



iBRoad policy brief

A guideline for implementing Building Renovation Passports and Building Logbooks

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All of iBRoad's reports, analysis and evidence can be accessed from ibroad-project.eu

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I. Recommendations for action

- 1. Implement a EU-harmonised system for issuing Building Renovation Passports (BRPs)
- 2. Anchor the BRP in national legislation
- 3. Implement funding to support the BRP
- 4. Build up a stock of qualified auditors through targeted training offers and Quality Assurance
- 5. Monitor the energy status of the building stock over long periods of time with a building database
- 6. Motivate building owners through transparent objectives and provide supporting tools

II. About iBRoad

iBRoad [aɪbiːˈɾəʊd]— the individual building renovation roadmap — is an energy consulting product for building owners. It offers guidance on improving the energy efficiency and overall performance of the building, and monitoring of renovation works already carried out. In parallel, it provides a clear perspective to reaching climate targets. The iBRoad development was funded by the EU Commission (Horizon 2020). All products and tools are adaptable to individual Member States´ requirements. iBRoad addresses specific EU provisions and offers systematic solutions to fulfil the respective obligations.

III. EU regulatory provisions

Europe should become the first climate-neutral continent. This is the central goal of the European Commission's Green Deal. The European Climate Law is a central initiative of the Green Deal. It is intended to establish greenhouse gas neutrality as a legally binding goal by 2050. To this end, the 2030 Climate Target Plan proposes to cut greenhouse gas emissions by at least 55% by 2030. The European Climate Pact is also part of the Green Deal. It will encourage broad societal engagement on climate and environment through a range of activities. It supports the transition to a climate-neutral society.

Energy- and resource-saving construction and renovation are among the central pillars of the Green Deal, as 40% of energy consumption is accounted for by the building stock. A key objective of the EU Commission is to double the renovation rate and depth. To achieve this without increasing the cost of housing, the Renovation Wave was published in October 2020. It introduces a range of actions to "make renovation a winwin for climate neutrality and economic recovery". The Renovation Wave addresses the energy performance of buildings, the decarbonisation of heating and cooling, and circularity principles in building renovation.

The EPBD² sets the framework for the energy performance requirements for existing and new buildings. It obliges Member States to identify concrete ways to decarbonise their building stock in the national Long-Term Renovation Strategies (LTRS). Advice to building owners is an indispensable element of the strategies.

Energy Performance Certificates (EPCs) inform building owners about the current energy demand of the building. They also include recommendations for the improvement of the energy performance of the building. Several Member States show in their long-term renovation strategies (LTRS) how EPCs can enable progressive

¹ European Commission, COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THECOMMITTEE OF THE REGIONS: A Renovation Wave for Europe – greening our buildings, creating jobs, improving lives, COM(2020) 550 final, 14 October 2020

² DIRECTIVE (EU) 2018/844 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency

policies for enabling building renovations. **Building Renovation Passports (BRPs)** are introduced in the EPBD as an optional additional instrument to stimulate cost-effective deep renovation of buildings. They systematically show the renovation steps with which individual buildings can be deeply renovated.

The EPBD also introduces **one-stop-shops**. This is a service concept for buildings owners offering a variety of services accessible from one source.

The EPBD will be revised in 2021 and the Renovation Wave already outlines measures for this revision. Among them are more effective EPCs, integrated with a digital building logbook, building renovation passports and a smart readiness indicator.

IV. Starting Point

Today, staged renovations make up the largest part of all renovations. Usually, building owners renovate only components once their useful life has expired. This is the accepted and cost-effective occasion. However, they do not call this a staged renovation.

Because building components last 40 years and more, it is important to carry out every renovation step deep and targeted. Consequently, a long-term plan is needed from the first step in order to combine all single steps into a meaningful whole and to avoid connection errors.

Economic assessments of both staged and one-step deep renovation showed that there is no clear economic advantage for either of them. Please see the complete exemplary calculations in the iBRoad-related paper "Planned staged deep renovations as the main driver for a decarbonised European building stock"³. One-step deep renovations benefit from early energy and cost savings, whereas staged deep renovations profit from a better use of the components' life cycles.

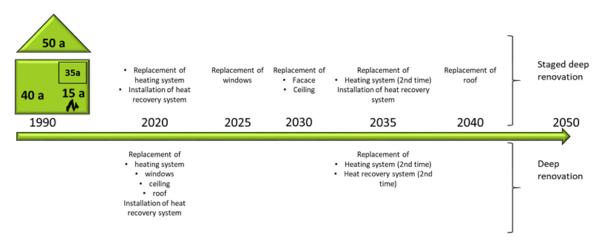


Figure 1. Comparison of one-step and staged renovation in a timeline. One-step renovations provide larger savings earlier; staged renovations use the components' life spans completely and stretch investment costs.

One-step and staged renovations are not in competition with each other. One may be more suitable than the other depending on the individual building and its owner; however, when staged renovations occur, it must be ensured that they achieve deep energy savings. To this purpose, appropriate strategies should ensure that also staged renovations are deep.

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³ https://www.eceee.org/library/conference proceedings/eceee Studies/2019/7-make-buildings-policies-greatagain/planned-staged-deep-renovations-as-the-main-driver-for-a-decarbonised-european-building-stock/



V. iBRoad – Renovation Roadmap

The iBRoad Renovation Roadmap provides an individual long-term strategy for building owners to reach optimum energy performance and thereby contribute to GHG reduction. For building owners, the lack of knowledge about what to do, where to start and in which order to implement renovation measures, is a main obstacle to improve the energy performance of their buildings. The iBRoad Renovation Roadmap supports owners by outlining a tailored renovation plan with a long-term horizon for deep step-by-step renovations. The iBRoad Renovation Roadmap allows building owners to gain an overview over future renovation measures, adapted to their individual buildings and preferences. All renovation measures can be laid out through advance planning and a deep future-proof level can be reached. This helps owners and investors to plan the best timing and scope for interventions.

The iBRoad Renovation Roadmap is issued by trained energy auditors. An on-site visit of the building is essential. The Renovation Roadmap takes the owner's view into account to map the individually optimised path to renovate and avoid mistakes in the long-term. iBRoad tools motivate and help owners to solve their building related problems. The standardised structure of the report develops the renovation steps based on the current building state. Each renovation step is described in detail with technical specifications, investment, anyway maintenance cost, incentives, savings, increase of indoor comfort and recommended preparations for later steps.

Energy auditors issue the Renovation Roadmap in a unified design with the Roadmap Assistant. This is an online tool and printing device developed during the iBRoad project.

ENERGY CLASS	ENERGY CLASS	ENERGY CLASS	ENERGY CLASS
E	B-	В	A+
-			
YOUR BUILDING	RENOVATION STEP 1	RENOVATION STEP 2	RENOVATION STEP 3
TODAY	2020	WHEN PLASTER NEEDS RENOVATION	2045
	PENDING MAINTENANCE MEASURES	PENDING MAINTENANCE MEASURES	PENDING RENOVATION
	WHAT TO DO?	WHAT TO DO?	WHAT TO DO?
	Substitution of the heating system by a condensing gas boiler Insulation of the cellar ceiling	External Wall insulation	Roof insulation Substitution of the heating system by a heating pump
	INVESTMENT COSTS	INVESTMENT COSTS	INVESTMENT COSTS
	10000 €	22000€	34000 €
	COSTS FOR MAINTENANCE 7000 €	COSTS FOR MAINTENANCE 15000 €	COSTS FOR MAINTENANCE 25500 €
ENERGY BILL	ENERGY BILL	ENERGY BILL	ENERGY BILL
3000 €/a	2700 €/a	2000 €/a	1030 €/a

Figure 2. iBRoad Renovation Roadmap; overview page of what to do when and costs; example with three renovation steps.

The iBRoad Renovation Roadmap in relation to European provisions

The **Building Renovation Passport (BRP)** breaks down the **Climate Target Plan** from the entire building stock to individual buildings. BRPs are an important pillar to boost the **Renovation Wave**. The individual MSs' long-term strategies direct funding to targeted measures and avoid deviations and lockin situations in renovation.

The **iBRoad Renovation Roadmap** provides a ready-to-use solution for the **BRP** as announced in the **EPBD**. It can adapt to specific national requirements and therefore offers a unified design, making the BRP a recognisable brand throughout all Member States.



VI. Logbook

The iBRoad Logbook serves as repository for data on individual buildings. It stores all building-related information digitally, e.g., implemented renovation measures, energy consumption, craftsmen, photos, loans, insurances. It saves each construction work in a new building status and keeps all former building states. Thus, it grows in time and allows the owner to track the building's history. Especially for staged renovations, it is essential that information from former stages is available for later stages. The Logbook complements the BRP: while the BRP guides the future path, the Logbook shows what has been achieved so far and paves the way for further steps. The Logbook is linked to the Renovation Roadmap and the contained data. It also integrates the Smart Readiness Indicators, indoor comfort and EPCs to ensure compatibility and integration of data throughout the renovation journey.

The iBRoad Logbook is an online tool. It can be set up and run by the building owner. Energy auditors may support the set-up process using detailed building data from the EPC software. The data set of the Logbook can be adapted to the specific needs of each Member State.

The iBRoad Logbook also provides an easy-to-understand assessment of the building status. It displays the efficiency of building components and equipment with colours from red to green.

The iBRoad Logbook may facilitate information sharing within the construction sector, and between building owners and tenants, financial institutions and public authorities. It may also serve the government to monitor the progress of the whole building stock. This provides feedback for policy instruments and enables the evaluation of funding schemes.

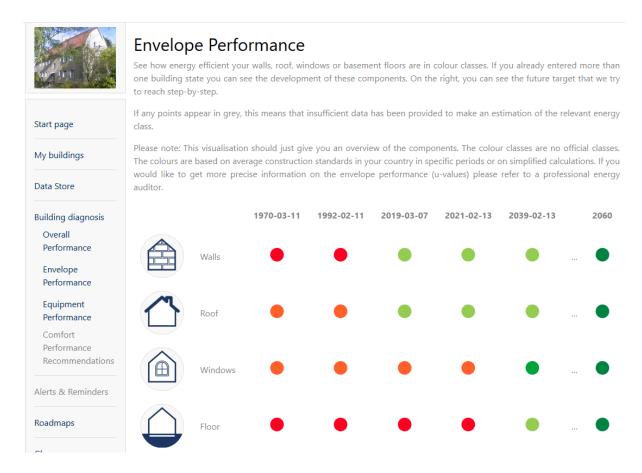


Figure 3. iBRoad Logbook; example with five building states (plus required final state)

The iBRoad Logbook in relation to European provisions

The iBRoad Logbook provides a ready-to-use solution for the **Digital Building Logbook** as announced in the **Renovation Wave**.

The Logbook allows the set-up of an EPC register. This was introduced by the EPBD, however it is not mandatory. A central EPC database is the core element of an effective EPC quality assurance scheme. It also enables an ex-post evaluation of the Renovation Wave and other policy instruments.

As the iBRoad Logbook also contains BRP data, it allows a **preview** into the future development of the building stock.

The Logbook can also offer a connection point to **one-stop-shops**. Building owners can grant access to certain Logbook data to a one-stop-shop and receive tailored information in return.



VII. Steps to Implement iBRoad

The following paragraph outline the steps to implement the iBRoad concept. For a detailed description of the feasibility study and how to overcome barriers see the iBRoad report "How can Member States implement iBRoad?"

i. Concept initiation

The iBRoad concept can be initiated by public or private actors or even a mixture of both. Interest from the government and the existence of strong private partners are crucial prerequisites. Available finance to incentivise energy renovation is a starting point because iBRoad provides a concept to invest in a targeted way and avoid mistakes.

ii. Preliminary analysis

Initiators should first outline a plan, including targets, how to achieve them, who is involved and how to proceed. The project's scope should be defined in detail, tailored to the national context.

A market analysis shows what kind of renovations are being performed in the country, the situation of the building stock and homeowners' willingness to invest in energy renovation. National funding programmes for renovation and levels of energy poverty should be explored. The analysis also comprises enabling policies and measures that promote deep renovation.

iii. End-user needs and stakeholder engagement

Understanding the end-users' needs will enable a more effective design of the individual buildings' renovation roadmaps tailored to specific markets. Fully considering the needs of end-users avoids the risk of 'locking-out' future renovation solutions due to lack of foresight.

Stakeholder dialogues allow the identification of the replicability potential of the iBRoad concept. Important stakeholders are public authorities, building and consumer associations, financial services, etc. It is recommended that stakeholder dialogues are carried out throughout several phases of the design, implementation and evaluation as this can raise awareness on the new tool while gathering feedback for future improvements. In addition, involving external parties will increase their rate of engagement and acceptance.

The reports "iBRoad stakeholder meetings" (key notes and findings from the 1st and 2nd round of physical events) describe the stakeholder involvement in eight Member States during the project.

iv. Comparison and integration with relevant existing tools

The tools, programmes and schemes already available on the market ought to be explored to investigate whether iBRoad should further build on these, offer a parallel product or develop a new independent tool.

v. Financial aspects

The required resources and potential financial risks to implement iBRoad need to be identified. There are three main cost categories: development of the tool, launch of the iBRoad concept, funding for renovations. The business model should consider how the cost will be covered and how it can be integrated into other financing instruments.

vi. Impact assessment

The way in which the impacts of iBRoad will be monitored and evaluated should be assessed prior to the implementation. This includes impacts on energy savings and construction works, capacity building and skills as well as broad social, economic and environmental impacts. Quantitative indicators can be calculated from audits, logbooks, the training activities of auditors and the number of auditors.

VIII. Tools for Implementing iBRoad

All information about iBRoad is available on the project site (www.ibroad-project.eu).

i. Tools at the level of authorities

iBRoad provides a number of reports to particularly support the implementation of the concept. The report "Country-specific adoption of elements within the national version of iBRoad" describes in detail how the online tools – Renovation Roadmap, Roadmap Assistant and Logbook – can technically be adapted to specific national requirements. The "training toolkit" comprises presentations for train-the-trainer and energy auditor seminars. The "Handbook for auditors" explains the usage of the online tools, the steps to perform a complete iBRoad energy audit and the iBRoad principles. The reports on the field test contain a complete set of questionnaires, which can be used as a template.

ii. Tools at governmental level

On a superordinate level, iBRoad reports address governmental issues of its implementation. The report "How can Member States implement iBRoad?" provides an overview of the implementation process considering both barriers and a feasibility study. Surrounding policy instruments that support the iBRoad concept are presented in the report "Stepwise and structured". "Protecting personal data when implementing iBRoad" shows the data protection aspects to consider with respect to iBRoad, while "Beyond the single-family house – Potential extension of iBRoad to other building types" offers ways to transfer the iBRoad concept to multi-family and non-residential buildings.



IX. Prerequisites for the introduction of iBRoad

The implementation of the iBRoad concept systematically builds on the current situation in a Member State. The concept is kept flexible to adapt to the given circumstances. Minimum requirements for the implementation relate to provisions on EU level that have been obligatory since many years, such as EPCs. Certain preconditions facilitate the implementation as shown in Table 1.

Table 1: Prerequisites and supportive instruments for the implementation of iBRoad

Requirement	Description	
Energy performance certificates (EPC)	EPCs are the basis for Renovation Roadmaps. They provide the concept, the calculation methods and the efficiency classes to assess the energy performance of buildings.	
Auditing and inspection schemes	iBRoad is an energy consulting product for building owners. If other auditing and inspection schemes or one-stop-shops already exist, they prepare the societal acceptance and the take up of iBRoad as well as the background infrastructure (see below).	
Software tools to calculate EPCs	EPC software tools have to be capable of calculating the energy demand for the present building state as well as for potential future states. Ideally, the tools also provide the renovation cost and energy bill after a renovation. The iBRoad Logbook will offer a basic software interface to import data from national calculation tools and avoid manual data entry. The interface requires a revision of the national tool to provide a specific data export file.	
Reliable and trusted energy auditors or EPC issuers	The iBRoad project provides training material for experts. However, sound knowledge and experience are needed about the national calculation tools, energy related building requirements and planning renovation measures for the building envelop and the technical equipment. Experts have to be well acquainted with the human factor, with costs, with everdeveloping regulatory requirements and financial mechanisms and other services available.	
Energy agencies or similar local authorities	The iBRoad project provides information and training material for authorities to manage the implementation of the iBRoad concept. Authorities are the central point of contact for the administration of iBRoad. They manage the concept internally and externally. This includes adaptation and implementation of the tools, communication with auditors, trainings, stakeholders and building owners, quality control, evaluation and further development.	
Incentive schemes for EPCs or energy audits	Incentives raise the reputation of energy audits and confirm the public commitment to support homeowners and to reach the climate targets. At the same time, they lower the initial hurdle to order a laboriously audit.	
Funding programmes for energy renovation	Funding programmes raise the homeowners' acceptance for renovation measures. In particular, funding schemes that refer to single renovation measures are more helpful for the roll out of iBRoad than programmes relating to holistic renovations as iBRoad focusses on staged renovation. If the programmes' technical requirements for single renovation measures are compatible with long-term GHG-targets, there is no loss of quality compared to holistic renovations. Funding schemes can also be rearranged to foster iBRoad.	

X. Embedding iBRoad into the policy framework

Surrounding policy instruments can increase the diffusion, adoption, dissemination and impact of the iBRoad Building Renovation Roadmap and Logbook. On the other hand, the iBRoad Building Renovation Roadmap (or its elements) can support or even enable other instruments to incite highly dynamic and deep retrofits in the first place. Only when embedded in a supportive policy surrounding, the recommendations of the building roadmap will, with a high probability, be implemented and practically transferred into renovation activity. A supportive policy surrounding refers mainly to three basic fields of action: informational, economic and regulatory instruments. The single elements can complement each other if adjusted to one another.

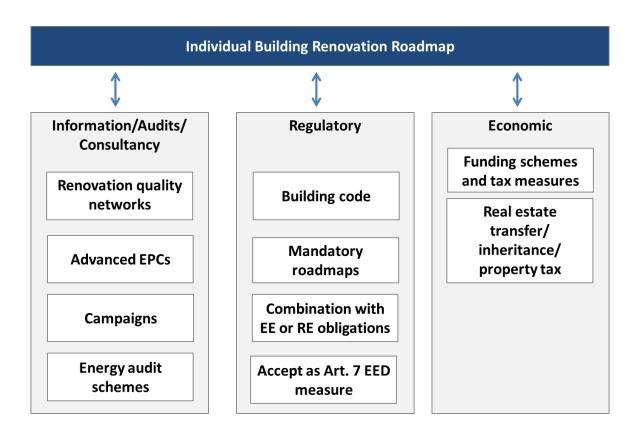


Figure 4. Embedding iBRoad into the policy landscape; Policy instruments can support iBRoad and vice versa, iBRoad provides a basis for policy instruments

Generally, **informational measures** raise awareness for the instrument, thus making it known to the target groups and increasing the uptake. They also enhance the trust in the tool when it is a known "brand" supported, e.g., by governmental information. Ultimately, information events could serve as trigger points for renovation.

The iBRoad tools can be coupled with existing **regulatory instruments**, enhancing the EPC, fulfilling EED Article 7 or other existing building obligations. One has to be aware though, that the iBRoad concept takes the building owners' perspective into account and therefore depends on trust. If they were obligatory, they could easily be rejected.

iBRoad can avoid costs and identify renovation strategies that reach the targets at lower investments. However, iBRoad cannot guarantee the **economic** viability for each renovation. Essentially, the idea of combining iBRoad with support programmes or tax schemes is twofold: on the one hand, a building



renovation roadmap can justify measures that are financially supported and make sure they are based on a sound concept. On the other hand, combining funding and iBRoad can also raise additional interest in the iBRoad Building Renovation Roadmap and the iBRoad Logbook and, thus, make the iBRoad tools more attractive.

For detailed information on embedding iBRoad into the policy framework please see the iBRoad report "Stepwise and structured – Surrounding policy instruments to support the iBRoad approach for building renovation take-off".



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