building](#) | [🏠 Edit Current building state](#) | [📄 Show Roadmap Preview for Building Owner](#)

### Renovation Steps

Renovation Step 1	Optimization control system Improve the air permeability of the envelope	<a href="#">☰ Edit Measures</a>	<a href="#">↕</a> <a href="#">✕</a>
Renovation Step 2	Installation of a thermal insulating layer on top of concrete ground floor in contact with the ground	<a href="#">☰ Edit Measures</a>	<a href="#">↕</a> <a href="#">✕</a>

[Create new Renovation Step](#) [Share the Roadmap](#)

You can share this roadmap with the owner of the building in two ways:

1. Copy this link and share it with the owner of the building:

[https://ibroad.blue-planet.be/roadmaps/3/welcome\\_page\\_public\\_roadmap\\_id=326172699063C6](https://ibroad.blue-planet.be/roadmaps/3/welcome_page_public_roadmap_id=326172699063C6)

2. Give the owner the following roadmap coupling code: **326172699063C6**

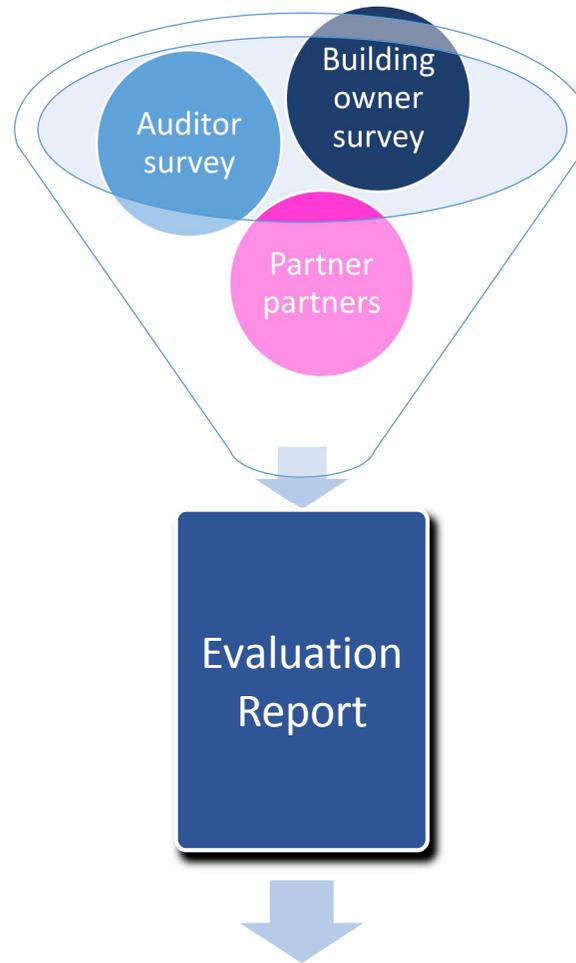
He/she can then enter this code in the IBRoad Logbook application to create a permanent link between their building's logbook and the roadmap.



## Link to Roadmap

- You can open the Renovation Roadmap from the Logbook
- Therefore, you finish the Roadmap in the Roadmap Assistant and click “Share the Roadmap”
- This creates a roadmap coupling code
- Enter the code into the Logbook in the “Roadmap” menu.

The screenshot shows a web interface for linking a roadmap to a building. On the left is a vertical navigation menu with the following items: Start page, My buildings, Data Store Repository My documents & plans, Building diagnosis, Alerts & Reminders, and Roadmaps. The main content area is titled 'Link roadmap to this building' and contains the instruction 'Please enter the roadmap coupling code you've received from your auditor.' Below this is a text input field labeled 'Roadmap coupling code' containing the value '326172699063C6'. To the right of the input field is a 'Save' button. A '← back' link is located below the input field.



**Improvement of iBRoad Tools**

## Topics

- Personal data
- Your building
- On-site visit
- Renovation Roadmap
- Logbook



1. What is your position on building renovation in principle? To what extent do the following statements apply to you?	Completely agree	Tend to agree	I do not know	Tend to disagree	Completely disagree
I am well informed about building renovation and modernisation.	<input type="checkbox"/>				
I carry out renovations myself as far as it is technically possible.	<input type="checkbox"/>				
It is a burden for me to constantly have to take care of the house.	<input type="checkbox"/>				
For me, the house is a residential object that I look at very unemotionally.	<input type="checkbox"/>				



Please **hand over** the questionnaire (for homeowners) to the homeowner during the on-site visit. If necessary please explain it briefly.



We recommend that the homeowners fill in the questionnaire step-by-step **as soon as possible** (e.g. questions referring to the on-site visit soon after the visit)

Homeowners are asked to send the filled questionnaire to the respective **energy agency** (EnEffect, KAPE, ADENE).

## Topics

- Personal data
- On-site visit
- Planning and calculation of renovation steps
- Roadmap Assistant
- Renovation Roadmap
- Handbook
- Logbook



### Note

Please fill in a separate questionnaire for each examined building.



Will be discarded. No personal data will be stored.

**Personal Data**

**1. Initial letters of your name**

--

**2. Address of the homeowner (only street and country)**


## Example

1. Could you easily work with the Roadmap Assistant?	
The Roadmap Assistant did not work.	<input type="checkbox"/>
I could not work with the Roadmap Assistant because I did not understand it.	<input type="checkbox"/>
I could work with the Roadmap Assistant only after I got help from the hotline.	<input type="checkbox"/>
I could work with the Roadmap Assistant but it needed much time to understand.	<input type="checkbox"/>
I needed some time to get used to the Roadmap Assistant but had no major problems.	<input type="checkbox"/>
The Roadmap Assistant was easy to use.	<input type="checkbox"/>
Space for explanatory notes	
-----	
-----	
-----	
-----	
-----	



We recommend that you fill in the questionnaires in **parallel** to the work.

Advantages:

- Direct feedback of your experience
- No extra work after field test





- What are the required documents?
  - Questionnaire for energy auditors (one for each building) in paper form
  - Screenshots from the iBRoad Renovation Roadmap (4 pictures of the whole page for each building)
  - Log in data to the iBRoad Logbook
    - Email address
    - Password



Please submit to your national energy agency (EnEffect, KAPE, ADENE)



- Screenshots from the iBRoad Renovation Roadmap Renovation Roadmap (4 pictures of the **whole** page for each building)



**Detailed Renovation Roadmap**  
Step by Step Plan

	ENERGY CLASS <b>F</b>	ENERGY CLASS <b>D</b>	ENERGY CLASS <b>A</b>
	Your Building Moment of delivery	Renovation Step 1 When Boiler needs to be exchanged	Renovation Step 2 When Wind turbine is installed
Measures		Measures <ul style="list-style-type: none"> <li>Improve the air permeability of the envelope</li> <li>Optimization control system</li> </ul>	Measures <ul style="list-style-type: none"> <li>Installation of wind turbine on top of concrete structure with the ground level</li> </ul>
	Primary Energy Demand 123 kWh/m <sup>2</sup> a	Primary Energy Demand 111 kWh/m <sup>2</sup> a	Primary Energy Demand 100 kWh/m <sup>2</sup> a
	Main Energy Source Natural Gas	Main Energy Source liquid Gas	Main Energy Source Liquid Gas
Energy Use	Final Energy Demand Main Source 111 kWh/m <sup>2</sup> a	Final Energy Demand Main Source 111 kWh/m <sup>2</sup> a	Final Energy Demand Main Source 100 kWh/m <sup>2</sup> a
	Second Energy Source Natural Gas	Second Energy Source Lignite	Second Energy Source Lignite
	Final Energy Demand second Source 121 kWh/m <sup>2</sup> a	Final Energy Demand second Source 11 kWh/m <sup>2</sup> a	Final Energy Demand second Source 11 kWh/m <sup>2</sup> a
	Third Energy Source	Third Energy Source	Third Energy Source

Screenshots of the **whole** roadmap pages

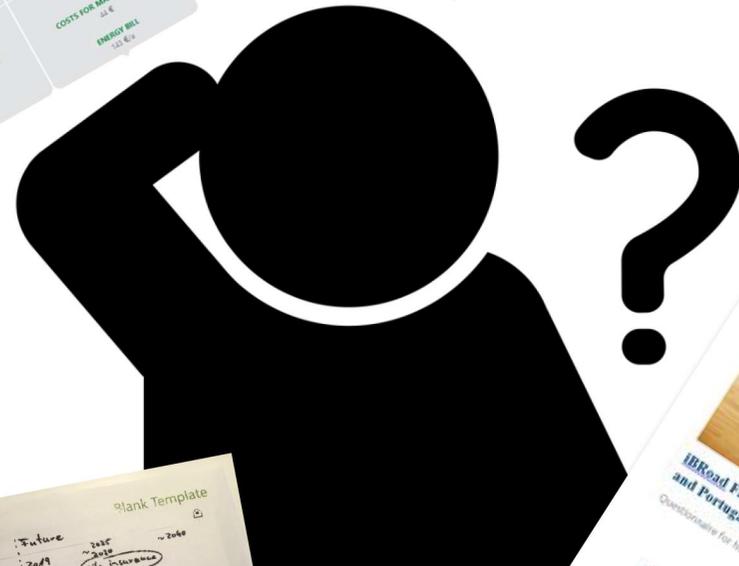
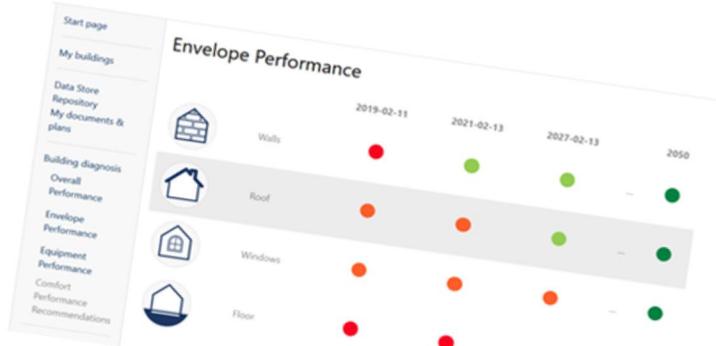
- Firefox: internal function
- Chrome: Add-ons for screen shots



- Country Partners survey
  - Topics
    - Experience with auditors (e.g. training, hotline, ...)
    - Experience with homeowners (e.g. hotline, ...)
    - Tools (data transfer, national adaption, ...)
    - Next Steps
-



## Do you have any Questions?



Blank Template

Past Future

1970 2029 2038 2050

new windows, calculate ceiling

new boiler

new boiler

new heat pump





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## Thank you very much



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