Support for setting up an optional building renovation passport

Analysis of the relevance, feasibility and possible scope of measures at EU level

Final report

Reference: ENER/C3/2018-447/05

Client: European Commission’s Directorate General for Energy

September 2019
This study is a service contract with the European Commission’s Directorate General for Energy and has received funding under contract ENER/C3/2018-447/05.

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Executive summary

This report has been prepared as part of a study commissioned, and supervised, by the European Commission’s (EC) Directorate-General for Energy. It is intended to provide technical support about the feasibility of introducing an optional building renovation passport in the European Union (EU). In particular, this study evaluates the relevance, feasibility and potential impact of building renovation passports. This work is carried out in close consultation with stakeholders and in collaboration with leading experts in the field. As part of the consultation process, a first stakeholder meeting was organised in June 2019, and a second meeting is planned for November 2019 where the content and suggestions in this report will be discussed.

The Directive on the Energy Performance of Buildings (EPBD) [2010/31/EU] does not include a definition of a building renovation passport, and no commonly agreed definition exists in the EU. Existing building renovation passports differ in some key features, purposes and in the terminology used. The definition presented below is based on the text in the EPBD, stakeholder input, and existing research.

Proposed definition of building renovation passport

A building renovation passport provides a long-term, tailored renovation roadmap for a specific building, following a calculation based on available data and/or an on-site audit by an energy expert. The instrument identifies and outlines deep renovation scenario(s), including steps to implement energy saving measures that could improve the building’s energy performance to a significantly higher level over a defined period of time\(^1\). The instrument can be complementary to energy performance certificates and/or combined with digital logbooks\(^2\).

The report comprises an analysis of the relevance and feasibility of introducing optional building renovation passports, and an investigation of the possible scope for additional measures for introducing a building renovation passport at EU level. Based on the review of existing schemes and initiatives, and an analysis of related policies, 33 policy options for the introduction of the building renovation passport were considered and analysed. The policy options are classified in six categories: (1) regulatory, (2) communication, (3) best practice exchange, (4) financial, (5) training and (6) guidance. In addition, they are divided into direct and supporting policy options.

Direct policy options focus on the introduction of building renovation passports. These options are to (1) let Member States decide whether to design and implement the instrument, (2) introduce an EU-wide common reference framework, or (3) incorporate staged renovation advice in existing energy performance certificates. Supporting policy options are measures that complement the direct measures (e.g. financial instruments, regulatory amendments, training of energy experts, or guidance documents).

Six feasible policy packages were developed, using many of the 33 policy options. Every policy package consists of one direct option and a number supporting options. Each of the three direct options described above has been included in two policy packages, and complemented by suitable supporting measures. The three direct measures have one policy package that is ‘soft’ and one that is more ‘stringent’. The supporting measures have been tailored to the direct measure and the ambition level of the specific package.

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1 The time of the roadmap could span from 5 to 20 years and the definition of the time horizon should be left to the implementing authority based on national/local conditions. The building owner can, of course, opt to implement all steps in one go.

2 See chapters: Linking the BRP with EPCs and Linking the BRP with a digital registry.
In addition to the below listed policy options, all policy packages include training of energy experts and increase of awareness through national/local communication campaigns. They both have an enabling effect on the uptake of BRPs and were considered relevant under all packages.

The direct measure in policy packages 1 and 2 leave the decision to implement, and design, the building renovation passport fully to the Member States. In both packages, the EU encourages Member States to explore the instrument through existing legislations (most notably through the long-term renovation strategies). Both packages include enabling options, including finance, communication and training, however the second package is more wide-ranging. In the second package, the EU encourages Member States to introduce minimum energy efficiency standards for renovation to boost the uptake of renovations and need for building renovation passports.

Figure 1 Policy options 1 and 2

In policy packages 3 and 4, the EU introduces a common reference framework for building renovation passports. In policy package 3, the framework does not include minimum requirements for the Member States, while policy package 4 does. The common reference framework is supported by other guidance documents and efforts, best practice exchange, as well as communication campaign and training for energy experts. Package 4 complements this with financial support measures and an EU framework for certification of experts. In package 4, the option is supported with more far-reaching financial instruments.
In policy options 5 and 6, the EU actively promotes the idea of building renovation passports, as complementary to the energy performance certificates, and proposes their introduction to complement EPCs in the next EPBD revision in 2026. In policy package 5, the uptake is complemented by targeted financial measures, best practice exchange, training, communication campaigns as well as guidance documents. In policy package 6, the provision is supported by mandatory measures driving a deep renovation of the building stock.
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Glossary

**Energy audit** – An assessment of the energy needs and efficiency of a building, conducted by a certified energy expert.

**Energy performance certificate (EPC)** – An EPC is a rating scheme indicating the energy performance of a building in the European Union. Each Member State (and, in certain cases, region) has developed its own EPC framework according to the framework given by the EPBD [2010/31/EU – Article 2 (12)].


**Individueller sanierungsfahrplan (iSFP)** – One of the first examples of a building renovation passport, developed by the German federal government providing a renovation roadmap for single family buildings.

**Indoor environmental quality (IEQ)** – IEQ is a general indicator of the quality conditions inside a building. It most commonly refers to indoor air quality, thermal comfort, aesthetics, ergonomics, biophilia, acoustics and lighting. Several of these elements have a significant impact on our health, comfort and productivity.

**Logbook** – A (digital) repository where all building information can be stored and continuously updated.

**Long-term renovation strategies**: These strategies must be established and implemented by Member States pursuant to Article 2a of the EPBD to support the renovation of the national stock of buildings into a highly efficient and decarbonised building stock by 2050, and will form part of Member States’ integrated national energy and climate plans.

**Minimum energy efficiency standards (MEES)**: A renovation obligation depending on the energy rating of a building (such as primary energy demand). If the performance doesn’t meet the minimum standards, the building must undergo a renovation.

**One-stop-shop** – An advisory service for building owners, compiling all information related to the renovation process and facilitating the contact with contractors and installers.

**Passeport efficacité énergétique (P2E)** – One of the first BRPs, developed and implemented in France.

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4 See for example iBRoad (2018) The logbook data quest.

About the study and this report

This study, commissioned and supervised by the European Commission’s (EC) Directorate-General for Energy (DG ENER), intends to provide technical support to investigate the feasibility of introducing optional building renovation passports (BRPs) in the EU. In particular, pursuant to Article 19a of the EPBD, this study evaluates the relevance, feasibility and potential impact of BRPs based on a number of aspects. This work is carried out in close consultation with stakeholders and in collaboration with leading experts, including IFEU and the Shift Project. As part of the consultation process, a first stakeholder meeting was organised in June 2019, and a second meeting is planned for November 2019, where the content and suggestions from this report will be discussed. In addition, 77 stakeholders from 22 countries completed an extensive survey on the concept of BRP and have been invited to provide written statements. The input received by stakeholders has shaped the direction of this feasibility study, as well as the assumptions the authors considered in the process.

This report is the second of three deliverables. Its main objective is to summarise the relevance, feasibility and possible scope of measures that could be introduced in the EU for the implementation of a BRP. Figure 4 provides an overview of the three deliverables of this project. The final report will be published by the end of 2019.

Figure 4: Deliverables on the optional building renovation passport

Background

Buildings are responsible for approximately 40% of energy consumption and 36% of CO₂ emissions in the EU, making them the largest energy consuming sector in Europe. About 35% of the EU’s buildings are now over 50 years old. At the same time, only 0.4-1.2% of the building stock is energy-renovated each year. The renovation of existing buildings could lead to significant energy savings and play a key role in the clean energy transition.

At the end of November 2016, the EC adopted the ‘Clean Energy for All Europeans’ package, a series of legislative proposals in the field of energy efficiency, renewable energy, electricity market design, security of electricity supply and energy governance. In the scope of this initiative, buildings are considered an essential driver of the clean energy transition.

As a part of the clean energy package, the Energy Performance of Buildings Directive (EPBD) [2010/31/EU] was amended; the amending Directive [2018/844] entered into force in July 2018. Member States are required to transpose the amended EPBD into
national law by 10 March 2020. One central amendment is the new Article 2a on long-term renovation strategies (LTRS). The requirement to establish national renovation strategies was first introduced in 2012 in the EU Energy Efficiency Directive [2012/27/EU]. It has been moved to the EPBD to ensure greater alignment with other aspects of energy performance of buildings. Article 2a of the EPBD strengthens this requirement and seeks to make these strategies a tool to support the transition to a highly energy efficient and decarbonised building stock by 2050, facilitating the cost-effective transformation of existing buildings to nearly zero-energy buildings.

According to Article 2a of the EPBD, Member States must include policies and actions to support targeted cost-effective measures and renovation in their LTRS. Such measures can include the introduction of optional schemes for building renovation passports. In addition, Article 19a of the EPBD requests the EC to carry out a feasibility study investigating the relevance and feasibility of introducing an optional building renovation passport, including a spectrum of policy options and their related impact at EU level. The BRP concept is still new in Europe, with few examples currently implemented. The concept raises interest as it enables a staged renovation approach through a long-term, step-by-step renovation roadmap for an individual building to improve its energy performance.

Objectives of this report

This report provides an analysis of the relevance, feasibility and possible scope of additional measures to support a BRP at EU level. The report aims to offer a balanced view and to highlight positive and negative aspects of different options and policy paths. It outlines a range of options for possible approaches at the EU and MS level for the possible adoption of BRPs. These options cover all possible measures, including non-legislative ones (e.g. supporting the exchange of best practices, promoting standards, guidelines, etc.), legislative ones (inclusion of dedicated provisions under the EPBD), and combinations of both.

The evidence derived from the first report of the feasibility study is used in this report. It concludes that, to be effective, BRPs should be integrated with and reinforced by other measures (e.g. simple access/use, financial support, communication). The most progressive and successful BRPs have combined renovation advice with financial support, legal requirements and/or communication campaigns.

Based on the existing findings, interviews with experts, available policy assessments and long-term renovation strategies, 33 relevant policy options were derived and evaluated in relation to the BRP (see Table 2). The policy options are categorised into regulatory, best practice exchange, communication, finance, guidance and training measures. Each policy option is assessed based on its potential impact and feasibility.

The most suitable policy options have then been used to derive six different policy packages (see chapter on Policy options) The aim is, however, not to perform a detailed evaluation of each policy option, but to present a first qualitative assessment of the policy packages, to evaluate whether the considered packages are feasible. The evaluation highlights the pros and cons of each policy package. The impact of the six

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6 Article 19a of the EPBD [2018/844]: “The Commission shall, before 2020, conclude a feasibility study, clarifying the possibilities and timeline to introduce the inspection of stand-alone ventilation systems and an optional building renovation passport that is complementary to the energy performance certificates, in order to provide a long-term, step-by-step renovation roadmap for a specific building based on quality criteria, following an energy audit, and outlining relevant measures and renovations that could improve the energy performance.”

7 Deliverable 4.1: Review of building renovation passport schemes and initiatives. The report has been published on the project website: EPBD19a.eu
policy packages will be analysed and modelled in the final report and presented/discussed at the stakeholder meeting in November 2019.

The first parts of the report discuss the BRP, including its definition and scope. Following that, the discussion focuses on the framework conditions, which includes barriers to deep renovation, structure and design of the concept, links with other instruments, as well as other relevant factors. The subsequent section outlines the suggested policy options. The final section describes

Next steps – Assessing the impact of the policy packages, including the impact assessment methodology.

**How to read these boxes?**

These grey boxes will show up throughout the report and highlight key lessons learnt.
1. The building renovation passport concept

The EPBD does not include a definition for a BRP, and no common definition exists in the EU. Existing examples differ in some key elements and in the terminology used. This section outlines a definition, for use in this feasibility study, based on the text in the amended EPBD, stakeholder input and existing research (including findings from iBRoad, Aldren, BPIE and IFEU).

Building renovation passport in the EPBD

Article 19a of the EPBD declares that the European Commission shall, before 2020, ‘conclude a feasibility study, clarifying the possibilities and timeline to introduce [...] an optional building renovation passport that is complementary to the energy performance certificates, in order to provide a long-term, step-by-step renovation roadmap for a specific building based on quality criteria, following an energy audit, and outlining relevant measures and renovations that could improve the energy performance’.

Article 2a(1)(c) of the EPBD provides that each LTRS ‘shall encompass policies and actions to stimulate cost-effective deep renovation of buildings, including staged deep renovation, and to support targeted cost-effective measures and renovation for example by introducing an optional scheme for building renovation passports’.

In the process of developing this report, a survey was shared with stakeholders to gather information on various focus areas, including how the BRP is perceived and what stakeholders think are important criteria for it. A question on the aspects a BRP should encompass, results of which are presented in Figure 5, reveals that the most favoured aspects focus on information on the current and future status of the building, staged renovation guidance and financial information, including energy costs and available loans/subsidies. Most stakeholders think the BRP should include information on health and comfort, while whole-life carbon emissions and the building’s smartness are considered less vital.
Examples from the field

- The Belgian Flemish Energy Agency has developed one of the existing BRPs. They do not use a definition for deep renovation but link the BRP to a long-term performance objective, stating that ‘existing buildings must achieve E60-level\(^8\) by 2050’ [8].

- The German federal authorities, responsible for another BRP, have not defined deep renovation but introduced a rule of the ‘best possible principle’. According to this principle, the energy expert must recommend the most ambitious option for each component of a particular renovation and justify any deviation from it. The measures ought to be compatible with the requirements of the KfW support scheme which ultimately leads to an efficiency level of around 30-40 kWh/m\(^2\)/yr of primary energy demand for a single-family house. If certain measures cannot achieve the best possible option, e.g. due to technical reasons, the auditor must

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\(^8\) According to Flanders’ energy efficiency legislation (EPB), a number of requirements in terms of insulation and ventilation are set and the overall energy efficiency of a new home is classified according to the so-called E-standard, with a low score indicative of a highly energy-efficient home. The standard for new buildings in 2016 is E60, corresponding to a primary energy demand for new and non-residential buildings of 100 kWh/m\(^2\)/y.
explain why they advised the owner to deviate from the best possible standard [8].

1.1. Proposed definition of building renovation passport

The definition presented below is based on the existing knowledge of stakeholder input and is only a recommendation of how a BRP could be defined and which features it should include. A definition of the common concept is necessary to assess its feasibility and potential impact.

Proposed definition of building renovation passport

A building renovation passport provides a long-term, tailored renovation roadmap for a specific building, following a calculation based on available data and/or an on-site audit by an energy expert. The instrument identifies and outlines deep renovation scenario(s), including steps to implement energy saving measures that could improve the building’s energy performance to a significantly higher level over a defined period of time. The instrument can be complementary to energy performance certificates and/or combined with digital logbooks.

1.2. Weighting the BRP components

Stakeholders have different views of what the scope of the BRP should comprise. While most stakeholders favoured including many aspects in the BRP, they also emphasised the importance of keeping the instrument economically and practically feasible.

A long-term, tailored renovation roadmap for a specific building to reduce its energy need is the primary purpose of the BRP. Several stakeholders think the concept should also incorporate aspects such as comfort, sustainability, accessibility and indoor environmental quality.

Figure 6 illustrates two layers of BRP components: central and complementary. The central components assist the building owners in their renovation process, while the complementary provide information on non-energy aspects. The layers have been derived from discussions with stakeholders, authorities that have implemented BRPs and technical experts.

9 The time of the roadmap could span from 5 to 20 years and the definition of the time horizon should be left to the implementing authority based on national/local conditions. The building owner can, of course, opt to implement all steps in one go.

10 See chapters: Linking the BRP with EPCs and Linking the BRP with a digital registry
### Lessons learnt

The BRP can be designed following a modular approach, allowing the implementation of the core components first and of the complementary elements at a later stage.

#### Complementary components

- **Quantification of CO₂**
- **Information on property value increase of certain renovation steps**
- **Information on how to replace hazardous material components with sustainable alternatives at each renovation step**

#### Central components

- **Recommendation for deep (staged) renovations, including cost indication**
- **Quantification of energy savings of potential measures**
- **Comparison of current and future energy use**
- **Recommendation on how to increase comfort and indoor environmental quality**

![Figure 6: BRP components](image)
2. Relevance of the building renovation passport

The relevance of the BRP refers to how well the instrument fulfils its overall objectives. The analysis discusses the BRP’s suitability for different building typologies and how it can alleviate key barriers to renovation by facilitating staged and one-step deep renovations. This section also includes an analysis of how BRPs can support Member States’ long-term renovation strategies.

2.1. The need to address barriers to deep renovation

The EU faces multiple barriers to improving the energy performance of the existing building stock. On the individual level, building owners also face multiple obstacles to improve the performance of their buildings. Together with high cost and difficulties in accessing finance, two of the most-often quoted barriers are the low awareness of the long-term benefits of renovation and the lack of knowledge about what to do, where to start, and which measures to implement in which order.

Our review of existing BRPs showed that the instrument can be effective in alleviating two of the main barriers: low awareness of the benefits of energy renovation and insufficient knowledge of what measures to implement and in which order. The analysis confirms that tailored renovation advice, together with other support measures, has an impact on the decision to renovate, the number of measures to implement, the performance level of the selected measures, as well as on what kind of measures to implement.

The BRP is a more comprehensive instrument than the EPC, as it provides tailored recommendations on how to achieve deep renovation over time for each individual building. Delivering a BRP may entail higher costs than delivering an EPC (e.g. additional training for the auditors and EPC certifiers) and if these additional costs are transferred to the building owners, they may become a barrier to its uptake.

Financial constraints are one of the main reasons why building owners choose less efficient solutions. The broad preference for suboptimal solutions hampers the long-term transition and makes the path to highly performing buildings more complicated. The review shows that long-term renovation advice, as provided by BRPs, can be used to better align the direction of private investments with the long-term vision for the building stock.

Table 1 displays the main relevant barriers related to building type and tenure, resulting from the stakeholder survey. All the results from the stakeholder survey can be found in the annexes.

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11 The rating is based on the results from the stakeholder survey, results from Deliverable 4.1, and existing research, including the EPBD Impact Assessment (SWD (2016) 414 final), which features a similar, but more general, ranking.
Table 1: Summary of the relevant renovation barriers by type and according to building category and tenure

<table>
<thead>
<tr>
<th>Type of barrier</th>
<th>Barrier</th>
<th>Residential</th>
<th>Non-residential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>Don’t know where to find the right information</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>Limited understanding of energy performance</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>Uncertainty of what to do and where to start</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>Financial</td>
<td>Cost of renovation is too high</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>Lack of attractive financial products</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>No energy savings guarantees</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>Other</td>
<td>Lack of time for renovation works</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>Low trust in installers/professionals</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>Too much hassle</td>
<td>**</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>Administrative barriers</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>Need to use the space (i.e. no room for renovation)</td>
<td>**</td>
<td>**</td>
</tr>
</tbody>
</table>

Lessons learnt
The BRP ought to be accompanied by an enabling policy framework to effectively alleviate these barriers

### 2.2. Building typologies and tenure

Energy performance and renovation potential can be affected by the tenure of buildings (social housing, private rental or private ownership) and the building type\(^\text{12}\) (single-family house, multi-family building, terraced house etc.). For example, some building tenures and types are more suitable for large-scale renovation programmes\(^\text{13}\), while others require a staged renovation approach. Figure 7 shows that the majority of buildings are residential single-family houses, which is a typology the existing BRPs have focused on [17].

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\(^{12}\) See the [TABULA webtool](#) for an overview of building typologies and their specific characteristics.

\(^{13}\) See, for example, [Energiesprong](#) in The Netherlands which offers large-scale, net-zero renovations for housing.
The answers from stakeholders show that most respondents (61%) think that the BRP can be useful for all building typologies because inappropriate renovation decisions can be made for all types of building. Other stakeholders considered the BRP most appropriate for residential buildings (single-family 26% and multi-family 23%)\textsuperscript{14}, arguing that the owners in these buildings generally have lower expertise than in commercial and public buildings. Figure 8 displays the full results.

The share of owner-occupied dwellings in the EU exceeds 70%; it ranges from 51.4% in Germany to 96.8% in Romania. While the existing BRPs target owner-occupied single-family houses, the BRP could be adapted to multi-family buildings. One of the benefits would be that the instrument helps owners to reach consensus on which energy saving measures to implement.

\textsuperscript{14} Multiple choices were allowed.
However, the largest information deficit about renovation is among single-family owners. It is relatively common for larger buildings (multi-family, commercial and public) to perform a detailed energy audit before detailing the renovation steps, while many single-family owners often make their decision by relying on the advice of friends and family members instead of building professionals.

### 2.3. Supporting staged and one-step deep renovation

There is a longstanding debate on whether the EU and Member States should favour one-step or staged deep renovation approaches. In the context of climate urgency and the need to drastically reduce energy consumption from the building stock, some stakeholders argue that the necessary path would be to renovate a large part of the building stock to a low-energy level in one step\(^1\). At the same time, excluding the possibility of staged renovations would increase the barrier for people to invest in any energy saving measure as it would increase the upfront cost\(^2\).

The BRP can facilitate both one-step and staged renovations by setting out the required measures and in which sequence they ought to be implemented. Staged deep renovation, consisting of several renovation steps spread over several years, can utilise relevant trigger points in the building life-cycle. The counterpart is one-step deep renovations, where all components are replaced with energy efficient alternatives at once [5]. Both variants – staged deep renovations and one-step deep renovations – have their advantages and disadvantages, which are presented below.

Most renovations today aim to renew one, or a few, part(s) of the building. A study by the German Federal Office for Building and Regional Planning (BBSR) reveals that only 6% of renovations are done in one step primarily due to high investment costs and disruption. Another study reveals that the rate is similar in Sweden at 5% [18]. In non-residential buildings, the share of one-step renovations is somewhat higher and amounts to 28% [5].

Existing BRPs do not favour one approach over the other. The building owner gets to decide if they prefer to implement the renovation steps in multiple stages or all in one go. The French Passeport Efficacité Energétique encourages the building owner to implement all measures in 2-3 steps, as it sees that too many steps might lower the final quality of the works.

Valid arguments support staged deep and one-step renovations (see Figure 9). When BRPs are introduced, it would be beneficial to design them to present both options, based on building typology and tenure, regulatory requirements, technical potential and the owners’ needs and financial capacity.

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\(^1\) [www.euractiv.com/section/energy/opinion/energy-efficient-buildings-why-meps-should-ban-the-staged-renovation-approach](http://www.euractiv.com/section/energy/opinion/energy-efficient-buildings-why-meps-should-ban-the-staged-renovation-approach)

The main arguments for **staged** deep renovation

1. Lower upfront cost enables more people to engage in energy renovations (that might lead to a low-energy level over time).
2. Carrying out renovation works at the time when certain building components (windows, boilers, etc.) must be replaced anyway due to completion of service life reduces costs (see section on trigger points).
3. Staged renovation enables flexibility and the possibility to incorporate measures that weren’t considered initially, such as additional rooms or space planning requirements.
4. Staged renovation allows the integration of new technologies that may not exist or have reached maturity when the renovation is initiated.
5. Staged renovation may not require the building to be completely vacated and regular activities can (partially) continue.
6. Staged renovation reduces overall carbon emissions due to usage of legacy equipment with the new systems.

The main arguments for **one-step** renovation

1. Lower risk of lock-in effects (e.g. the obstruction of highly efficient renovation measures because of recently performed low efficient measures) because of the possibility of integrated planning and implementation of the renovation.
2. The cumulative energy savings are higher in one-step renovation if it’s carried out immediately.
3. Overall quality of renovation is better in one-step renovation (better airtightness, less thermal bridges, systems dimensioned consistently with envelope performance).
4. Staged renovation can cause a larger inconvenience to the occupants due to multiple construction works on the building’s envelope.
5. Lower total investment costs as synergies arise, from scaffolding to site set-up to planning costs, along with being able to scale heating equipment to lower capacities.
6. Greater ability to assess work quality and building performance than after a partial renovation (blower-door test not relevant if the building envelope is only partly renovated).
7. Indoor environmental conditions can be improved more effectively than in staged renovation.

**Figure 9: Arguments for staged and one-step renovations (elaboration based on IFEU compilation)**

**Lessons learnt**

One-step deep renovations can achieve energy savings faster than staged renovation, but supporting policies for deep staged renovation could be introduced and made available to guarantee the same level of savings over time, e.g. financial schemes promoting staged deep renovation with the condition that the renovation follows the steps outlined in a BRP and is completed within an agreed number of years.

**2.4. Link with long-term renovation strategies**

One original feature of BRPs is the integration of a long-term perspective. If an outer wall is insulated today, it will not be renovated again in the near future. Buildings that have been partially restored, but with insufficient depth, will likely not be renovated again before a decade or two. This is because the successive renovation steps are usually less economical due to the now lower monetary saving potential [1]. Based on the current status of the building, BRPs can display how the building could be transformed in the short, medium and long term.

Article 2a of the **EPBD** requires EU countries to adopt a long-term renovation strategy (LTRS), which ‘support the renovation of the national stock of residential and non-residential buildings, both public and private, into a highly energy efficient and decarbonised building stock by 2050, facilitating the cost-effective transformation of existing buildings into nearly zero-energy buildings.’ The strategies must include an overview of the building stock, a long-term roadmap to 2050 and an identification of policies to achieve the objectives set out.
BRPs could support long-term renovation strategies by (i) providing public authorities with information on the building stock and which type of renovation measures are primarily needed, (ii) assisting policymakers in identifying the most effective policies and financial incentives to increase the quality and volume of deep renovations, (iii) providing the market, financial institutions and investors with a long-term projection on the type of refurbishments to be implemented.

**Lessons learnt**

BRPs could support the preparation and implementation of LTRS by providing data on the status of the building stock and the renovation measures mostly needed. This would be possible if BRPs were designed to feed this information to Member States (e.g. via a database) and make it accessible at any given moment.

### 2.5. Integrating the BRP into existing and new frameworks

#### 2.5.1. Linking the BRP with EPCs

Energy performance certificates (EPCs) were introduced by the EPBD in 2002 [2002/91/EC] with the aim to make the energy performance of individual buildings more transparent. The EPBD recast in 2010 [2010/31/EU] reconfirmed and strengthened the instrument by introducing independent quality control of EPCs, penalties for non-compliance, the obligation to display the energy label in advertisements, a mandatory requirement to hand out a copy of the EPC in sale and rent transactions and improvement of renovation recommendations (cost-effective and cost-optimal measures).

A BRP can be viewed as an evolution of the EPC, as it not only indicates the energy performance of a building and gives recommendations on renovation, but it also supports building owners with personalised suggestions and a more detailed renovation roadmap. The BRP function could be included as an optional add-on to the EPC or be automatically integrated, as done in Flanders where they use existing building data to develop the BRP renovation steps.

The Flemish BRP is a direct continuation of the existing EPC scheme and other Member States (most notably France and Ireland) are exploring the possibility to evolve their EPCs in the same direction. In Germany, there is no link between the federal BRP and the country’s EPC framework. Instead, the BRP has been linked to their energy audit framework. The building owner gets an EPC as an automatic by-product of the BRP.

Most stakeholders think the BRP should be an expansion of the EPC framework (36% said it should be linked and 39% would link them if the quality of the existing EPC framework was perceived as effective).

**Lessons learnt**

The BRP should be coupled with existing EPC frameworks where it’s feasible to do so. The existing EPC ‘infrastructure’ can be used to introduce and facilitate the use of BRPs, including relying on, and additional training for, building professionals issuing EPCs. In some Member States, the BRP is more complementary to an audit framework (such as Germany) or other renovation advice framework.

Linking the BRP with existing databases and registries can be an opportunity to re-evaluate existing schemes and improve them to ensure the information provided to building owners is up-to-date and tailored to their needs (e.g. building on a static instrument like EPC to deliver a more suitable instrument for renovations over time).
2.5.2. Linking the BRP with a digital registry

The BRP can be combined with a repository of building-related information (i.e. a logbook) on aspects such as the energy consumption and production, executed maintenance and building plans. This provides several functionalities to the building owner that could go beyond energy performance. The type of information stored in the logbook and its functionalities can evolve over time and could range from energy production and consumption to equipment maintenance, as well as insurance, property plans and obligations, energy bills, smart meter data and links to available financing options for renovation projects (e.g. green loans, incentives, tax credits).

Combining the two concepts can support public authorities in fulfilling reporting requirements and in developing new policies and financial instruments. Data concerns are discussed further in the following sections. Flanders and Portugal are developing their EPC and BRP schemes to directly support the objectives of their long-term renovation strategies. In doing so, public authorities will be able to not only gather information on the energy transition of each building, but also modify policies and financial support according to market developments (such as changes in renovation rate). Integrating the BRP with a digital logbook and linking it to financial schemes and existing one-stop-shops are potentially effective solutions to further enhance these positive synergies.

The Flemish energy agency sees the benefits of integrating the renovation roadmap (titled EPC+) with a logbook (titled Woningpas):

- The incorporation of the renovation roadmap in the logbook creates higher visibility for the instrument. The renovation roadmap is not a static piece of paper but always consultable in the logbook (i.e. the digital registry). As people can consult the logbook for other reasons (e.g. questions about the environment), they also get information on energy.
- The renovation advice in the EPC will be interactively combined (from autumn 2019) with available premiums tailored to the citizen at the time of logbook consultation.
- The information can be continuously updated, including the costs for implementing certain renovation measures. As the cost varies over time, this enables a more accurate prediction.
- The building owner will be able to update the implementation of the renovation through the logbook. The owner can indicate which steps he/she has already carried out and which steps he/she plans to carry out in the coming years.
- In the future, there may be renovation obligations in Flanders, whereby a new owner has the obligation to fulfill a number of measures within five years after purchasing the home. The BRP will provide a list of steps to follow and the logbook would help to keep track of their implementation and follow-up.
- The logbook simplifies the administrative requirements. After indicating that certain work has been completed (and after proving it with relevant documents, such as invoices), the premiums/financial supports can be automatically requested or paid out.

Lessons learnt

The BRP can be developed independently of a logbook. If developed in parallel, the EC could provide public authorities with guidance and a forum for best practice exchange on how to couple the two instruments.
3. Feasibility of the building renovation passport

The feasibility section comprises an assessment of the practicality of implementing the BRP, including the related costs, the need for an enabling framework and data protection and privacy issues.

3.1. Bearing the cost of a building renovation passport

Producing the BRP itself comes with a cost, which mainly comprises labour costs, administration and data management. For example, the cost for producing the EPC has been an obstacle for implementing the entire framework [19]. As with EPC, the BRP should be produced at a reasonable price to meet its expectations. It can be difficult for implementers to find a good balance between cost and quality.

In terms of allocating the responsible actor to cover the cost of the BRP, there are several design framework possibilities: the cost could be covered by the building owner (e.g. paying a fee for the on-site visit), through the repayment of an energy efficiency loan/mortgage, or they could be covered or subsidised by whoever offers the service (e.g. a public authority or a private company).

Examples from the field:

- In Germany, a subsidy is available for the iSFP, run by the Federal Office for Economic Affairs and Export Control (BAFA), under the ‘Energieberatung vor Ort’ programme. This programme grants subsidies of up to 60% for an on-site audit (maximum €800 in single and two-family buildings, €1100 up from three dwellings)¹⁷.
- In France, for the time being, the on-site visit is free of charge, but different options are considered for the future, including introducing a fee of a maximum €400, or recovering costs via financing programmes. If a fee were to be introduced, the project managers foresee exceptions for vulnerable groups, such as low-income households, to alleviate an additional access barrier.

Analysis of existing schemes and initiatives shows that building owners are rarely willing to fully pay for a BRP. According to a survey done by the French Shift Project, building owners are on average willing to pay around €105 for a BRP. Our survey showed that most stakeholders (39%) thought €200-€500 was a reasonable cost for a BRP for a single-family house, followed by €50-€200 (22%) and €500-€1000 (19%).

Lessons learnt
Encourage Member States to subsidise the cost for the development of the BRP to a level where it becomes attractive to building owners. The subsidy can be reduced when the instrument has penetrated the market. Quality of the BRP is crucial to gain trust for the instrument and its usability.

¹⁷www.bafa.de/SharedDocs/Kurzmeldungen/DE/Energie/Vor_Ort_Beratung/20170512_sanierungsplan.html
3.2. The need for an enabling framework

The lack of sufficient competence and skills in the workforce is one of the main barriers to effective implementation of BRPs. Another obstacle is to make BRPs an attractive option for building owners, which initially probably requires public funding to bring down the cost.

3.2.1. Competence and skills to carry out deep renovations

The transition to a low-carbon economy will require higher skills in the renovation value chain, including energy experts, contractors and installers. In order to ensure the effective implementation of the solutions provided by BRPs, the schemes should be accompanied by a clear plan, establishing which skills are needed for the workforce and how they are going to be acquired. The analysis of existing schemes and initiatives reiterates this, as several project managers highlighted that the lack of skilled auditors/construction workers is a main hurdle. An increase in demand for deep renovations needs to be matched with a supply of a skilled workforce.

A report published by the European Construction Observatory states that 3 million construction workers in Europe need to increase their skills in energy efficiency and renewable energy in the coming years. The report concludes that ‘obstacles to the development of skills include structural barriers, such as the low predictability of the industry and structural fragmentation, which leads to short-term employment and limited incentives for long-term investment in the workforce skill base. The construction industry suffers from a negative image, being considered tiring, unattractive, unproductive and having low-service orientation.’ [1]

3.2.2. Competence and skills to carry out a BRP

When considering the introduction of BRP, an analysis of the skills needed to deliver this tool is needed, to ensure that experts issuing renovation roadmaps are properly trained to do so. Developing a BRP might require additional abilities or perspectives from the energy expert. The difference between issuing an EPC and conducting an energy audit is that a renovation roadmap requires considering the long-term perspective of the building (up to 20 years). The energy expert should be able to explain the different steps in a long-term staged renovation process. Proper training of energy experts is essential for the effectiveness of BRPs: auditors/experts often follow specific routines and while they usually have an excellent technical knowledge, their ability to clearly communicate with their clients is a weak spot. The required ‘new’ skills include building energy modelling, elimination of lock-in effects, comfort and risk assessment (thermal comfort, IAQ, etc.), knowledge of how measures interact, cost evaluation, as well as communication and motivational skills.

Two of the central skills are explained below:

- **Knowledge of renovation works and their interaction**
  
  To conduct successful BRPs, auditors need to develop their skills in building energy modelling to accurately model the impact of renovation measures. They will need to develop knowledge on the technical specification of renovation works by attending trainings and by examining the physical mock-ups (on-site or off-site).
• **Knowledge of renovation lock-in effects**
  
The policy support, technical specifications, availability of products, adequate financial mechanisms and optimal sequencing will be assessed by auditors when preparing a BRP and also adequately avoiding any lock-ins (renovation interventions that prevent a better intervention in the future). This aspect is particularly critical in staged renovation approaches.

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**Lessons learnt**

The success of the implementation of the BRP is dependent on an increase in competence and skills of the construction workforce. Policymakers could support this through, for example:

- Introducing policies and measures to support training activities, development of guidelines and other support material.
- A quality framework for development of a BRP, in which the expert provides a declaration of conformity to the client, which he/she can use to receive subsidies for the work.

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### 3.2.3. Data protection and privacy

Data privacy and security are protected by EU legislation (most notably under the General Data Protection Regulation (GDPR)) and every development regarding the addition of confidential information to a digital document will have to adhere to this regulation. The GDPR is designed to harmonise privacy laws in the European area, to protect and ensure the privacy of all European citizens and to reform the European approach to data privacy. The scope of the GDPR is securing the processing of personal data by wholly or partially automated means as well as the processing by non-automated means of personal data contained in filing systems or intended to form part of a filing system.

The data privacy and ownership aspects relevant when setting up a BRP, or related logbook, can be summarised as follows:

- **Confidentiality:** Ensuring that the information can only be seen by authorised people. When properly achieved, confidentiality prevents unauthorised access to restricted data in an organisation. An organisation can enforce confidentiality by implementing access controls, such as authentication and encryption.
- **Integrity:** Ensuring that the information cannot be changed or removed without authorisation. An organisation needs to validate that the data, while in transit or at rest, has not been modified from its original state. Digital signatures and encryption help maintain data integrity.
- **Availability:** Ensuring that only authorised people can access information when needed. Data and access to data must be available and resistant to single points of failure. Data backups, redundant disks and multiple network connections help ensure availability\(^\text{18}\).

**Examples from the field**

- In Flanders, building owners have access to the logbook (Woningpas), which comprises the BRP, through their electronic ID card. In the future, building

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\(^{18}\) The Horizon 2020 project iBRoad discussed privacy issues related to the BRP and especially the logbook. Read more here: [https://ibroad-project.eu/news/the-logbook-data-quest](https://ibroad-project.eu/news/the-logbook-data-quest)
owners will have the opportunity to grant access to public authorities and third parties, such as buyers, tenants, architects, experts, contractors, lawyers and real estate agents. The use of blockchain technology is also being considered to facilitate a smooth and safe exchange of information. Building owners can, and are encouraged to, expand Woningpas data with information on investments and energy savings (for example from invoices, adoption of grid premium for energy-saving investments) by uploading supporting documents. For instance, after each investment, owners may decide to update energy performance on the basis of evidence and information on the performance of the installed equipment or installations. This enables public authorities to monitor the path towards the long-term target for the building stock and assists them in planning and implementing their long-term renovation strategy [8].

- In Germany, the building owner is provided with a hard copy of the BRP. If the building owner sells the estate, there is no automatic procedure to hand over the roadmap to the buyer, nor is there any right to request this document. The iSFP is owned solely by the building owner, meaning that no commercial activities can be linked with the roadmap [8].

**Lessons learnt**

While legislation exists in the EU to ensure building owners’ data privacy, a guidance document clarifying existing rules and options to ensure proper data protection would be useful for public authorities that are designing and implementing BRPs and aiming to link them with external registries, like EPC databases.
4. Additional factors influencing the building renovation passport

This chapter presents considerations about how key elements of the BRP design and implementation can influence its impact. The first part outlines three key elements of BRP frameworks, including how to reach building owners, data collection requirements and technical framework for building modelling. The second part discusses how the roadmap is delivered to the customer, including number of renovation steps, link to renovation trigger points and degree of personalisation.

4.1. Three key elements of BRP frameworks

The analysis of existing schemes and initiatives shows that BRPs are generally based on three key elements: the initial contact with building owners, data gathering procedures and the technical modelling.

4.1.1. Reaching out to building owners

Communication campaigns are needed to make people interested in deep renovations in general but specific and targeted communication and marketing campaigns to promote BRPs are also necessary to make sure building owners will seek them out when deciding to renovate. The review of existing cases also showed that one-stop-shops and local advice centres play a key role in getting homeowners interested in energy renovations.

The majority of homeowners do not consult an expert before deciding which renovation measure to implement. A local authority representative said that ‘people are not interested in the BRP simply because they don’t know about it’.

Lessons learnt

Develop guidelines and set up best practice exchange forums to assist interested Member States and local authorities to integrate the BRP in existing renovation advice venues.

4.1.2. Data collection requirements

The BRP can be developed based on various data inputs, including an extensive energy audit (as done in Germany) or based on existing data, as in Flanders. A BRP that is primarily based on an on-site audit is likely more accurate than one based on available data, such as EPCs, user-inserted information or automated data (house templates, construction norms, climate data, etc.). On the other hand, gathering on-site data is more expensive.

On-site data gathering is the first source of information for the BRP. To generate a successful process for data gathering, some key aspects should be considered: make

19 An Ipsos survey of the potential BRP users in Portugal, Bulgaria and Poland shows that homeowners are most likely to trust friends, family and colleagues for advice on renovation measures [18]. Consulting energy experts is more common for non-residential buildings.

20 Interview (by email) with local implementer of the federal BRP in Germany.
the tool simple for the auditor, generate value for the building owner and use the data in a smart way. For example:

- Create a checklist for the energy expert: the German iSFP, P2E and the Danish BetterHome model supply their energy experts with comprehensive checklists on how to conduct the on-site visit, what information to collect and what to ask the building owner. The expert fills in simple checklists on the state of the building, the information is then fed into an online application to calculate energy savings and indoor air quality improvement depending on different packages of measures. Furthermore, the installer can easily extract a renovation proposal for the building owner based on the information gathered [9].

- Integrate automation as much as possible: this involves uploading building information in defined templates online, which can include utility bills, building components (e.g. technical details, age etc.), building operation (e.g. number of occupants, occupancy schedules, etc.) and equipment and lighting details. Data is collected in an online repository that can be automatically accessed by energy experts for analysis and energy modelling.

How the required data is collected has an impact on cost. Until now, the cost of BRP schemes based mainly on on-site audits is higher than the costs of other BRP schemes. The average cost for a German BRP, which uses on-site data, starts at €900 for a single-family house, compared with €400 for the French P2E and €200-€400 for the Flemish EPC+, which require less data from on-site audits.

Experts conclude that other important determinants for the cost are how many times the auditor visits the site and how much the owner is willing to pay [13]. Existing BRP schemes show that it might be necessary to visit the site more than once (a second time to explain the results and details of the BRP and maybe also a follow-up check).

**Lessons learnt**

The BRP could be based on a combination of available data and an on-site check, in order to find a balance between quality and cost. Available and automatically gathered data based on climatic region, building typology and other attainable information could save the auditor/expert time on-site and thus save money. To save time and further reduce costs, the homeowner can be asked to prepare as much as possible in advance (energy bills, building plans, etc.), if the information is not available in a public registry.

**4.1.3. Technical framework for building modelling**

As a starting point for the technical modelling of the BRP, the expert generally models the building as it is today using thermo-physical values of the building envelope, heating demand, occupancy schedules, efficiency of the heating system, etc. Some of this data can be derived from the EPC register but should be checked and possibly updated. If not available or not up to date, the expert needs to assess the existing building components (insulation, heating system, occupancy, etc.), and other necessary technical data. If available and accepted, the expert can use a national calculation/simulation software, which calculates the energy demand of the building

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21 Data templates help arrange and synthesise the information.
22 The cost for the regional BRP in Baden Wuertemberg is €750, not including the €200 state subsidy. The cost for the federal iSFP is even greater.
based on the national calculation procedures (building code, etc.). If a national calculation software is not available, the expert needs to find another solution\textsuperscript{23}.

The expert conducts a simulation and compares the calculated annual energy demand with the actual energy consumption and carries out an adjustment in input values (calibration) so that the model mirrors the actual building situation as much as possible. Based on this calculation, the final and primary energy demand, the actual energy costs, the CO\textsubscript{2} emissions and the EPC label of the building can be derived accurately [11]. Using monthly energy consumption over a representative period (e.g. at least one year) can enhance modelling reliability.

Based on the state and condition of the building, and potentially in combination with the wishes and preferences of the building owner and individual trigger points (such as children moving out, financial availability, etc.), the expert defines the energy demand of a set of renovation packages to be implemented in a specific sequence.

Currently, there is no common EU framework that would ensure these steps are consistently followed in the BRP schemes that exist.

**Lessons learnt**

Set up a European common reference framework to ensure a high quality of simulation using the national calculation tool/simulation software. If the EU is to provide guidelines for BRPs, the technical modelling is a central aspect to be covered. It would also enable comparison across the EU.

### 4.2. How is the renovation roadmap delivered to the customer?

BRPs are intended to provide detailed and individualised renovation advice to building owners. The evaluation of existing BRPs showed that effectiveness partly depends on interactions with building owners. In the end, they are the users of the instrument. This chapter discusses some of the key aspects, including the number of renovation steps, trigger points, personalisation of the concept and privacy issues.

#### 4.2.1. The number of renovation steps

After compiling all required data and evaluating how to achieve the highest level of energy performance, the expert informs the owner of envisioned renovation steps, based on the target energy performance level that the owner wishes to achieve over a defined period of time indicated in the BRP.

The list of renovation measures provided to the owner outlines the performance parameters such as reduction in energy demand, ease of application, related costs and time required. In addition to the main parameters, other impacts of renovation measures must be given, like improvement of indoor air quality, thermal comfort, reduction in noise etc. Depending on local conditions, design and preferences of the owner, the number of renovation steps can vary.

In most of the existing BRPs, the number of renovation steps is not settled before the energy expert discusses with the building owner and/or visits the site. In the German federal renovation roadmap, the number of renovation packages/steps is decided by the energy auditor (see illustration in Figure 11). In the French Passeport Efficacité

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\textsuperscript{23} The H2020 iRoad project is developing a simple streamlined techno-economic calculation tool that can be used for this purpose.
Energétique, they encourage a BRP that includes only 2-3 steps, as they see that too many steps might lower the final quality of the works.

 Lessons learnt
The number of renovation steps should be decided jointly by the energy expert and the building owner. The number of steps can be defined for each building based on specific technical aspects and the financial plan of the building owner.

4.2.2. Linking energy renovation to ‘trigger points’

Trigger points are key moments in the life of a building when carrying out energy renovations would be less disruptive and more economically advantageous than in other moments. The EPBD [2010/31/EU] clarifies that a ‘trigger point’ is ‘an opportune moment in the life-cycle of a building, for example from a cost-effectiveness or disruption perspective, for carrying out energy efficiency renovations’. The EC recommendations state that a trigger point could be: (a) a transaction (e.g. the sale, rental or lease of a building, its refinancing, or a change in its use); (b) renovation (e.g. an already planned wider non-energy-related renovation); or (c) a disaster/incident (e.g. fire, earthquake, flood).

Linking energy-efficiency renovation with trigger points should ensure that energy-related measures are not neglected or omitted at a later stage in the life-cycle of the building. Focusing on energy efficiency at trigger points should limit the risk of missing opportunities to renovate and increase possible synergies with other actions [20]. Aligning renovation advice with (foreseeable) trigger points may require the need to train energy experts to identify/consider trigger points when issuing a BRP.

Lessons learnt
BRPs could have greater impact if available or produced when a trigger point occurs, as they could provide ready-to-use guidance to owners. Where possible, the renovation steps in the BRP could also be aligned with certain trigger points.
4.2.3. **Personalisation of BRPs**

Existing BRPs support building owners with personalised instructions on their renovation options. Personalised recommendations and advice allow a more tailored approach based on the property’s energy usage, the way it is occupied and used. In Germany, the building owner is put at the very centre of the BRP development process and the individual approach, including in-depth dialogues between the building owner and the energy auditors, is considered key.

**Challenges of a personalised approach**

- The BRP becomes more expensive, as discussions with the owners are relatively time consuming and it becomes harder for the auditor to recycle advice.
- Harder to transfer the BRP to new owners of the building [8].

**Advantages of a personalised approach**

- More effective in incentivising investment in renovation works.
- The possibility to adapt the recommendations to the users’ energy behaviour.

**Lessons learnt**

The BRP should foresee a certain level of customisation and input from building owners should be integrated in the BRP plan. One advantage of combining advice tailored to each specific building with advice tailored to its owner(s) and linked to behaviour and other external factors is that in case of sale, only the personalised part needs updating.
4. Policy options

Based on the review of existing BRP schemes and initiatives, and an analysis of related policies, 33 policy options for the introduction of BRPs have been identified. The identification of these policies is based on stakeholder input\(^{24}\), expert interviews\(^{25}\) and desk research\(^{26}\). The policy options are divided into six categories: regulatory, communication, best practice exchange, financial, training and guidance. They are further divided into direct and supporting policy options.

Direct policy options correspond to the different ways BRP schemes could be established in the EU: (i) let Member States decide whether to design and implement the instrument without any specific guidance, (ii) introduce an EU-wide common reference framework, or (iii) incorporate BRPs as a requirement under the EPBD. Supporting measures are those that complement the direct measure (e.g. financial instruments, regulatory requirements, training of auditors or guidance documents).

The identified policy options are expected to be effective in supporting the uptake of BRP as an instrument to enable higher rate, depth and quality of renovations in Europe. The full analysis is available in Annex 3, including an analysis of potential impacts, existing case studies and an appraisal of the feasibility for the EU to implement the specific policies.

The policy options have been derived as measures to be introduced at the EU level, but they could be used by national and local authorities to select options suiting their specific conditions.

Based on the 33 policy options, six policy packages have been developed. Each of the packages consists of one direct policy option and a number of supporting policy options. Each of the three direct policy options described above has been included in two policy packages, one with a ‘soft’ and one a ‘stringent’ approach. Accompanying supporting measures have been tailored to the direct measure and the ambition level of the specific package.

Table 2 below summarises the selected policy options. The first three measures are direct, while the others are supportive.

\(^{24}\) Stakeholders have been involved through a stakeholder meeting in Brussels in June 2019, an extensive online survey mid-2019 and an informal workshop at the eceee summer study early June 2019.

\(^{25}\) The EPBD19a team has been in contact with national implementers and experts from France, Germany, Belgium, Ireland and Portugal.

\(^{26}\) The desk research comprises a review of European directives, most notably the EPBD and EED, national long-term renovation strategies and evaluations of policies and strategies at EU, national and local levels.
Table 2: Policy options

<table>
<thead>
<tr>
<th>Code</th>
<th>Direct/ supporting</th>
<th>Voluntary (V), Mandatory (M)</th>
<th>Type of measure</th>
<th>Policy options</th>
<th>Related measures</th>
</tr>
</thead>
</table>
| R.1  | Direct             | V                           | Regulatory     | Design and implementation of BRPs entirely left to MS | a) Do nothing  
b) Use LTRS to encourage uptake of BRP  
c) Encourage the BRP through EPBD Article 20(2) |
| R.2  | Direct             | V                           | Regulatory     | Introduce a common EU reference framework for BRPs | a) The EC to publish guidelines or recommendations on how MS can introduce the BRP  
b) The EC to publish guidelines or recommendations on how MS can introduce the BRP, including mandatory core features  
c) Introduce a CEN standard for the implementation of the BRP |
| R.3  | Direct             | M                           | Regulatory     | Incorporate BRPs as a requirement under the EPBD | a) Expand Article 11 of the EPBD to incorporate BRPs  
b) Develop the BRP as a new separate requirement and link with EPC frameworks |
| B.1  | Supportive         | V                           | Best practices exchange | Establish a forum for best practices exchange | a) Set up a new BRP forum for MS (similar to EPBD-CA and EMA network)  
b) Encourage local best practices exchange fora through existing initiatives, including Covenant of Mayors and Energy-Cities  
c) Establish a forum as part of the CA EPBD |
<p>| C.1  | Supportive         | V                           | Communication  | Support regional energy advice centres and one-stop-shops | Encourage MS’s operational programmes (conveying funds from CF, ERDF and ESF) - or other financial programmes - to support regional energy advice centres |
| C.2  | Supportive         | V                           | Communication  | Communication campaign | Encourage national/regional communication campaigns increasing awareness of the BRPs, including where to get a BRP, its benefits and costs |
| C.3  | Supportive         | V                           | Communication  | Align local and national bodies providing renovation support | Develop a communication ‘network’ of bodies/actors providing renovation support/advice services |
| C.4  | Supportive         | V                           | Communication  | Explore how the BRP can support building experts and public authorities | Fund a study exploring how the BRP can simplify and benefit the work for professionals, including automated support and simplified administration requirements |
| F.1  | Supportive         | V                           | Finance        | Couple BRP to property purchase taxes | a) Develop guidance on how the BRP could be integrated into existing taxation policies, such as the property purchase tax. The size of the tax could be contingent on the EPC rating and/or the existence of a BRP |
| F.2 | Supportive | V | Finance | Encourage progressive funding - or tax support - for packages of measures (or individual measures) as recommended by the BRP |
| F.3 | Supportive | V | Finance | Encourage MS/regions to introduce a financial bonus that is triggered when a certain percentage of stages in the BRP have been implemented. For example, the bonus could consist of a lump sum handout when the first recommendation(s) of the BRP is completed; or could foresee the reimbursement of the cost of issuing the BRP once two steps have been realised. |
| F.4 | Supportive | V | Finance | Encourage MS to set up a bonus-malus system for building. As a bonus, highly efficient buildings could be exempt from certain property taxes. The malus is an extra fee on energy inefficient buildings, defined based on the energy demand/EPC rating. Getting a BRP could lead to a deferment of the malus. |
| F.5 | Supportive | V | Finance | Subsidise the cost of preparing/issuing a BRP for a given building |</p>
<table>
<thead>
<tr>
<th></th>
<th>Supportive</th>
<th>V</th>
<th>Finance</th>
<th><strong>Introduce a new financial scheme incentivising MS/regional authorities to launch a BRP</strong></th>
</tr>
</thead>
</table>
| F.6 | V | Introduce a new financial scheme incentivising MS/regional authorities to launch a BRP | a) Direct certain EU funds (ERDF, CF, EEEF, Invest EU, Elena, Horizon Europe) to assist MS, and regional authorities, in setting up BRP frameworks  
  b) Link certain EU funds (ERDF, CF, EEEF, Invest EU, Elena, Horizon Europe etc.) to BRPs and related initiatives. |

<table>
<thead>
<tr>
<th></th>
<th>Supportive</th>
<th>V</th>
<th>Finance</th>
<th><strong>Incentivise energy efficiency improvements of existing buildings through preferential financing conditions linked to loans and mortgages.</strong> BRPs can improve the availability of data for valuers and lenders and ensure that renovation works are planned and implemented in a technically sound manner.</th>
</tr>
</thead>
</table>
| F.7 | V | Incentivise energy efficiency improvements of existing buildings through preferential financing conditions linked to loans and mortgages. BRPs can improve the availability of data for valuers and lenders and ensure that renovation works are planned and implemented in a technically sound manner. | a) Encourage MS to explore if/how existing funds can be used to set up financial support schemes linked to the use of BRPs  
  b) EU Commission establish a technical assistance facility for BRP implementation  
  c) Set out a clear definition of an Energy Efficient Mortgage to enable banks to differentiate between energy efficient and conventional mortgages in their risk management processes  
  d) The EU Commission to promote this practice, either as part of a communication exercise or in regular activities linked to best practice (meetings, publications, etc.). |

<table>
<thead>
<tr>
<th></th>
<th>Supportive</th>
<th>V</th>
<th>Finance</th>
<th><strong>Encourage banks to offer lower interest rate on loans taken for measures linked to a BRP</strong></th>
</tr>
</thead>
</table>
| F.8 | V | Encourage banks to offer lower interest rate on loans taken for measures linked to a BRP | a) Encourage MS to explore if/how existing funds can be used to set up fiscal support schemes linked to the use of BRPs  
  b) EU Commission establish a technical assistance facility for lower interest rate for deep renovation steps  
  c) Develop guidelines on how to support and enable banks to lower the interest rate for loans linked to the BRP |

<table>
<thead>
<tr>
<th></th>
<th>Supportive</th>
<th>V</th>
<th>Finance</th>
<th><strong>Link BRP to the annual property tax. A certain part of the property tax could be dependent on the building’s energy efficiency level. Issuing a BRP could lead to lower tax level.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>F.9</td>
<td>V</td>
<td>Link BRP to the annual property tax. A certain part of the property tax could be dependent on the building’s energy efficiency level. Issuing a BRP could lead to lower tax level.</td>
<td>Develop guidance on how the BRP could be integrated into already existing taxes, such as the property tax</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Supportive</th>
<th>V</th>
<th>Finance / regulatory</th>
<th><strong>Set BRP as prerequisite for certain financing</strong></th>
</tr>
</thead>
</table>
| F.10 | V | Set BRP as prerequisite for certain financing | a) Encourage MS to explore if/how existing funds can be used set up financial support schemes linked to the use of BRP  
  b) EU Commission establish a technical assistance facility for BRP implementation  
  c) Develop guidelines on how to design financial subsidies linked to BRPs |

<table>
<thead>
<tr>
<th></th>
<th>Supportive</th>
<th>V</th>
<th>Guidance</th>
<th><strong>Develop guidelines on how to integrate the BRP into EPC, energy audit and renovation advice schemes</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>G.1</td>
<td>V</td>
<td>Develop guidelines on how to integrate the BRP into EPC, energy audit and renovation advice schemes</td>
<td>Develop guidance document, including step-by-step advice and best practices, outlining how a BRP can be integrated with existing frameworks</td>
<td></td>
</tr>
<tr>
<td>G.2</td>
<td>Supportive</td>
<td>V</td>
<td>Guidance</td>
<td>Develop guidelines on interoperability of BRP databases, as well as data protection for public authorities wishing to store and utilise BRP data</td>
</tr>
<tr>
<td>G.3</td>
<td>Supportive</td>
<td>V</td>
<td>Guidance</td>
<td>Develop guidelines on how to integrate BRP with one-stop-shop services</td>
</tr>
<tr>
<td>G.4</td>
<td>Supportive</td>
<td>V</td>
<td>Guidance</td>
<td>Develop guidelines for public authorities on local, regional and national level</td>
</tr>
</tbody>
</table>
| G.5 | Supportive | V/M | Guidance/regulatory | Introduce a combined approach for the BRP and the digital logbook | a) Introduce the requirement of a digital logbook in the next EPBD revision  
b) Develop a guidance document outlining how a BRP can be combined with a digital logbook |
| G.6 | Supportive | V/M | Guidance | Issuing a BRP can lead to compliance with certain obligations, such as an energy efficiency and renewable heating obligation | Develop guidance on how the BRP could be coupled with energy efficiency and renewable obligations |
| R.4 | Supportive | V | Regulatory | Introduce BRP in energy efficiency obligation schemes | Amend article 7 of the next Energy Efficiency Directive to make BRPs, and other advice instruments, acceptable as eligible EEO measures |
| R.5 | Supportive | M | Regulatory | Make the BRP mandatory for all buildings with EPC from class E and below by 2030, which could be regularly strengthened | a) Introduce requirements in the next EPBD revision  
b) Encourage MS to implement requirements at national level (e.g. as part of their LTRS) |
| R.6 | Supportive | M | Regulatory | BRP mandatory for every building sold after 2030 | a) Introduce requirements in the next EPBD revision  
b) Encourage MS to implement requirements at national level (e.g. as part of their LTRS) |
| R.7 | Supportive | M | Regulatory | Buildings with EPC below class E can only be sold/rented if certain BRP steps have been implemented by 2030 | a) Introduce requirements in the next EPBD revision  
b) Encourage MS to implement requirements at national level (e.g. as part of their LTRS) |
| R.8 | Supportive | M | Regulatory/guidance | Define long-term renovation targets in national building regulations, comprising an automatic tightening of renovation requirements from 2030 | a) Introduce provision in next EPBD requiring MS to align and regularly update national building regulations to long-term renovation targets  
b) Develop guidance on how to include long-term aspects in regulatory approaches |
| R.9 | Supportive | M | Regulatory | Establish minimum energy efficiency standard (MEES) for energy renovations | Introduce requirements in the next EPBD revision defining a primary energy demand threshold for buildings above |
The BRP is more than just an advisory tool for building owners. Its main component, the long-term staged-renovation plan, can also be integrated into other policy instruments. For example, support programmes or tax credits can integrate elements of a BRP in various ways. The BRP can, for example, be a prerequisite for being granted a higher subsidy level for certain renovation measures.

The review of existing BRPs concluded that most of the successful BRPs have combined renovation advice with financial support, legal requirements and/or communication campaigns. The review showed that the BRP ought to be integrated with and reinforced by other elements (e.g. simple access/use, financial support, communication) in order to be effective. The example below illustrates how Germany supports its federal BRP with supportive policies at federal and regional levels.
Example from the field: German policies supporting the building renovation roadmap

The German building renovation roadmaps, the ‘Sanierungsfahrplan Baden-Württemberg’ (SFP BW) and the ‘individueller Sanierungsfahrplan’ (iSFP) at federal level, are embedded into a supportive policy framework. Figure 12 shows the existing policies sub-divided by typical categories of instruments.

Figure 12: Embedding policy framework for German building renovation roadmaps

One approach that is being discussed in Germany is improving funding conditions in case a BRP is available to further boost the interest. This would be coupled with the new support schemes that are currently developed as part of the ‘support scheme strategy’ of the Federal Ministry of Economic Affairs. Some stakeholders suggest the renovation roadmap as a prerequisite for funding individual renovation measures with tax reliefs [4].

Role of mandatory measures

Mandatory measures are in general more effective than voluntary measures, however they can be harder to implement (e.g. these measures could face lower social acceptability).

- Advantages include increased effectiveness, if designed and implemented properly, and the obligation to monitor and enforce mandatory provisions tends to provide better data for evaluation. In addition, evaluation can be used to adjust the mandatory measure to ensure greater effectiveness and better impacts.

- Among the disadvantages, the trusted relationship between the auditor and the client tends to be lower when the relationship is not optional.

Three of the six policy packages (presented in the next chapter) propose mandatory measures.
Role of financial measures

Although some energy efficiency improvements can be made without significant investments, reaching significant levels of energy savings through renovation and the installation of measures and equipment requires substantial funding. The review of existing BRPs revealed that aggregating and streamlining financial support (e.g. grants and loans) is a necessary condition to make deep renovations viable and attractive to building owners. Even when building owners are aware of the benefits that energy renovations deliver, energy improvements are rarely prioritised.

Financial constraints are the main reason for people not to renovate and the explanation to why innovative one-stop-shops analysed in this study have not conducted more than 100-1,800 deep renovations each. Financial constraints are also the main reason why building owners choose less efficient solutions. However, the availability of cheap and reliable long-term finance alone might not be enough to incentivise renovation; the review shows that targeted renovation advice which increases awareness is needed to better align the direction of private investments.

The financial measures included in this analysis include measures that incentivise people to get a BRP (e.g. subsidising the cost of a BRP) and measures that incentivise them to carry out the renovation steps outlined in the BRP (e.g. a bonus that is triggered when a certain percentage of steps – or savings – in the BRP have been implemented).

Three out of the six policy packages include one or several financial measures.

Role of other enabling measures

Some measures play a more accompanying role (e.g. disseminating information, training of energy experts/auditors and raising awareness) without themselves directly aiming to increase renovation activities. For methodological reasons, at this stage of the study, it is not possible to assign a specific effect to such measures. However, even these non-quantified measures make a substantial contribution to the objectives of the policy packages. Without these, the forecasted impact would be lower.

All policy packages (excluding the reference option) feature a communication campaign and training of energy experts, which both are enabling measures.

4.2. Policy packages

Measure tree

The ‘measure tree’ below outlines the six policy packages. The six direct measures are presented in the first horizontal row, while the supportive measures are presented in the second vertical column. The supportive measures are presented in groups, with coding (e.g. R.1 = Regulatory policy 1) that can be retrieved in Table 2). The vertical green highlighted areas show which policy groups are included in that specific policy package.
<table>
<thead>
<tr>
<th>Type of measure</th>
<th>Group of measures - code</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voluntary</td>
<td>Encourage BRP in LTRS (EPBD art. 2a)</td>
<td>R.1 R.1 R.1 R.1</td>
</tr>
<tr>
<td>Voluntary</td>
<td>Introduce awareness programme to promote renovation advice - C.1-C.4</td>
<td>C.2 C.2 C.2 C.2 C.2 C.2</td>
</tr>
<tr>
<td>Voluntary</td>
<td>Qualification and training programmes for energy experts and auditors - T.1 - T.2</td>
<td>T.2 T.2 T.2 T.2 T.2 T.2</td>
</tr>
<tr>
<td>Voluntary</td>
<td>Encourage MS to set up financial support schemes linked to BRP - F.1-F.6</td>
<td>F.5 F.5 F.3, F.5 F.3, F.5</td>
</tr>
<tr>
<td>Voluntary</td>
<td>Encourage financial institutions to link services (loans, mortgages etc.) to BRPs - F.7-F.9</td>
<td>F.8 F.8</td>
</tr>
<tr>
<td>Voluntary</td>
<td>Set up a forum of best practices exchange of BRP design and implementation - B.1</td>
<td>B.1</td>
</tr>
<tr>
<td>Voluntary</td>
<td>Develop a guidance document outlining how a BRP can be combined with a logbook - G.7</td>
<td>G.7 G.7 G.7</td>
</tr>
<tr>
<td>Voluntary</td>
<td>Support BRP through regional energy advice centres and one-stop shops - C.1, G.3</td>
<td>C.1, C.3</td>
</tr>
<tr>
<td>Voluntary</td>
<td>Develop a guidance document on how to integrate the BRP into existing energy audit schemes - G.1</td>
<td>G.1 G.1 G.1</td>
</tr>
<tr>
<td>Mandatory</td>
<td>Create a common EU framework for certification of building experts carrying out BRPs - R.10</td>
<td>R.10</td>
</tr>
<tr>
<td>Mandatory</td>
<td>Introduce minimum energy efficiency standard for renovation - R.9</td>
<td>R.9</td>
</tr>
<tr>
<td>Mandatory</td>
<td>Make BRP mandatory for certain building segments (EPC rating, buildings for sale etc.) after 2030 - R.5 - R.6</td>
<td>R.6 R.5, R.6</td>
</tr>
<tr>
<td>Mandatory</td>
<td>Buildings with EPC below class D can only be sold if step 1-2 of renovation roadmap implemented by 2030 - R.7</td>
<td>R.7</td>
</tr>
</tbody>
</table>
The six policy packages plus the reference option are presented below. Each policy package includes a short explanation of the rationale of the selected supportive policies and an indication of strengths, weaknesses, potential impact and feasibility.

**Policy package option 0: No change (reference option)**

**Rationale:** The reference option assumes that:
- No additional regulation or formal guidance to support the introduction of BRPs from the EC is provided, but that Member States will move forward with the implementation of the EPBD.
- Supportive measures, such as sharing good practices, facilitated by existing exchange platforms (e.g. EPBD Concerted Action and Energy and Managing Authorities Network) will continue their work.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strength (+)</td>
<td>Minimal effort required from EU and MS. No additional administrative procedures.</td>
</tr>
<tr>
<td>Weakness (-)</td>
<td>Limited impact/missed opportunity.</td>
</tr>
<tr>
<td>Potential impact</td>
<td>Low. Implementation will proceed in frontrunner countries, with few additional followers.</td>
</tr>
</tbody>
</table>
Policy package option 1: Leave design and implementation to MS (soft)

Rationale: Policy package option 1 assumes that:
- The decision to implement and how to design the BRP is fully left to the Member States.
- The EU supports the uptake of the instrument through a number of supportive measures and actions:
  o Guidelines and best practice exchange on how the BRP can support the objectives of the LTRS. The requirement for EU countries to adopt LTRS is set out in Article 2a of EPBD. These strategies will support the renovation of the national stock of buildings into a highly efficient and decarbonised building stock by 2050 and a cost-effective transformation of existing buildings into nearly zero-energy buildings. Among other things, the strategies must include ‘policies and actions to stimulate cost-effective deep renovation of buildings’.
  o EU supports Member States which have or are planning to implement a BRP by making funds, such as European Energy Efficiency Fund or European Fund for Strategic Investments, available for BRP development and implementation (i.e. to subsidise the cost of the BRP preparation).
  o Support national/regional communication campaigns to increase awareness of the BRPs.
  o Introduce and support training of energy experts.

<table>
<thead>
<tr>
<th>Strength (+)</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS can tailor the instrument to the needs of their specific market. Supportive measures provide clear incentives for adoption.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weakness (-)</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>The BRPs will be developed in different directions. Risk that some BRP frameworks won’t be optimally designed and comparison with other schemes will be difficult. Synergies across borders will be limited.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Potential impact</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low. The policy package will inspire additional MS to explore the instrument. The impact from these will be modest without additional support.</td>
<td></td>
</tr>
</tbody>
</table>
Policy package option 2: Leave design and implementation to MS (stringent)

Rationale: Policy package option 2 assumes that:
- The decision to implement BRP and how to design it is fully left to Member States.
- The EU supports the uptake of the instrument through a number of supportive measures and actions:
  - Guidelines and best practice exchange on how the BRP can support the objectives of the LTRS (as in policy package 1).
  - Support national/regional communication campaigns to increase awareness of the BRPs.
  - Introduce and support training of energy experts.
  - EU supports Member States which have or are planning to implement a BRP, by making funds, such as European Energy Efficiency Fund or European Fund for Strategic Investments, available for BRP development and implementation (i.e. to subsidise the cost of the BRP preparation).
  - Introduce in the next EPBD a requirement stating that BRP becomes mandatory for certain building segments (EPC rating, buildings for sale etc.) after 2030.
None of the supportive measures contradict Member States’ right to design the instrument.

MS decide whether to design and implement BRP

No regulation or formal guidance from EU level

Supportive measures from EU

<table>
<thead>
<tr>
<th>Show how BRP can support LTRS (EPBD art. 2a) preparation and objectives – R.1</th>
<th>Increase awareness through national/local communication campaigns – C.2</th>
<th>Introduce training programme for energy experts – T.2</th>
<th>Encourage MS to set up financial support schemes linked to BRP – F.5</th>
<th>Develop guidelines on how banks can offer favourable interest rate for loans/mortgages – F.8</th>
<th>Make BRP mandatory for certain building segments after 2030 – R.6</th>
</tr>
</thead>
</table>

Variable | Result
--- | ---
Strength (+) | MS can tailor the instrument to the needs of their specific market and supportive measures provide clear incentives for adoption. The introduction of a BRP obligation (mirroring EPC requirements) in the next EPBD would impose a long-term perspective in the market.
Weakness (-) | The BRPs will be developed in different directions. Risk that some BRP frameworks won’t be optimally designed and comparison with other schemes will/could be difficult.
Potential impact | Moderate.
Policy package option 3: Introduce a common reference framework (soft)

Rationale: Policy package option 3 assumes that:

- The EU introduces a common reference framework, that comprises detailed guidelines and/or recommendations outlining how Member States can develop and implement a BRP but doesn't include minimum requirements for the Member States.
- The EU supports the uptake of the instrument through a number of supportive measures and actions:
  - Guidelines and best practice exchange on how the BRP can support the objectives of the LTRS (as in policy package 1).
  - Support national/regional communication campaigns to increase awareness of the BRPs.
  - Introduce and support training of energy experts.
  - Establish a forum as part of the CA EPBD to exchange best practices.
  - Guidance documents on how to integrate the BRP into EPC and existing audit schemes BRP, and how it can be combined with a digital logbook.
  - Encourage Member States to set up and support regional energy advice centres, including one-stop-shops.
  - Guidelines on how banks can offer a favourable interest rate for loans/mortgages.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strength (+)</td>
<td>The common reference framework enables a more consistent development of BRPs across the EU. MS can still tailor the instrument to their specific market but are empowered by information and guidance documents.</td>
</tr>
<tr>
<td>Weakness (-)</td>
<td>Lack of minimum requirements allows for ineffective BRPs.</td>
</tr>
<tr>
<td>Potential impact</td>
<td>Moderate/high. The BRPs would, on average, reach a higher and homogeneous quality, but many MS could opt out of the scheme and its impact be limited.</td>
</tr>
</tbody>
</table>
Policy package option 4: Introduce a common reference framework (stringent)

Rationale: Policy package option 4 assumes that:
- EU introduces a common reference framework, which includes mandatory requirements of what the instrument should include. The mandatory requirement defines the core features of BRP, which could include links to EPC, target nZEB renovation level, prepared by qualified experts.
- This is supported by:
  o An expansion of Article 17 of the EPBD, to introduce a common EU certification framework for EPC/BRP certifiers to enhance quality of both instruments.
  o Support national/regional communication campaigns to increase awareness of the BRPs.
  o Introduce and support training of energy experts.
  o Guidelines and best practice exchange on how the BRP can support the objectives of the LTRS (as in policy package 1).
  o Guidance documents on how to integrate the BRP into EPC and existing audit schemes, and how it can be combined with a digital logbook.
  o EU supports Member States which have or are planning to implement a BRP, by making funds, such as European Energy Efficiency Fund or European Fund for Strategic Investments, available for BRP development and implementation (i.e. to subsidise the cost of the BRP preparation)
  o Encourage Member States/regions to introduce a bonus that is triggered when a certain percentage of stages in the BRP have been implemented.

| Introduce a common European reference framework for the BRP |

Guidance how MS can introduce the BRP, incl. minimum requirements on what the instrument should comprise

<table>
<thead>
<tr>
<th>Variable</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strength (+)</td>
<td>The common reference framework enables a more consistent development of BRPs across the EU. MS can tailor the instrument to their specific market but need to include certain aspects.</td>
</tr>
<tr>
<td>Weakness (-)</td>
<td>Many MS would not adopt the instrument if it is perceived as too costly.</td>
</tr>
<tr>
<td>Potential impact</td>
<td>High.</td>
</tr>
</tbody>
</table>
Policy package option 5: Incorporate BRPs as a requirement under the EPBD (soft)

**Rationale:** Policy package option 5 assumes that:

- The EU actively promotes the idea of a BRP as complementary to the EPC and proposes its introduction to reinforce EPCs in the next EPBD review\(^\text{27}\) in 2026.
- This activity is supported by:
  - EU supports Member States which have or are planning to implement a BRP, by making funds, such as European Energy Efficiency Fund or European Fund for Strategic Investments, available for BRP development and implementation (i.e. to subsidise the cost of the BRP preparation).
  - Support national/regional communication campaigns to increase awareness of the BRPs.
  - Introduce and support training of energy experts.
  - Guidelines on how to support and enable banks to offer a favourable interest rate on loans/mortgages which are linked to a BRP.
  - Encourage Member States to introduce progressive funding – or tax support – for packages of measures (i.e. renovation steps) as recommended by the BRP.
  - Encourage Member States/regions to introduce a bonus that is triggered when a certain percentage of stages in the BRP have been implemented.
  - Guidance documents on how to integrate the BRP into EPC and existing audit schemes, and how it can be combined with a digital logbook.

### Incorporate BRPs as a requirement under the EPBD

Expand Article 11 of the EPBD to incorporate BRPs

### Supportive measures for the EU

<table>
<thead>
<tr>
<th>Supportive measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encourage MS to set up financial support schemes linked to BRP</td>
</tr>
<tr>
<td>Increase awareness through national/local communication campaigns</td>
</tr>
<tr>
<td>Introduce training programme for energy experts</td>
</tr>
<tr>
<td>Guidelines on how banks can offer a favourable interest rate for loans/mortgages</td>
</tr>
<tr>
<td>Encourage MS to introduce progressive funding for packages of measures recommended by the BRP</td>
</tr>
<tr>
<td>Encourage MS to set up a bonus that is triggered when certain steps of the BRP are accomplished</td>
</tr>
<tr>
<td>Set up a forum of best practices exchange of BRP design and implementation</td>
</tr>
<tr>
<td>Guidelines on how BRP can be integrated with EPC and combined with a digital logbook</td>
</tr>
</tbody>
</table>

### Variable | Result
--- | ---
**Strength (+)** | All MS would expand their EPCs with a renovation roadmap. Several MS are exploring this option already.

**Weakness (-)** | Next EPBD review is in about seven years and it might not lead to a revision of the directive. MS with ineffective EPC framework must improve the whole system prior to expanding it.

**Potential impact** | Moderate.

\(^{27}\) A review does not have to lead to a revision of the directive.
Policy package option 6: Incorporate BRPs as a requirement under the EPBD (stringent)

Rationale: Policy package option 6 assumes that:

- EC actively promotes the idea of BRP as complementary to the EPC and proposes its introduction to reinforce EPCs following the next EPBD revision.
- Support national/regional communication campaigns to increase awareness of the BRPs.
- Introduce and support training of energy experts.
- The provision is also supported by new EPBD requirements, including:
  - Introduce minimum energy performance requirements for energy renovation, going beyond the current EPBD requirement for ‘major renovations’.
  - BRP mandatory for every building sold after 2030.
  - BRP mandatory for all buildings with EPC from class D and below by 2030 and regularly strengthened after that (e.g. class C by 2035 etc.).
  - Buildings with EPC below class E can only be sold if steps 1-2 of renovation roadmap implemented by 2030.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strength (+)</td>
<td>The mandatory supportive measures would drive demand for deep renovation, while the BRP would include the guidance and know-how. Clear indication to the market that it would have to adapt, including training of experts, innovative construction methods etc.</td>
</tr>
<tr>
<td>Weakness (-)</td>
<td>Renovation obligations can come with unexpected consequences. Energy-poor people are at risk and should be supported through other measures.</td>
</tr>
<tr>
<td>Potential impact</td>
<td>High</td>
</tr>
</tbody>
</table>
5. Next steps – Assessing the impact of the policy packages

5.1. Impact assessment methodology

The aim of the impact assessment model to be developed within Task 6 is to simulate the impacts of implementing the six policy packages in the EU. The impacts will include, among others, energy savings, CO₂ emissions trajectory, employment, level of investments mobilised, etc.

A three-step approach will be followed to estimate the impact of the policy packages in large-scale implementation. These steps have been defined undertaking certain assumptions.

Step 1: Quantification of the impact per building renovation passport scheme
First, the effects of BRPs will be quantified. Based on evaluations of energy consultations, results of existing BRP schemes and experts’ estimations, the impacts per BRP will be estimated. For example, the BRP can lead to energy savings stemming from different effects:

- Increase in renovation rate (at least at a component level, e.g. more windows or boilers replaced, more walls insulated, etc.) due to higher awareness of the benefits of energy efficiency and the available financial options.
- Increase in renovation depth due to better information made available to building owners, making the decision to invest in deep renovation easier (more renewables, better U-values, less lock-in effects, etc.).
- More impactful measures compared to similar investments – again, because owners are better informed.
- Faster/earlier realisation of savings (anticipated renovation steps).

Step 2: Regionalisation of these savings
As data from existing BRP schemes is limited, it will be necessary to make assumptions in order to predict their impact on a larger scale. The assumptions will include extrapolation, regional matching (based on available historical datasets of neighbouring countries), monetary matching (based on available data of countries with similar GDP per capita) and consultation with experts. Assumptions will also include improvement due to learning curves (e.g. decrease in cost per renovation, as the number of renovated cases increases).

Step 3: Definition of policy packages
The final step will be to define the policy packages based on information from existing BRP schemes, where we will set reasonable upscale rates, depending on available audits, possible financial support from Member States, etc.
5.2. Impact categories

The potential impact of the BRPs will be assessed by modelling, where possible, their impact on some of the following categories:

- Energy savings (percentage reduction in energy use)
- Energy cost savings (percentage reduction on annual energy costs)
- CO₂ emissions trajectory (tonnes of CO₂ emitted)
- Total investment costs for policy packages (investments required by Member States) (million €)
- Annual investments in building renovations (investments from building owners) (million €)
- Share of renewables (impact on heat pumps, solar PV, etc.)
- Multiple benefits (health and productivity)
- Fuel imports
- Employment.

Depending on the results from the research under tasks 4 and 5, and the input from stakeholders, the impact categories could be further developed.
Annexes

Annex 1: Survey results

Main results on-line survey
77 Respondents from 22 countries

Type of stakeholder – maximum two choices

Geographical expertise/skills of respondents

Stakeholders scope of interest/expertise

Geographical scope of interest/expertise:

City or local level  Country level  EU level  Global
Which of the following initiatives, related to the concept of the building renovation passport, are you familiar with?

How important are the following aspects for a building renovation passport?
Barriers to renovations according to respondents

What are the main barriers preventing building owners from investing in renovations?

Indicate what effect you think building renovation passports could have on:
How important do you consider each factor in increasing investments in deep energy renovations?

A building renovation passport...
Annex 2: Deep renovation definitions

The EPBD does not provide definitions of 'deep renovation', 'step-by-step renovation' or 'deep staged renovation'. There are several ways to define deep renovation, step-by-step renovation and deep staged renovation. Some are presented below.

Deep renovation

- The Energy Efficiency Directive [2012/27/EU] states that the long-term renovation strategies\(^{28}\) should ‘address cost-effective deep renovations which lead to a refurbishment that reduces both the delivered and the final energy consumption of a building by a significant percentage compared with the pre-renovation levels leading to a very high energy performance. Such deep renovations could also be carried out in stages.’

Deep renovation is a process enabling the full potential of a building to reduce its theoretical energy demand by a careful planning of the renovation to avoid the installation of lock-in measures. Deep renovation can be approached with the following methods:

a) Percentage of energy savings realised

b) Maximum energy performance

c) A selection of energy-saving measures to be executed.

For the European Commission\(^ {29}\), deep renovations typically achieve more than 60% energy savings compared to pre-renovation levels.

According to the Global Buildings Performance Network, deep renovation combines approaches a) and b). ‘Deep Renovation or Deep Energy Renovation is a term used for a renovation that captures the full economic energy-efficiency potential of improvement works, with a main focus on the building shell, of existing buildings that leads to a very high energy performance. The renovated buildings’ energy reductions are 75% or more compared to the status of the existing buildings before the renovation. The primary energy consumption after renovation, which includes, inter alia, energy used for heating, cooling, ventilation, hot water and lighting after the deep renovation of an existing building is less than 60 kWh/m²/a\(^ {30}\).’

- The Flemish Energy Agency (VEA), which has developed one of the existing BRPs, does not use a definition for deep renovation, but refers to a long-term efficiency objective: existing buildings must achieve the E60-level by 2050. This corresponds to 100 kWh/m² gross surface, combined with a series of mandatory requirements (measures and installations). Users can choose how to combine these elements based on their individual needs and preferences.

- The Shift Project in France, the developer of P2E, one French BRP, defines deep renovation as the renovation of a given dwelling reaching a high level of efficiency in one go – the objective is to achieve a Bâtiment Basse Consommation

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\(^{28}\) Between 2014 and 2017, EU Member States submitted strategies to show how they plan to foster investment in the renovation of residential and commercial buildings. These strategies were an obligation under Article 4 of the Energy Efficiency Directive and part of their National Energy Efficiency Action Plans. With the Clean Energy for all Europeans package, the requirement was revised, enforced and transferred to Article 2a of the EPBD.


\(^{30}\) GBPN Definition: www.gbpn.org/reports/what-deep-renovation-definition.
(BBC; low-energy building) level of renovation, equivalent to 80kWh/m² of primary energy per year, including heating, hot water and cooling.

- Germany has not defined deep renovation, but introduced the ‘best possible principle’. According to this principle, the efficiency level that the building stock has to reach on average is equivalent to the KfW’s Efficiency House 55 (corresponding to about 30–40 kWh/m²/yr of primary energy consumption for a single-family house). As a general rule, the auditor has to recommend the most ambitious standards and options for each component of a particular building. If this is not possible, he/she has to explain why they advise the owner to deviate from the best possible standard.

- Finland defines deep renovation in its long-term renovation strategy (2017) as follows: ‘a renovation is extensive if the total costs of repairs relating to the external walls and roofs of technical systems of a building based on reconstruction costs exceed 25 percent of the value of the building, excluding the value of the building land. In connection with an extensive renovation, anyone undertaking repairs must demonstrate that the measures selected are at a cost-optimal level.’

- Greece defines deep renovation in its long-term renovation strategy (2017) as a renovation that decreases the energy need by at least 60%.

**Staged renovation**

In the EED guidebook published by the Coalition for Energy Savings, staged renovation is described as follows: ‘the successful implementation of a staged-renovation requires the definition of a holistic renovation plan to avoid that any stage of the renovation increases significantly the overall costs, or precludes subsequent stages, in the course of the standard renovation cycle. This renovation plan will look at the building as a whole (including envelope, control systems, technical systems and equipment), and define the sequence of the renovation stages with a view to reach the final goal (the significant reduction of energy consumption).’

The EuroPHit project defines staged renovation as: ‘A master plan [that] can be tailored to fit the needs of the building and/or its owners/users. For example, it could specify the replacement of various components at various points in time or go façade by façade. However the plan is composed, it should define the type, quality and order of measures to be taken. The reward for steps carried out following an integrated plan: a futureproof, comfortable, sustainable building with consistently low running costs.’

**Deep staged renovation**

No definition of ‘deep staged renovation’ exists but the Flemish and French cases do elaborate on the subject:

- The Flemish authorities expanded the EPC with a renovation roadmap. Together with the stakeholders in the Flemish Renovation pact, a concept note was set up and approved by the Flemish government, in which the requirements of the enhanced EPC were described: ‘The standard recommendations from the current EPC will be replaced by recommendations fit to the specific dwelling. These recommendations will describe the renovation works and investments, needed to renovate the dwelling in line with the long-term goals of 2050’.

- Staged deep renovation in France has the same efficiency target as deep renovation, but renovation can be paced out over a longer time horizon. According to P2E, this approach has the advantage of limiting upfront costs and
allowing building owners to plan their renovation over time. On the other hand, the risk of lock-in effects and consequent lower comfort improvement is higher.

**Annex 3: Policy list**

Provided as an Annex to the EU Commission.
References


