

Individual Building Renovation Roadmaps

iBRoad My path towards an energy efficient home

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Horia Petran INCD URBAN-INCERC

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The 3rd edition of National Forum ETICS

Bucharest 19.09.2019



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!





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)

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- ✓ Indoor Air Quality
- ✓ Visual comfort
- ✓ Acoustic comfort
- Ergonomics & aesthetics
- Low energy costs
- Real estate value

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Privacy / Safety / Security



Vlaanderen



TECHNICAL CHALLENGES

- A multitude of building types Different requirements
- A multitude of services Market fragmentation
- Technological developments Need for education and training
- Long lifecycle / Non-modularity Structure and components



Road



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SOCIOECONOMIC CHALLENGES

- Ownership fragmentation Decisionmaking fragmentation: Developers / Owners / Occupants / Operators
- Family needs changing over time
- Lack of awareness and expertise
- Non access to finance / Energy poverty
- Personal data protection Possible lack of aggregate data

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CHALLENGES

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

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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 longterm horizon (15-20 years).

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







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

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

AUTOMATED DATA

Smart meters

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 Monitoring systems, e.g. RES, heating, CO₂ 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















Two Parts of iBRoad

iBRoad

Individual Building Renovation Roadmaps

iBROA



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iBRoad Logbook





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Step by Step Plan

	ENERGY CLASS	ENERGY CLASS	
F	D	A	
TODAY	WHEN BOILER NEEDS TO BE EXCHANGED	WHEN WINDOWS NEED TO BE EXCHANGED	
YOUR BUILDING		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 456555 €	INVESTMENT COSTS 44 €	
	COSTS FOR MAINTENANCE 2467 €	COSTS FOR MAINTENANCE 44 €	
ENERGY BILL 159 €/a	ENERGY BILL	ENERGY BILL 143 €/a	

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Renovation Roadmap – Why?

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

Individual Building Renovation Roadmaps

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

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iBROA

Renovation Roadmap – Why?



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

Individual Building Renovation Roadmaps

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a long-term plan can consider the occations ("trigger points") in the homeowners' lives

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Renovation Roadmap - Idea

Individual Building Renovation Roadmaps

What is the Renovation Roadmap?

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Step by Step Plan





iBRoad Roadmap: diagnosis tool on building's performance and 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
- getting a long-term renovation overview





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



















Five steps to create a Renovation Roadmap



Renovation Roadmap - Idea

Visualisation of the Renovation Roadmap

Current building state

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Individual Building Renovation Roadmaps

BRoad Plan		Home Roadmap Detailed Roadmap	Your Building Renovation Steps log out		ils of the	renovati
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Detailed renovation step

tion Roadmap

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revious Steps Benefits

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Health	
۲	The renovation measures reduce the amount of moisture entering your room,
Reduction of	ndraw Humidity, Maldiand Tanisa
Noise Prote	ation
۲	There will be new windows with better sound insulation.
Redection of	Ania Immissioni
Thermal Co	mbort
۲	The temperature at the walk increases, so that they obtain a higher comfort.
Redaction of	Draught, Owelsaating and Colal
	Additional Benefits
Indoor Air C	Jusiky
	Regulated vertifation improves the quality of your indoor space.

	ENERGY CLASS	ENERGY CLASS	
F	D	A	
TODAY	WHEN BOILER NEEDS TO BE EXCHANGED	WHEN WINDOWS NEED TO BE EXCHANGED	
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Roadmap

overview



Detailed Renovation Roadmap

Step by Step Plan

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	ENERGY CLASS			ENERGY CLASS	INIRGY CLASS
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	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Electricity
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		Instaltment Costs for Bereviation Step		Investment Costs for Renovation Step	Investment Costs for Renovation Step
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Detailed

Roadmap

iBROAD Individual Building Renovation Roadmaps

iBRoad Logbook

iBRoad



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iBRoad Logbook



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iBRoad Plan

Step by Step Plan

		ENERGY CLASS	
		A	
		WHEN WINDOWS NEED TO BE EXCHANGED	
		RENOVATION STEP 2	
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iBRoad Logbook – Why?

iBROAD Individual Building Renovation Roadmaps

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



Most renovations are stepwise and refer to a long period of time. How can they be remembered?





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iBRoad Logbook – Why?

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

Individual Building Renovation Roadmaps

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Simple forward planning for homeowners





iBRoad Logbook – Idea Individual Building Renovation Roadmaps



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iBRoad Logbook:

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



iBROA



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

















Logbook access



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Logbook Steps: alternative ways to produce the Logbook





EXPECTED BENEFITS

The iBRoad renovation roadmap is a customised, long-term, homeimprovement 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)





iBRoad FIRST OUTCOMES

iBRoad





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



Thank you

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