Individual Building Renovation Roadmaps

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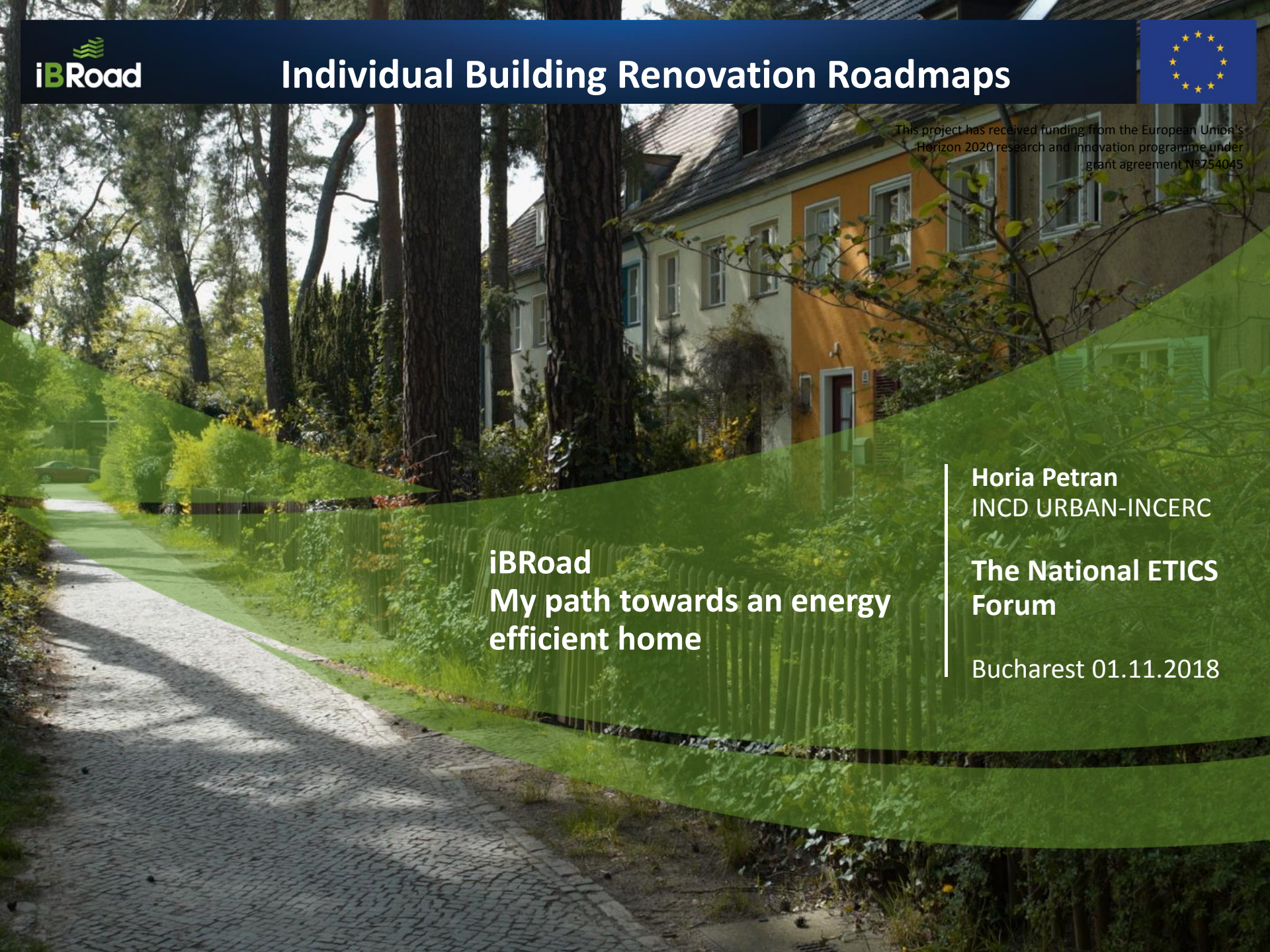

iBRoad
My path towards an energy efficient home

Horia Petran
INCD URBAN-INCERC

The National ETICS Forum

Bucharest 01.11.2018

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº754045

THE CHALLENGE

About half of Europe's buildings were built before 1975.

Less than 3% of EU buildings' Energy Performance Certificates (EPCs) are label A or higher.

The building stock renovation rate in the EU is only about 1% today; 80% of current buildings will still be around in 2050.

Therefore, we need to "deep renovate" existing buildings, aiming at Nearly Zero-Energy Buildings (NZEBs).

The Renovate Europe campaign's ambition is to reduce the energy consumption of the building stock by 80% by 2050.

Similarly ambitious targets are reflected in the revised EPBD with a clear vision for a decarbonised building stock by 2050!

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THE CHALLENGE

Residential buildings correspond to 2/3 of EU's building stock final energy consumption.

Renovating a home is complex and time consuming. There is lack of knowledge about what to do and in which order.

The main trigger for renovation is often other than energy efficiency. Building owners' / tenants' requirements are multiple:

- ✓ Thermal comfort (summer & winter)
- ✓ Indoor Air Quality
- ✓ Visual comfort
- ✓ Acoustic comfort
- ✓ Ergonomics & aesthetics
- ✓ Low energy costs
- ✓ Real estate value
- ✓ Privacy / Safety / Security

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CHALLENGES

- Non access to finance
- Non access to finance
- Market fragmentation
- Various
- Need for education and training
- Various
- Various
- Various

POTENTIAL SOLUTIONS

- Aggregation / Bundling
- **Step-by-step renovation**
- One-Stop Shops – BetterHome DK
- Mass customisation – Energiesprong
- BUILD UP Skills / Construction Skills
- Building Information Modelling (BIM)
- **Building Renovation Passports**
- Other market innovations (technical, financial, etc.), e.g. “energy efficient mortgage” – EeMAP

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PROPOSED SOLUTION – iBRoad

iBRoad works on lifting barriers to renovation by developing an **Individual Building Renovation Roadmap for single-family houses**. This tool looks at the building as a whole, and provides a customised step-by-step renovation plan (iBRoad-Plan) over a long-term horizon (15-20 years).

The plan is supported by a logbook (iBRoad-Log), a repository of all information available about the building.

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PROJECT TASKS

Explore the principles of the Individual Building Renovation Roadmap – Analyse existing examples from Germany, France and Belgium (Flanders).

Develop modules and key approaches of iBRoad

Design and test national implementation of iBRoad supported by auditor training – in Bulgaria, Poland, Portugal and Germany.

Analyse the replicability and feasibility of iBRoad in the EU

Engage Stakeholders

Communicate and Disseminate project results

CURRENT APPLICATIONS

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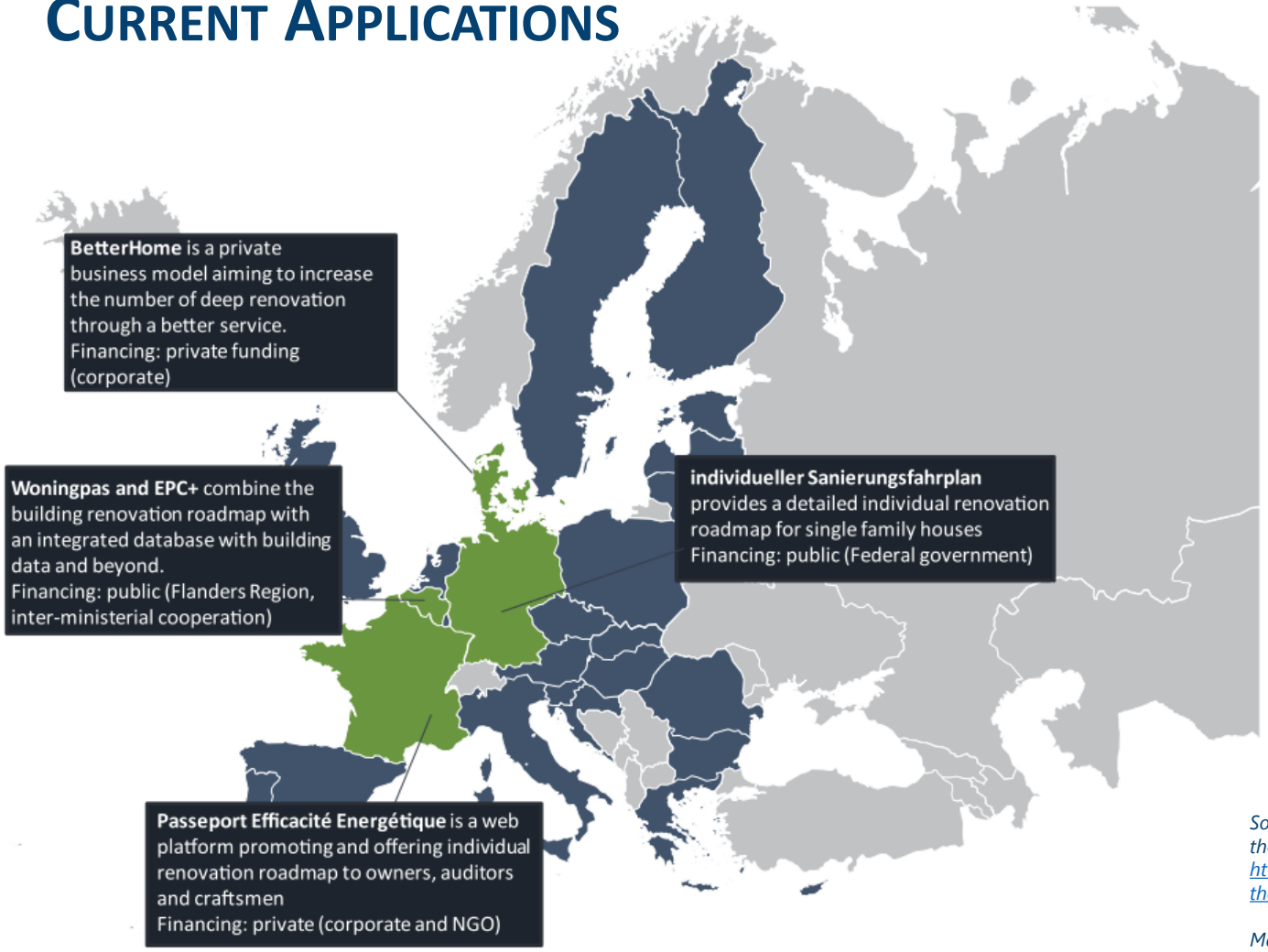

Source: iBRoad project report "The Concept of the Individual Building Renovation Roadmap" https://ibroad-project.eu/news/the-concept-of-the-individual-building-renovation-roadmap/

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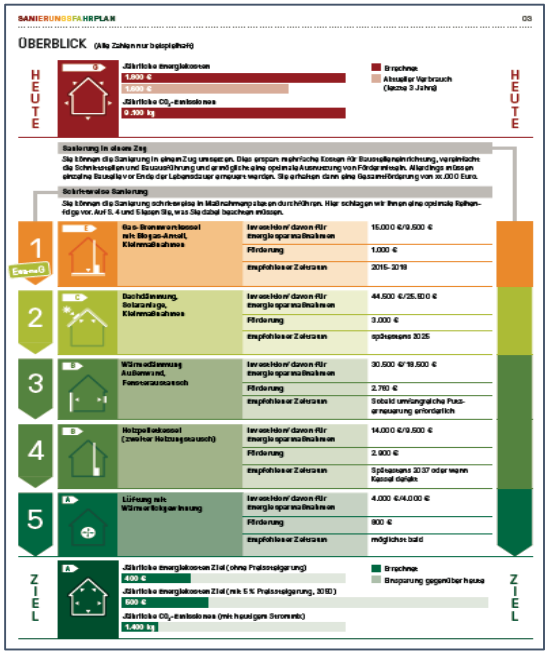
POTENTIAL SOLUTIONS – BUILDING RENOVATION PASSPORTS

DEEP AND QUALITATIVE RENOVATION

HOLISTIC RENOVATION PROCESS

Source: Energiesprong

BUILDING RENOVATION ROADMAP



Source: ifeu

THE BUILDING RENOVATION PASSPORT CONCEPT

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INFORMATION AT INDIVIDUAL BUILDING LEVEL

EXISTING ENERGY PERFORMANCE CERTIFICATE (EPC)

ON-SITE GATHERED INFORMATION

- Energy audit
- Building professionals, e.g. construction plan, info installations, BIM, etc.
- Building owner or tenant
- Public authorities

AUTOMATED DATA

- Smart meters
- Monitoring systems, e.g. RES, heating, CO_2 meters, etc.

BUILDING RENOVATION PASSPORT

RENOVATION ROADMAP

- Comprehensive audit
- Systematic renovation in a sensible order and packages
- Considers individual context
- Long-term perspective

LOGBOOK

- Inventory of building-related information
- Functionalities for users
- Beyond energy
- Linking building owners and users to third parties

Source: iBRoad project

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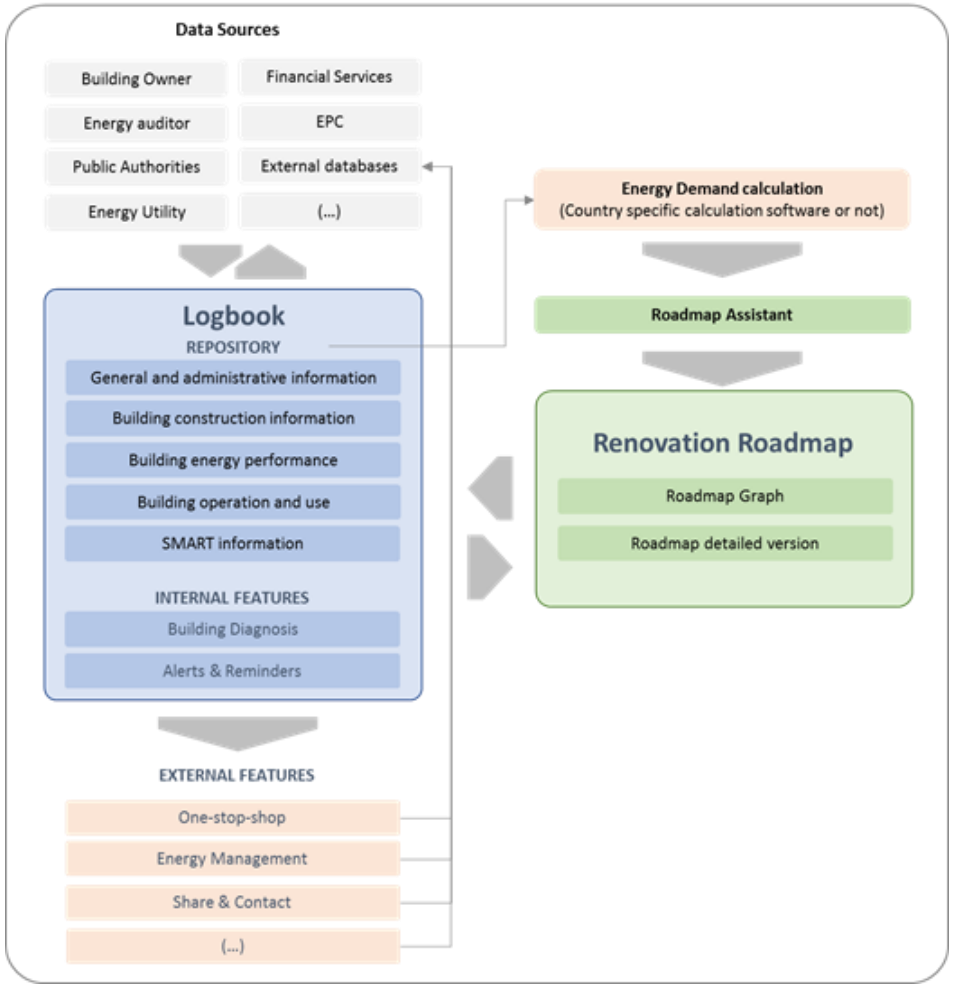
OVERVIEW OF THE iBRoad TOOLS – CONCEPT



Source: iBRoad project (Work in progress)

iBRoad-LOG OVERVIEW (1)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº754045

A - GENERAL AND ADMINISTRATIVE INFORMATION

General and **administrative Information** related to **the building/unit** characterization and its **user**

B - BUILDING CONSTRUCTION INFORMATION

Technical information and data related to the **building construction**

C - BUILDING ENERGY PERFORMANCE

Energy Information based on **EPC information** or other energy assessments

D - BUILDING OPERATION AND USE

Data and information on how the **building is operated**

E - SMART INFORMATION

Smart information related to the building

Source: iBRoad project report "The logbook data quest" https://ibroad-project.eu/news/the-logbook-data-quest/

iBRoad-LOG OVERVIEW (2)

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EU

EUROPEAN LEVEL Fixed structure: common European approach for Logbook data structure			NATIONAL/REGIONAL LEVEL Flexible structure: Logbook data structure adapted to each country context		
Level 0 (Modules)	**Level 1** (22 Topics)	**Level 2** (66 Sub-topics)	**Level 3** (Topic)	**Level 4** (Sub-Topics)	**Level n** (Sub-Topics)
A	8	18			
B	2	12			
C	4	23			
D	6	11			
E	3	4			

Country dependent

iBRoad-LOG OVERVIEW (3)

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iBROAD Logbook template (final version)

June, 2018

Information level

Text in dark blue: Core information

Text in red: Complementary information

What

What data will be mapped and how it will be organized

Country data structure:

EUROPEAN LEVEL	NATIONAL/REGIONAL LEVEL
(structure of information which represents a common european approach for the type of data collected under the Logbook) Fixed structure	*(structure of information related to the national specific data collected under the Logbook)* Flexible structure adapted to the national level

Who and Where

Who holds information and where is it stored

Who and How to access

Who can access information and how to do it

Owner of information; building owner;

Data protection

Issues related to Data Protection Regulation

EU Information level ID			NATIONAL Information level ID				Variable			Holder of information			Data for the iBroad		Confidentiality and Privacy	Validity	Availability
L0	L1	L2	L3	L4	L5	Ln	Code	Value	Unit	Holder name	Type of holder	Store location	Actor	Role			
A- GENERAL AND ADMINISTRATIVE INFORMATION																	
	1.Building ID	1. National code															
		2. Inspire ID															
		3. Energy suppliers ID															
	2.Address	1. Geo Coordinates															
		2. Address data															
	3. Property ID	1. Legal registration															
		2. Fiscal registration															
	4. Building general features	1. Building															
		2. Building Unit															
	5. Licences and Plans	1. Urban Licences															
		2. Design Plans and Designers															
	6. Conservation Status	1. Evaluation of the conservation status															
	7. Building User	1. Building user information															
		2. User profile															
	8. Other building information	1. Governmental taxes and incentives															
		2. Financial programs															
		3. Real estate information															
		4. Energy and Construction market															

A- GENERAL AND ADMINISTRATIVE INFORMATION

Descriptio General and administrative information related to the building/unit characterization and its users

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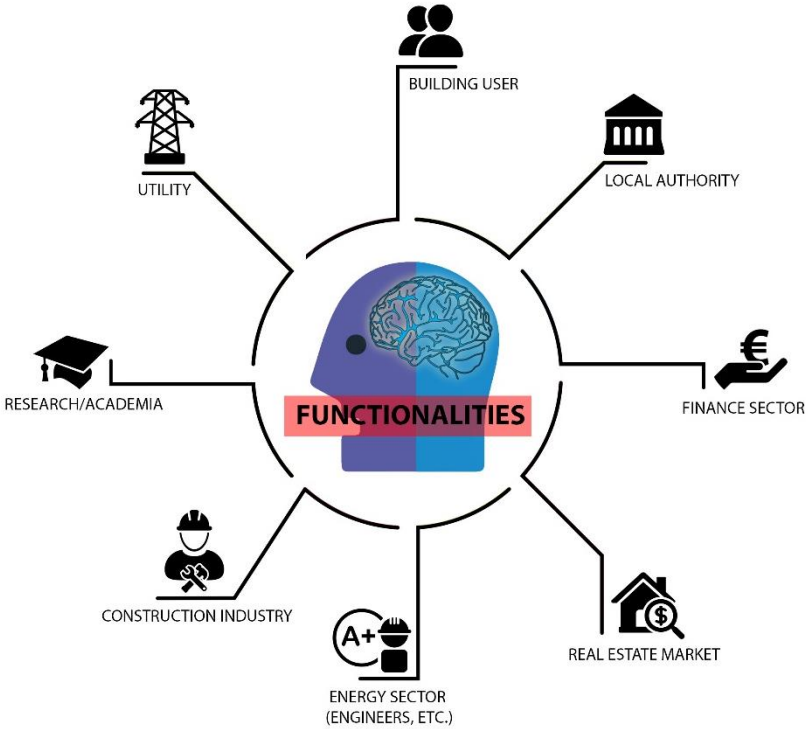

Stakeholders considered (source: ADENE)

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potential iBRoad-Log functionalities (source: ADENE)

iBRoad-PLAN OVERVIEW

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	2018 Your Building Today	2019 Renovation Step 1	2021 Renovation Step 2	2023 Renovation Step 3
	ENERGY CLASS G	ENERGY CLASS C	ENERGY CLASS B	ENERGY CLASS A
IMPROVEMENTS		PRIMARY ENERGY DEMAND (35) 100 kWh/m²a NAME OF ENERGY SOURCE (36) Gas NAME OF ENERGY AUX (38) Electricity FINAL ENERGY DEMAND (AUX) (39) 70 kWh/m²a CO_2-EMISSION (40) 40 kg/(m²a)	PRIMARY ENERGY DEMAND (35) 80 kWh/m²a NAME OF ENERGY SOURCE (36) Gas NAME OF ENERGY AUX (38) Electricity FINAL ENERGY DEMAND (AUX) (39) 65 kWh/m²a CO_2-EMISSION (40) 35 kg/(m²a)	PRIMARY ENERGY DEMAND (35) 30 kWh/m²a NAME OF ENERGY SOURCE (36) Biomass NAME OF ENERGY AUX (38) Electricity FINAL ENERGY DEMAND (AUX) (39) 22 kWh/m²a CO_2-EMISSION (40) 15 kg/(m²a)
CHARACTERISTICS	PRIMARY ENERGY DEMAND (35) 120 kWh/m²a NAME OF ENERGY SOURCE (36) Gas NAME OF ENERGY AUX (38) Electricity FINAL ENERGY DEMAND (AUX) (39) 90 kWh/m²a CO_2-EMISSION (40) 60 kg/(m²a)	PRIMARY ENERGY DEMAND (35) 100 kWh/m²a NAME OF ENERGY SOURCE (36) Gas NAME OF ENERGY AUX (38) Electricity FINAL ENERGY DEMAND (AUX) (39) 70 kWh/m²a CO_2-EMISSION (40) 40 kg/(m²a)	PRIMARY ENERGY DEMAND (35) 80 kWh/m²a NAME OF ENERGY SOURCE (36) Gas NAME OF ENERGY AUX (38) Electricity FINAL ENERGY DEMAND (AUX) (39) 65 kWh/m²a CO_2-EMISSION (40) 35 kg/(m²a)	PRIMARY ENERGY DEMAND (35) 30 kWh/m²a NAME OF ENERGY SOURCE (36) Biomass NAME OF ENERGY AUX (38) Electricity FINAL ENERGY DEMAND (AUX) (39) 22 kWh/m²a CO_2-EMISSION (40) 15 kg/(m²a)
PERFORMANCE	PRIMARY ENERGY DEMAND (35) 120 kWh/m²a NAME OF ENERGY SOURCE (36) Gas NAME OF ENERGY AUX (38) Electricity FINAL ENERGY DEMAND (AUX) (39) 90 kWh/m²a CO_2-EMISSION (40) 60 kg/(m²a)	PRIMARY ENERGY DEMAND (35) 100 kWh/m²a NAME OF ENERGY SOURCE (36) Gas NAME OF ENERGY AUX (38) Electricity FINAL ENERGY DEMAND (AUX) (39) 70 kWh/m²a CO_2-EMISSION (40) 40 kg/(m²a)	PRIMARY ENERGY DEMAND (35) 80 kWh/m²a NAME OF ENERGY SOURCE (36) Gas NAME OF ENERGY AUX (38) Electricity FINAL ENERGY DEMAND (AUX) (39) 65 kWh/m²a CO_2-EMISSION (40) 35 kg/(m²a)	PRIMARY ENERGY DEMAND (35) 30 kWh/m²a NAME OF ENERGY SOURCE (36) Biomass NAME OF ENERGY AUX (38) Electricity FINAL ENERGY DEMAND (AUX) (39) 22 kWh/m²a CO_2-EMISSION (40) 15 kg/(m²a)

Source: iBRoad project (Work in progress)

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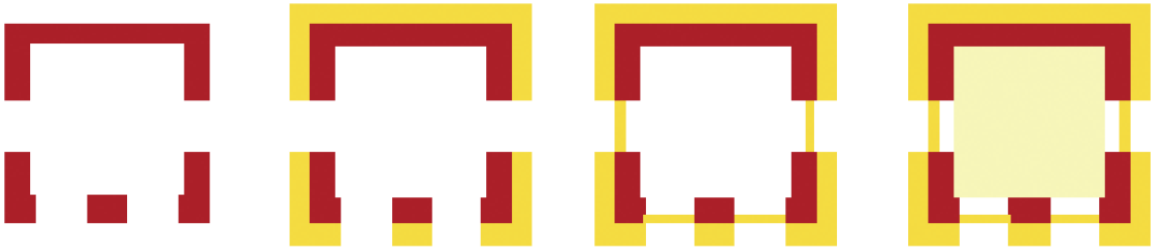
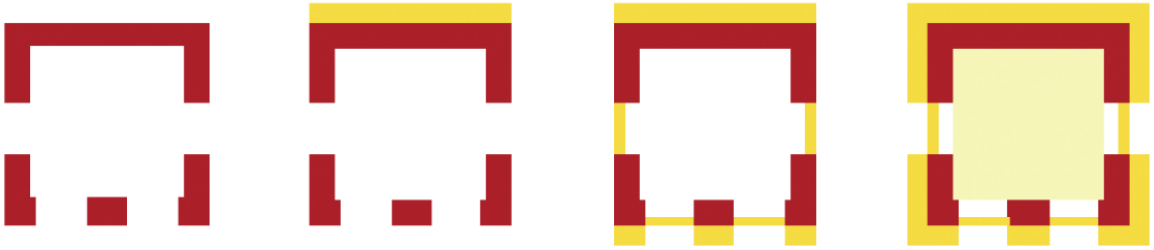
POTENTIAL SOLUTIONS – STEP-BY-STEP RENOVATION

Example: component by component approach



Original state | Insulation | Windows, ventilation, airthightness | Heating system, RES

Example: one facade at a time



Original state | North facade | South facade, windows, ventilation, airthightness | East & west facade, heating system, RES

Source: EuroPHit project / Passive House Institute

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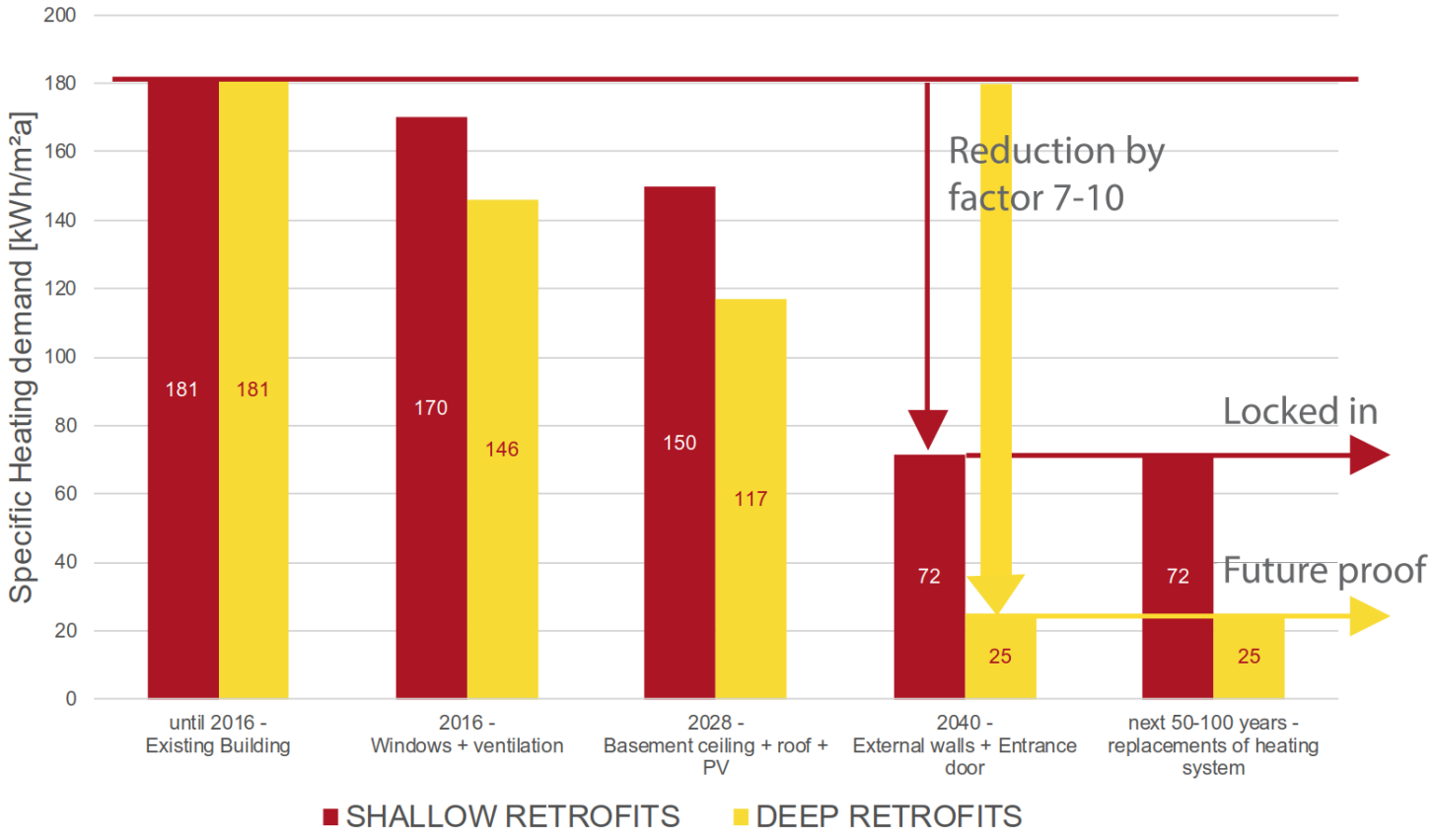
POTENTIAL SOLUTIONS – STEP-BY-STEP RENOVATION – LOCK-IN



The graph shows the heating demand per m² of a house comparing shallow and deep energy retrofit measures following various retrofit steps over years. In the end, the house with the shallow measures applied has a heating demand 3 times as high as that of the deep retrofit measures.

Source: EuroPHit project / Passive House Institute

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EXPECTED BENEFITS

The **iBRoad renovation roadmap** is a **customised, long-term, home-improvement plan which considers the occupant's needs and specific situation and avoids the risk of 'lock-in' effects**. In this respect, it enables

- ✓ maintaining the overview of the building's history
- ✓ planning of renovation steps
- ✓ achieving deep renovation levels over a long-term horizon (stepwise)
- ✓ access to financing (either through own resources, or by giving insurance to financing institutions)

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EXPECTED IMPACTS

- ✓ Enabling the adoption of future policies in support of energy performance and decarbonisation of the building stock.
- ✓ Increasing the number of individual deep renovations.
- ✓ Providing tailor-made advice, suggesting an optimal strategy for an individual building, taking into account the owners' financial and occupancy situation, specific needs and preferences.
- ✓ Supporting a reliable energy performance rating.
- ✓ Monitoring the performance of buildings over time, creating a positive impact on the compliance rate of the implemented measures.

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EXPECTED RESULTS

- ✓ 8 country factsheets
- ✓ Report on existing building renovation roadmaps and logbooks
- ✓ Guide to integrating techno-economic assessment modules and logbook components in iBRoad programmes
- ✓ Study for the pilot-country-specific adoption of iBRoad
- ✓ iBRoad modules for the three pilot countries
- ✓ iBRoad training toolkit for energy auditors in the pilot countries
- ✓ Report on implementation and evaluation of the iBRoad for the pilot countries
- ✓ Assessment of the feasibility and replicability of iBRoad across Europe, policy brief
- ✓ Guidance on data protection issues relevant to iBRoad
- ✓ Extensive communication and stakeholder engagement, including project website, discussion forum and national meetings.

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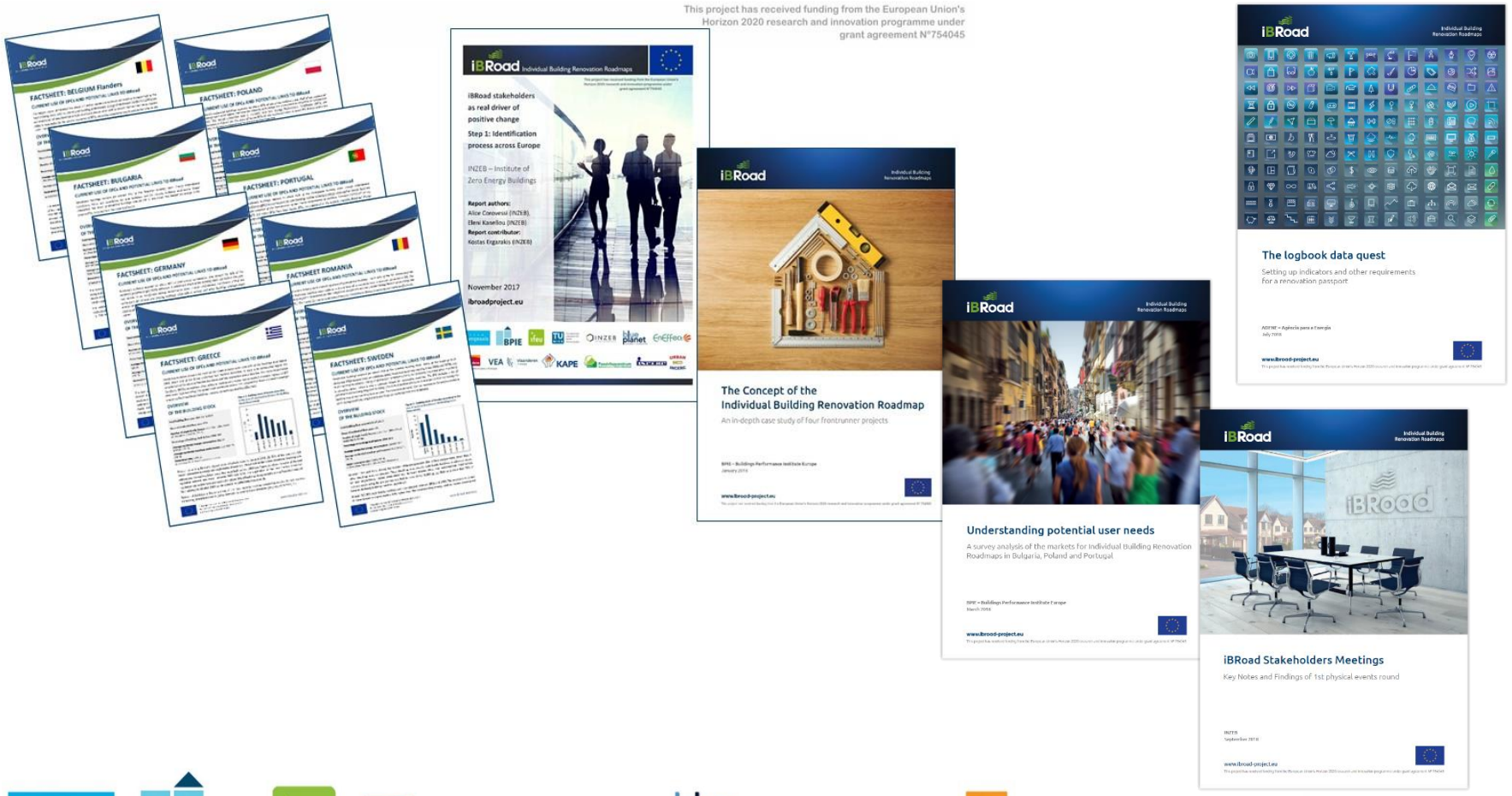
iBRoad FIRST OUTCOMES



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iBRoad – Next Steps

- ✓Finalising software tools
- ✓Pilot application in BG, PL, PT, DE
- ✓Stakeholder feedback
- ✓Replicability across Europe, including data management aspects

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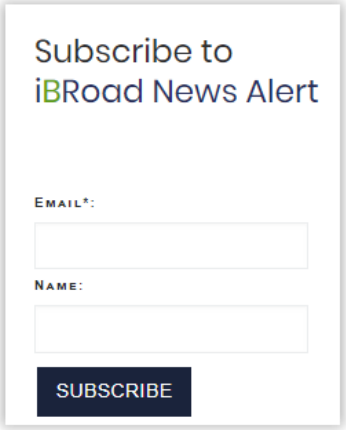
https://ibroad-project.eu/

iBRoad overview video with subtitles in 10 languages
https://ibroad-project.eu/results/videos/



Thank you

iBRoad

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