iBRoad

Individual Building
Renovation Roadmaps

My path towards an energy efficient home

Layman's report

Sympraxis Team

December 2020

www.ibroad-project.eu

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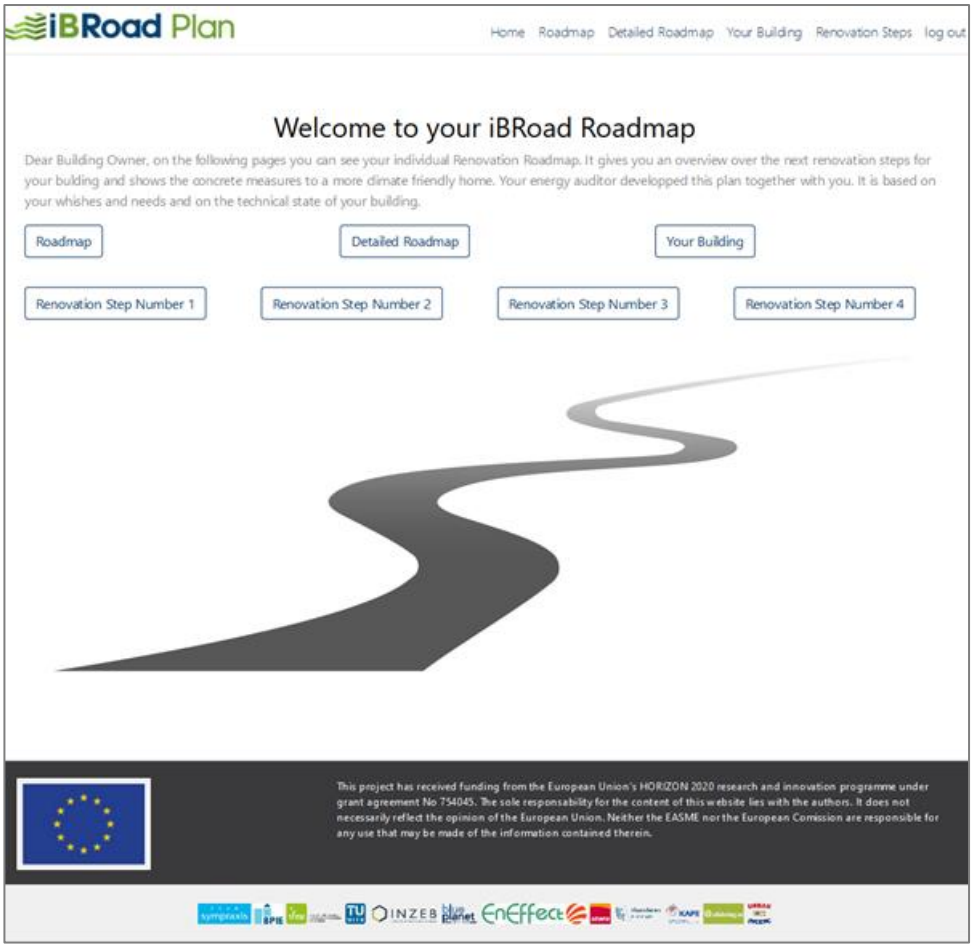
Renovating a building can be complex, especially if done in several steps, as most home renovations in Europe are. To help homeowners, iBRoad has worked on the Building Renovation Passport concept, developing and testing an Individual Building Renovation Roadmap, which provides a customised long-term (5-30 years) renovation plan. This is further supported by a building Logbook – a repository of information such as building plans, works implemented, energy consumption and production, etc.

iBRoad's tools and methods have been successfully tested in Bulgaria, Ireland, Poland and Portugal – plus Germany for the Logbook. Feedback has been positive and confirms the usefulness for both homeowners and professional auditors.

Buildings in the EU are responsible for 40% of our energy consumption and 36% of greenhouse gas emissions. Roughly 75% of European buildings are considered wasteful energy-wise, while energy efficiency can be improved in up to 97% of all cases. For the EU to become carbon-neutral by 2050, more deep renovations –improving the energy performance of a building by at least 60%– are needed. This is the aim of the ambitious Renovation Wave, launched by the European Commission in October 2020. iBRoad provides valuable methods and tools for the realisation of the Renovation Wave in practice.

To find out more, please read on.



Home page of iBRoad Roadmap software tool

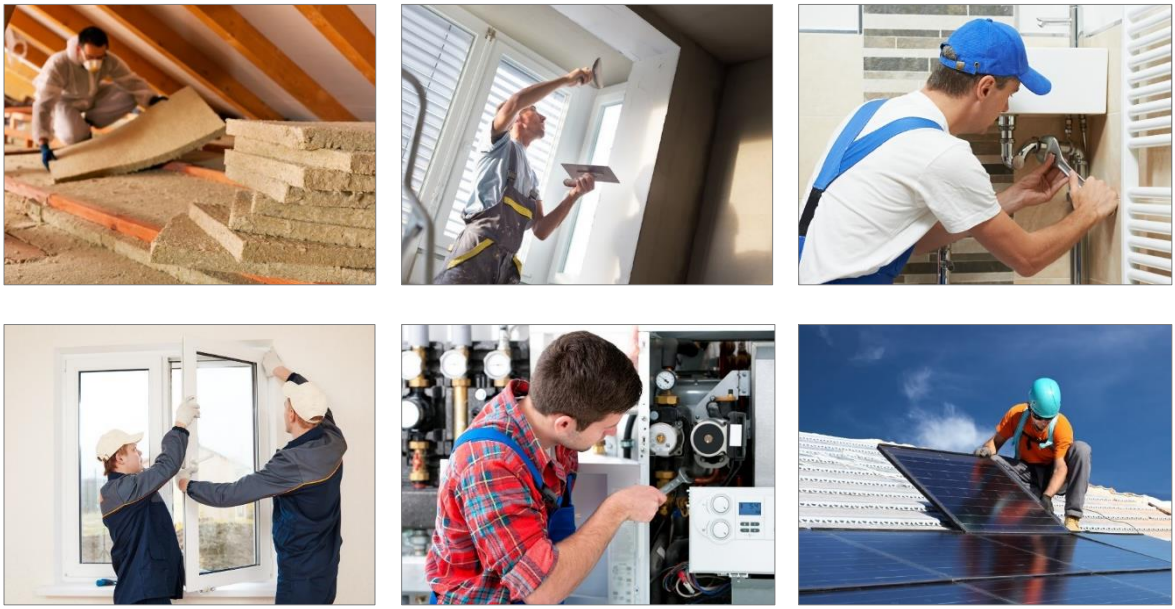
II. iBRoad IN BRIEF

Building renovation can be a challenge

Renovating a building can be complex, expensive and time consuming. In Europe, most home building renovations are implemented step-by-step over a course of several years. This adds the risk of "lock-in" –making today certain renovation choices which will limit the future renovation potential.

For homeowners then, lack of knowledge about what renovation measures to implement and in which order, can be an important obstacle to improving energy performance and the overall status of their building.

What exacerbates the challenges is the uniqueness of each situation. Buildings vary in their construction characteristics, history of renovations/interventions, actual use, and more. Homeowners themselves have varying needs, preferences and available resources.



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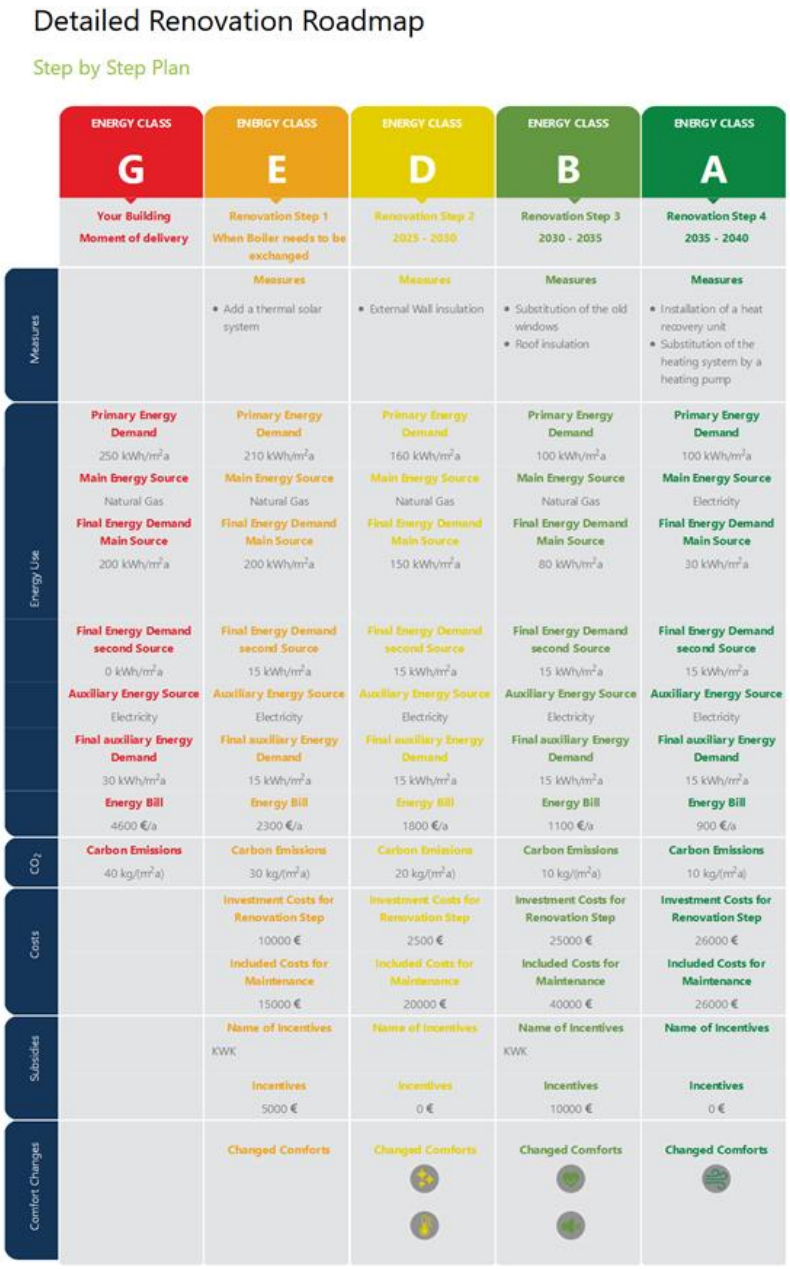
The individual Building Renovation Roadmap: a plan for a better home

In complicated situations, a plan is essential. To help homeowners, the Horizon 2020 iBRoad project developed a model Individual Building Renovation Roadmap –a customised long-term (5-30 years) step-by-step plan for building renovation.

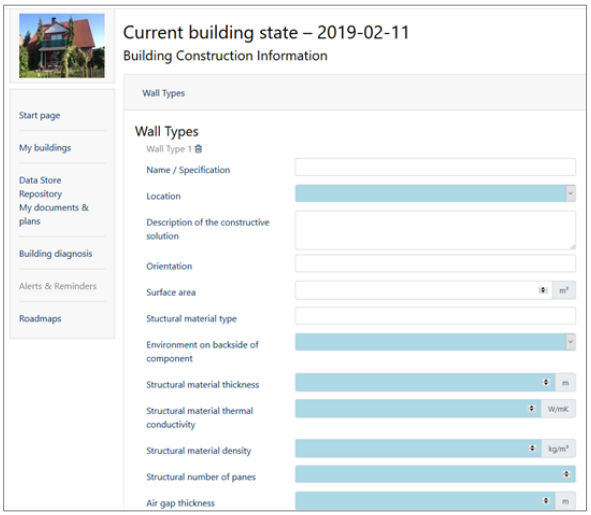
The Roadmap is developed by a trained energy auditor, following an on-site building assessment and an interview with the homeowner. The auditor uses the iBRoad software to present a step-by-step improvement plan, taking into account the homeowner's needs and preferences. The aim is to renovate their building in a suitable and future-proof manner.

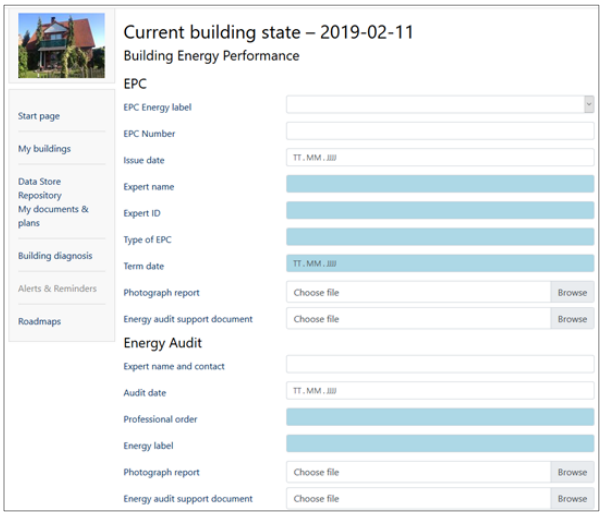


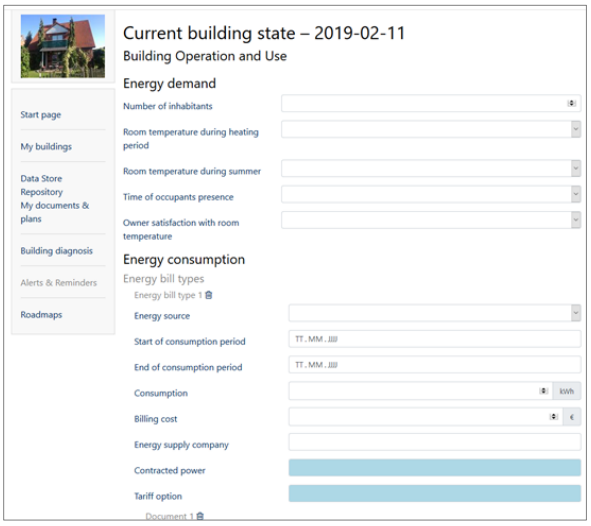
Sample detailed building renovation Roadmap, outlining measures, expected energy use, costs and other aspects per step.

The Building Logbook: a digital repository for our homes' information

In iBRoad's approach, the building Roadmap is complemented by a Logbook –a digital building repository for information such as building plans, works implemented, energy consumption and production, etc. The Logbook's "everything in one place" approach is extremely useful for homeowners. It can also help technicians called in for home maintenance or improvements, as well as energy auditors and other service providers. iBRoad's Logbook organises the building's history in "snapshots", allowing homeowners to revisit each stage in their building's evolution.





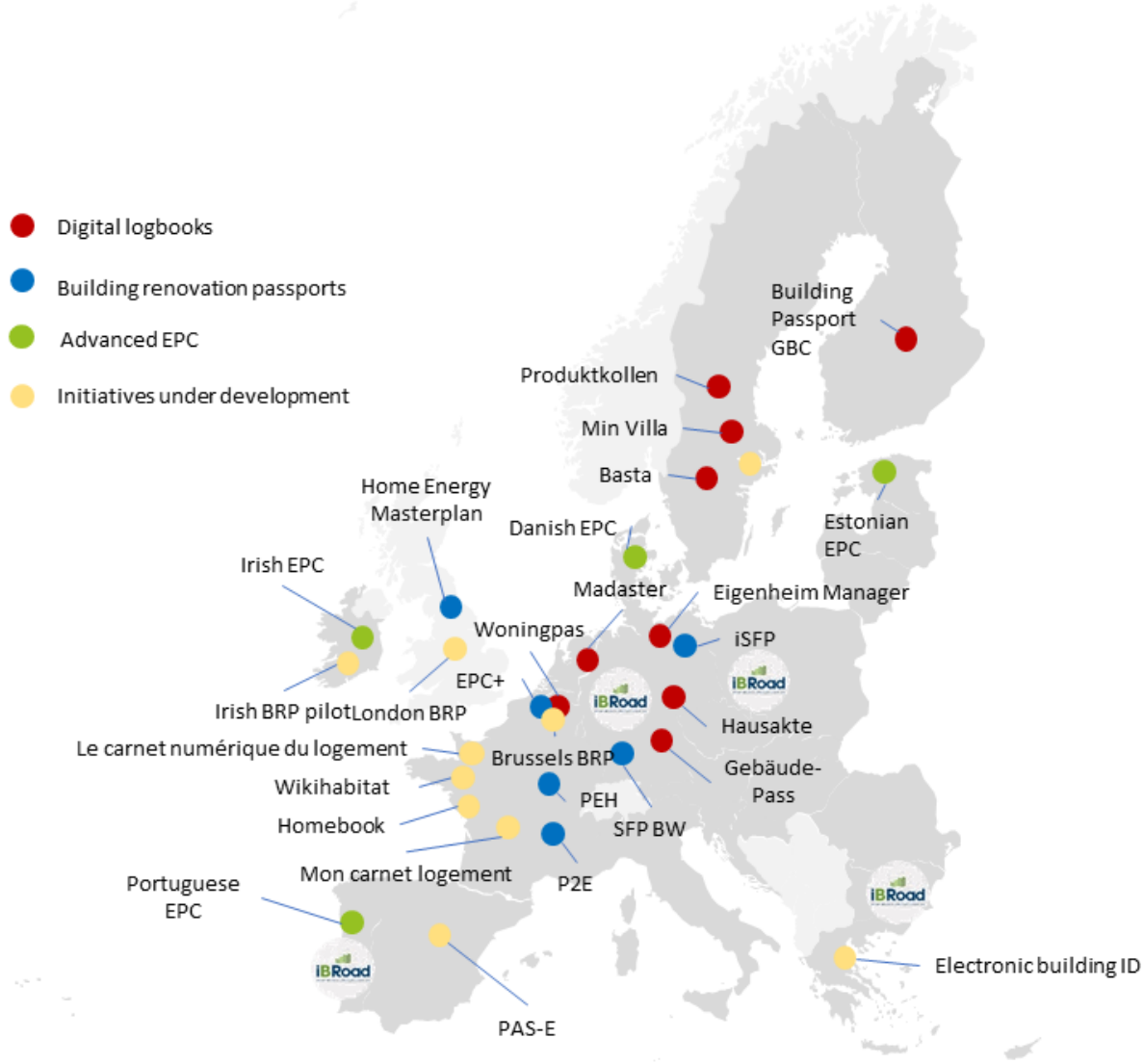


Sample pages from the iBRoad Logbook, for building envelope, energy demand and consumption, overall performance, etc.

A passport for renovating buildings

The combination of the building renovation Roadmap and Logbook represents iBRoad's specific proposal for the Building Renovation Passport. This is a concept of growing interest and discussion in recent years, with more and more relevant initiatives springing up across Europe. The iBRoad model itself was based on elements and approaches from other frontrunner projects which were analysed in depth, further developed and refined.

Building Renovation Passports represent an evolution over Energy Performance Certificates (EPCs), which have been around since more than a decade. EPCs are useful to show the energy performance of a building. Building Renovation Passports can also introduce a perspective for the future, and record developments over time.



Overview of initiatives related to Building Renovation Passports (Source: Jonathan Volt, BPIE)

The imperative for deep renovation

Buildings in the EU are responsible for 40% of our energy consumption and 36% of greenhouse gas emissions. Much of this is wasted: roughly 75% of European buildings are considered inefficient energy-wise, while up to 97% have a significant potential for further improvement.

The European Commission has therefore published the Renovation Wave to boost building renovation for climate neutrality and recovery. The objective is to at least double the annual energy renovation rate of buildings by 2030 and to foster deep energy renovations –improving the energy performance of a building by at least 60%.

The iBRoad methods and tools can help make this possible!

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EUROPEAN COMMISSION

Brussels, 14.10.2020
COM(2020) 662 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives

{SWD(2020) 550 final}

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Testing, testing

The iBRoad project tested its tools in Bulgaria, Poland, Portugal, and Germany (only the logbook). The testing entailed adapting the tools for the countries' specifications, training professional auditors, and implementing the process for producing the roadmaps and logbooks to suitable buildings. The work, with 27 auditors and 65 buildings, confirmed the tools' potential in supporting deep renovation, receiving positive feedback from both homeowners and professionals.

Pilot country	No.	Year of construction	Number of renovation steps	Current energy level	Final / future energy level	Current primary energy demand [kWh/m²]	Future primary energy demand [kWh/m²]	Estimated date for final renovation step	Completeness
Bulgaria	1	1970	3	G	B	600	362	When plaster needs renovation	complete
	2	-	4	D	B	269	36	2035-2040	complete
	3	1950	3	G	B	600	119	New heating system	complete
	4	1994	3	G	B	504	176	2019	parts missing
	5	1970	4	G	B	479	126	When boiler is exchanged	complete
	6	1980	4	F	A	390	73	2030-2035	complete
	7	1950	3	F	B	600	112	New heating system	-
	8	1968	5	E	A+	411	27	2035-2040	complete
	9	1982	4	G	B	500	111	2030-2035	complete
	10	1947	4	G	A	600	95	2025-2030	complete
	11	1911	2	D	B	362	142	2025-2030	parts missing
	12	2008	2	C	B	203	158	2025-2030	complete
	13	1929	5	G	A	505	109	2035 - 2040	complete
	14	1962	4	D	B	262	108	2035-2040	complete
	15	-	3	D	B	280	136	When windows are exchanged	parts missing

Pilot country	No.	Year of construction	Number of renovation steps	Current energy level	Final / future energy level	Current primary energy demand [kWh/m²]	Future primary energy demand [kWh/m²]	Estimated date for final renovation step	Completeness
Portugal	1	1986	5	C	A+	183	74	2035-2040	complete
	2	1500	5	D	A+	155	48	2035-2040	complete
	3	1971	4	E	A+	183	0	When plaster needs renovation	complete
	4	1937	3	F	A+	600	27	2030-2035	complete
	5	2001	3	A	A+	30	0	When boiler is exchanged	complete
	6	1937	4	F	A+	600	19	2030-2035	complete
	7	1919	5	D	A+	356	120	2025-2030	complete
	8	1998	4	C	A+	116	0	When plaster needs renovation	complete
	9	1994	2	A+	A	145	112	2025-2030	parts missing
	10	2002	3	C	A	278	104	2030-2035	complete
	11	1575	4	D	A	319	42	2025-2030	complete
	12	1988	4	F	A+	423	117	When windows are exchanged	complete
	13	1998	5	E	B-	203	0	2025-2030	complete
	14	1972	4	D	B-	387	250	2025-2030	complete
	15	1995	3	C	A	176	19	2030-2035	parts missing
	16	1966	2	E	A	326	27	2025-2030	complete
	17	1946	4	F	A	350	92	2030-2035	-
	18	1989	5	D	A+	116	20	When plaster needs renovation	complete
	19	2001	5	E	A	192	19	When plaster needs renovation	complete
	20	1981	4	C	A	211	34	2025-2030	complete

Pilot country	No.	Year of construction	Number of renovation steps	Current energy level	Final / future energy level	Current primary energy demand [kWh/m²]	Future primary energy demand [kWh/m²]	Estimated date for final renovation step	Completeness
Poland	1	1975	3	medium orange	light green	474	134	Substitution of the old windows	complete
	2	1978	3	dark orange	light green	382	123	2030-2035	complete
	3	1987	4	dark orange	yellow	400	172	2019	complete
	4	1950	3	dark orange	light orange	570	326	2020	complete
	5	1978	1	red	yellow	600	159	As soon as possible	complete
	6	1975	3	medium orange	yellow	321	160	When windows are exchanged	complete
	7	1981	3	dark orange	light green	435	185	2025-2030	complete
	8	2000	3	dark orange	light green	233	185	2035-2040	complete
	9	1978	3	light green	dark green	138	31	2025-2030	complete
	10	1990	3	light orange	light green	335	193	2025-2030	complete
	11	1991	4	medium green	dark green	70	78	2025-2030	complete
	12	1936	5	red	light green	422	134	When plaster needs renovation	parts missing
	13	1978	3	medium orange	light green	276	133	2025-2030	complete
	14	1980	3	dark red	yellow	600	189	2025-2030	parts missing
	15	1999	5	medium green	light green	165	197	2035-2040	complete
	16	2000	5	dark orange	yellow	374	152	During the attic renovation...	complete
	17	2006	5	medium orange	light green	143	86	2030-2035	complete
	18	1981	5	red	medium green	181	46	2025-2030	complete
	19	1980	4	light orange	yellow	600	316	2025-2030	complete
	20	1982	2	yellow	medium green	198	161	When plaster needs renovation	complete

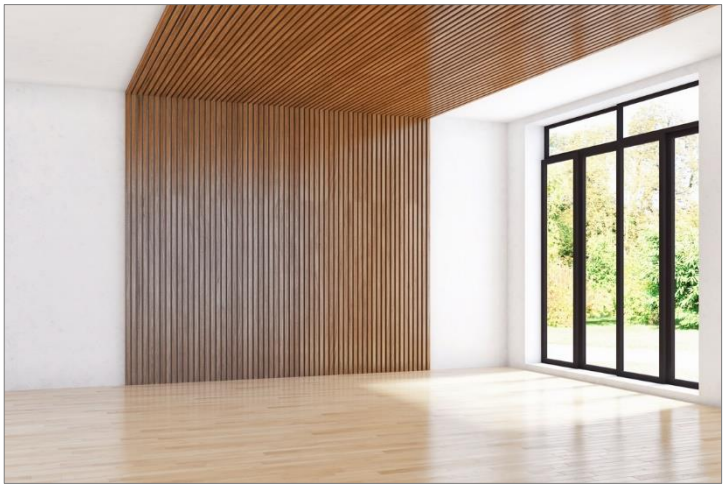
Auditors' training in Bulgaria, Portugal and Poland, and estimated energy rating of buildings before and after renovation.

iBRoad then collaborated with the Irish Green Building Council (IGBC) which organised a further test with 11 auditors and 20 more buildings, corroborating the potential.

Auditors' training in Ireland and related IGBC report.

Multiple benefits from renovating

Renovating a building can improve a lot more than its energy performance. In fact, many home renovations may be undertaken primarily for other reasons, such as rearranging spaces, or upgrading the facade. All such changes can be integrated under a single Roadmap, ensuring the most efficient combination of interventions, and including the multiple benefits that a well-planned renovation can provide, such as improvement of thermal comfort, indoor air quality, sound insulation, and more.



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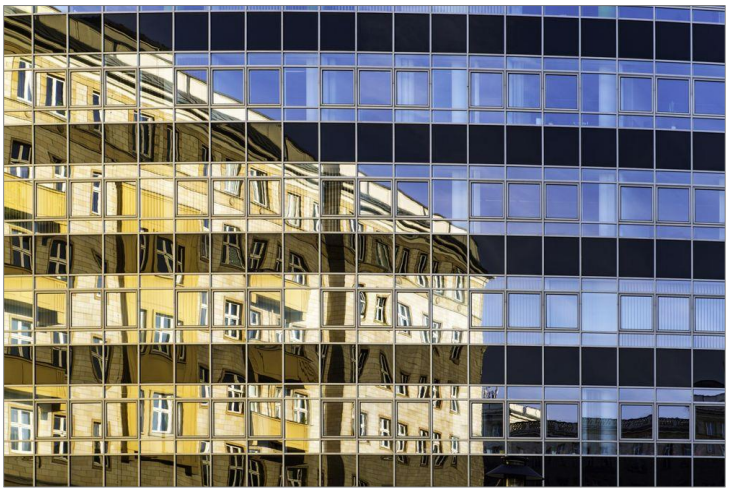
Beyond homes

While the iBRoad project focused on single-family houses, the tools and methods that it developed can be adapted for many other types of buildings. A Logbook is useful for any building, while a Roadmap is very important when renovation is done in several steps over time, rather than in one go. It could be of particular interest, for example, for public historical buildings, where maintenance, upgrades and other interventions may need to be planned years ahead.



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Financing and funding

Another key reason for employing tools such as the iBRoad Roadmap and Logbook is better financing, and possibly funding, of the renovation. The most efficient measures can be scheduled first, allowing the building owner to save on energy costs and have more money available for future renovation steps. The financial information can be included in the Roadmap.

When seeking financing from a bank, a building renovation roadmap can be used as a business plan to negotiate better terms. It can also help with funding where this is available. For example, in Germany, the new funding scheme BEG which supports building efficiency, rewards building owners with an individual building roadmap (iSFP) with 5% more funding.

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Over to the authorities

Funding provisions like the above can help promote effective deep renovation with the use of renovation roadmaps. The iBRoad project has included such financial measures in a set of policy proposals in support of the Building Renovation Passport, also including informational and regulatory instruments.

iBRoad's software tools are available, upon request, to authorities and agencies who would be interested in testing them for potential national or local adoption.

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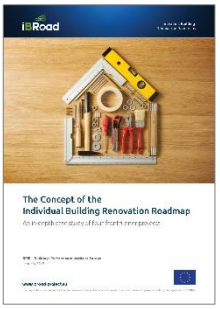
III. FIND OUT MORE

To find out more about specific aspects of iBRoad, check out the following and other reports freely available from the project's website **www.ibroad-project.eu**

About the initiatives that inspired iBRoad

The Concept of the Individual Building Renovation Roadmap – An in-depth case study of four frontrunner projects



About end-users needs and wants in the iBRoad pilot countries

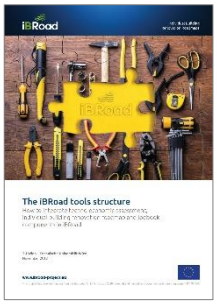
Understanding potential user needs – A survey analysis of the markets for Individual Building Renovation Roadmaps in Bulgaria, Poland and Portugal

About the data to be included in the iBRoad logbook

The logbook data quest – Setting up indicators and other requirements for a renovation passport

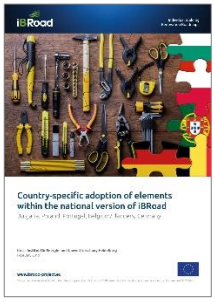
About the elements and methods that iBRoad brings together

The iBRoad tools structure – How to integrate techno-economic assessment, individual building renovation roadmap and logbook components in iBRoad



About adapting iBRoad elements to national conditions

Country-specific adoption of elements within the national version of iBRoad – Bulgaria, Poland, Portugal, Belgium/Flanders, Germany



About the iBRoad auditing process; includes an overview of the software tools

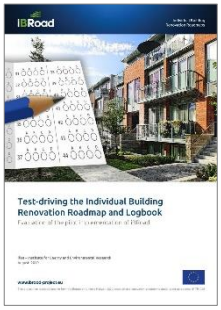
Handbook for Energy Auditors – Guidance and advice on how to create an iBRoad Individual Building Renovation Roadmap and how to use the iBRoad Building Logbook

About the iBRoad auditors' training

iBRoad training toolkit – Guidance for auditors in the iBRoad pilot countries

About the results of the iBRoad pilot tests

Test-driving the Individual Building Renovation Roadmap and Logbook – Evaluation of the pilot implementation of iBRoad



About the main steps to implement iBRoad

iBRoad policy brief – A Guideline how to implement individual Renovation Roadmaps and Building Logbooks

About points of attention on the way to implement iBRoad

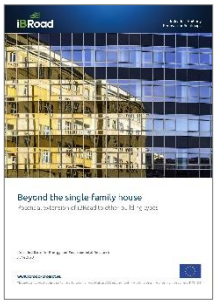
How can Member States implement iBRoad? Barriers and drivers for countries willing to explore the feasibility and replicability of iBRoad

About policy measures to help the iBRoad approach achieve its maximum potential

Stepwise and structured – Surrounding policy instruments to support the iBRoad approach for building renovation take-off

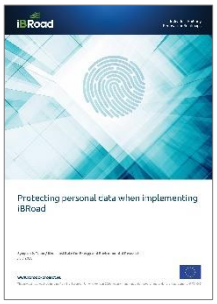
About the potential of the iBRoad approach for other types of building

Beyond the single-family house – Potential extension of iBRoad to other building types



About data protection measures needed to implement iBRoad

Protecting personal data when implementing iBRoad



About the authorities' and the market's views on iBRoad

iBRoad Stakeholders Meetings – Key Notes and Findings of 1st and 2nd physical events round (2 reports)

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