

OUR BUILDINGS 
Long-term Strategies for
Deep Energy Retrofitting

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EU ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE – GUIDANCE FOR PUBLIC OFFICERS

Navigating new requirements for renovation strategies

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The opinions put forward in this paper are the sole responsibility of the authors and do not necessarily reflect the views of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

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Introduction

The Clean Energy for all Europeans policy package led to the revision of several key pieces of legislation related to the renovation of buildings. Most notable was the revision of the EU Energy Performance of Buildings Directive (EPBD) ([Directive \(EU\) 2018/844](#)). This now sets a clear direction for the full decarbonisation of the European building stock by 2050. This is a step change, with a clear goal and tools to achieve that vision, including strengthened provisions for national renovation strategies and supporting measures. The revised EPBD (2018) was published in the Journal of the European Union on June 19, 2018 and entered into force on July 9, 2018. In addition, the Governance Regulation ([Regulation \(EU\) 2018/1999](#)) set new requirements in terms of planning and reporting for national renovation strategies as part of National Energy and Climate Plans (NECPs). It entered into force on 14 December 2018.

By 10 March 2020, Member States must provide their new renovation strategy to the European Commission. This should also include details on progress with implementation of the current strategy, which should have been provided to the European Commission in 2017. The strategy will need to be updated by June 2024 as part of the integrated NECPs (under the Governance Regulation), and a further new and updated version is required by January 2029 as part of the second NECPs. The Governance Regulation stresses the importance of stakeholder exchange and consultation in various ways. Besides the specific reporting requirements set out for the long-term renovation strategies and the NECPs, it also foresees nationally organised multilevel climate and energy dialogues as well as regional cooperation. This creates opportunities to link renovation strategies to other national, regional and local initiatives and facilitates synergies.

Figure 1 Timeline of requirements for new renovation strategies



Attention is now moving to implementation. National renovation strategies were first introduced in 2012 by the EU Energy Efficiency Directive (EED). This latest revision moves the requirement from the EED to the EPBD to align with other aspects concerning the energy performance of buildings. It strengthens the requirement with special attention to worst-performing buildings, split-incentive dilemmas and market failures, energy poverty and all public buildings.

However, implementation is rarely straightforward and comes with challenges. The assessment of the existing national strategies for Romania and Bulgaria shows that improvements were needed to meet the existing requirements [1]. Now that there are new requirements, this is an opportunity to strengthen and improve these strategies to ensure they not only meet the requirements but provide

strong tools to support the transition into a highly energy-efficient and decarbonised building stock by 2050.

This guide provides guidance to support and inspire public officers to improve national renovation strategies. It accompanies the templates for national and local renovation strategies developed for Romania and Bulgaria in 2019. Updates and new publications can be found on the [project's website](#).

Snapshot of new requirements according to the revised EPBD

The new requirements build on the current ones. According to the revised text (article 2a) of the EPBD, each Member State must prepare a new long-term roadmap that includes:

- Milestones (indicative) for 2030, 2040 and 2050
- Explanation of contribution to the overall EU energy efficiency target for 2030
- Overview of the national building stock
- Expected share of renovated buildings in 2020
- Approaches to renovation relevant to the building type and climatic zone, including potentially relevant trigger points
- Policies and actions to stimulate cost-effective deep renovation of buildings, including staged deep renovation, for example by introducing an optional scheme for building renovation passports
- Policies and actions to target the worst-performing segments of the national building stock, split-incentive dilemmas and market failures
- Actions that contribute to the alleviation of energy poverty
- Policies and actions to target all public buildings – this links to the requirement in the Energy Efficiency Directive to renovate 3% of central government buildings every year
- Initiatives to promote smart technologies and well-connected buildings and communities
- Initiatives to promote skills and education in the construction and energy efficiency sectors
- An estimate of expected energy savings and wider benefits, such as those related to health, safety and air quality.

Multiple Benefits of Renovation

Implementing renovation strategies brings many benefits. Impacts including economic benefits, health benefits, increases in comfort, reduction in fuel poverty and climate protection can be important drivers for implementing renovation strategies. The wider benefits are not only relevant on a macroeconomic scale but bring positive change for individual citizens. They are therefore relevant for municipalities to focus on. Examples exist of municipalities investing the savings gained through deep renovation of public buildings into community projects, such as in education or healthcare facilities [2].

Studies show that for each €1 million invested in energy efficiency, 8 to 27 jobs are created per year, while improvements in energy efficiency support GDP growth rates from 0.25% to 1.1%. The benefit-cost ratio of energy-efficiency renovation can be as high as 4:1 when quantified health and well-being impacts such as reduced illness and better indoor comfort are included in the assessments. One of the

most important impacts is the reduction of CO₂ emissions. Carbon emissions in the building sector across the EU could be reduced by 71-90% by 2050. Also, productivity gains are considerable. Proper energy renovation will result in 11-23% less sick leave and performance gains of about 12% among individual employees [3] [4].

The new European legislation is meant to help in drafting renovation strategies targeting specific issues such as split-incentive dilemmas or fuel poverty to realise the wider benefits of energy renovation. For all benefits to unfold in practice, renovation strategies should be as ambitious as possible and aim for deep renovation. Most importantly, they should be designed in a way that facilitates implementation and reduces hurdles for implementers at the local level.

Guidance on developing long-term renovation strategies

This guidance, which builds on previous guidance published by BPIE¹ [5] and the new requirements in the EPBD, runs through the steps that should be taken and content that should be included to meet the new requirements and produce a thorough and successful strategy. Where there are specific areas that need to be addressed in Bulgaria and/or Romania, these are highlighted in boxes. Examples have been included from individual sections of existing strategies and measures being implemented by different Member States that can be considered good practice.

The list of elements to include in the renovation strategy, as set out in the Directive, provides a basic content outline. This has been structured to follow the phases of development and implementation – Figure 2. The time to set up a renovation strategy varies according to local and national circumstances and existing processes and capacities. For the national level, at least one year should be allowed for the whole process to secure an adequate technical and economic appraisal as well as proper participation of stakeholders.

Figure 2 Structure of a renovation strategy

Section 1 Overview of the national building stock

- Providing a bottom-up view of different building typologies

Section 2 Approaches to renovation

- Considering energy efficiency, renewable energy, passive and district energy measures

Section 3 Socio-economic assessment

- Assessing and quantifying the benefits and costs of packages of measure to assess cost-effectiveness and determine a prioritised set of measures

Section 4 Policy assessment

- Reviewing barriers to renovation and assessing the potential of policies (including those listed in the Directive)

Section 5 Policy package

- Including:
 - Milestones for 2030, 2040 and 2050
 - Package of policy and measures
 - Funding and financing needs and sources

Annex 1 Implementation progress report

- Report on the implementation of planned policies and actions in 2017 renovation strategy

Annex 2 Consultation summary

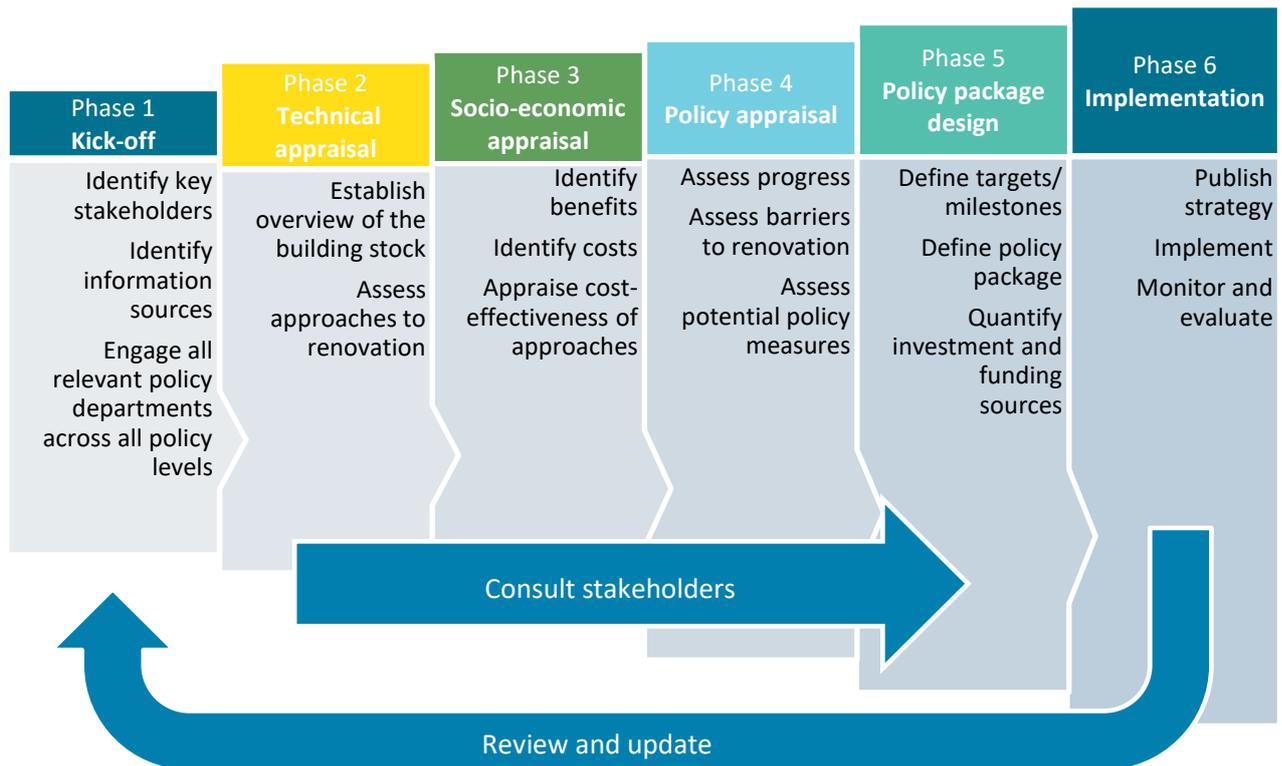
- Summarising the results of public consultation into the long-term renovation strategy

¹ BPIE also supported the development of the renovation strategy in Romania, publishing a report in 2014 [26].

Table 9 at the end of this chapter provides a full structure which can be used as a template for the basis of a national long-term renovation strategy.

The key steps in developing a renovation strategy can be divided into six phases, with stakeholder consultation throughout the process, and the feedback loop to review and update the strategy regularly (Figure 3).

Figure 3 Phases in developing a renovation strategy



National challenges and differences may mean that some steps are undertaken in a different order. The phasing is a suggestion to ensure all elements are covered systematically and thoroughly.

Some of the content and the steps may also have been previously covered by planning and reporting required as part of commitments under the Covenant of Mayors and Sustainable Energy (and Climate) Action Plans (SE(C)APs). Guidance from the EmBuild project provided an overview of the links between SE(C)APs and national renovation strategies under the EED [6].

Phase 1: Kick-off

Planning and preparation are vital to the creation of a good strategy. Identifying stakeholders and sources of information is an important first phase.

A strategy development team should gather key representatives from government ministries across all the relevant policy departments, including those responsible for energy, the building/housing sector, industry, economy, finance and health, and nominate a clear lead. It is also important to

engage across all policy levels, meaning not only national level, but also regional, provincial, municipal, city and local levels. Delivering national strategies will require detailed action plans at sub-national levels, while successful policies and implementation experience at regional and local level can also inspire national level policies.

Identifying stakeholders early ensures involvement and input from external stakeholders such as housing/building experts, the finance community, representative industry bodies, civil society and tenant and owner associations. This phase is also important given the new requirement to consult on the strategy prior to publication. This stage should identify which stakeholders to engage, and how best to engage them and take the first step in engagement². The following sub-chapter explains more on stakeholder engagement and consultation.

In addition, data and information gathering at this stage will underpin the subsequent phases. This means identifying sources of information on the building stock and reviewing available literature and studies on barriers to renovation and the effectiveness of existing or previous renovation initiatives. Gathering this information is also important in developing measures to target the worst-performing segments of the national building stock, which is a new requirement of the EPBD 2018.

ROMANIA: recognition of good practice at the local level and links between all national strategies

Many cities in Romania have developed tools to monitor energy consumption in public buildings as a basis for sustainable action plans for monitoring, analysis and reporting. This model could be used as first step in preparing a good strategy.

Other strategies that touch on the topic of renovation and/or buildings should be linked to the national renovation strategy to ensure a coherent and strategic approach to renovation.

For Romania this means that the national renovation strategy should link to the policies and approaches set out in national strategic documents, such as the Romanian energy strategy 2019-2030 with an outlook to 2050; the Romanian sustainable strategy 2030; the Programme for Improving Energy Efficiency at the local level in accordance with the Law no.121/2014 on Energy Efficiency.

² The Build Upon² Horizon 2020 project (buildupon.eu) encouraged structured collaboration between renovation stakeholders and national renovation strategies.

BULGARIA: links between all national strategies

The national renovation strategy should link to other strategies that touch on the topic of renovation and/or buildings to ensure a coherent and strategic approach to renovation.

For Bulgaria this means that the policies and approaches set out in national strategic documents should be considered and incorporated (where appropriate) in the national renovation strategy, and vice versa. This means that the energy and CO₂ emissions savings planned from building renovation should be integrated in the higher-level planning documents through a bottom-up approach. More specifically, the realistic outcomes from building renovation should be linked to the National Energy Efficiency Action Plan (which should be subordinated to the National Energy Strategy). As regards the residential sector, the renovation programmes (for example, the National Programme for Energy Efficiency in Multifamily Residential Buildings) should be linked to the National Housing Strategy (now in preparation).

Consulting stakeholders

Consulting with stakeholders is not a specific stage but ongoing throughout at each stage with at least one wide and inclusive public consultation on the strategy. Consultation throughout the process of development and implementation will ensure that stakeholders are actively involved and will encourage cooperation in delivering a successful and effective strategy. This should be closely linked to a long-term communication strategy to support policy implementation and specific communication measures such as demonstration projects. It is also an opportunity to gather data and information from outside of government to strengthen the strategy. This should include establishing a wide stakeholder group as a forum for consultation, policy formulation and feedback on practical issues and barriers to renovation.

Sufficient time should be dedicated to the consultation process to ensure that stakeholders have time to engage and that their views are taken into account in the strategy development process.

The public consultation needs to be conducted before submitting the strategy to the European Commission. The results of this consultation should be summarised and form an annex to the strategy itself. It is important to ensure consultation is not a one-off event during the development phase of the strategy. The Directive specifically states there should be an inclusive consultation process during the implementation.

Table 1 Contents for Annex 2

Annex 2 Consultation summary

Summary of the results of public consultation into the long-term renovation strategy, including:

- Summary of responses to consultation
- List of stakeholder groups consulted
- Explanation of consultation process, including how inclusive consultation has been ensured across all stages

Stakeholder consultation principles

Stakeholder involvement may take place in many ways. While it depends on national and local cultural norms and practices, there are some principles that should be followed to secure an impactful participation.

The following principles can serve as useful guidelines for developing an approach to consulting the public on the national renovation strategy.

- **Consultations should be clear and concise.** Be clear on the questions asked and limit the number of questions. Make them easy to understand and easy to answer.
- **Consultations should have a purpose.** It should be clear how consultation responses will be taken into account when taking policy forward. Consult about policies or implementation plans when their development is at a formative stage. Do not ask questions about issues that have already been decided.
- **Consultations should be informative.** Give enough information to ensure that those consulted understand the issues and can give informed responses. Link to other available information where possible, such as impact assessments of the costs and benefits of the options being considered.
- **Consultations can take different forms and are part of a process.** Consider whether informal iterative consultation is appropriate, using new digital tools and open, collaborative approaches. Consultation is not just about formal documents and responses. Nor should they be one-off moments in the policy process.
- **Consultations should provide enough time for responses.** Judge the length of the consultation on the basis of the nature and impact of the proposal. Consulting for too long will delay policy development. Consulting too quickly will not give enough time and will reduce the quality of responses.
- **Consultations should be targeted and take account of the groups being consulted.** Consider the full range of stakeholders affected by the policy, and whether representative groups exist. Ensure they are aware of the consultation and can access it. Certain stakeholders may need more time to respond. When the consultation spans all or part of a holiday period, consider how this may affect consultation and take appropriate mitigating action, such as prior discussion with key interested parties or extending the deadline.
- **Consultation should facilitate scrutiny.** Publish a summary of the responses received, including how they have informed the policy. Responses to consultations should be published in a timely fashion (ideally within 12 weeks).

Stakeholder consultation and involvement in practice

Stakeholder consultation can happen with oral statements in public hearings, as written consultation, or in a more comprehensive process as shown below. The choice of the format also depends on the length of the entire process and the tasks at hand. Since the national renovation strategies will have to be updated on a regular basis, establishing a long-term consultation format may be useful.

Denmark

In Denmark, in preparation for the national renovation strategy in 2014, a broad range of stakeholders, including construction, finance, energy and manufacturing sectors, was included in the consultation process and encouraged to engage in drafting initiatives. In total, about 200 participants were involved.

Six working groups were created to help formulate initiatives for the renovation strategy (covering single family houses; flats; public buildings; businesses; financing and economic security; and innovation and green business). These cross-cutting themes were chosen by the participants themselves during the kick-off meeting. An inter-ministerial task force was created to coordinate efforts and discuss cross-cutting initiatives and issues. Stakeholders agreed to participate in the process without any financial compensation, which shows the value and benefits of the experience for them in terms of gaining knowledge and influencing the final strategy. Outcomes of the working group meetings were compiled in a catalogue of initial proposals. This formed the basis for developing the renovation strategy. [7]

Experiences from BuildUpon

Under the Horizon 2020 Project [BuildUpon](#), stakeholder dialogues have been held in many European countries to support a broad range of stakeholders to consult on their national renovation strategies. A series of interviews carried out by BPIE in 2016 confirmed that many countries found these workshops helpful to strengthen their national renovation strategies. Depending on the national needs, the workshops focused on different topics (e.g. residential building sector, urban vs. rural areas, public buildings, public procurement, green buildings).

Ireland provides one example of how to design a consultation processes on national renovation strategies involving stakeholders from all levels. Several workshops have been carried out focusing on the design and delivery of its National Renovation Strategy. The workshops, including online consultation formats, have been at all political levels – national, local and European – and aimed at connecting policy-makers vertically. The results were fed into the next workshops to develop a vision into concrete recommendations step by step [8]. Both Romania and Bulgaria have participated in the project.

Phase 2: Technical appraisal

Phase 2 involves the appraisal of the potential for improving the energy performance of buildings. It covers analysing the national building stock to establish a detailed overview, and analysing approaches to renovating this building stock in terms of potential energy efficiency and renewable energy measures.

The starting point is gaining a full understanding of the building stock through a bottom-up view of the different building typologies, construction styles, ages, climatic zones, occupancy, and ownership patterns. This fulfils the first section of the strategy. Table 2 lists the contents for this section. If a full technical appraisal is not feasible under certain local circumstances this should not prevent

municipalities from continuing with the next steps. Setting up renovation strategies with incomplete data is always better than no action and can help to better identify what other data is needed.

Table 2 Contents for Section 1

Section 1 Overview of the national building stock

Identify main building categories:

- i) Single-family houses
- ii) Blocks of flats/apartments and other multi-residential dwellings
- iii) Offices
- iv) Educational buildings
- v) Hospitals/health establishments
- vi) Hotels and restaurants
- vii) Sports facilities
- viii) Warehouses and retail premises
- ix) Other types of energy-consuming buildings

Identify age bands which have a material bearing on building energy performance:

- i) Traditional construction types, including historic buildings (typically pre-1900)
- ii) Buildings constructed prior to regulations on energy performance (e.g. 1901-1960)
- iii) Early-phase building regulations
- iv) Mid-phase building regulations
- v) Latest building regulations

Quantify the number, type, size (floor area) of each combination of building type and age band

Identify the split by owner – public, private or mixed

Identify the split by tenure – owner-occupied, rented, mixed

Identify the split by location – urban, suburban, rural

Identify the energy use and performance characteristics of each building combination:

- i) Construction type and U-value of main building elements:
 - (1) Floor
 - (2) Walls
 - (3) Windows and external doors
 - (4) Roof
- ii) Air infiltration rate
- iii) Energy systems (and typical replacement lifecycles):
 - (1) HVAC system type/performance level/controls
 - (2) Hot water provision
 - (3) Lighting systems/controls
- iv) Maintenance (e.g. mandatory safety checks/servicing)

- v) Energy use for:
 - (1) Heating
 - (2) Cooling
 - (3) Ventilation
 - (4) Hot water
 - (5) Lighting
 - (6) Appliances
- vi) Energy carriers:
 - (1) Gas (natural gas or LPG)
 - (2) Liquid fuels (oil, etc.)
 - (3) Solid fuels (coal, etc.)
 - (4) Renewable energies:
 - (a) Solar energy for hot water generation
 - (b) Solar PV
 - (c) Wind
 - (d) Heat pump (type and coefficient of performance)
 - (e) Biomass (wood chips, wood pellets)
 - (f) Other (specify)
- vii) District heating (identify energy carriers)

The inventory of public buildings that supports meeting the requirement to renovate 3% of the central government buildings (Article 5 of the EED) could provide some of this data. In addition, the reference buildings developed by Member States for calculating cost optimality (Articles 4 and 5, EPBD) may serve as a guide for the number and type of building categories. It may also be necessary and useful to consult with wider stakeholders, such as industry stakeholders, who may have access to other data that could be used in the overview.

ROMANIA: include latest data and trends

For Romania it is important that the latest data on energy consumption in buildings is reflected in the next version of the strategy. There has been a reduction in district heating and increase in the use of gas since the 2014 strategy was produced, yet this was not reflected in the 2017 version. This change also has an important impact on cost and benefits of the approaches to renovation being considered. At present 1.2 million homes out of a total of 7.5 million are connected to centralised heating systems.

The definition of biomass must also be updated.

BULGARIA: collection of data

For Bulgaria, it is necessary to look for the most efficient use of the available information from different sources. For example, in the residential sector, the National Statistical Institute could be asked to provide reports presenting the relevant results from the census. It would be especially helpful to analyse the complete statistics regarding houses and multi-family buildings, in terms of number of dwellings/households, year of construction, building materials used, method of heating and energy efficiency measures already implemented.

The next national census (in 2021) should be used to collect all necessary data regarding the energy performance and characteristics of the building stock.

A public database of the buildings with functionality for analyses and comparative reports should be created and maintained.

From this overview it is possible to consider and assess approaches to deploying different combinations of energy efficiency and renewable energy measures for each building category. A wider range of energy efficiency measures, such as insulation of the building envelope, and renewable energy measures such as solar hot water should be explored.

Where district energy systems are in place or considered, aligning approaches to renovating the building stock and expanding district energy systems is an important element. There are many benefits for owners and occupants of buildings, district energy utilities and public authorities that can be gained from doing so. Taking a district approach can more effectively match energy supply and needs. This can avoid unnecessary investments and lock-in effects, and make it more cost-effective to pursue sustainable energy supply options, such as district energy based on renewable energy or excess heat, for the remaining energy demand. [9]

Table 3 Contents for Section 2

Section 2 Approaches to renovation

Identify opportunities for retrofit of energy efficiency measures for each building category:

- i) Fabric measures – building envelope
- ii) Exterior windows and doors
- iii) Technical facilities – heating/ventilation/cooling/hot water
- iv) Air tightness/infiltration
- v) Lighting
- vi) Appliances

Identify opportunities for retrofit of renewable energy measures:

- i) Passive solar energy
- ii) Solar energy for hot water generation
- iii) Solar energy for generation of electricity (Photovoltaics)
- iv) Wind energy
- v) Heat pump

- vi) Biomass
- vii) Biogas
- viii) Geothermal hot water

Identify opportunities for retrofit of passive measures:

- i) Shading
- ii) Natural ventilation
- iii) Natural cooling

Identify opportunities to align renovation and connecting/expanding/updating a district energy system

Identify packages of measures that can achieve at least 60% energy saving (deep renovation)

Phase 3: Socio-economic appraisal

Appraising the cost-effectiveness of measures is key to identifying a prioritised set of renovation measures. This means looking at the costs and benefits of the measures beyond an economic angle, looking also at the societal impacts. Policies can then be designed to drive forward these measures.

One of the key challenges when undertaking the socio-economic appraisal is access to good quality data on the costs and savings of renovation activities, and also forecasting these over the coming decades. Available information on the costs of deep renovation may be limited to demonstration or pilot projects, which may not be representative of the costs in a larger-scale rollout. Inevitably, certain assumptions will need to be made based on incomplete data. In order to improve the knowledge base for future revisions and updates to the strategy, it is recommended that Member States introduce or enhance data gathering processes to develop a more accurate picture of the true costs and benefits of building renovation. This would also support later updates of the renovation strategy.

In any economic appraisal, the discount rate, or rate of return applied, is a very significant consideration [10]. Discount rates used by building owners and other potential investors are typically far higher than societal discount rates. The challenge is to design a support regime that increases building owners' underlying propensity to invest in renovation. While financial support programmes can bridge some of the gap, inevitably regulatory measures will need to be developed and used extensively, such as requiring renovation of the least efficient building stock or at change of ownership.

Monetisation of the wider benefits that arise in addition to the energy cost savings is often overlooked. The cost of a public subsidy provided to stimulate deep renovation may be more than offset by the benefits that result from it. Energy efficiency improvements can ease pressure on public finances (i.e. budgets of public authorities), by generating increased tax revenues through increased economic activity and by reducing expenditure on energy and unemployment benefits. Improvements in energy efficiency can also lead to improved indoor air quality and thermal comfort, which have knock-on

productivity benefits [3]. Results include fewer days of work missed, shorter hospital stays and improved educational performance. There is a clear correlation between the quality of a building (office, school, factory etc.) and the number of sick days (absenteeism) reported. Studies report that a better building can result in 0.4-1.5 fewer sick days per employee per year [11], while another study concluded that every €1 invested in insulation results in €0.78 benefit in reduced sick days [12]. A better building can also improve performance by 11-16% in offices and 13-20% in schools due to better air quality, thermal comfort, light (electric and natural), acoustics and control [13]. Promoting the environmental benefits of energy efficiency improvements, including reduced carbon emissions and energy use, can also enhance public relations and organisational reputation [14]. Many studies looking at the multiple benefits of renovation and wider energy efficiency improvements can provide additional inspiration for this section.

The phase should culminate in determining a prioritised package of renovation measures for each building category based on their cost-effectiveness.

BULGARIA: quantification of benefits

The new version of the strategy for Bulgaria needs greater identification and quantification of the benefits, including energy, CO₂, jobs created, health benefits and air quality improvements. Specific benefits of particular value for Bulgaria are the alleviation of energy poverty, and hence the improved air quality and health benefits (close to BGN 100 million is given as direct support to energy-poor households for purchasing (mainly) coal and wood, while at the same time another BGN 100 million is invested in municipal programmes for improving the outdoor air quality); the city landscape and housing conditions; stimulating the construction sector and local economies; and increasing citizens' responsibility and organisation for maintenance of the building stock.

Table 4 Contents for Section 3

Section 3 Socio-economic appraisal

Identify and quantify the benefits arising from different packages of measures for deep renovation, including:

- Economic benefits: energy cost savings; increase in GDP; impact on economic activity, increase in property values; impact on public finances; reduction of energy import bill
- Societal benefits: reduction in fuel poverty; health benefits; increased comfort/productivity
- Environmental benefits: reduced greenhouse gas emissions; air quality improvements
- Energy system benefits: increased energy security; avoided new generation capacity; reduced peak loads

Identify and quantify the costs:

- Total cost of installing renovation measures, minus any avoided cost due to end-of-life replacement or by undertaking renovation alongside other building maintenance, new construction or modernisation measures.
- Transaction costs, including costs of temporary relocation of occupants

Determine prioritised renovation packages for each building category (based on the cost and benefit appraisal)

Phase 4: Policy appraisal

The purpose of the policy appraisal is, firstly, to review the progress of implementation of the current renovation strategy and the wider policy landscape related to building renovation. Secondly, it should identify the changes to policies and additional policies that will be necessary to unleash the building renovation market.

The review of the renovation strategy from 2017 should, according to the Directive, form an annex to the strategy itself. This review should evaluate progress towards national targets, contribution to EU energy efficiency targets for 2020 and 2030, and outcomes of existing policies in terms of energy savings delivered and impact on the renovation rate and depth. This is also an opportunity to review successes on regional and local levels which may provide inspiration for policy development at national level. Therefore, it is important to engage policy-makers at the relevant regional, provincial, municipal, city and local levels at this stage to gather their input and experience.

BULGARIA and ROMANIA: links to other strategies

The progress of implementation of building and renovation-related policies in other national strategies should also be reviewed, to ensure a strategic overview of progress is provided.

Table 5 Contents for Annex 1

Annex 1 Implementation progress report

Review of implementation progress of previous (2017) renovation strategy, including:

- Progress towards national targets
- Contribution to EU energy efficiency target for 2020 and 2030
- Outcomes of existing policies in terms of energy savings delivered and impact on the renovation rate and depth

Reviewing progress should also include analysing how existing policies have addressed the barriers to renovation and where they are still present. Barriers include:

- Legislative and regulatory barriers: such as those due to the existing legal framework, including overlaps between laws and complex administrative process, or lack of legislation.
- Fiscal and financial barriers: these includes lack of funds, high transaction costs, subsidised low energy prices that affect investments.
- Communication barriers: these include insufficient communication about the advantages of deep renovation and the resulting lack of awareness, particularly in the general public.
- Capacity barriers: such as insufficient technical capacity and/or knowledge to develop and implement measures and policies.
- Technical barriers: these include lack of knowledge on the existing building stock and lack of knowledge/skills regarding technical solutions and measures.
- Research and development (R&D) barriers: these include barriers such as insufficient research or pilot projects which results in lack of knowledge, data or experience.

The next step is to assess the potential of policies to overcome these barriers. BPIE has developed a checklist of possible actions which, together, provide a solid policy framework on which to base the renovation strategy (Figure 4).

Figure 4 Checklist of potential policies



Some policies may not be applicable in all Member States and all would need tailoring to the specific national and market circumstances; it is unlikely that they could be introduced within a single policy cycle. Nevertheless, the list illustrates the wide range of actions that should be considered. Consultation with stakeholders could also identify additional possible actions.

BULGARIA and ROMANIA: Communication strategy

For a policy or financial instrument to work properly it must be supported by a comprehensive and professionally delivered long-term communication strategy. This should include demonstration projects and involvement of citizens/beneficiaries/investors. Explaining the direct and wider benefits, decreasing transaction costs and promoting behaviour/role models of renovation to consumers is important to build understanding and buy-in to the strategy and national policy. Despite many initiatives, there is currently no funding in the National Energy Efficiency Programme for communication in either country.

BULGARIA and ROMANIA: Capacity building

Capacity building programmes are needed for municipal officers (including both technical staff and procurers) for planning, implementation and control of the building renovation process, as well as for communication with citizens. Besides a general lack of specialised construction workers, there is a need to improve the capacity of building professionals at local level (such as auditors, designers, construction workers, building supervisors) to deliver high-quality deep energy retrofit projects considering all potential energy-saving measures within an outcome-based, whole-building perspective (rather than focusing on specific measures as is the current practice).

BULGARIA and ROMANIA: Procurement

Legal practices for sustainable and innovative procurement in the building sector need to be established. Currently procurement is led by the lowest price, and this can result in the lowest quality of services. The procurement procedure and nationally endorsed practice should allow qualification/experience and outcome-based criteria to be set.

EPBD 2018 now requires specific measures to be considered related to:

- Targeting public buildings
- Alleviating energy poverty
- Identifying trigger points in the lifetime of a building which could be an opportunity for renovation
- Building renovation passports.

The following sections provide guidance on these specific elements since they are newly required considerations.

Once all the policy options have been considered (Table 6), this completes Phase 4 of the strategy.

Table 6 Contents for Section 4

Section 4 Policy assessment

Identify barriers to deep renovation:

- i) Legislative and regulatory barriers
- ii) Fiscal and financial barriers, including split-incentive dilemmas and market failures
- iii) Communication and capacity barriers
- iv) Technical barriers
- v) R&D barriers

Identify policies/measures to overcome identified barriers

Assess potential role of the following measures/policies/approaches:

- i) Measures to target all public buildings
- ii) Targeting the worst-performing segments of the national building stock
- iii) Policies to alleviate energy poverty
- iv) Measures exploiting trigger points for renovation in the life-cycle of buildings
- v) Policies and actions to stimulate cost-effective deep renovation of buildings, including staged deep renovation
- vi) Introducing building renovation passports
- vii) National initiatives to promote smart technologies and well-connected buildings and communities
- viii) National initiatives to promote skills and education in the construction and energy efficiency sectors

Policies and actions to target all public buildings

Renovating public buildings can help to build expertise and drive the renovation market. By focusing initially on the public sector, Member States can help build up the necessary skills, expertise and workforce that will be required to renovate the larger privately-owned stock.

National governments are already required to put in place measures to renovate 3% of buildings owned and occupied by central government or deliver equivalent savings (under Article 5 of the EED). And some Member States have also developed inventories of buildings owned and occupied by central government as part of the requirement of Article 5. Table 7 shows some of the measures focusing on central government buildings that have been considered across Europe³. These could be relevant for all public buildings.

³ This list of measures comes from the reports Member States submitted to the European Commission in 2015 on how they would achieve Article 5 of the EED (requiring either 3% renovation of central government buildings every year or to take measures to achieve the equivalent savings). Detail on how or if these measures have been implemented is currently not available.

In addition, data and information on public buildings should be readily available since Energy Performance Certificates (EPCs) are required for buildings (over 250m²) occupied by public authorities and visited by the public⁴. This can be used to help to develop policies and actions targeting these buildings.

Table 7 Examples of measures taken/planned targeting central government buildings

Type of measure	Examples from EU countries
Financing	<ul style="list-style-type: none"> Energy performance contracting and ESCOs (Austria, Portugal, Croatia)
Renewable energy	<ul style="list-style-type: none"> PV installations for own consumption (Malta, Poland)
Energy management	<ul style="list-style-type: none"> Appointing energy officers in each building (Ireland, Portugal) Operations optimisation (Denmark, Austria) Metering for energy and water (Croatia) Smart meter installation (Malta) Control of air conditioning (Malta)
Inspections	<ul style="list-style-type: none"> Inspections of down-time electricity use (Finland) Analysis of energy consumption during off-times (nights, weekends and holidays)
Property management	<ul style="list-style-type: none"> Penalties and bonuses for energy efficiency in contracts with property management companies (Finland)
Public procurement/ sustainable procurement	<ul style="list-style-type: none"> Switching to energy-saving devices (Denmark) Rental contracts being renewed become green lease contracts (Finland)
Behaviour change	<ul style="list-style-type: none"> Raising awareness among building users (France, Denmark) Large-scale behavioural change campaign (Ireland) Behaviour change programme for employees (Netherlands)

Trigger points

Trigger points are key moments in the life of a building (e.g. rental, sale, change of use, extension, repair or maintenance work) when carrying out energy renovations would be less disruptive and more economically advantageous than at other moments [15]. Taking advantage of these occasions could facilitate investment decisions to undertake energy renovation works. They can be prompted by practical opportunities (e.g. need for repairs or maintenance, or building an extension), personal circumstances (e.g. a new-born in the family, retiring or children moving out) or change of ownership (e.g. new tenants, new owners, putting a property on sale). The demand for these works is usually not energy-led, but they offer the opportunity to include energy improvements with reduced additional cost and disruptions while avoiding the lock-in effect and delivering additional benefits such as improved indoor air quality, with a positive impact for comfort, health and productivity.

⁴ As required by Article 12 of the EU Energy Performance of Buildings Directive 2010/31/EU

BULGARIA and ROMANIA: Trigger points

Trigger points should be established in both Romania and Bulgaria since they are not considered in the current renovation strategies.

Trigger point policies need to be carefully designed and applied to protect specific building types (such as public or historic buildings) or occupants (e.g. low-income households), as well as to ensure the appropriate financial support is provided. It is important to address concerns about gentrification and rent increases (i.e. the fear that introducing requirements for renovation may lead to unwarranted rent increase) and combine the interests of tenants with those of investors who want a short pay-back.

To guarantee the expected results, policies identifying trigger points should be tailored to the building type (e.g. single-family buildings vs. multi-family buildings, schools and kindergartens vs. office buildings, etc.). They should be accompanied by additional targeted measures promoting deep renovation (such as building renovation passports and minimum energy performance requirements for specific building types, like commercial and public buildings), and properly integrated into medium- and long-term planning.

The following examples show how European countries are using trigger points in their renovation strategies.

Conditions for renting out or selling a building unit with poor energy performance (Flanders region, Belgium)

In Flanders, Belgium, a new standard was introduced in January 2015, setting minimum requirements for roof insulation in residential buildings (single-family houses and multi-family apartments) when the building is to be rented out. If a residential building does not meet the minimum requirements, it receives penalty points. From 2020 if a building or apartment receives more than 15 penalty points, it will be ineligible for renting.

Mandatory requirements in case of building extensions (Italy)

In the autonomous province of Bolzano from 2019, owners of buildings will be allowed to expand the surface of their dwelling by up to 20%, or up to 200m², only if the building achieves heating consumption below 70kWh/m²/yr.

Improvement of energy performance in case of other works (Poland)

In Poland, in building renovations the reconstructed elements must meet the same levels of thermal insulation as new buildings. For example, if an external wall is rebuilt it must be insulated respecting current U-value requirements.

Requirements in case of change of building use (Denmark)

In Denmark, minimum energy requirements are established for building components in case of change of building use which would result in significantly higher energy consumption (e.g. conversion of an outbuilding to accommodation, or conversion of usable roof space to accommodation).

Measures to tackle energy poverty

National programmes renovating low-income and energy-poor homes can be highly cost-effective considering the wider health, societal and economic benefits of renovation [16] [17]. Shifting public budgets from energy subsidies for the energy poor to energy renovation programmes will mobilise investment in renovation, which is a key aim of the national renovation strategies. Member States can use EU funds, such as Structural and Cohesion funds that aim to improve the welfare of EU countries, as sources of funding for programmes to renovate the homes of the energy poor.

Grants for low-income families (Lithuania)

In 2009, the Lithuanian government and the European Investment Bank (EIB) established the Lithuanian JESSICA Holding Fund for multi-family building renovation, with an initial investment of €227 million – €127 million from the European Regional Development Fund and €100 million in national funding. The Fund offers long-term loans with a fixed interest rate (3%) for the improvement of energy efficiency in multi-family buildings, and for low-income families the loan can be converted into a grant. Until 2015, renovation of some 1,055 buildings had been financed under the JESSICA Holding Fund, totalling around 29,500 apartments. Since May 2015, through JESSICA II, 3,300 apartments in 133 different buildings have been renovated, with another 9,300 apartments currently undergoing renovation.

Energy-poor targeted advice and fund (Ireland)

The Irish Warmer Homes Scheme targets vulnerable and energy-poor homes providing advice and funds for energy efficiency measures. From 2000 to 2013 over €82 million was distributed through the scheme and more than 95,000 homes were supported. The energy efficiency interventions include measures such as attic insulation, draught proofing, efficient lighting and cavity wall insulation. In 2010, the implemented measures saved 25 GWh and many beneficiaries were lifted out of energy poverty. The number of beneficiaries who found it difficult or impossible to pay utility bills on time decreased from 48% to 28%. The number of families with children that could keep a comfortable temperature at home increased considerably from only 27% to 71%. The number of beneficiaries who suffered from long-term illness or disorders decreased by a massive 88%. Recipients showed significant improvements in other health problems including heart attacks, high blood pressure/hypertension, circulatory problems, problems with joints/arthritis, headaches, and physical and mental disability.

Building renovation passports

A building renovation passport is a promising tool to align building renovation to individual needs and long-term renovation requirements at the same time. It allows for a whole-house approach, even with restrictive budgets for renovation, by proposing a series of renovation steps that build on one another

and that can be completed over time. More precisely, a building renovation roadmap is a document – in electronic or paper format – outlining a long-term (up to 10 or 20 years), step-by-step renovation roadmap and logbook for a specific building. This is based on an on-site energy audit fulfilling specific quality criteria and indicators established during the design phase, following a dialogue with building owners. The building renovation passport also explains the expected benefits in terms of reduced heating bills, improved comfort and reduced CO₂ in a user-friendly way. The logbook is a repository of building-related information on aspects such as energy consumption and production, executed maintenance and building plans, providing several functions to the building owner beyond the energy performance.

BULGARIA and ROMANIA: Building renovation passports

The Horizon 2020-funded iBRoad project⁵ is exploring the introduction of the building renovation passport concept in Bulgaria and Romania.

In Bulgaria the individual building renovation roadmap (iBRoad) is acknowledged as a potentially useful tool to support building owners and public authorities to strive for more comprehensive renovations. iBRoad could help solve (with better homes, lower energy bills and mitigation of fossil fuel dependency) two of the most important societal problems in Bulgaria: energy poverty and air pollution. However, to be successful, the iBRoad tool must bring real benefits to the end-users (owners, real-estate buyers, as well as public authorities). [18]

As one of the pilot countries in the project, iBRoad has explored potential users' needs, preferences and trust in Bulgaria.

Figure 5 Key findings from iBRoad survey (Source: [19])

- **83%** of respondents think they can reduce their household's energy consumption through renovation measures
- **92%** thinks that energy efficiency will be an important aspect when deciding to purchase a home
- Only **9%** would trust the Energy Performance Certificate for advice about potential renovation measures

BULGARIA



Only 9% of respondents said they would trust the Energy Performance Certificate for advice about renovation measures. In terms of a renovation roadmap, the most cited items the respondents wanted to see were estimated costs of each renovation step (59%), expected benefits in terms of reduced heating/bills (58%) and technical information to help them avoid mistakes (47%). Also, according to the respondents, the ideal timeframe for the roadmap is five years. More than half of respondents would be interested but not willing to pay (54%) for a renovation roadmap, while a third (32%) would be interested and willing to pay. [19]

These insights should be used to enable a more effective design of the individual building renovation roadmaps in Bulgaria.

In Romania, in-depth analysis has not been carried out, but stakeholder engagement identified several specific areas that should be considered in the development of building renovation passports. These include adapting the concept to socio-economic conditions, which are different from those typical of other European countries (e.g. Germany or Belgium), and the importance of protecting personal information [20]. In Romania there is a mandatory energy audit at national level that can cover part of the building renovation passport. Consideration should be given to expanding this requirement to establish the concept of renovation passports in Romania.

In Bulgaria, the building passports will be mandatory for all buildings from 2024. They are currently mandatory only for new buildings. All buildings over 250 m² are in principle subject to an energy audit; however, there is no control over the implementation of this requirement. Stricter implementation could allow market introduction of the building renovation passport concept, especially if coupled with suitable incentive instruments and integrated in the legal procedure for setting up an EPC. There are plans to pilot the concept within a new financing scheme for soft loans for energy efficient building renovation of single-family houses; the first results are expected in 2019.

In Romania there is a mandatory energy audit at national level that can cover part of the building renovation passport. Consideration should be given to expanding this requirement to establish the concept of renovation passports in Romania.

The experience in Germany, France and Belgium offers valuable lessons about the route that leads to a successful development and implementation. The research conducted so far, and the feedback gathered directly from the initiators of the individual renovation roadmaps, has helped identify potential mistakes and pitfalls that should be avoided. Creating the right conditions for a successful implementation of a building renovation passport requires careful planning. It may also provide inspiration to other countries considering developing their own approach to building renovation passports.

⁵ ibroad-project.eu

Individual renovation roadmap, Germany

In Germany, the Sanierungsfahrplan (SFP) [renovation roadmap] was officially launched in 2015 in the federal state of Baden-Württemberg and a newly developed Individueller Sanierungsfahrplan (iSFP) was launched at the national level in 2017. In Germany, EPCs are not considered reliable enough to stimulate renovation and are often viewed as an administrative obligation. On the other hand, there is a strong culture of on-site energy auditing, but the very detailed reports delivered to building owners (up to 150 pages) are often left unread and do not promote staged renovations. The iSFP has been designed to be a user-friendly tool that includes both short- and long-term measures and suggests ways to avoid lock-in effects. As about 85% of the energy renovation measures funded in Germany concern only one building component, the iSFP puts a strong focus on staged renovation and the interdependences between the stages. Behind this tool is the idea that building owners must be given the appropriate means to turn renovation from “a nuisance that I have to endure” (I have to renovate) into “an opportunity to improve my house and my living environment” (I want to renovate).

In Germany, the building owner is put at the very centre of the process, and the individual approach, including in-depth dialogues between the building owner and the energy auditors, is key. As a result, the development of a renovation roadmap includes these steps:

On-site visit

- Inspect the building and meet with the building’s owner to discuss his/her wishes and needs (based on a checklist)
- Assessment of the current status of the building

Development of individual scenarios

- The auditor develops different renovation scenarios based on the result of the on-site audit. Auditor provides an overview of all the building components, prioritising what needs to be renovated
- Discussion with the owner to select his/her preferred renovation options
- The auditor provides detailed input into a software and proposes measures to implement

Presentation of results

- The results are presented to the owner during a second on-site meeting, where a decision on the final renovation options is reached (the auditor and the owner discuss the options together);
- The auditor prints the step-by-step renovation plan and delivers it to the building owner.

Energy efficiency passport, France

The concept for the Passeport Efficacité Énergétique (P2E) was developed by the Shift Project together with a group of building specialists and professionals, between 2012 and 2014. The objective was to unlock the thermal renovation of residential buildings, identified as an imperative step towards decarbonising the economy.

Building upon the notion of “energy efficiency reflex”, P2E suggests a pragmatic approach to maximise the opportunities to trigger energy renovation every time maintenance work is done in a building.

Using any type of renovation or maintenance work as a trigger to install energy-renovation measures helps promote energy efficiency among building owners and professionals and may generate higher levels of renovation.

The passport provides a set of solutions (“performance combinations”), based on the combination of specific features like building type, age, climate (etc.) that would allow to reach the BBC and SNBC level for the overall building stock. Each building is considered as one “piece of the puzzle” contributing to the overall 2050 target (Bâtiments Basse Consommation, BBC 2050, equivalent to 80kWh/m² of primary energy per year). These combinations aim to provide a set of consistent solutions for all parts of the building, which taken together will realise the final goal. By simplifying the choice of possible renovation solutions and making it easier for the building owner, the system aims at “industrialising” the renovation process and achieving economies of scale.

In France, the P2E online platform links individuals, energy auditors and tradespeople. After the owner and the energy auditor establish contact through the platform, three steps follow:

Individual contact between the auditor and the owner (30 min, by phone)

- Explanation of the approach and the procedure of the audit
- General and contextual discussion on the renovation project
- Recovery of existing elements (plans, invoices, maintenance contract ...)
- Make a quick plan of the building
- Complete the questionnaire “General characteristics”

On-site technical visit (2h/2h 30min)

- Wall inspection
- Inspection of opening elements (doors, windows, etc.)
- Floor inspection
- Roof inspection
- Systems inspection
- Evaluation of the airtightness

Dialogue (1h / 1h 30min)

Based on the technical characteristics of the buildings, the combinations available on the platform and owner’s need, the auditor takes stock of the general state of the household and proposes several intervention options to the building owner. The plan presents a series of interventions to be completed by a specific date to achieve defined performance levels (compatible with the long-term energy consumption levels established by the energy transition law).

Building passport, Flanders, Belgium

The Flemish Energy Agency (VEA), in cooperation with a wide network of stakeholders, has designed and implemented the “Renovation Pact” (2014-2018), designed to lead to a thorough improvement of the energy performance of the region’s building stock. Flanders established that by 2050 the existing building stock should become as energy efficient as the current requirements for new buildings (E60).

One of the main actions foreseen in the Renovation Pact is to develop the Woningpas (a logbook) and the EPC+ (a more user-friendly version of the EPC, including a clear overview of measures, ordered by priority, needed to reach the 2050 objective). The two instruments aim to provide building owners with useful, easy-to-understand information and long-term guidance. Through these instruments, the public authorities in Flanders also intend to contribute to the region's long-term objectives.

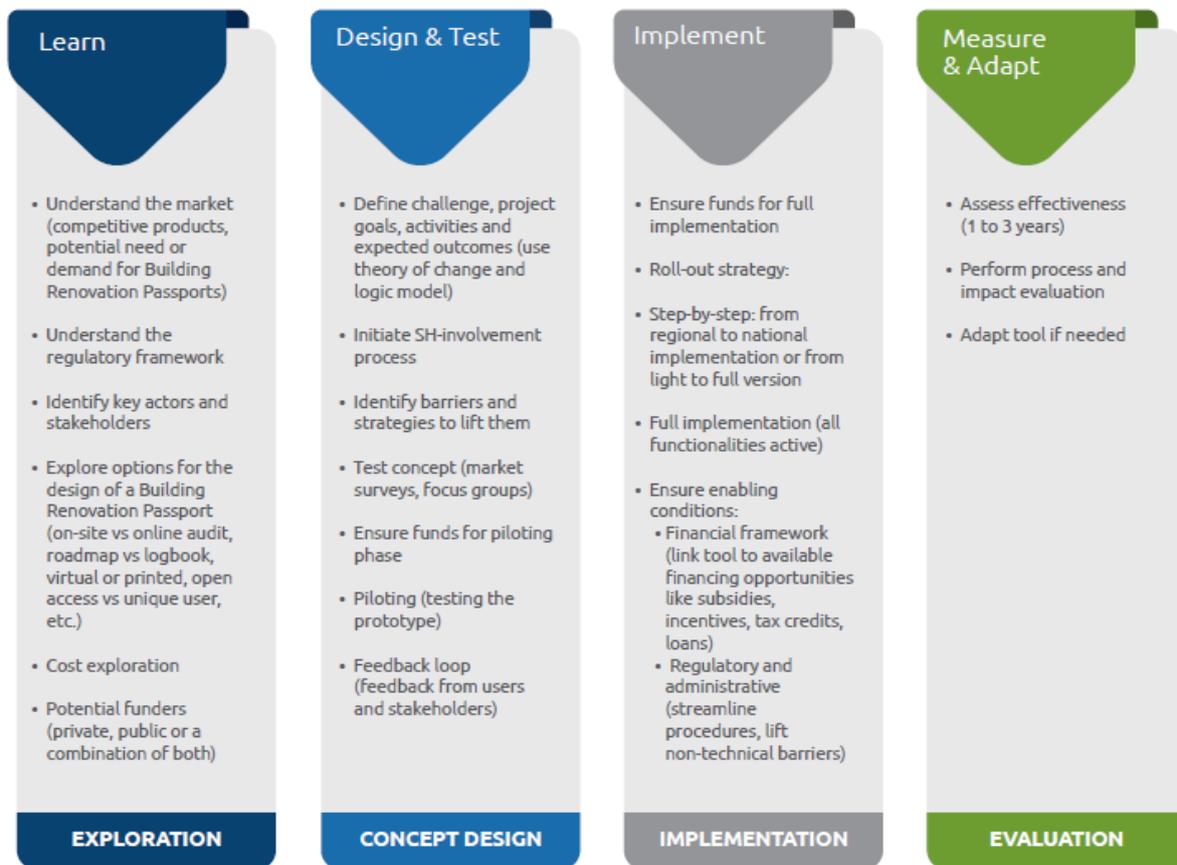
The Woningpas is a unique integral digital file of each individual building. The file can be retrieved by the building owner and by individuals given authorised access. The logbook features energy performance information, renovation advice, the housing quality (such as stability, humidity, safety) and data on the environment; other building aspects such as durability, water, installations and building permits will be added in future. The Woningpas will make it possible to track the evolution of each individual building.

Learning from practical experiences: iBRoad

The Horizon 2020-funded iBRoad project⁶ has reviewed the schemes in Flanders, France and Germany (as well as the BetterHome scheme in Denmark) and developed an overview of the process for creating an individual building renovation roadmap. Regardless of the nature of the originator (private, public or a combination of both) or its geographical coverage (municipal, regional or national), introducing a building renovation passport requires careful planning. The process can be summarised in four main blocks (Figure 5): exploration, concept design, implementation and evaluation.

⁶ <https://ibroad-project.eu>

Figure 5 Process for creating an individual building renovation roadmap (Source: [21])



Developments at European level

While Member States are required to consider the potential of building renovation passports, the European Commission is also tasked with exploring the concept by 2020. This means that although building passports may not be required at national level, the European Commission will conduct research to assess whether such schemes (including as an optional provision) could be feasible. Depending on the assessed feasibility, this could later result in their being required nationally.

To take this forward, the European Commission⁷ will:

1. Review existing building renovation passports and related schemes and initiatives in the EU and globally at national and regional level – this should develop an understanding of the characteristics and pros/cons of the various schemes and initiatives.
2. Analyse the possible scope for EU measures including non-legislative ones (e.g. supporting the exchange of best practices, promoting standards, guidelines, etc.), legislative ones (inclusion

⁷ In May 2018, the European Commission launched a tender to carry out the feasibility study (<https://ted.europa.eu/udl?uri=TED:NOTICE:247384-2018:TEXT:EN:HTML&tabId=1>).

of dedicated provisions under the EPBD), and a combination of both; highlight their possible advantages and drawbacks, including the costs of implementation

3. Establish policy options for the possible introduction of additional (non-legislative and legislative) measures at EU level to support building renovation passports, including the introduction of an optional building renovation passport scheme under the EPBD and, for each option, an assessment of potential impacts. These may include extending EPCs and introducing optional stand-alone building renovation passport schemes. Interactions with other provisions such as the Smart Readiness Indicator will also be considered.

Following this and in discussion with Member States, a decision will be made on next steps.

Phase 5: Policy package design

Phase 5 brings together the previous phases to set out a holistic policy package. This includes setting targets and milestones, defining the package of policies which will form the strategy and providing a forward-looking perspective that identifies the needs and sources of investment to implement the strategy. This forms section 5 of the strategy (**Table 8**). Defining policies should include at least a description of each policy and action, its scope, duration, allocated budget and expected impact. It should go beyond an inventory of measures to provide a long-term vision including the evolution and development of future policies.

BULGARIA: matching scenarios to policies

It is important that the scenarios modelled in earlier phases match with the policy package being defined. For example, the scenarios in the current national strategy for Bulgaria are calculated assuming energy performance class B will be achieved, but this is not yet in the regulations and the subsidies are only targeted to energy class C. Also, the best scenario modelled is to increase the renovation rate to 5%. Yet there is no explanation of how this could be achieved. This is particularly important for single-family homes where the rate is extremely low (close to 0%), as there is no dedicated financing mechanism for this building type (a soft loan mechanism is planned for 2019, but it has to “compete” with the 100% grant scheme for multi-family buildings). There needs to be a clear vision backed by policies to achieve it.

Specifically, measurable progress indicators need to be established with milestones for 2030, 2040 and 2050. How they contribute to achieving the EU’s energy efficiency target of 32.5% for 2030 (in accordance with the revised EED) should be specified. They should consider the long-term EU goal of reducing greenhouse gas emissions in the Union by 80-95% compared to 1990 by 2050. This would require a highly energy efficient and decarbonised national building stock, meaning highly energy efficient buildings with a very low energy demand supplied by renewable energy sources and intelligently integrated into a decarbonised, flexible energy system.

The expected share of renovated buildings can be expressed in different ways, including percentage of buildings, absolute number, and floor area renovated by building type.

BULGARIA and ROMANIA: milestones

There is a lack of milestones in the current strategy for Bulgaria. It is vital that these are included in the new strategy with quantifiable indicators, targeting zero-carbon building stock by 2050.

There are no national milestones set in Romania. However, at a local level some municipalities have set their own milestones for 2020 and 2030, in the context of their Sustainable Energy Action Plans (SEAPs) and Sustainable Energy and Climate Action Plans (SECAPs) as part of their obligations under the Covenant of Mayors. These should be taken into account in the national strategy. It is understood that targets for 2030 will be established in the plan for energy and climate which was published at the end of 2018 (as a draft).

To achieve these goals a holistic package of policies must be defined, building on the potential policies and approaches identified in the policy appraisal. There should be a particular focus on measures to be in place within the next three to five years (before the scheduled review and update of the strategy).

At this stage it is also crucial to identify the scale of investment required to deliver the strategy and potential sources of the investment needed. Because of long-term nature of the strategy, which spans the period to 2050, it needs to be resilient to the fluctuating market conditions that will be encountered over time. Nevertheless, the action plan over the next few years, at least until the first milestone in 2030, should explicitly detail how renovation activity will be financed. At the same time as maximising the allocation of EU and other public funding sources to the renovation of buildings, it is important for Member States to identify ways to leverage high levels of private funding, whether building owners' own resources or those of the investment community. The [Smart Finance for Smart Buildings Initiative](#) of the EU Commission provides more detail on potential financing mechanisms to:

- aggregate projects, through investment platforms or groups
- reduce perceived risk of energy efficiency operations
- use public funding to leverage additional private-sector investment
- guide investments in the public building stock
- develop accessible and transparent advisory tools, such as one stop shops for consumers and energy advisory services.

The European Commission will collect and disseminate best practices on successful public and private financing schemes for energy efficiency renovation and financial incentives to renovate from a consumer perspective. These may provide a source of inspiration for implementation.

BULGARIA: moving beyond grants

In Bulgaria there has been a trend for grants to finance 100% of the costs of renovation measures. This is particularly the case for multi-family apartment blocks. Such grants fuel the expectation that energy performance improvements should be fully paid for by the state, thus distorting a potentially healthy market. Reliance on grants also becomes a barrier to other forms of financing, which, unless funding 100% of the costs, are seen as not as good. Instead, public money should attract market financing and end users should participate financially and be responsible.

There is a declared intention to shift from 100% grants in the National Energy Efficiency Programme to more sustainable financial mechanisms for financing energy efficiency in the residential sector. This is a major landmark to guide the investment decisions of all stakeholders, but it requires a timeframe and accompanying measures with specific indicators to make this approach socially acceptable. The national renovation strategy published in 2017 describes three steps to reduce the grant by 2020 – 75%, 50% and 25% – but at the beginning of 2019 there is still no public announcement of how and when this will be done. Reducing grant coverage in steps of 25% each year does not appear to be a socially acceptable approach that will stimulate investment decisions. In the proposal for the national budget for 2019, there is no sign of funding for the National Energy Efficiency Programme, and its continuation is not being discussed, which casts serious doubts on its sustaining effect.

Table 8 Content of section 5

Section 5 Policy package

Define a policy package based on socio-economic and policy appraisal, with a particular focus on measures to be introduced within the next five years

Set out roadmap with key dates, targets for the introduction of policies

Include **milestones for 2030, 2040, 2050**

Define expected share of renovated building by 2020 (and 2030)

Define contribution of policies to achieving the EU 2030 energy efficiency target

Quantify total annual investment requirements to 2050 to deliver policy package

Identify existing sources of funding for building energy renovation:

- i) Local public funds
- ii) National public funds
- iii) EU Structural/Cohesion funds
- iv) Banks and other sources of finance, e.g. pension funds and investment trusts

Identify possible new funding sources, instruments and mechanisms, including:

- i) aggregating projects, through investment platforms or groups, or consortia of small and medium-sized enterprises
- ii) reducing perceived risk of energy efficiency operations
- iii) use of public funding to leverage additional private-sector investment
- iv) guiding investments into an energy efficient public building stock, in line with Eurostat guidance
- v) accessible and transparent advisory tools, such as one stop shops for consumers and energy advisory services

Phase 6 Implementation and ongoing review and update

The final phase, although by no means the end of the process, results in the strategy being published as a comprehensive policy document and kicks off implementation.

Publishing the strategy is an opportunity to promote the benefits of renovation of buildings to stakeholders, including the wider public, to raise awareness and garner support for the strategy. This support is a vital component of ensuring strong, comprehensive implementation.

Implementation requires the development of regulation and support programmes. It includes developing the necessary legislative mechanisms to implement the strategy. This phase takes time and requires substantial political will and persistence. It may be useful to establish a taskforce including policy-makers from all departments and levels to take forward implementation. Inclusive consultation during implementation is also required.

At this stage monitoring and evaluation processes should be set up to check the progress of implementation and that the strategy is on track in terms of delivery and its planned impacts. This also feeds into reviewing and updating the strategy regularly. Establishing an independent committee to monitor and report progress on the strategy on an ongoing basis can be useful to gather recommendations for improvements and updates.

BULGARIA and ROMANIA: monitoring methods

There is a need to establish clear and technically sound monitoring methodologies based on quantifiable goals and set reporting periods (with forms of reporting and stakeholder engagement procedures) for the Bulgarian and Romanian strategies. This would increase the transparency of the policy development and implementation processes. This is particularly important for stakeholders who are closely following implementation, as it would build greater understanding on the impact of the strategy.

To support the monitoring and evaluation process, setting up an open-source national database of energy efficiency indicators could increase transparency and also the collection of data at national level. This could also be supplemented by local and regional data. Being able to use correct and comprehensive data will inform better planning, which in turn leads to better results during implementation.

Following the first new format renovation strategy required by 10 March 2020, the strategy must be updated by 30 June 2024, as part of the Integrated National Energy and Climate Plan (NECP) under the Governance Regulation. Another new version is required by January 2029 as part of the second NECP. Each update should evaluate the impact of policies and measures to date and the potential of possible future measures.

Table 9 Full structured template of renovation strategies

Section 1 Overview of the national building stock

Identify main building categories:

- i) Single-family houses
- ii) Blocks of flats/apartments and other multi-residential dwellings
- iii) Offices
- iv) Educational buildings
- v) Hospitals/health establishments
- vi) Hotels and restaurants
- vii) Sports facilities
- viii) Warehouses and retail premises
- ix) Other types of energy-consuming buildings

Identify age bands which have a material bearing on building energy performance:

- i) Traditional construction types, including historic buildings (typically pre-1900)
- ii) Buildings constructed prior to regulations on energy performance (e.g. 1901-1960)
- iii) Early-phase building regulations
- iv) Mid-phase building regulations
- v) Latest building regulations

Quantify the number, type, size (floor area) of each combination of building type and age band

Identify the split by owner – public, private or mixed

Identify the split by tenure – owner-occupied, rented, mixed

Identify the split by location – urban, suburban, rural

Identify the energy use and performance characteristics of each building combination:

- i) Construction type and U-value of main building elements:
 - (1) Floor
 - (2) Walls
 - (3) Windows and external doors
 - (4) Roof
- ii) Air infiltration rate
- iii) Energy systems (and typical replacement lifecycles):
 - (1) HVAC system type/performance level/controls
 - (2) Hot water provision
 - (3) Lighting systems/controls
- iv) Maintenance (e.g. mandatory safety checks/servicing)
- v) Energy use for:
 - (1) Heating
 - (2) Cooling
 - (3) Ventilation
 - (4) Hot water
 - (5) Lighting
 - (6) Appliances
- vi) Energy carriers:
 - (1) Gas (natural gas or LPG)
 - (2) Liquid fuels (oil, etc.)
 - (3) Solid fuels (coal, etc.)
 - (4) Renewable energies:
 - (a) Solar energy for hot water generation
 - (b) Solar PV
 - (c) Wind
 - (d) Heat pump (type and coefficient of performance)
 - (e) Biomass (wood chips, wood pellets)
 - (f) Other (specify)
- vii) District heating (identify energy carriers)

Section 2 Approaches to renovation

Identify opportunities for retrofit of energy efficiency measures for each building category:

- i) Fabric measures – building envelope
- ii) Exterior windows and doors
- iii) Technical facilities – heating/ventilation/cooling/hot water
- iv) Air tightness/infiltration
- v) Lighting
- vi) Appliances

Identify opportunities for retrofit of renewable energy measures:

- i) Passive solar energy
- ii) Shading
- iii) Solar energy for hot water generation
- iv) Solar energy for generation of electricity (Photovoltaics)
- v) Wind energy
- vi) Heat pump
- vii) Biomass
- viii) Biogas
- ix) Geothermal hot water

Identify opportunities for retrofit of passive measures:

- i) Shading
- ii) Natural ventilation
- iii) Natural cooling

Identify opportunities to align renovation and connecting/expanding/updating a district energy system

Identify packages of measures that can achieve at least 60% energy saving (deep renovation)

Section 3 Socio-economic appraisal

Identify and quantify the benefits arising from different packages of measures for deep renovation, including:

- Economic benefits: energy cost savings; increase in GDP; impact on economic activity, increase in property values; impact on public finances; reduction of energy import bill
- Societal benefits: reduction in fuel poverty; health benefits; increased comfort/productivity
- Environmental benefits: reduced greenhouse gas emissions; air quality improvements
- Energy system benefits: increased energy security; avoided new generation capacity; reduced peak loads

Identify and quantify the costs:

- Total cost of installing renovation measures, minus any avoided cost due to end-of-life replacement or by undertaking renovation alongside other building maintenance, new construction or modernisation measures.
- Transaction costs, including costs of temporary relocation of occupants

Determine prioritised renovation packages for each building category (based on the cost and benefit appraisal)

Section 4 Policy assessment

Identify barriers to deep renovation:

- i) Legislative and regulatory barriers
- ii) Fiscal and financial barriers, including split-incentive dilemmas and market failures
- iii) Communication and capacity barriers
- iv) Technical barriers
- v) R&D barriers

Identify policies/measures to overcome identified barriers

Assess potential role of the following measures/policies/approaches:

- i) Measures to target all public buildings
- ii) Targeting the worst-performing segments of the national building stock
- iii) Policies to alleviate energy poverty
- iv) Measures exploiting trigger points for renovation in the life-cycle of buildings
- v) Policies and actions to stimulate cost-effective deep renovation of buildings, including staged deep renovation
- vi) Introducing building renovation passports
- vii) National initiatives to promote smart technologies and well-connected buildings and communities
- viii) National initiatives to promote skills and education in the construction and energy efficiency sectors

Section 5 Policy package

Define a policy package based on socio-economic and policy appraisal, with a particular focus on measures to be introduced within the next five years

Set out roadmap with key dates, targets for the introduction of policies

Include **milestones for 2030, 2040, 2050**

Define contribution of policies to achieving the EU 2030 energy efficiency target

Define expected share of renovated building by 2020 (and 2030)

Quantify total annual investment requirements to 2050 to deliver policy package

Identify existing sources of funding for building energy renovation:

- i) Local public funds
- ii) National public funds
- iii) EU Structural/Cohesion funds
- iv) Banks and other sources of finance, e.g. pension funds and investment trusts

Identify possible new funding sources, instruments and mechanisms, including:

- i) aggregating projects, through investment platforms or groups, or consortia of small and medium-sized enterprises
- ii) reducing perceived risk of energy efficiency operations
- iii) use of public funding to leverage additional private-sector investment
- iv) guiding investments into an energy efficient public building stock, in line with Eurostat guidance
- v) accessible and transparent advisory tools, such as one stop shops for consumers and energy advisory services

Annex 1 Implementation progress report

Review of implementation progress of previous (2017) renovation strategy, including:

- Progress towards national targets
- Contribution to EU energy efficiency target for 2020 and 2030
- Outcomes of existing policies in terms of energy savings delivered and impact on the renovation rate and depth

Annex 2 Consultation summary

Summary of the results of public consultation into the long-term renovation strategy, including:

- Summary of responses to consultation
- List of stakeholder groups consulted
- Explanation of consultation process, including how inclusive consultation has been ensured across all stages

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