



Joint Working Group of CA EED, CA EPBD and CA RES

Assistance Documents

for EU Member States in developing long term strategies for mobilising investment in building energy renovation

(per EU Energy Efficiency Directive Article 4)

COMPOSITE DOCUMENT

(Main Document plus Annexes)

This set of documents has been developed by a Joint Working Group drawn from three EU 'Concerted Action' projects (EPBD, EED and RES) under the Intelligent Energy for Europe programme.

It has been prepared as a resource to encourage and assist Member State authorities. However, it has a voluntary status and any views expressed herein are not to be attributed to the EU Commission or to any national or EU institutional party.

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November 2013

Summary

The aim of this suite of documents is to provide a structured and clear checklist of questions and accompanying reference material that will assist authorities in EU Member States in the task of formulating their long term strategies to mobilise the large scale energy efficiency upgrading/ renovation of their building stocks, as required by Article 4 of the EU Energy Efficiency Directive.

The core of the *Main Document* takes the form of a series of nine steps, each containing a checklist of indicative issues to be considered, followed by signposts to two other documents: *Annex 1* which contains a selection of examples of potentially useful approaches, case studies and other documentation; and *Annex 2* which is a supplementary reference offering detailed expansions on the checklist of questions, and can be viewed as an extended menu.

These indicative nine steps are as follows:

1. Vision and time horizon
2. Stakeholder engagement
3. Market characterisation
4. Key barriers and challenges
5. Techno-economic appraisal
6. Financing
7. Policy measures
8. Shaping the offer – growing market confidence
9. Publication and implementation.

The building sector in all Member States is a highly diverse and complex one, in terms of typologies, physical quality, demography, ownership and usage patterns, legal frameworks and economic circumstances. The supply chains and networks of stakeholders within the building industry are also highly complex, often weakly coordinated, with differing perspectives and priorities, and may not be well skilled to deliver on the ambitious goals required in the strategy. Indeed, the industry often does not have a strong record of successful innovation compared with other sectors. This makes the task of formulating and, more importantly, delivering a successful strategy a deeply challenging and multi-faceted one.

This set of documents does not seek to identify or answer all the issues that need to be addressed in developing a strategy. It does, however, aim to provide a useful starting point for Member State authorities by way of posing a series of possible questions to be addressed in partnership with stakeholders, in conjunction with signposts to some possible productive approaches to tackling particular challenges, including examples of relevant actions and experiences. While the specific content of the resulting strategy in each Member State is the responsibility of the Member State, it is hoped that these documents will help towards the ultimate efficiency and quality of delivery of the set of strategies required across the 29 countries subject to the Directive, and help their effective early implementation.

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About the Joint Working Group

The Joint Working Group consisted of five standing members plus two active participants:

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Acknowledgements

The establishment of the Joint Working Group was an initiative of the co-ordinators of the three EU Concerted Action projects, in conjunction with the EU Commission officials overseeing the respective projects. The Joint Working Group is grateful to all of them for their support and encouragement throughout the process of developing this document. They are as follows:

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Introduction

Buildings account for 40% of Europe's energy consumption and associated CO₂ emissions. The single largest sectoral contribution to EU energy efficiency targets for 2020, and likely beyond, is required to come from improved energy efficiency in buildings – mainly existing buildings.

Of Europe's existing buildings, only about 1.2% are renovated – not necessarily to their full energy efficiency potential - and about 0.1% demolished per year. Even if all buildings were renovated at this rate to the highest energy efficiency standards, it would be insufficient to meet EU energy saving targets for 2020. Three important sets of actions are needed in order to achieve those targets: Firstly, whenever building renovation takes place, all available feasible energy saving technologies must be incorporated; it is estimated that 'deep' renovation can cut energy consumption by as much as 60% - 80% for the majority of Europe's buildings. Secondly, the annual rate of renovation must be tripled before 2020. Thirdly, financial instruments to accelerate building renovation must be identified and implemented.

But to make this happen in the real marketplace of property and construction is an immense societal challenge which calls for long term strategies and initiatives across Member States.

Against this background, with the goal of transforming the energy performance of the building stock, Article 4 of the EU Energy Efficiency Directive (EED) sets out obligations on each EU Member State to develop a strategy for building energy renovation, including particular elements, as follows:

'Member States shall establish a long-term strategy for mobilising investment in the renovation of the national stock of residential and commercial buildings, both public and private.

This strategy shall encompass:

- (a) An overview of the national building stock based, as appropriate, on statistical sampling;*
- (b) Identification of cost-effective approaches to renovations relevant to the building type and climatic zone;*
- (c) Policies and measures to stimulate cost-effective deep renovations of buildings, including staged deep renovations;*
- (d) A forward-looking perspective to guide investment decisions of individuals, the construction industry and financial institutions;*
- (e) An evidence-based estimate of expected energy savings and wider benefits.*

A first version of the strategy shall be published by 30 April 2014 and updated every three years thereafter and submitted to the Commission as part of the National Energy Efficiency Action Plans.'

The aim of this set of documents is to provide practical assistance to the national authorities specifically responsible for developing this strategy in each EU Member State. That practical assistance is in the form of a suggested structured approach to formulating the strategy. For each aspect of the strategy development process, this *Main Document* sets out a series of indicative issues to be considered. These are accompanied by links to a selection of useful reference case examples and information sources, which are detailed in *Annex 1*. The case examples draw upon, and point to, a number of other publications and model approaches that Member State authorities may find useful, either in general or in particular national circumstances. Similarly, some case examples will have general relevance, while others will be of most interest to particular geographical or institutional circumstances. *Annex 2* is provided as a supplementary reference for Member State authorities, offering detailed expansions on the checklist of questions outlined in the Main Document, and can be viewed as an extended menu.

While the targets and aspirations set out in the EED and other EU policies provide a basic framework for setting short and long term national targets and describe various means that Member States might apply in meeting them, it is recognised throughout that it is for each Member State to choose a path best suited to its own particular circumstances and institutions in achieving the common goal.

Scope and principles

It is important to note that this set of documents is a voluntary offering to assist Member States authorities. It draws together publicly available information pertinent to building energy renovation strategies from a variety of sources, both within and outside the EU. But it does not claim to identify all the questions and issues that need to be addressed in developing a strategy, and does not claim to provide answers to many of the questions raised.

Almost all of the reference information is freely accessible on the internet¹; however, in a small number of cases access to the information may require online registration or purchase of a publication. This information does not address all of the questions identified. Moreover, it is not suggested that any of the case examples are ideal, merely that they contain interesting elements relevant to certain issues. And there will certainly be other useful case examples and information that were not within the capacity of the Joint Working Group to identify in the time available.

The information is structured into a format intended to be of practical assistance, while acknowledging the flexibility open to each Member State in the individual approach it may choose to adopt. It is especially important to emphasise and that this documentation **must not be seen as prescriptive** of what approach should be taken by Member States authorities – in either the format and content of their strategies.

Building Energy Renovation – Approach to Strategy Development

Review of selected reference publications

The value of a strategy consists not only of the end product (the published document), but also the process required in the development of that end product. The quality and effectiveness of a strategy depend very much on the quality of the analytical, consultative and stakeholder engagement processes.

Member State authorities may already have an established process for developing national strategies. However, there is no known precedent or obvious analogue for a strategy as comprehensive and ambitious as is required by EED Article 4.

It is therefore useful for Member States to consider the approaches suggested in three reference publications which highlight common themes and stages in the strategy (or roadmap) development process:

- [A Guide To Developing Strategies For Building Energy Renovation, BPIE, 2013](#)
- [Renovation Roadmaps for Buildings, Policy Partners \(for Eurima\), 2013](#)
- [Energy Technology Roadmaps: A Guide to Development and Implementation, IEA, 2010.](#)

While these documents vary in emphasis they are generally aligned in terms of the various stages in process or methodology that need to be pursued in the development of building energy renovation strategies. They generally divide the development process into four key stages. Although the sequence and elements of the stages can differ, they can usefully be broken down into the following categories:

Stage	Elements or tasks
Initiation	Identifying and engaging stakeholders-
	Defining the vision, scale, boundaries and key elements of the strategy
Development	Identifying, analysing and detailing key issues, actions (including policy instruments) and responsibilities
Dissemination	Collating and publishing the strategy
Implementation, monitoring and review	Putting the strategy into practice, including regular reviews and updates

¹ A notable exception: Access to information in the EU Concerted Action resource websites (whether for EED, EPBD or RES Directive) is confined to nominees from Member State authorities. However, it can be expected that the authorities responsible for managing EED Article 4 obligations will have such access.

Structure of this documentation

Without prejudice to the discretion open to Member States in the formulation of their strategies, this document offers indicative examples of possible detailed steps (or task modules) that might be identified and applied by Member State authorities in this task.

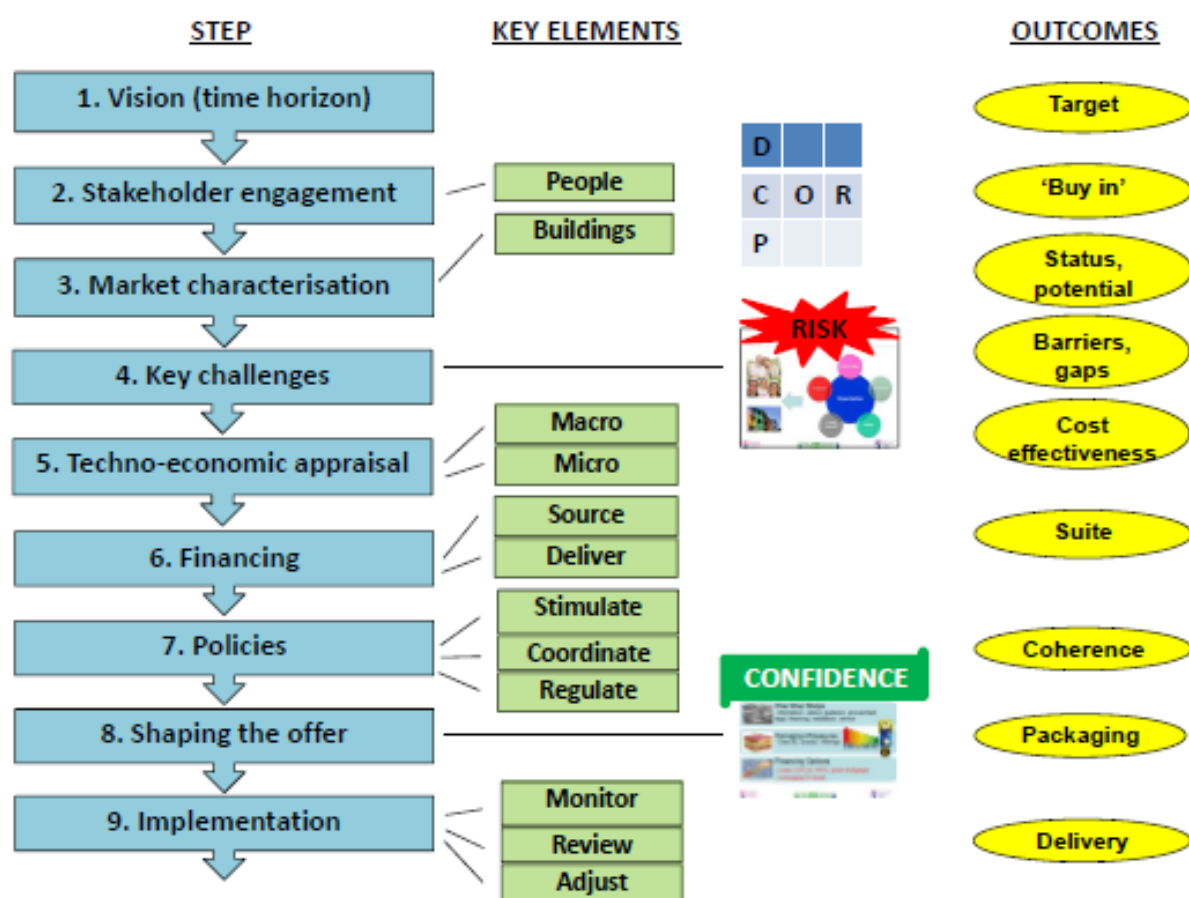
Figure 1 illustrates a suggested sequence of nine Steps (with main elements and outcomes) set out in this Main Document and the accompanying two Annexes. In the sections that follow, each Step presents a checklist of indicative issues to be considered, accompanied by signposts (hyperlinks) to examples of potentially useful approaches, case studies and other documentation, detailed further in Annex 1. Each Step also includes a shortlist of possible questions to be considered, which is similarly hyperlinked to an expanded menu of questions offered in Annex 2.

Since a large number of the case examples have relevance to more than one of the Steps, the case examples are numbered and referenced in a manner that is intended to convey the cross-linkages while limiting duplication. Where a case example is referenced more than once, mention of it in later Steps is usually confined to identifying the first Step under which it was referenced.

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The particular sequence of steps itself is not important. Of most significance are the menus of questions and ideas offered, with the aim of helping towards the ultimate efficiency and quality of delivery of the set of strategies required across the 28 countries in the EU, and their effective early implementation.

Figure 1: Suggested steps, key elements and outcomes in the strategy formulation process



- 1. Vision and time horizon:** Issues and questions to consider in setting a vision and time horizon for the long term strategy, and associated targets and milestones.
- 2. Stakeholder engagement:** Issues and questions to consider in securing stakeholder engagement, understanding, alignment and commitment.

3. **Market characterisation:** Issues and questions to consider in segmenting, profiling and seeking to understand the marketplace of existing buildings, their owners/ occupiers/ investors, in order to identify the potential for energy performance improvement.
4. **Key barriers and challenges:** Issues and questions to consider in assessing and overcoming key challenges and barriers to mobilisation of this sector.
5. **Techno-economic appraisal:** Issues and questions to consider in assessing the technical, economic and other costs and benefits of building energy renovation, from individual investor, national exchequer and societal perspectives. This includes tackling of constraints and conflicts.
6. **Financing:** Issues and questions to consider in quantifying, sourcing, designing and delivering the necessary finance, and in managing risk.
7. **Policy measures:** Issues and questions to consider in assessing options and formulating policies to stimulate, coordinate and regulate large scale delivery of quality renovation activity.
8. **Shaping the offer – growing market confidence:** Issues and questions to consider in developing actions to create investor trust and confidence across the market segments.
9. **Implementation:** Issues and questions to consider in the process of mobilising the full breadth and depth of action for effective delivery in the short term and on the long term vision.

The process is shown here as a broadly logical cascade of stages, with the tasks in the later stages generally influenced by the outcomes of the earlier stages. It is possible that there may also be some reverse interactions which lead to a degree of iteration or adjustment to the outcomes or earlier stages; for example the detailed levels of ambition in the Vision step (Step 1), covering diverse market sectors, might be adjusted as result of the tasks and findings of the Techno-economic appraisal step (Step 5). Overall, the aim is that the systematic process of addressing the sets of questions outlined for each stage can help Member State authorities to arrive at well integrated and coordinated strategies.

With similar provisos in relation to the strong cross-links between the different stages of the overall process, the following is the approximate correspondence between the five specific provisions in EED Article 4 and the Steps outlined above:

- (a) an overview of the national building stock based, as appropriate, on statistical sampling – Step 3;
- (b) identification of cost-effective approaches to renovations relevant to the building type and climatic zone – Steps 3 and 5;
- (c) policies and measures to stimulate cost-effective deep renovations of buildings, including staged deep renovations – Steps 5 and 7;
- (d) a forward-looking perspective to guide investment decisions of individuals, the construction industry and financial institutions – Steps 2, 5, 7 and 8;
- (e) an evidence-based estimate of expected energy savings and wider benefits – Steps 3, 5 and 8.

Developing and delivering the strategy

Given the wide range of individual institutional configurations, experience and traditions across Member States in establishing national strategies, it is not considered necessary or appropriate for this document to prescribe the detailed approach that Member State authorities might take in the process of developing or delivering its particular strategy under EED Article 4.

However, in brief it is suggested that the task of DEVELOPING the strategy will typically include two parallel interacting processes – namely (1) data, analysis and drafting – including drawing on key information resources, modelling, analysis and drafting elements of the strategy; and (2) engagement with key decision makers and stakeholders, including workshops and other consultative processes. These processes ideally lead to sufficient consensus and shared commitment to enable finalisation and launching of the strategy.

The task of DELIVERING the strategy will typically require - (1) transmission of that shared commitment into co-ordinated implementation of the different elements of the strategy to achieve the upscaling of building energy renovation activity that is necessary; and (2) a review of the effectiveness at least every three years, followed by adjustment and reinforcement of particular actions as required.

1 Step 1: Vision and Time Horizon

Issues and questions to consider in setting a vision and time horizon for the long term strategy, and associated targets and milestones.

1.1 Indicative issues to be considered

EED Article 4 requires a long term strategy to be developed, which must address, at a minimum, five prescribed content elements and will represent an unprecedented level of ambition. The draft statement of Vision is the high level kick off step to that strategy formulation process which should act as a consistent and inspirational force in driving wide societal acceptance and delivery of the strategy throughout its life. Successful formulation of the Vision requires clear government leadership, is interdependent with all steps to follow, and particularly with Step 2: Stakeholder engagement.

Given the scale, complexity and inertia of the existing stock of buildings and the diverse circumstances and perspectives of the multiple decision makers, the process of setting long term and intermediate targets for mobilising and delivering the upscaled and deepened market activity required to achieve the vision requires strong and skilful coordination. In this context, it may be beneficial to consider segmenting the strategy into a series of individual action plans to address the particular needs of the different market segments.

The nature of such a vision and strategy is to create long term stability and a pace of acceleration that is both sufficiently ambitious and realisable, in order to ensure stakeholder confidence and commitment to deliver over time. This is on the basis of having been formulated through a process that is evidence based, with wide consensus across policy, consumer and industry interests, and of being open to adjustment and continuous improvement in delivery, including the three year review process.

Examples of possible elements in a **phased approach** to the setting of intermediate and ultimate renovation strategy (roadmap) targets are given in general publications by the [Building Performance Institute of Europe](#), [The Policy Partners](#) and the EU [‘THINK’ project](#). While technology focussed, the [IEA generic guide](#) offers approaches that can help towards a successful roadmapping process.

Individual national or regional **roadmaps** such as by the [Basque Government](#) and the [Sustainable Energy Authority of Ireland](#) illustrate some of the perspectives and elements that might be contained in a long term strategy, to respective time horizons of 2025 and 2050. Examples of roadmapping approaches by advocacy groups include Eurima’s [‘Renovation Tracks’](#) report and Spain’s [GTR roadmap](#).

In the context of securing such long term commitment to the strategy from the array of stakeholders, it will be important to extend the debate **beyond direct energy policy benefits** to include other potentially significant benefits to building owners, tenants and to wider society, such as highlighted in the [IEA report analysing the co-benefits of energy efficiency programmes](#).

Section 1.3 lists these case examples pertaining to the above aspects of the strategy development process. These are hyperlinked to more detailed descriptions in Annex 1.

1.2 Some key questions summarised

The following is a list of possible questions to be considered, which are hyperlinked to an expanded set of options in Annex 2.

1.2.1 [What is the purpose of the vision?](#)

1.2.2 [What could be included in the vision?](#)

1.2.3 [Who should lead the visioning process?](#)

1.2.4 [What should inform the process?](#)

1.2.5 [What are the boundaries of the vision?](#)

1.2.6 [How long is a ‘long term’ strategy?](#)

1.2.7 What phasing and milestones are appropriate?

1.3 Case examples and documentation

The following is a selection of case examples that may assist addressing issues and questions in setting a vision and time horizon for the long term strategy, and associated targets and milestones. Fuller details are given in Annex 1, to which these references are hyperlinked.

The roadmapping process:

Case 1: [Building Performance Institute of Europe \(BPIE\): A Guide to Developing Strategies for Building Energy Renovation](#)

This is a high level overview of the process of developing renovation strategies, with many useful suggestions.

Case 2: [The Policy Partners \(for Eurima\): Renovation Roadmaps for Buildings](#)

This report, on behalf of an industry association, is also a high level overview of the process of developing renovation strategies, with many useful suggestions. It offers indicative timelines for building energy renovation roadmaps.

Case 3: [IEA Energy Technology Roadmaps: A Guide to Development and Implementation](#)

This is a useful and authoritative generic guide to the roadmap development process in an energy technology or policy context.

Case 4: [Eurima: Renovation Tracks for Europe Up to 2050](#)

This report by an industry association analyses and compares possible pathways for the renovation of the EU building stock, with accompanying estimates of energy and emissions benefits, financial impact and employment effects. It emphasises the case for deep renovation.

Case 5: [European University Institute: EU 'THINK' - How to Refurbish All Buildings by 2050](#)

The report of an EU research project 'THINK', focussing on the policy options to tackle the building refurbishment challenge, graded as market facilitation, regulatory instruments and public support measures.

National and regional roadmaps:

Case 6: [Working Group for Rehabilitation "GTR" \(Grupo de Trabajo sobre Rehabilitación\): A National Perspective on Spain's Buildings Sector: A Roadmap for a New Housing Sector](#)

Devised by an advocacy building rehabilitation working group, this 'white paper' roadmap outlines an action plan to an 80% decarbonisation of the Spanish residential housing sector by 2050. It includes segmentation of the Spanish national housing stock and the identification of 'hotspots' of homogenous building types that can be usefully targeted.

Case 7: [Basque Government: Bultzatu 2025: Strategy for sustainable buildings in the Basque Country](#)

This is an example of a roadmap with a time horizon of 2025, relating mainly to energy renovation, with detailed profiling and situation analysis of the existing housing stock, plus analysis of improvement potential. Highlights many economic, social and environmental developmental benefits from the strategy, and is the outcome of coordinated action between the Basque Government, its public corporations and stakeholder clusters.

Case 8: [Sustainable Energy Authority of Ireland: Residential Energy Roadmap](#)

This is an example of a roadmap relating mainly to building energy renovation. It shows a range of scenarios based on modelling assumptions and outlines a potential path to a 90% reduction on residential energy use and CO₂ emissions to 2050. Proposes three categories of change actions - policy measures, technological development and knowledge and skills.

Other informing studies:

Case 9: European Environmental Bureau: Energy Efficiency – 15 Good Practice Case Studies

Publication by a NGO of a selection of case studies of projects and schemes in eight countries, mainly for building energy renovation, with potential for replication.

Case 10: World Business Council for Sustainable Development (WBCSD): Transforming the Market – Energy Efficiency in Buildings

This is the final report of a WBCSD roadmapping research project which analysed energy use by building type in the EU and five other markets, and highlights a potential 60% energy efficiency improvement in the building stock by 2050. The roadmap sets out key short and medium term actions to enable this goal.

Case 11: International Energy Agency: Energy Efficiency Governance Handbook

This handbook presents guidance to practitioners, government officials and stakeholders towards establishing effective energy efficiency governance structures for their countries, covering legislative frameworks and funding mechanisms, institutional arrangements, and co-ordination mechanisms, which work together to support implementation of energy efficiency strategies, policies and programmes.

Case 12: International Energy Agency: Analysis of co-benefits of energy efficiency programmes

Widens the horizon of energy efficiency policy and the building renovation strategy by highlighting a range of often unappreciated economic and societal benefits, to assist assessment of the full value of energy efficiency improvements and enable optimisation of policy design to maximise opportunities.

2 Step 2: Stakeholder Engagement

Issues and questions to consider in gaining and securing stakeholder engagement and commitment.

Particularly relevant to addressing clause (d) of EED Article 4.

2.1 Indicative issues to be considered

The success of the strategy depends heavily on a co-ordinated commitment by a wide body of stakeholders responsible for its delivery, extending well beyond the traditional energy community. To ensure that these stakeholders make the necessary commitment, it is important that they gain an early shared understanding of their own roles and opportunities, and are actively engaged by the national authorities in the formulation of the strategy. Those roles include direct delivery on elements of the strategy, or can be indirect in enabling (or not disabling) others to deliver. While this engagement and consensus building takes time, it is a key determinant on the quality and effectiveness of the strategy in delivering the transformative change required in the marketplace.

This vital aspect is reflected in a number of the examples of roadmapping approaches in Step 1: by the [Building Performance Institute of Europe](#), [The Policy Partners](#), the [Basque Government](#) and Spain's [GTR roadmap](#). Further national and expert perspectives on how to secure and gain stakeholder engagement are included in the online proceedings of a [World Green Building Council](#) seminar on planning renovation strategies. It is also important to appreciate that each Member State will have its own traditions and protocols for stakeholder engagement in the formulation of major national strategies, and it is likely to be appropriate to employ such approaches in the case of the present strategy.

In so doing, it may also be useful to consider or check that approach with regard to the following principles:

- Inclusiveness – with participation from government, industry, construction, suppliers, academia etc
- Collaborative – in using the collective expertise from all parties to define objectives and methods
- Consensus building – seeking shared understanding and consensus on strategy and commitment to work to its implementation
- Forward looking – towards ongoing partnership and networking of stakeholders.

In such engagement, it is likely to be appropriate to co-ordinate with other policy dimensions to the national energy agenda, extending to regional and local level. For example, actions under the aegis of the sustainable energy action plans of the EU Covenant of Mayors may facilitate such dialogue and co-ordination.

These principles form part of an overall approach to strategy co-ordination and governance, including mechanisms for achieving ongoing stakeholder participation and commitment. The International Energy Agency (IEA) offers guidance on such a governance framework in relation to [roadmap/ strategy development](#) and on establishing effective [energy efficiency governance](#) structures.

Section 2.3 lists these case examples pertaining to this particular aspect of the strategy development process. These are hyperlinked to more detailed descriptions in Annex 1.

2.2 Some key questions summarised

The following is a list of possible questions to be considered, which are hyperlinked to an expanded set of options in Annex 2.

[2.2.1 Who should be included?](#)

[2.2.2 On what issues might they be engaged?](#)

[2.2.3 When and how should they be engaged?](#)

2.2.4 Case examples and documentation

The following is a selection of case examples that may assist addressing issues and questions in gaining and securing stakeholder engagement and commitment. Fuller details are given in Annex 1, to which these references are hyperlinked.

Stakeholder engagement in the roadmapping process:

Case 1: [Building Performance Institute of Europe \(BPIE\): A Guide to Developing Strategies for Building Energy Renovation](#)

In Step 1.

Case 2: [The Policy Partners \(for Eurima\): Renovation Roadmaps for Buildings](#)

In Step 1.

Case 6: [Working Group for Rehabilitation “GTR” \(Grupo de Trabajo sobre Rehabilitación\): A National Perspective on Spain’s Buildings Sector: A Roadmap for a New Housing Sector](#)

In Step 1.

Case 7: [Basque Government: Bultzatu 2025: Strategy for sustainable buildings in the Basque Country](#)

In Step 1.

Case 13: [World Green Building Council: ‘Planning for the Long-Term: Creating National Renovation Strategies’](#)

Examples from different countries of approaches to stakeholder engagement as provided at this seminar in Brussels in April 2013 may be useful as a starting point. This network has also published a useful report entitled ‘The Business Case for Green Building’.

Case 14: [Covenant of Mayors: Sustainable Energy Action Plans](#)

The Covenant of Mayors is a support network to local authorities towards implementing sustainable energy and CO₂ emissions policies. Its web pages hold a repository of nearly 3,000 local and regional action plans for sustainable energy, aimed towards meeting their sustainable energy targets to 2020, and cover all building types.

Co-ordination and governance:

Case 3: [IEA: Energy Technology Roadmaps: A Guide to Development and Implementation](#)

In Step 1.

Case 11: [IEA: Energy Efficiency Governance Handbook](#)

In Step 1.

3 Step 3: Market Characterisation

Issues and questions to consider in segmenting, profiling and seeking to understand the marketplace of existing buildings, their owners/ occupiers/ investors, in order to identify the potential for energy performance improvement.

Particularly relevant to addressing clauses (a), (b) and (e) of EED Article 4.

3.1 Indicative issues to be considered

Understanding the market arena

The goal of the strategy is to stimulate activity that will, in a defined timescale, transform a highly complex and fragmented market. That market arena consists of the stock of existing buildings in need of energy renovation, and the chains and networks of people and organisations who make the decisions that determine whether that investment in energy renovation takes place. It is hugely diverse in terms of typologies: sector (residential, commercial, public, industrial), building size, form, construction materials, technical energy systems, intensity of use, energy performance, energy pricing, age, life expectancy, heritage constraints, technical constraints, ownership, in-house skills, common business models, asset value, economic health, investor attitudes and motivations, and access to finance. In larger Member States, there can also be significant regional differences in climate and building idioms. These many diverse factors translate into diverse patterns of building use and energy consumption.

The challenge can be summarised as a twin one: to stimulate a three to five fold increase in the volume of demand by building owners for energy efficiency renovation works, with a need to build a matching delivery capacity of high quality and efficiency across the building industry supply chain. The purpose of this step is to gain a sufficiently clear and realistic understanding and quantification of the status and latent energy renovation potential of the national building stock.

This is reflected in the fact that the Directive requires the strategy to include: ‘an overview of the national building stock based, as appropriate, on statistical sampling’; ‘an evidence-based estimate of expected energy savings and wider benefits’; ‘identification of cost-effective approaches to renovations relevant to the building type and climatic zone’; ‘policies and measures to stimulate cost-effective deep renovations of buildings, including staged deep renovations’; and a forward-looking perspective to guide investment decisions of individuals, the construction industry and financial institutions. This Step is a vital platform to informing the approach in the strategy to meeting all these requirements.

Gathering data for insight

Different countries will have a range of data and research sources and approaches to characterising the different segments of the building stock, both quantitatively and qualitatively. The EU [TABULA](#) project, covering 15 countries, has developed housing energy typologies and sought to identify and quantify renovation potential. Another statistical information source might be national or regional registers of building energy certificates and their detailed data files, such as the [SEAI energy certificate research tool](#) which is accessible to the research community.

Technical and socio-economic research surveys of specific building types, sectors and users in different countries are also likely to give partial insight. Any databases or impact evaluation studies of grant or other incentive schemes may also provide useful information. The [UK Home Energy Efficiency Database](#) is an example of a resource which tracks energy efficiency improvements to the housing stock (under an incentive scheme) on a technical and geographical basis. The Wallonia (Belgium) [‘building passport’ initiative](#) will enable tracking of all energy efficiency actions pertaining to the building and contribute to a growing database of live information.

Market research surveys of the attitudes, concerns, needs and capacities of key decision makers could be expected to complement the technical profiling of buildings and particularly help to inform the Steps to follow.

For each Member State, combining the technical and socio-economic profiling of different segments of the building stock is important in order to identify the realistic potential for phased investment in energy renovation. But this is likely to be difficult in many cases. In practice, the ideal comprehensive profile of the market arena that is implied in the first paragraph above will not be possible. There will be weak or fragmented information in at least some aspects. Where data gaps exist, reference to data available in other countries for analogous circumstances may be useful, such as can be accessed through the [BPIE Data Hub](#) portal website.

The aim will be to obtain a 'sufficiently accurate' knowledge of the building stock, in terms of energy and associated technical characteristics, and of the receptiveness of key decision makers to investing in energy renovation. This will inform the Steps to follow, particularly what is the most realistic and cost effective route to maximising the building stock capacity for positive change. The roadmap proposal of the advocacy group [GTR in Spain](#) is one example of how such gathered building stock data could be applied.

Section 3.3 lists case examples pertaining to this aspect of the strategy development process. These are hyperlinked to the more detailed descriptions in Annex 1.

3.2 Some key questions summarised

The following is a list of possible questions to be considered, which are hyperlinked to an expanded set of options in Annex 2.

3.2.1 [Status: Do you have a national building stock model that covers all sectors?](#)

3.2.2 [Potential: What information can this yield on the technical potential of energy renovation?](#)

3.2.3 [What information can this yield on the required number and pace of energy renovations?](#)

3.2.4 [For each sector, do you have a building stock model – or research information - that profiles some or all of the following?:](#)

3.2.5 [For each sector or subsector, can this data be used to estimate cost-effective potential and the financing needs?](#)

3.2.6 [From either statistical sources or from stakeholders, what is the existing level of building energy renovation?](#)

3.3 Case Examples and Documentation

The following is a selection of case examples that may assist addressing issues and questions in segmenting, profiling and seeking to understand the marketplace of existing buildings and their owners/ occupiers/ investors, in order to identify the potential for energy performance improvement.

Fuller details are given in Annex 1, to which the following references are hyperlinked.

General portal:

Case A: [BPIE Data Hub](#)

This extensive online repository and search engine for statistics and policy information on Europe's building stock covers 30 European countries and has integrated other collaborative sources (websites, databases and tools) that provide additional information.

Databases and data sources on building stock and related policies:

Case 14: [United Kingdom: Home Energy Efficiency Database \(HEED\)](#)

A UK Energy Saving Trust series of reports based on data in HEED provides a geographic distribution of professionally installed measures – currently cavity wall and loft insulation – claimed under the Carbon Emissions Reduction Target (CERT) scheme.

Case 15: [IEE TABULA project](#)

The IEE 'TABULA' project established libraries of housing energy typologies for 15 participating EU Member States and analysed the impact on each typology of standard and advanced levels of energy refurbishment. It also conducted team international expert workshops on energy assessment of national housing stocks.

Case 16: [Ireland: Building Energy Rating Research Database and Tool](#)

Ireland's database of 350,000 Energy Performance Certificates is a rich source of statistical information that is open to data mining by the research and policy communities to analyse technical and associated economic profiles and potential scenarios for building energy renovation.

Case 17: [Belgium, Wallonia, Building Passports](#)

Implementation of a 'building passport' to follow all actions on a given building will enable tracking of all energy efficiency actions pertaining to the building and contribute to a growing database of live information which can help track progress over the years of the strategy.

Case 18: [MURE Odyssee database of energy efficiency indicators, policies and measures](#)

ODYSSEE MURE is an IEE project which has developed a range of indicators of energy efficiency across all sectors, and monitors energy efficiency trends and policy measures in Europe. Requires registration and subscription.

Case 198: [Canada: Screening methodology for implementing cost effective energy retrofit measures in office buildings](#)

Also in Step 5. The paper describes a Canadian methodology developed to screen office buildings for their current level of energy consumption and potential for retrofit application.

Application of data to strategy development:

Case 1: [Building Performance Institute of Europe \(BPIE\): A Guide to Developing Strategies for Building Energy Renovation](#)

In Step 1. Annex 2 of this document offers suggestions on what data would ideally be gathered.

Case 6: [Working Group for Rehabilitation "GTR" \(Grupo de Trabajo sobre Rehabilitación\): A National Perspective on Spain's Buildings Sector: A Roadmap for a New Housing Sector](#)

In Step 1.

Case 7: [Basque Government: Bultzatu 2025: Strategy for sustainable buildings in the Basque Country](#)

In Step 1.

4 Step 4: Key barriers and challenges to mobilising investment in building energy renovation

Issues and questions to consider in assessing and overcoming key challenges and barriers to mobilisation of this sector.

NOTE: This Step identifies a number of issues which are the subject of responses in Steps 5, 6 and 7 in particular. Step 7 may be viewed as a 'mirror image' response to Step 4.

Collectively, the various barriers to building energy renovation can be summarised as constituting a perceived risk or deterrent to the relevant decision makers. Given that for most stakeholders energy is outside of their core area of expertise, such risk is based not only on concerns over investment cost, but on the time, effort and uncertainty that might be involved.

Key barriers that need to be addressed include: high capital costs; imperfect information; lack of awareness and confidence by both the demand and supply side of the market; and various forms of uncertainty (technical, regulatory, policy, etc.). Decision makers faced with significant uncertainty are likely to delay investment decisions or opt for choices where uncertainty appears low, quantifiable and manageable. The streams of decision makers across all sectors need to be offered a sufficiently attractive and compelling case to commit to the level of sustained investment that is needed.

The identification and diagnosis work in this Step is aimed at informing the Steps to follow, which include the tasks of developing responses and solutions to tackle these barriers.

4.1 Indicative issues to be considered

While the societal benefits of buildings' energy renovation provide strong justification for the strategy, there are many barriers to its successful delivery, some well-known, others less so. Many of these barriers reflect or result in a lack of information, awareness, motivation, capacity, trust or conviction by either the building owner or investor (demand side) or by the key service providers (supply side). An important step in formulating the strategy is therefore the identification and assessment of specific barriers to building energy renovation, and particularly deep renovation, and the development of specific responses and solutions to tackle these.

Comprehensive refurbishment is a complex process which requires technical skills and capacity to coordinate multiple economic agents (auditors, contractors, equipment vendors, banks, insurance companies...), while the market offer of well-coordinated works aimed at tapping most of the building sector's energy savings potential is still to date not well structured. As an example, the awareness and understanding of the Energy Services Companies (ESCOs) concept has increased in recent years, creating more confidence in the market, where potential clients can begin to consider energy efficiency services more as 'business-as-usual' than as a speciality. Yet, still insufficient awareness of the specifics of the ESCO model and scepticism towards its advantages among both clients and financiers remains a commonly reported barrier to the deployment of ESCO projects in the large majority of EU countries. The lack of standardisation is perceived as the most important motive for this uncertainty and mistrust in both traditional and ESCO type funding models. In addition, the lack of experience of clients, ESCOs and financial institutions and the inhomogeneous energy efficiency renovation offer, which makes standardisation of contracts difficult, have been identified as reasons for mistrust.

Reference is now made to examples of **integrated approaches** to tackling such barriers, followed by approaches to other challenges.

Create confidence towards energy efficiency services

In Austria, in the Graz region, the [Thermoprofit®](#) network consists of energy services suppliers who commit themselves to pre-set quality standards and are certified and regularly assessed by an independent commission, to confirm compliance. The aim is to improve confidence in the services offered by ESCOs and facilitate the marketing of their services to potential clients.

Create confidence amongst investors

Currently, investors, whether institutional or private, do not consider energy efficiency to be an attractive investment especially considering its long maturity. While some investors are willing to invest (notably institutional investors such as pension funds or insurances), there is no vehicle to purchase energy efficiency securities (representing loans for energy efficiency improvements). Yet, investment needs are very large in the long term: in order to attract sufficient capital towards energy renovation at low cost (low interest rates and long maturity), it is essential that capital holders gain confidence in these investments.

In the USA, the [Investor Confidence Project](#) gathers a set of protocols aiming at enabling a market for investment in energy efficiency projects and creating a track-record of energy efficiency investment characteristics, in order to reassure private investors and help develop appropriate insurance tools. Similarly the [International Performance Monitoring and Verification Protocol](#) is an example of a framework offering an independent and standardised approach that builds confidence.

Considering the risk of possible defaults during the early period of the contracts, clients and financiers will seek to secure the capacity of the ESCO or project promoter to assume the financial consequences of an energy performance guarantee, if applicable. In France, some insurance companies are currently developing specific energy performance insurances for ESCOs. The private insurer Verspieren is notably proposing [Energi'Assur](#), which covers the difference between the energy consumptions in the first year after retrofit and the yearly targeted consumption (i.e. adjusted on climate and in some cases use of the building) in the 4 following years.

Build and pool clients' capacity

On the other hand, the lack of capacity on the client side to define and negotiate complex contracts is a key obstacle for EPC to be used for deep renovation ("there is no good contract without a good client"). Indeed, both supply and demand sides need to be structured in order to develop the market.

In France, the initiative of the region Rhône-Alpes ([OSER](#)) aims at expanding the dynamic of thermal rehabilitation in public buildings by pooling skills and resources and providing a range of services (technical and financial) to local authorities.

In Paris, [Coach Copro](#) supports condominiums in structuring their energy refurbishment projects and negotiating with contractors. Notably they provide template methods and documents as well as a secured database, only accessible to the co-owners of a given building, gathering all relevant information to follow the refurbishment project.

Track and build on previous initiatives

Another initiative of interest is in Wallonia where the concept of "[building passports](#)" has been created. This aims at recording all actions on a given building (energy audits, previous interventions, recommendations, etc.) over time, independently of its owner. It aims at allowing the new owner of a dwelling to know the history of the initiatives and diagnoses already made on his property. It thus saves on the cost of information and avoids unnecessary repetition of actions.

Tackling other barriers

In the context of developing approaches to providing integrated solutions, there are important modular issues to be tackled. For example, the need to ensure the ongoing improvement in the capacity of the industry is being addressed on a European scale through the [Build Up Skills](#) initiative. At national level, a complementary action is the development in Ireland of a [code of practice](#) for building energy renovation. Publicly accessible registers of experts, such as the [UK Competent Persons Schemes](#) and [Germany's database of experts](#), can also help to provide building owners, financiers and national authorities with confidence in the quality of the work.

Another example of a challenging issue is the need to develop a balanced approach to the renovation of traditional and historic buildings. Guidance on this topic has been emerging in the UK on '[Responsible Retrofit of Traditional Buildings](#)' and in the tools developed by [Historic Scotland](#).

Section 4.3 offers a list of case examples pertaining to this aspect of the strategy development process. These are hyperlinked to more detailed descriptions in Annex 1.

4.2 Some key questions summarised

The following is a list of possible questions to be considered, which are hyperlinked to an expanded set of options in Annex 2.

- 4.2.1 [Have you identified actual and possible barriers to the upscaling of building energy renovation in your country?](#)
- 4.2.2 [How do you resolve the dichotomy between societal and private investment perspectives?](#)
- 4.2.3 [What are your particular challenges with older buildings?](#)
- 4.2.4 [Do you have a national code of practice for building energy renovation?](#)
- 4.2.5 [Do you have a national skills plan for building energy renovation?](#)
- 4.2.6 [Is there a suitable support system for developing new products/services for building retrofit?](#)
- 4.2.7 [Do you have a monitoring and verification system or guidelines for energy efficiency programmes?](#)
- 4.2.8 [Is there a forum to co-ordinate the different ministries involved in building retrofit?](#)

4.3 Case examples and documentation

The following is a selection of case examples that may assist addressing issues and questions in assessing and overcoming key challenges and barriers to mobilisation of this sector.

Fuller details are given in Annex 1, to which the following references are hyperlinked.

General consideration of barriers:

Case 1: [Building Performance Institute of Europe \(BPIE\): A Guide to Developing Strategies for Building Energy Renovation](#)

In Step 1.

Case 2: [The Policy Partners \(for Eurima\): Renovation Roadmaps for Buildings](#)

In Step 1.

Case 5: [European University Institute: EU 'THINK' - How to Refurbish All Buildings by 2050](#)

In Step 1.

Case 6: [Working Group for Rehabilitation "GTR" \(Grupo de Trabajo sobre Rehabilitación\): A National Perspective on Spain's Buildings Sector: A Roadmap for a New Housing Sector](#)

In Step 1.

Case 7: [Basque Government: Bultzatu 2025: Strategy for sustainable buildings in the Basque Country](#)

In Step 1.

Case 12: [International Energy Agency: Analysis of co-benefits of energy efficiency programmes](#)

In Step 1.

Integrated approaches:

Case 20: [Austria, Thermoprofit Initiative](#)

This initiative is aimed at energy services market development through a network of suppliers committed to specified quality standards and subject to independent certification to those standards, with the goal of improving market confidence

Case 21: [France, Versperien, Energ'Assur](#)

To help overcome risks on building envelope energy investments, the insurance company Versperien provides Energ'Assur, which covers the difference between the energy consumption in the first year after retrofit and the yearly targeted consumption in the following 4 years.

Case 22: [France, OSER, Rhone-Alpes region](#)

This regional initiative is establishing a local public company as a dedicated investment fund vehicle for leveraging investments in thermal energy rehabilitation of buildings, including ambitious retrofit of public buildings.

Case 23: [France, Paris, Le Coach Copro®](#)

The Paris Climate Agency has created *Le Coach Copro®* which supports condominiums in structuring their energy refurbishment projects and negotiates with contractors. Notably they provide template methods and documents as well as a secured database, only accessible to the co-owners of a given building, gathering all relevant information to follow the refurbishment project.

Case 24: [The REQUEST Project and Database](#)

The REQUEST database is a repository of tools and policies across Europe (on incentives, communication, education, stakeholder participation) for increasing the uptake of low-carbon renovation measures in residential buildings and promoting an integrated supply chain for renovation. It covers 115 case studies and gives a comparative evaluation of incentive measures, pilot projects and suggested best practices.

Case 18: [Belgium, Wallonia, Building Passports](#)

Implementation of a 'building passport' to follow all actions on a given building (once entered in the database), independently of its owner, enables tracking of all energy efficiency actions pertaining to the building and providing an effective 'one stop shop' of information.

Investment security and guarantees:

Case 25: [USA, Investor Confidence Project \(ICP\)](#)

This project has developed protocols aimed at enabling investment quality energy efficiency projects, by reducing transaction costs and engineering overhead, while increasing the reliability and consistency of savings. It is engaging a growing network of equity and debt finance companies, building owners and managers, energy service providers, insurers, engineers, utilities, NGOs and public sector bodies.

Case 26: [International Performance Measurement and Verification Protocol \(IPMVP\)](#)

Comparable to the Investor Confidence Project, and developed by a coalition of international organisations, IPMVP has become the national measurement and verification standard in the US and many other countries, and has been translated into 10 languages. A driving force was the need for a common protocol to verify energy savings claimed by energy services companies (ESCOs).

Skills and Codes of Practice:

Case 27: [EU BUILD UP Skills initiative](#)

This is a strategic initiative under the Intelligent Energy Europe (IEE) programme to boost education and training of craftsmen and other on-site construction workers and systems installers in relation to energy efficiency and renewables in all types of buildings. 30 countries are participating.

Case 28: [UK: Register of Competent Persons](#)

The UK Competent Person Schemes (CPS) established by the UK Government provide householders and regulatory authorities with confidence to engage registered persons and organisations to carry out energy efficiency work in buildings.

Case 29: [Germany \(dena\): Database of experts for energy efficient building and refurbishment](#)

This online database of over 5,000 experts (including engineers, architects and tradespersons) helps owners of residential and non-residential buildings to find qualified specialists in energy-efficient building and refurbishment.

Case 30: [Ireland: Methodology for energy efficient retrofit of existing domestic dwellings](#)

This code of practice for energy renovation of housing sets out the technical and professional practice requirements for specifiers and contractors responsible for delivering professional services to householders under national schemes. It is associated with a model form of contract to provide consumer assurance and protection.

Approaches to older buildings:

Case 31: [UK: Responsible retrofit of traditional buildings](#)

The UK Sustainable Traditional Buildings Alliance (STBA) has produced a report to address technical, economic and heritage concerns regarding energy renovation of traditional buildings. It has also produced a useful tool in the form of a 'guidance wheel' for assessing and planning works to such buildings.

Case 32: [Historic Scotland: Refurbishment strategies for heritage buildings](#)

This website is an example of a guidance resource for sensitive energy renovation of older buildings. It includes a range of guidance documentation on practical solutions to improving energy efficiency, case studies and technical papers.

5 Step 5: Technical and economic appraisal

Issues and questions to consider in assessing the technical, economic and other costs and-benefits of building energy renovation, from individual investor, national exchequer and societal perspectives. This includes tackling of risks, constraints and conflicts.

Particularly relevant to addressing clauses (b), (c), (d) and (e) of EED Article 4.

5.1 Indicative issues to be considered

The Directive requires the strategy to identify cost-effective approaches relevant to the building type and climate, to propose policies and measures to stimulate cost-effective 'deep' renovations', and to take a 'forward looking' perspective to guide investment decisions.

Based on the evidence gained from Step 3, it is first necessary to assess and determine the limits of technical feasibility regarding depth of renovation, followed by an economic feasibility (cost-effectiveness) test to identify cost optimality, and the risk and reliability of returns. This will be followed or accompanied by procurement of finance (Step 6). To inform the judgements in the strategy, this analysis is needed for each building typology group. Ultimately these technical, economic and financing appraisals will be needed in implementing the strategy on the ground for each individual building renovation investment project.

The perspective, scope and definition applied towards 'cost-effectiveness' is thus critical to these aspects of the strategy. It is vital that the perspectives, scopes and definitions on 'costs' and 'benefits' should be clear and appropriately differentiated for each sector or sub-sector of the building stock. There are several different approaches. The most fundamental distinction is between the micro-economic, often relatively short term and narrowly bounded, approach by individual building owners and investors and a more macro-economic, forward looking and inclusive or societal approach appropriate to public policy making. Given that building owners are the prime actors and decision makers in the 'real world' market, the gap between these two perspectives will need to be bridged by appropriate policy interventions.

Regarding scope, in both the micro and macro perspectives the drivers and benefits of renovation extend beyond energy savings, so it is important that the full array of motives and co-benefits is factored into the business case. On this basis, at individual investor and project level another fundamental aspect is therefore the proper attribution of costs and benefits, so that the energy dimension to the investment costs is not overstated – and that the additional non-energy benefits are not understated. Thus in a high proportion of renovations the energy element needs to be viewed as a marginal or incremental cost in the context of a package of upgrade measures to the overall building quality. A dramatic or 'deep' (rather than a modest) improvement in energy performance can thus be viewed as an opportunistic value adding dimension to the overall renovation project.

From a public policy perspective, inclusive and holistic methodologies are important in the challenge of establishing optimal energy renovation strategies for the building stock. A common [Life Cycle Costing methodology](#) has been developed and encouraged through an EU study. A potentially helpful initiative towards informing further development of established cost optimal analyses in individual Member States (as required by the EPBD) is the investigation of [cost-effective approaches to energy and carbon minimisation](#) under IEA EBC Annex 56 (primarily EU countries).

The [UK Energy Efficiency Strategy](#) sets out several cost effectiveness considerations, both micro-economic and macro-economic, covering both domestic and commercial sectors. Some indicators for evaluating social and environmental impacts are also given. A Hungarian study on [risks and opportunities](#) indicates that a programme of deep renovation of public buildings at current rates may be more cost effective than an accelerated rate of shallow renovation, because of future opportunities lost in the latter scenario.

Micro-economically, the case of the US [Empire State Building refurbishment](#) highlights the attractive business case for 'deep' energy efficiency improvements opportunistically in the context of an overall building refurbishment. A Canadian paper describes one example of a [screening methodology](#) to assess

potential for retrofit application. Two examples of evaluation of the impacts of national or regional stimulus programmes are the assessments of the [Italian White Certificates](#) scheme and of [incentive programmes in Saxony](#) (Germany).

Among the aspects to be considered in the techno-economic appraisal are some not directly economic factors which influence investor perspective – including investor attitudes, tenant vs owner interests, likely ownership or rent duration, opportunities for renovation at new purchase or rental, and the economic and saving attitudes of building owners. However, experience in codifying these aspects seems to be limited. In this context, it is helpful to include benefits other than energy and carbon savings in the investment perspective. The [IEA analysis of co-benefits](#) and a [USA study on non-energy benefits](#), indicating that the value of such benefits may considerably exceed the energy benefits, may be useful.

There is also a need to be technically forward looking. While most of the technologies applicable to building energy renovation are technically proven and evolving at a moderate pace, there is a need to stimulate further innovation and new solutions in order to improve technical and cost performance.

Section 5.3 offers a list of case examples pertaining to this Step in the strategy development process. These are hyperlinked to more detailed descriptions in Annex 1.

5.2 Some key questions summarised

The following is a list of possible questions to be considered, which are hyperlinked to an expanded set of options in Annex 2.

- [5.2.1 Based on the building stock model \(Step 3\), have you assessed the limits of technical feasibility for each market segment?](#)
- [5.2.2 How do you approach and define cost-effectiveness with a 'forward looking' perspective?](#)
- [5.2.3 How well does cost-effectiveness correlate with the depth of energy renovation?](#)
- [5.2.4 How useful is the 'Cost Optimal' assessment methodology?](#)
- [5.2.5 From the assessment for each market segment, is it possible to produce a prioritised list \(or 'league table'\) of individual energy efficiency investments based on cost-effectiveness?](#)
- [5.2.6 Is it possible to produce a league table of 'bundled' energy renovation investments based on composite cost-effectiveness?](#)
- [5.2.7 How to reconcile and connect the public policy and individual investor perspectives, and bridge the gap?](#)
- [5.2.8 How might building energy renovations be 'staged' or phased?](#)
- [5.2.9 How does cost-effectiveness of a measure correlate with the merit or demand of an incentive scheme?](#)

5.3 Case examples and documentation

The following is a selection of case examples that may assist addressing issues and questions in assessing the technical, economic and other costs and-benefits of building energy renovation, from individual investor, national exchequer and societal perspectives. This includes tackling of risks, constraints and conflicts.

Fuller details are given in Annex 1, to which the following references are hyperlinked.

Strategic approaches:

Case 33: [UK Department of Energy and Climate Change Strategy](#)

DECC, UK: The Energy Efficiency Strategy: The Energy Efficiency Opportunity in the UK (2012) is an example of structuring a national strategy, with several cost effectiveness considerations, both micro-

economic and macro-economic, and covering both domestic and commercial sectors. Some indicators for evaluating social and environmental impacts are also given.

Case 34: [Life Cycle Costing \(LCC\) for sustainable construction: a common methodology](#)

This EC supported review produced a comprehensive manual covering the LCC approaches in 12 countries, aimed at encouraging a new common methodology comprising 18 steps.

Case 35: [IEA: Cost-Effective Energy and Carbon Emission Optimisation in Building Renovation](#)

This IEA Energy in Buildings and Communities research initiative (Annex 56) is developing useful insights into cost effectiveness of progressively deeper building energy renovation, using a cost optimal approach to assessing different packages of measures. **NOTE: Access to the full details is restricted to registered users.**

Macro and micro economics:

Case 36: [Hungary: Risks and opportunities of building retrofit - Retrofitting public buildings](#)

The paper illustrates different levels of cost effectiveness that can be achieved under varying conditions, and points out the opportunities and the risks of different trajectories in retrofitting public buildings. Its scenario analysis indicates that a programme of deep renovation at current rates is more cost effective than an accelerated rate of shallow renovation.

Case 37: [US Empire State Building refurbishment](#)

This is a successful, relatively deep, opportunistic energy renovation with a marginal or incremental approach to cost effectiveness assessment within a holistic building renovation initiative. It highlights the business case for pursuing relatively 'deep' energy efficiency improvements.

Case 208: [Canada: Screening methodology for implementing cost effective energy retrofit measures in office buildings](#)

The paper describes a Canadian methodology developed to screen office buildings for their current level of energy consumption and potential for retrofit application.

Case 39: [Italy: ENEA Study on the Italian White Certificate Programme 2006-2013](#)

This study illustrates a cost-benefit analysis of the energy impact of, in this instance, a 'white certificates' programme applied to energy supply companies covered 1000 projects in the building sector (with shallow retrofit measures).

Case 40: [Comparative evaluation of incentive programmes in Saxony](#)

This illustrates a comparative analysis in quantitative economic terms of four incentive programmes at regional level in Saxony (Germany), using a range of economic indicators.

Non energy benefits:

Case 12: [International Energy Agency: Analysis of co-benefits of energy efficiency programmes](#)
In Step 1.

Case 41: [USA: Non energy benefits study](#)

This paper reports a wide set of US experiences in evaluating non-energy benefits of building energy performance improving investments for the final users. The data from field surveys indicates that the value of 'non energy benefits' can range from 50% to 300% of the value of the direct energy cost savings.

6 Step 6: Sourcing and Delivering Finance

Issues and questions to consider in quantifying, sourcing, designing and delivering the necessary finance, and in managing risk.

6.1 Indicative issues to be considered

Finance is fundamental to the successful implementation of building energy renovation. Estimates of the total investment required across the EU to year 2050 to deliver on the goal of deep renovation of the building stock extend upwards from €940 billion (present value).

Without the right amounts and forms of finance directed to the right places at the right time, renovation will lack the necessary scale and pace required by the goals of the strategy. To facilitate and develop the necessary co-ordination and commitment requires alignment between the previous analysis and findings regarding opportunities, barriers and need on the **demand** side of the market (building owners/ investors) and the operating needs, risk perceptions and policies of the financial community on the **supply** side. With such alignment, suitable **delivery mechanisms** can be put in place to tackle key barriers and mobilise investment activity. Financing also needs to be coordinated with accompanying **underpinning measures** to tackle perceived risks of various kinds and build confidence in the market.

Wholesale finance sources include public finances, EU structural funds, institutional and private finance, and need to be of sufficient scale and form to excite and accelerate the market, build a critical mass and create a momentum that can be sustained into the long term. To maximise leverage and effectiveness they may be combined and geared in many ways and enable the development and delivery of a suite of financing mechanisms and 'products' to incentivise or otherwise stimulate investment action, suitably attuned to the different market segments.

Relevant sources of EU and European Investment Bank (EIB) funding are given in an [EU Commission overview](#) publication. This is complemented by an [IEA study on mobilising investment](#) which focusses on ensuring coherent design and coordination of economic policy instruments, and the [IEA energy efficiency governance handbook](#). An extensive study by the [World Economic Forum](#) is also worthy of consideration.

In addition to the [EIB](#) as a key source of 'wholesale' finance to retail financial and government institutions, a strong example of such a source, and associated successful delivery model over many years, is Germany's [KfW](#) bank. ERDF wholesale finance has similarly been leveraged in the [Kredex](#) scheme in Estonia. Other sources of funds with a long term perspective, e.g. pension funds, may also be engaged in such financing.

The [UK Green Deal](#) is aiming to create a market based business model for energy renovation of individual homes, which includes a 'pay as you save' mechanism for 'on-bill' financing, with the capital cost of measures being paid back on the energy bill over several years. In contrast, a more traditional grant scheme for multiple housing units (condominiums) is being applied in [Bulgarian homes](#).

A variety of ESCO/EPC and Public–Private Partnership type models are being applied in many countries, with different approaches to facilitative security, administrative efficiency (e.g. standard templates) and risk mitigation mechanisms. These include interesting examples in Germany, with the [Energy Savings Partnership in Berlin](#), with [Energies Posit'if](#) in France, with the [Bulgarian 'Energy Efficiency Fund'](#) and ['Energetics and Energy Savings Fund'](#) and [Canada's Federal Buildings Initiative](#) supporting the energy upgrading of public buildings.

A similar range of confidence building financial stimulus models was previously highlighted in Step 4: The [Thermoprofit Initiative in Austria](#) and three schemes in France ([Energ'Assur](#), [OSER](#) and [Coach Copro](#)). The security and confidence in such models can be strengthened by established monitoring and validation protocols such as the [Investor Confidence Project](#) and the International Performance Measurement and Verification Protocol ([IPMVP](#)).

Examples of successful tax incentive driven programmes are the [Italian Tax Credits](#), the [US PACE](#) initiative and the [Netherlands Green Funds](#) scheme.

Ongoing assessment of value for money is important to securing large scale societal and financial community commitment. Examples of such evaluations include [KfW monitoring](#) in Germany, the [GRACE assessment of incentives](#) in three countries, an [assessment of Ireland's domestic grants](#) scheme and an evaluation of the [Italian White Certificate](#) programme.

Section 6.3 offers a list of case examples pertaining to this aspect of the strategy development process. These are hyperlinked to more detailed descriptions in Annex 1.

6.2 Some key questions summarised

The following is a list of possible questions to be considered, which are hyperlinked to an expanded set of options in Annex 2.

- 6.2.1** [How much investment is needed, over what timescale and from whom?](#)
- 6.2.2** [To what extent is national public funding available to support building energy renovation at the necessary scale?](#)
- 6.2.3** [For each market segment, what types of financial instrument are most appropriate?](#)
- 6.2.4** [What is required to source 'wholesale' funds of the necessary scale – including from EU institutions?](#)
- 6.2.5** [How to engage and gear 'retail' funds of the necessary scale?](#)
- 6.2.6** [What sort of support do financial institutions and investors need from government?](#)
- 6.2.7** [What do/ should financial institutions require from proposers of programmes, schemes or projects?](#)
- 6.2.8** [How can efficient fund distribution mechanisms be set up for broad access to financing?](#)
- 6.2.9** [How to 'stage' the level of incentive or financing?](#)

6.3 Case examples and documentation

The following is a selection of case examples that may assist addressing issues and questions in quantifying, sourcing, designing and delivering the necessary finance, and in managing risk.

Fuller details are given in Annex 1, to which the following references are hyperlinked.

Policy and general:

Case 42: [EU Commission document “Financial Support for Energy Efficiency in buildings”](#)

This report gives an overview of relevant sources of EU and EIB funding, analyses the effectiveness and coordination of EU and national funding and indicates how financial support for energy efficiency in buildings can be improved.

Case 43: [IEA: Mobilising investment in energy efficiency](#)

This is an extensive review of the experience with economic instruments in energy efficiency policy, with a focus on coherent policy design to make such instruments most effective, including a particular focus on deep energy renovation.

Case 11: [IEA: Energy Efficiency Governance Handbook](#)

In Step 2.

Case 44: [World Economic Forum: A profitable and resource efficient future - Catalysing retrofit finance and investing in commercial real estate](#)

This study is the product of a multi-stakeholder and cross-industry initiative to equip policy makers and industry leaders with the information and tools to build and scale commercial retrofit markets around the

world. It contains examples and financing recommendations to enable and scale the market for building retrofit.

Wholesale finance:

Case 45: [European Investment Bank programmes, projects and studies](#)

The European Investment Bank offers a wide range of financial instruments for energy efficiency investments within and outside the EU, including intermediated lending, indirect financing, risk sharing instruments as well as investment funds and programmes for supporting energy efficiency projects.

Case 46: [Germany, public promotional bank KfW](#)

The State owned bank KfW runs promotional programmes supporting energy efficiency in the building sector (housing, commercial buildings, public buildings). Its offer comprises soft loans and grants for investment as well as grants for energy efficiency advisory services.

Case examples of funds delivery (different business models):

Case 47: [Estonia, Use of EU Regional Development Fund \(Kredex\)](#)

Established by the Estonian government in 2001, Kredex is a revolving fund that supports financing of energy efficiency projects, including the building sector, promoted through grants, loans and loan guarantees.

Case 48: [UK Green Deal](#)

This financing mechanism for energy renovation of dwellings is enabled through on-bill financing and repayment mechanism for professionally installed energy efficiency measures. It includes clear rules on contracting, accreditation of market players, and measurement and verification.

Case 49: [Energy renovation of Bulgarian homes](#)

A three year project is supporting implementation of energy efficiency measures in multifamily residential buildings in 36 urban centres, with registered associations of condominium owners eligible for grants at 50% of the renovation cost.

ESCO and PPP models:

Case 50: [Germany: 'Energy Savings Partnership' in Berlin](#)

A successful ongoing project, initiated in 1996 to facilitate energy performance contracting (EPCs) in building energy renovation by means of a range of actions, particularly establishing a viable contractual model meeting both suppliers and building owners needs, and a mechanism of clustering projects to meet financier needs. .

Case 51: [France, Ile de France region, Energies Posit'if](#)

A public private company providing finance for deep renovation of residential and public buildings with contracts between 15 and 30 years.

Case 52: [Bulgaria: Energy Efficiency Fund \(BgEEF\)](#)

Established in 2004, BgEEF is a public-private for profit entity, providing direct loans, partial credit guarantees and portfolio guarantees to energy efficiency projects. The latter act as a shock absorber against cash flow risks in ESCO projects in particular.

Case 53: [Bulgaria: Energetics and Energy Savings Fund \(FEEI\)](#)

With loans from the EBRD, the FEEI releases ESCOs from the burden of debt accumulated on projects by buying buys from ESCOs the future receivables (energy savings) from their energy performance contracts, once energy savings are proven.

Case 54: [Canada Federal Buildings Initiative \(FBI\)](#)

A successful programme for engaging ESCOs in the delivery of energy efficiency investments in public sector buildings.

Other confidence building - packaging, standardisation and new business models:

Case 25: [USA, Investor Confidence Project \(ICP\)](#)

In Step 4.

Case 26: [International Performance Measurement and Verification Protocol \(IPMVP\)](#)

In Step 4.

Case 20: [Austria, Thermoprofit Initiative](#)

In Step 4.

Case 21: [France, Versperien, Energ'Assur](#)

In Step 4.

Case 22: [France, OSER, Rhone-Alpes region](#)

In Step 4.

Case 23: [France, Paris, Le Coach Copro](#)

In Step 4.

Tax based examples:

Case 55: [US: Property Assessed Clean Energy \(PACE\)](#)

PACE is a public financing mechanism applied across over 30 US states to facilitate positive cash flow on energy efficiency and renewable energy investments, with the cost of the investment being collected through property taxes tied to the property.

Case 56: [Italian Tax Credits](#)

The Tax Credit in Italy for energy efficiency actions in existing buildings (2007-2013) is one of the most effective instruments applied in the country for energy efficiency. Positive overall assessments of macro-level cost effectiveness and socio-economic impact have been published.

Case 57: [Netherlands: Green Funds](#)

The Green Funds Scheme is a largely self sustaining using tax incentives to stimulate investment in green funds used by financial institutions to provide favourable loans to eligible projects. It has supported over 6000 projects across many sectors with every euro of public funds leveraging a private investment of €40.

Monitoring and value for money assessment:

Case 58: [Germany: Monitoring of the KfW promotional programmes for energy efficient construction and refurbishment](#)

The KfW soft loans for energy efficient construction and refurbishment have been analysed in terms of macro-level impacts, and show a high level of cost-effectiveness from a national perspective.

Case 59: [Grants Evaluation: Final Report of project ENERCITEE "GRACE"](#)

Final report of the ENERCITEE 'GRACE' project shows a comparative analysis of incentive schemes for sustainable energy in Germany, Italy and Poland.

Case 60: [Ireland: Economic analysis of residential and small business energy efficiency improvements](#)

This includes a pre and post billing analysis of the energy savings from the national domestic energy grants scheme, highlighting the favourable cost/benefit to householders of the measures supported.

Case 39: [Italy: ENEA Study on the Italian White Certificate Programme 2006-2013](#)

In Step 5.

7 Step 7: Policy measures

Issues and questions to consider in assessing options and formulating policies to stimulate, coordinate and regulate large scale delivery of quality renovation activity.

Particularly relevant to addressing clauses (c) and (d) of EED Article 4.

7.1 Indicative issues to be considered

Policies need to be designed to systematically address uncertainty and other risk issues identified in Steps 4, 5 and 6. A key question in approaching policy for the building renovation sector is: What needs to be different in order to mobilise a significant scaling up of building energy renovation activity? Having identified the (market) barriers and needs from those previous Steps, it is suggested that there is a particular policy role for the State to signal, orchestrate and co-ordinate, to stimulate and to regulate, in order to develop and deliver effective responses to those barriers and needs.

Strong **policy co-ordination** is required to overcome the limited planning horizon of many consumers and industry players given the long-term nature of the transition for the buildings sector which needs to be co-ordinated over many years in an environment of regulatory stability. All stakeholders need to understand their roles in the long-term vision for the sector so that the necessary support structures are put in place in a timely fashion to meet the goals and milestones of the strategy.

From a governmental perspective, a number of analyses indicate a typical lifetime benefit to cost ratio of 5:1 for government investment in building energy renovation, when not only energy benefits, but jobs and enterprise benefits, as well as social co-benefits, are taken into account. These can be strong drivers in securing broad based political and societal support and commitment, expressed through policy measures.

Building a healthy, more self-sustaining, market needs to address both demand and supply issues – to stimulate and build demand appetite and commitment, and to stimulate and build the supply capacity and ensure it is regulated appropriately. Several possible roles for the State will be important: as an exemplar, as a guarantor, and in establishing the support structure to enable efficient standardised administrative and organisational procedures (e.g. technical assistance to the financial community, registers of competent persons) to overcome other barriers identified above. The very fragmented nature of the building sector, with numerous decision makers and applications, means that the policy mix needs to be "broad" in order to tackle as many barriers as possible, and "deep", in order to ensure that the barriers faced by all those in the decision-making chain are addressed.

The policy mix can take a number of different roles and forms. A policy may be directed at tackling market, financial, technical, skills or other barriers; at direct market delivery or at facilitating healthy market development; it may be macro or fiscal in leverage, or may be focussed on a specific sector or issue. It may take the form of **regulation, incentive, development or promotion**, or a combination of these.

The effectiveness of policy measures, existing or proposed, requires **evaluation**, and some policies (such as particular types of incentives) may have a role in stimulating and developing a market, while others may be more appropriate to sustaining and maturing that market. It is suggested that among the criteria to be considered here are additionality, overall value for money, administrative efficiency and enforceability. Case examples were given in Step 6 of evaluations of policy measures such as grants and tax incentives, but there is a deeper need to ensure that a culture of evaluation and review is embedded into the process of design and delivery of the different action plans within the overall strategy.

Many of the case examples already referenced in Steps 1 to 6 reflect a significant policy content, either explicitly or implicitly, and are therefore not repeated here. Below is a short reprise of some of these examples.

Step 1 highlighted several documented examples of strategy development in the building energy renovation or wider energy efficiency sector, such as: General policy options and approaches in the [BPIE](#), [the Policy Partners](#), the [THINK](#) project; and the specific policy content of national and regional roadmaps

proposed by [GTR in Spain](#) and the [Basque Country](#). A number of the good practice case studies cited by the [European Environmental Bureau](#) are also relevant.

Achieving the goals of the strategy will require new mechanisms for aggregation in order to deliver the scale and pace of renovation required, beyond the level of individual buildings, and extending to neighbourhoods, wider communities and cities. In this regard, city authorities and local governments can play a key role at local policy level in the planning, facilitation and in some cases direct delivery of **integrated solutions**. Initiatives such as [Sustainable Energy Action Plans](#) under the aegis of the Covenant of Mayors may be helpful towards such integration, and help to provide a regulatory stability to ensure that the initiatives of the kind identified in Steps 4, 5 and 6 are effective and enduring.

Step 4 identified a selection of administrative, financial and underpinning policy initiatives aimed at overcoming a range of barriers to building energy renovation. These have included Austria's [Thermoprofit](#) initiative, France's [Energ'Assur](#), [OSER](#) and [Coach Copro](#) initiatives. Step 6 has similarly identified a number of incentivising and facilitating initiatives across Member States, including the [KfW programmes](#) in Germany, the [Kredex scheme in Estonia](#), the [UK Green Deal](#), the [Bulgarian Energy Efficiency Fund](#) and [Energetics and Energy Savings Fund](#), the [Energies Posit'if](#) in France and the [Berlin Energy Savings Partnership](#). A number of these initiatives are aimed at facilitating the ESCO and energy performance contracting markets in particular. Examples of interesting tax based systems are the [US PACE](#) programme, [Italy's Tax Credits](#) programme and the [Netherlands Green Funds](#) scheme. Various grants schemes and obligation schemes such as [Italy's White Certificates](#) are examples of direct economic instruments. All of these initiatives have been the product of active policy intervention at national, regional or local level.

Step 5 includes a fundamental policy formulation consideration regarding the definition and perspective on cost-effectiveness, in which a [Life Cycle Costing](#) approach is seen as most appropriate in terms of serving long term societal needs. The UK Energy Efficiency Strategy articulates both macroeconomic and microeconomic factors to be considered.

In addition to the above 23 examples, section 7.3 offers a short list of three **databases** compiling information from across EU and IEA member countries which can be viewed as an inventory of current and potential policy instruments: the IEA [Building Energy Efficiency Policies \(BEEP\) database](#), the [REQUEST project and database](#), and the EU MURE database (requires registered access). These are also hyperlinked to more detailed descriptions in Annex 1. .

7.2 Some key questions summarised

The following is a list of possible questions to be considered, which are hyperlinked to an expanded set of options in Annex 2.

- 7.2.1 [What systems are in place to plan, monitor and evaluate policy effectiveness?](#)
- 7.2.2 [Have you conducted an assessment of the existing suite of policies and initiatives?](#)
- 7.2.3 [Have you conducted an assessment of options for new or amended policies?](#)
- 7.2.4 [What policies are needed to tackle information barriers or deficits in the different market segments?](#)
- 7.2.5 [What policies are needed to tackle economic barriers in the different market segments?](#)
- 7.2.6 [What policies are needed to tackle technical barriers in the different market segments?](#)
- 7.2.7 [What policies are needed to tackle skills barriers in the different market segments?](#)

7.2.8 What policies are needed to tackle financing barriers in the different market segments?

7.2.9 What policies are needed to encourage innovation in the different market segments?

7.2.10 Are new or modified institutional arrangements necessary?

7.3 Case examples and documentation

The following is a selection of case examples that may assist addressing issues and questions in assessing options and formulating policies to stimulate, coordinate and regulate large scale delivery of quality renovation activity.

Fuller details are given in Annex 1, to which the following references are hyperlinked.

Inventories of policy measures:

Case 19: [MURE Odyssee database of energy efficiency indicators, policies and measures](#)

In Step 3.

Case 24: [REQUEST project and database](#)

In Step 4.

Case 61: [IEA Building Energy Policies \(BEEP\) database](#)

A standardised profiling of building energy efficiency policies worldwide, including most EU countries. This covers regulatory, incentive and promotional policies.

8 Step 8: Shaping the offer– growing market confidence

Issues and questions to consider in developing solution packages to create confidence and accelerate action by relevant investors and decision makers across the market segments.

Particularly relevant to addressing clauses (d) and (e) of EED Article 4.

8.1 Indicative issues to be considered

At this point in the strategy development process, the challenge in each market segment is to unlock the opportunities and barriers identified in Steps 3 and 4 and the response elements emerging from Steps 5 to 7, and seek to integrate those response elements and translate them to the real marketplace. In particular, there is a need to make deep renovation a 'normal' rather than niche market. It is suggested that a key task in this regard is to support the development and promotion of packaged offerings and 'one stop shop' approaches to make it easier and more attractive to the key decision makers in the market.

Restrictions on the availability of finance (whether self finance, loan finance or 'free' finance incentives) may not always be the main barrier to action. To get the market moving at an accelerated pace, the main commencement barriers can be summarised as lack of both market appetite (demand) and capacity (supply).

It is suggested that there needs to be a focus on transforming what is currently an ignored or not sufficiently interesting, attractive or easy proposition to most building owners and investors, into a compelling proposition. A packaged response to the array of barriers and challenges, which from the investment decision maker's perspective constitute RISK, can help to stimulate and establish over time a culture of CONFIDENCE and reputation for deep energy renovation. This requires an integrated approach building trust in all elements: cost-benefit, other benefits, technical, skills and service, finance, convenience and project coordination. Without such standardised approaches, it is difficult to envisage a significant acceleration in the scaling up or in the depth of building energy renovation activity.

Such an integrated approach will involve a complementarity of actions between commercial and professional interests in the construction and property market, and public policy makers and institutions. This will include the forward looking economic perspectives, technical and enabling administrative initiatives and systems identified in Steps 4, 5 and 6, and the reiterated policy actions in Step 7.

In addition to those initiatives identified above, a number of other elements are helpful towards gaining the confidence of investors in the attractiveness of the deep energy renovation proposition. The case examples from Step 5 are also particularly relevant here. The examples given demonstrate how joined up advice and guidance for the supply chain has been developed in order to improve both supply side confidence and end consumer confidence in building retrofit products and services. Not all initiatives will be successful and it will be important to learn the lessons from such experiences and continuously adapt to market conditions while holding to the fundamental strategic goals.

The relatively long-standing [KfW programmes](#) in Germany and the newly established [UK Green Deal](#) contain such elements aimed at gaining consumer trust. The US [Investor Confidence Project](#) and the [IPMVP](#) are examples of measurement and verification protocols that can help to underpin the delivery of guaranteed results in the framework of energy efficiency services contracts. Examples of mechanisms for developing confidence in the quality of service providers are the [UK Competent Persons Register](#) and the forthcoming Irish [code of practice for home energy retrofit](#). Such codes of practice and competent persons schemes have been developed by both governments and the private sector to develop markets. The [REQUEST database](#) includes a compilation of tools, techniques and schemes, that promote low carbon renovation, with a particular focus on quality assurance.

Mechanisms for aggregation of customers or for efficient procurement of services can also help to develop market confidence, reduce transaction costs and achieve economies of scale. There is an opportunity in particular to engage with master planning initiatives at district or neighbourhood level (e.g. local regeneration plans), and at city level, to provide such mechanisms as part of a coherent local policy framework. In this context, initiatives such as the [Sustainable Energy Action Plans](#) under the aegis of the Covenant of Mayors may be useful. In this context of seeking integrated approaches, it will be appropriate

to collaborate closely with the developing Smart Cities and Communities agenda at local, national and EU level and derive maximum benefit from new practical concepts emerging from that innovation arena.

Section 8.3 offers a short list of case examples pertaining to this aspect of the strategy development process, complementing the case examples of previous Steps. These are hyperlinked to more detailed descriptions in Annex 1.

8.2 Some key questions summarised

The following is a list of possible questions to be considered, which are hyperlinked to an expanded set of options in Annex 2.

8.2.1 [Where is building energy renovation positioned in a marketing context?](#)

8.2.2 [How can trust and confidence be built in the market?](#)

8.2.3 [How can these elements be created and packaged?](#)

8.2.4 [How can specific business models be created and assisted?](#)

8.3 Case examples and documentation

The following is a selection of case examples that may assist addressing issues and questions in developing solution packages to create confidence and accelerate action by relevant investors and decision makers across the market segments.

Fuller details are given in Annex 1, to which the following references are hyperlinked.

Cumulatively the Case Examples in the preceding Steps are relevant, particularly the Case Examples in Step 5.

Facilitating mechanisms and resources:

Case 24: [The REQUEST database](#)

In Step 4.

Case 25: [US Investor Confidence Project](#)

In Step 4.

Case 26: [International Performance Measurement and Verification Protocol](#)

In Step 4.

Case 28: [UK Registers of Competent Persons](#)

In Step 4.

Case 30: [Ireland Retrofit Code of Practice](#)

In Step 4.

Package type solutions:

Case 46: [Germany: KfW programmes](#)

In Step 6.

Case 48: [UK Green Deal](#)

In Step 6.

Integrated framework potential:

Case 14: [Covenant of Mayors Sustainable Energy Action Plans](#)

In Step 2.

9 Step 9: Publishing and implementing the strategy

Issues and questions to consider in the process of mobilising the full breadth and depth of action for effective delivery in the short term and on the long term vision.

9.1 Indicative issues to be considered

Publishing a coherent strategy that addresses the main issues and identifies the specific action areas and tasks, associated responsibilities and timelines is of course an important outcome of the development process. However, as earlier Steps have demonstrated, this is not the conclusion of the process.

Such a strategy will entail delivery on a number of action lines with cross dependencies. Indeed it is possible that the overarching strategy will include a number of specific action plans to tackle particular sectors or issues. In this context, adoption of a well-disciplined regime for monitoring, verifying and reporting progress, for reviewing impacts and feedback, learning lessons, and ongoing adjustment and updating of the strategy will be important. The maintenance of registers of activity levels, and of mechanisms for active ongoing stakeholder participation can be expected to be intrinsic to ensuring the effectiveness of this implementation and updating process.

Some of the case examples from previous Steps provide include experience with strategy dissemination and implementation but there is no known precedent for a strategy in the built environment of the scope and ambition required by EED Article 4. The majority of case examples above apply at the level of particular programmes and schemes, which can be components of the strategy. Examples would include the [GRACE project](#) for evaluating the impacts of particular grants schemes and the [assessment of KfW's promotional programmes](#) in Germany. Databases such as the [UK Home Energy Efficiency Database](#) are examples of mechanisms that enable progress on particular actions to be tracked.

Complementing the case examples of previous Steps, Section 9.3 offers a small number of case examples pertaining to this delivery phase of the strategy process, which generally represent a mirror to Step 1. These are hyperlinked to more detailed descriptions in Annex 1.

9.2 Some key questions summarised

The following is a list of possible questions to be considered, which are hyperlinked to an expanded set of options in Annex 2.

9.2.1 [What will be published?](#)

9.2.2 [Who will oversee?](#)

9.2.3 [How?](#)

9.2.4 [Phasing?](#)

9.2.5 [What arrangements are needed for monitoring, evaluation and adjustment?](#)

9.3 Case examples and documentation

The cumulative set of case examples listed in previous Steps include a number which address issues and questions in the process of mobilising the full breadth and depth of action for effective delivery in the short term and on the long term vision.

Fuller details are given in Annex 1, to which the following references are hyperlinked.

Strategy delivery in general:

Case 1: [Building Performance Institute of Europe \(BPIE\): A Guide to Developing Strategies for Building Energy Renovation](#)

In Step 1.

Case 2: [The Policy Partners \(for Eurima\): Renovation Roadmaps for Buildings](#)

In Step 1.

Case 3: [IEA Energy Technology Roadmaps: A Guide to Development and Implementation](#)

In Step 1.

Case 4: [Eurima: Renovation Tracks for Europe Up to 2050](#)

In Step 1.

Case 5: [European University Institute: EU 'THINK' - How to Refurbish All Buildings by 2050](#)

In Step 1.

Case 11: [IEA: Energy Efficiency Governance Handbook](#)

In Step 1.

Data and evaluation:

Case 15: [UK Home Energy Efficiency Database](#)

In Step 3.

Case 58: [Monitoring of KfW promotional programmes in Germany](#)

In Step 6.

Case 59: [Grants Evaluation: the GRACE project](#)

In Step 3.

Generic information sources

The following web portals and initiatives are sources of information relevant to many of the Steps outlined above.

Case A: [BPIE Data Hub](#)

The Data Hub is an online repository for statistics and policy information on the building stock in 30 European countries Europe's. It includes a building stock inventory and data search engine that allows production of customised country profiles. Users can browse data by selecting a combination of countries, topics, building types and owner profiles.

Case B: [BUILD UP website: European portal for energy efficiency in buildings](#)

This is a large library of information on issues pertaining to improving the energy performance of buildings across Europe. It includes the BUILD UP Web Seminar on 'Statistics on Europe's building stock: A guide to collecting, harmonising and sharing data'.

Case C: [European Council for an Energy Efficient Economy \(eceee\): Summer Studies](#)

eceee Summer Studies have a record of generating peer reviewed evidence and experience in relation to energy efficiency policies and practices, with considerable attention given in recent years to various elements of the challenge of energy renovation of buildings.

Case D: [EU Intelligent Energy Europe programme: delivered projects](#)

A number of projects funded under this programme have aimed at identifying and creating solutions to particular challenges in building energy refurbishment, in areas such as skills development, financial instruments and Energy Performance Contracting (EPC).

Case E: [IEA: Energy in Buildings and Communities \(EBC\)](#)

The IEA Energy in Buildings and Communities (EBC) initiative carries out research and development activities toward near-zero energy and CO₂ emissions in the built environment, focussed on developing solutions to particular techno-economic challenges. Results are available on-line or through purchased publications. **NOTE: Access may be restricted to countries which are registered participants in the EBC.**

Cases F, G, H: [Concerted Actions: EU Energy Efficiency Directive \(EED\), Energy Performance of Buildings Directive \(EPBD\) and Renewable Energy Sources Directive \(RES\)](#)

The Concerted Action projects involve authorised representatives of EU Member States sharing information and experiences from national adoption and implementation of the various requirements of these three Directives. Among the topics that have been examined and documented through this work across the three Directives have been the development of the energy services market, experiences with regulatory and financial instruments, enforcement of regulations, and skills development and training.



Annex 1: Case examples

Joint Working Group of CA EED, CA EPBD and CA RES

Assistance Documents for EU Member States in developing long term strategies for mobilising investment in building energy renovation

(per EU Energy Efficiency Directive Article 4)

ANNEX 1 – CASE EXAMPLES

This Annex is part of a set of documents developed by a Joint Working Group drawn from three EU ‘Concerted Action’ projects (EPBD, EED and RES) under the Intelligent Energy for Europe programme. As an *Annex*, it provides a selection of case examples to be read in conjunction with the *Main Document*.

It has been prepared as a resource to encourage and assist Member State authorities. However, it has a voluntary status and any views expressed herein are not to be attributed to the EU Commission or to any national or EU institutional party.

It contains active hyperlinks.

It will greatly assist navigation through this document in PDF if you include ‘Previous View’ and ‘Next View’ buttons in your toolbar. Depending on the version of Adobe Acrobat, you can do this by a menu sequence of ‘View > Show/Hide > Toolbar Items > Page Navigation’ and tick the ‘Previous View’ and ‘Next View’ options.

NOTE: For some Case Examples, there may be a requirement for users to pre-register online in order to access the information.

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The following table maps the relationship between the case examples detailed further below and the individual strategy development steps set out in this document, with the relevant correspondences being identified in the shaded boxes.

NOTE: For some Case Examples, there may be a requirement for users to pre-register online in order to access the information.

[illegible]

CASE NO.	TITLE OF CASE EXAMPLE	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9
33.	UK Department of Energy and Climate Change Strategy (DECC): Energy Efficiency Strategy - The Energy Efficiency Opportunity in the UK									
34.	Life Cycle Costing (LCC) for sustainable construction: a common methodology									
35.	IEA: Cost-Effective Energy and Carbon Emission Optimisation in Building Renovation									
36.	Korytarova & Urge-Vorsatz: Risks and opportunities of building retrofit - Retrofitting public buildings in Hungary									
37.	US Empire State Building refurbishment									
38.	Chidiac et al: "A screening methodology for implementing cost effective energy retrofit measures in Canadian office buildings"									
39.	ENEA: Italian White Certificates									
40.	Evaluation of incentive programmes in Saxony									
41.	Thorne Amann: "Valuation of non-energy benefits to determine cost-effectiveness of whole house retrofit programs: A literature review"									
42.	EU Commission document 'Financial support for EE in buildings'									
43.	IEA: Mobilising investment in energy efficiency									
44.	World Economic Forum: A profitable and resource efficient future - Catalysing retrofit finance and investing in commercial real estate									
45.	EIB programmes, projects and studies									
46.	Germany: KfW Energy Efficient Construction and Refurbishment									
47.	Use of European Regional Development Fund (ERDF) in Estonia (Kredex)									
48.	UK: The Green Deal									
49.	Bulgaria: Energy Efficient Housing programme									
50.	Berlin: "Energy Savings Partnership"									
51.	France: Energies Posit'if									
52.	BgEEF : Bulgarian Energy Efficiency Fund									
53.	Bulgarian Energetics and Energy Savings Fund (FEEI or EESF)									
54.	Canada: Federal Buildings Initiative (FBI)									
55.	USA: Property Assessed Clean Energy (PACE)									
56.	Italian Tax Credit Programme									
57.	Netherlands: Green Funds Scheme									
58.	Germany: Monitoring of the KfW promotional programmes for energy efficient construction and refurbishment									
59.	Grants Evaluation: The GRACE project									
60.	SEAI, Ireland: Evaluation of savings from grants									
61.	IEA Building Energy Policies Database (BEEP)									

General sources and portals of information:

CASE NO.	TITLE OF CASE EXAMPLE	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9
A.	BPiE: Data Hub									
B.	BUILD UP: European web portal for energy efficiency in buildings									
C.	European Council for an Energy Efficient Economy (eceee)									
D.	Intelligent Energy for Europe project database									
E.	IEA Implementing Agreements on 'Energy in Buildings and Communities'									
F.	EED Concerted Action									
G.	EPBD Concerted Action									
H.	RES Directive Concerted Action									

Case 1	BPIE: A Guide to Developing Strategies for Building Energy Renovation								
Relevant strategy Steps	Step 1	Step 2		Step 4	Step 5		Step 7		Step 9
Context	EU wide								
Status	2013								
Main features	<p>This publication is a high level overview of the process of developing renovation strategies, with useful suggestions. The first part outlines multiple benefits that arise from building energy renovation, numerous challenges and barriers and encourages a visionary approach in setting a long term strategy. The second part describes the strategy development process in detail, including a description of key phases and a suggested list of actions Member States could take to underpin the strategy.</p> <p>It also suggests steps to be taken in the technical and economic appraisal of the renovation potential in the building stock.</p> <p>Recent BPIE studies have indicated potential net cost savings up to €1300 billion (present value) arising to end users from energy renovation of Europe's buildings between now and 2050. This is estimated to require a total investment of €940 billion (present value) to year 2050, and to create wider employment and enterprise benefits in national economies.</p>								
Stakeholders involved	Building energy efficiency advocates								
Further information	www.bpie.eu/documents/BPIE/Developing_Building_Renovation_Strategies.pdf								

Case 2	The Policy Partners (for Eurima): Renovation Roadmaps for Buildings								
Relevant strategy Steps	Step 1	Step 2		Step 4	Step 5		Step 7		Step 9
Context	EU wide								
Status	2013								
Main features	<p>This report is a high level overview of the process of developing renovation strategies, with useful suggestions. It is intended as a practical tool and information source for building energy renovation roadmap developers.</p> <p>Starting with an analysis of roadmap literature, policy and roadmaps in other sectors, the report suggests a framework structure and process for roadmap development and some key principles for successful strategies; this includes a review of the political support and stakeholder engagement needed, roles of public and private sectors, definition of goals and targets, and time lines of successful approaches.</p> <p>The report also provides information on possible contents of successful building roadmaps. It considers specific examples of policies from existing national and regional building renovation programmes and assesses the conditions under which they are likely to contribute to deep renovation of the building sector. It suggests that many plans that are called roadmaps or national strategies fall short on the elements that would make them effective.</p> <p>The report includes key recommendations on the content and process of building energy renovation roadmap development, including indicative timelines. A pull-out table is provided, setting out examples of existing policies in ten jurisdictions which may be useful in supporting essential elements of an effective buildings renovation roadmap.</p>								
Stakeholders involved	Eurima								
Further information	www.eurima.org/uploads/ModuleXtender/Publications/96/Renovation_Roadmaps_for_Buildings_PP_FINAL_Report_20_02_2013.pdf								

Case 3	IEA: Energy Technology Roadmaps – A Guide to Development and Implementation								
Relevant strategy Steps	Step 1	Step 2					Step 7		Step 9
Context	International								
Status	2010								
Main features	<p>This is a useful generic guide to the roadmap development process in an energy technology or policy context.</p> <p>It is aimed at providing countries and companies with the context, information and tools they need to design, manage and implement an effective energy roadmap process, with particular focus on what steps governments and industry need to take.</p>								
Stakeholders involved	International Energy Agency's Energy Technology Policy Division.								
Further information	http://www.iea.org/publications/freepublications/publication/name,3919,en.html								

Case 4	Eurima: Renovation Tracks for Europe Up to 2050								
Relevant strategy Steps	Step 1								Step 9
Context	Report for European insulation industry association								
Status	On-going								
Main features	<p>This report by Ecofys consultants analyses and compares possible pathways for the renovation of the EU building stock, with accompanying estimates of energy and emissions benefits, financial impact and employment effects. It emphasises the case for deep renovation.</p> <p>Three renovation scenarios for the period to 2050 were developed and assessed. They are characterised by two important parameters, which are the speed of renovation (renovation rate) and the ambition level regarding energy efficiency improvement and use of renewable energy. The 2050 horizon is selected in order to take a long term and strategic view on the sector that reveals long term consequences of choices to be made now and in the coming years. The scenarios assume renovation rates not exceeding 3% taking into account normal renovation cycles (30 to 40 years), enabling connection of the measures to already anticipated (often non-energy related) renovation actions.</p>								
Stakeholders involved	EURIMA members								
Further information	www.eurima.org/uploads/ModuleXtender/Publications/90/Renovation_tracks_for_Europe_08_06_2012_FINAL.pdf								

Case 5	European University Institute: EU 'THINK' - How to Refurbish All Buildings by 2050								
Relevant strategy Steps	Step 1			Step 4			Step 7		Step 9
Context	EU perspective								
Status	2012								
Main features	<p>This is a report of an EU Framework Programme research project 'THINK', focussing on some useful questions and policy options to tackle the building refurbishment challenge, graded as market facilitation, regulatory instruments and public support measures.</p> <p>Three levels of solutions are identified: prerequisites, primary and secondary actions. The prerequisites are to provide correct economic signals by abolishing regulated end-user prices and internalising the carbon price. Primary actions are to establish national building refurbishment plans and create a working energy performance certification scheme. Secondary actions include facilitation of a building refurbishment market framework, strengthening of standards and labels,</p>								

	the development of a technology roadmap and making better use of EU funding. The scope of this report extends to enabling actions to national building refurbishment programmes. It suggests that a 'one size fits all' approach is not appropriate across the diverse circumstances of different countries.
Stakeholders involved	Research authors from three countries –Hungary, Italy, Romania
Further information	www.eui.eu/Projects/THINK/Documents/Thinktopic/THINKTopic72012.pdf

Case 6	Working Group for Rehabilitation “GTR” (Grupo de Trabajo sobre Rehabilitación): A National Perspective on Spain’s Buildings Sector: A Roadmap for a New Housing Sector							
Relevant strategy Steps	Step 1	Step 2		Step 4			Step 7	
Context	Spain							
Status	On-going							
Main features	Devised by an advocacy building rehabilitation working group, this ‘white paper’ roadmap outlines an action plan to an 80% decarbonisation of the Spanish residential housing sector by 2050. It includes segmentation of the Spanish national housing stock and the identification of ‘hotspots’ of homogenous building types that can be usefully targeted.							
Stakeholders involved	Public and private sector interests							
Further information	http://www.europeanclimate.org/documents/20111128_GTR_Spain%20Building%20Retrofits%20Study[1].pdf							

Case 7	Basque Government: Bultzatu 2025: Strategy for sustainable buildings in the Basque Country							
Relevant strategy Steps	Step 1	Step 2	Step 3	Step 4			Step 7	
Context	Basque Country, Spain							
Status	On-going							
Main features	An example of a roadmap with a time horizon of 2025, relating mainly to energy renovation, with detailed profiling and situation analysis of the existing housing stock, plus analysis of improvement potential. Highlights many economic, social and environmental developmental benefits from the strategy, and is the outcome of coordinated action between the Basque Government, its public corporations and stakeholder clusters.							
Stakeholders involved	Public and private sector interests							
Further information	http://proceedings.eceee.org/visabstrakt.php?event=3&doc=5B-149-13							

Case 8	Sustainable Energy Authority of Ireland: Residential Energy Roadmap							
Relevant strategy Steps	Step 1						Step 7	
Context	Ireland							
Status	2010 and on-going							
Main features	An example of a roadmap relating mainly to building energy renovation. Shows a range of scenarios based on modelling assumptions and outlines a potential path to a 90% reduction on residential energy use and CO2 emissions to 2050. Proposes three categories of change actions -policy measures, technological development and knowledge and skills.							
Stakeholders involved	National working group							
Further information	http://www.seai.ie/Renewables/Residential_Energy_Roadmap.pdf							

Case 9	European Environmental Bureau: Saving Energy in Europe – 15 Good Practice Case Studies							
Relevant strategy Steps	Step 1						Step 7	Step 8
Context	Austria, Denmark, Germany, Greece, Latvia, Portugal, Sweden, UK							
Status	2011							
Main features	<p>This is a compilation by the EEB (a NGO) of a 'showcase' of energy efficiency 'good practice' projects and schemes in eight countries, principally in building energy renovation, with broad assessment of how they could work elsewhere, aimed at encouraging replication across the EU.</p> <p>The authors seek to demonstrate how energy saving incentives/schemes introduced at different levels (state, borough, city etc.) can result in reduced energy use. The examples covered are relevant to a number of the aspects that will need to be address in building energy renovation strategies.</p> <p>The report includes details of how each scheme or project was implemented, the costs involved, the energy and CO2 saving achievements, and suggests the level of future potential.</p>							
Stakeholders involved	A wide group: NGOs, energy agencies, industry and business interests, financiers and housing and community bodies.							
Further information	http://www.eeb.org/?LinkServID=30CC2E6A-D8B0-0495-BA4A5F7B9A45C403&showMeta=0							

Case 10	World Business Council for Sustainable Development (WBCSD): Transforming the Market – Energy Efficiency in Buildings							
Relevant strategy Steps	Step 1				Step 5		Step 7	
Context	The study's focus was on a unique data inventory of the building stock in six markets that produce more than half of the world's GDP and generate almost two-thirds of global primary energy: Brazil, China, EU, India, Japan and USA.							
Status	Published 2009.							
Main features	<p>This is the final report of the WBCSD Energy Efficiency in Buildings (EEB) \$15 million research project. It claims to be the most rigorous study ever conducted on the subject of energy efficiency in buildings, and highlights a potential 60% energy efficiency improvement in the building stock by 2050.</p> <p>This roadmapping project took a bottom-up, market-driven approach to understanding the barriers to lower energy use, based on what is stated to be the most detailed view ever of the current state of energy demand in buildings.</p> <p>Energy use by building type was analysed for millions of existing and new buildings, both residential and commercial, and projected out to 2050, accounting for differences such as climate and building design. Researchers modelled the market response to various combinations of financial, technical, behavioural and policy options, to identify the optimum mix to achieve transformation for each market studied.</p> <p>The roadmap sets out key actions in the short and medium term for seven groups who can contribute to meeting this challenge, ranging from investors to government authorities. The study makes six principal recommendations:</p> <ul style="list-style-type: none"> • Strengthen building codes and energy labelling for increased transparency; • Use subsidies and price signals to incentivize energy-efficient investments; • Encourage integrated design approaches and innovations; • Develop and use advanced technology to enable energy-saving behaviour; • Develop workforce capacity for energy saving; • Mobilise for an energy-aware culture. 							
Stakeholders involved	The study was sponsored by 14 international companies, 10 of which are headquartered in the EU. WBCSD membership is 200 companies from 36 countries and 22 major industrial sectors.							
Further information	Details can be found at www.wbcd.org/web/eeb.htm and include sector							

	analysis, case studies and a complete description of the model. The interactive roadmap is available on the CD Rom that can be found in the report or on the WBCSD website at http://www.wbcd.org/web/eeb-roadmap.htm
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Case 11	IEA: Energy Efficiency Governance Handbook								
Relevant strategy Steps	Step 1	Step 2					Step 7		Step 9
Context	International								
Status	2010								
Main features	<p>Energy efficiency governance is the combination of legislative frameworks and funding mechanisms, institutional arrangements, and co-ordination mechanisms, which work together to support implementation of energy efficiency strategies, policies and programmes.</p> <p>This handbook draws on the experience of hundreds of energy efficiency experts worldwide as well as energy efficiency good governance case studies and literature. The findings are presented as guidance to practitioners, government officials and stakeholders towards establishing effective energy efficiency governance structures for their countries.</p> <p>The handbook is organised in an accessible format according to the three main governance areas and contains individual chapters addressing specific governance topics. These three areas are:</p> <ul style="list-style-type: none"> • Enabling frameworks - Laws and decrees, strategies and action plans, funding mechanisms • Institutional arrangements - Implementing agencies, resourcing requirements, role of energy providers, stakeholder engagement, public-private sector co-operation, international assistance • Co-ordination mechanisms – Governmental co-ordination, targets, evaluation <p>The full, detailed findings of the project are presented in the report titled <i>Enabling Energy Efficiency: A Comprehensive Review of Energy Efficiency Good Governance</i> (IEA, 2010a).</p>								
Stakeholders involved	Experts from: IEA, the Central European University, European Bank for Reconstruction and Development (EBRD), Inter- American Development Bank (IDB), the World Business Council for Sustainable Development, UK Carbon Trust, Swiss Government, the World Bank, universities, survey of 500 individual experts.								
Further information	http://www.iea.org/publications/freepublications/publication/gov_handbook.pdf								

Case 12	IEA: Spreading the Net: The multiple benefits of energy efficiency improvements								
Relevant strategy Steps	Step 1			Step 4	Step 5		Step 7		
Context	International, national, local, individual								
Status	Published 2012								
Main features	<p>This International Energy Agency (IEA) report widens the horizon of energy efficiency policy by highlighting a range of often unappreciated economic and societal benefits, to assist assessment of the full value of energy efficiency improvements and enable optimisation of policy design to maximise opportunities.</p> <p>The report describes the wider socioeconomic outcomes that can arise from energy efficiency improvement, aside from energy savings. It enumerates many of the most prominent multiple benefits of energy efficiency and provides a rich menu of the variety of the benefits that may be of interest to policy makers. Based on a review of existing literature, this report summarises the significance of each of these potential outcomes of energy efficiency measures.</p> <p>Outcomes are produced at different levels of the economy: at the individual level (individuals, households and enterprises); at the sectoral level (by economic</p>								

	<p>sector such as transport, residential, industrial sectors); at the national level (including macro-economic benefits, and benefits to national budgets); and at the international level (reflecting the international public good of these benefits). In many cases, a ripple effect emerges when energy efficiency improvements take effect at the individual level, triggering benefits for a household and/or enterprise that have a multiplier effect on a specific sector and possibly the whole economy.</p> <p>These benefits can include:</p> <ul style="list-style-type: none"> • Health and well-being impacts • Poverty alleviation: Energy affordability and access • Increased disposable income • Business productivity and competitiveness • Energy provider and infrastructure benefits • Increased asset values • Job creation • Reduced energy-related public expenditures • Energy security • Macroeconomic effects • Reduced greenhouse gas emissions • Natural resource management • Contribution to development and urban regeneration goals.
Stakeholders involved	Energy Efficiency Unit of the IEA
Further information	http://www.iea.org/publications/insights/ee_improvements.pdf

Case 13	World Green Building Council seminar: ‘Planning for the Long-Term: Creating National Renovation Strategies’							
Relevant strategy Steps		Step 2						
Context	EU, Czech Republic, Denmark, France, Ireland, Spain, UK							
Status	2013							
Main features	<p>The Europe Regional Network of the World Green Building Council (WGBC, a network with strong industry participation) brought key stakeholders together in Brussels in April 2013 to start a crucial conversation about how the challenge of EED Article 4 will be met. Through 14 separate presentations from seven countries, the event focused on two main themes:</p> <ul style="list-style-type: none"> • The need for strong policy-making platforms to form between governments, industry and construction experts and other stakeholders, to design and deliver national renovation strategies. Examples of such platforms from France, Denmark and the UK were showcased. • The importance of ensuring active and open inter-state dialogue on experiences and emerging best practice between national policy-making platforms. Presentations were given by Member States on their policy approaches and from experts from the Building Performance Institute Europe, Climate Strategy & Partners and the International Energy Agency on the ways to design renovation strategies. <p>Such examples of stakeholder engagement may be useful as a starting point. For example, the French government decided to place responsibility for the delivery of this policy on someone outside the public service. A team of four at the Ministry coordinates thousands of stakeholders across four sectors: private housing, social housing, private tertiary buildings and public tertiary buildings. Informal general assemblies take place between all stakeholders a number of times a year, with monthly meetings of 40 top representatives of the whole buildings sector and more than 20 different workshops also taking place throughout the year. Regional clusters have also been mobilised, and a tour of the process around the regions is organised.</p> <p>A helpful document is ‘The Business Case for Green Building’, examining the business costs and benefits of green building in five categories.</p>							

Stakeholders involved	A wide range of public and private stakeholders
Further information	http://www.worldgbc.org/regions/europe/policy/national-renovation-strategies/planning-long-term-creating-national-renovation-strategies Also, for the business case: http://www.worldgbc.org/files/8313/6324/2676/Business_Case_For_Green_Building_Report_WEB_2013-03-13.pdf

Case 14	Covenant of Mayors: Sustainable Energy Action Plans							
Relevant strategy Steps		Step 2				Step 7	Step 8	
Context	EU							
Status	2008 onwards							
Main features	<p>Founded in 2008, the Covenant of Mayors is an EU wide commitment framework for action at local level within the competence of the local authority. The Covenant's commitments cover the geographical jurisdiction of the local authority (town, city, region). Signatory local authorities commit to establishing Sustainable Energy Action Plans (SEAP), over a timescale to 2020 and possibly beyond, which focus on measures aimed at reducing the CO₂ emissions and final energy consumption by end users. Over 3000 SEAPs have been adopted to date.</p> <p>In addition to providing for a long term vision and targets, the SEAP defines concrete reduction measures, together with time frames and assigned responsibilities, which consist of short-term actions (3-5 years) leading to those long-term goals. It will include actions concerning both the public and private sectors. The local authority is expected to play an exemplary role and hence take actions related to the local authority's own buildings and facilities, vehicle fleet, etc. – as is consistent with other provisions in the EU Energy Efficiency Directive. While the scope of the SEAP will include buildings, facilities and transport, facilitating local clean electricity production and heat/ cooling generation, it is clear that building energy renovation can be a significant contributor.</p> <p>The SEAP can also cover areas where local authorities can influence energy consumption on the long term (as land use planning), encourage markets for energy efficient products and services (public procurement), as well as changes in consumption patterns (working with stakeholders and citizens).</p> <p>Also: How to Develop a Sustainable Energy Action Plan (SEAP) Guidebook.</p>							
Stakeholders involved	Over 3000 local and regional authorities							
Further information	http://www.eumayors.eu/index_en.html							

Case 15	UK: Home Energy Efficiency Database (HEED)							
Relevant strategy Steps			Step 3					Step 9
Context	UK							
Status	On-going							
Main features	<p>HEED is a national database which tracks the energy efficiency characteristics of the UK's housing stock and registers the uptake of sustainable energy measures. The database is a key source of information to assist local, regional and central government in monitoring and reporting, and to facilitate better targeting, increased uptake and improved cost. It is open to interrogation by the public.</p> <p>The database registers energy efficiency installations on a property-by property basis with data from a wide variety of sources including energy suppliers, government scheme managing agents, local authorities and other landlords. It stores property details including building type and address, the installed energy efficiency measures, but not personal details. It will also store survey data so</p>							

	that a picture of the remaining potential can be built up. A UK Energy Saving Trust series of reports based on data in HEED provides a geographic distribution of professionally installed measures – currently cavity wall and loft insulation – claimed under the Carbon Emissions Reduction Target (CERT) scheme.
Stakeholders involved	UK energy agency and sector stakeholders
Further information	http://www.energysavingtrust.org.uk/Organisations/Government-and-local-programmes/Free-resources-for-local-authorities/Homes-Energy-Efficiency-Database/CERT-reports-from-HEED

Case 16	IEE TABULA project							
Relevant strategy Steps			Step 3					
Context	15 countries							
Status	2009 - 2012							
Main features	<p>The IEE 'TABULA' project (Typology Approach for Building stock Energy Assessment) has established libraries of housing energy typologies for 15 participating EU Member States. It also conducted team international expert workshops on energy assessment of national housing stocks.</p> <p>Its aim is to create a concerted structure on the building typologies in Europe in order to estimate the energy demand of residential building stocks at national level and, consequently, to predict the potential impact of energy efficiency measures and to select effective strategies for upgrading existing buildings.</p> <p>The TABULA project has fixed three independent variables which are: location, age and geometry (shape/volume). In specific country cases, this can result in typologies covering multiple climatic zones, building ages and geometries of housing (single-family house, multi-family house, terraced house, apartment block), necessary to characterise the diversity of the housing stock.</p> <p>TABULA has also analysed the impact on each typology of standard and advanced levels of energy refurbishment.</p>							
Stakeholders involved	Energy agencies, consultancies and universities from 15 countries							
Further information	http://www.building-typology.eu/tabula.html and reports on http://www.building-typology.eu/tabula/download.html See also: Building typologies seminar in Austria: http://www.energyagency.at/aktuelles-presse/veranstaltungen/detail/veranstaltung/energy-assessment-of-national-housing-stocksinternational-expert-workshop-building-typologies.html?no_cache=1 Analytical paper and application from Italy: http://www.ibpsa.org/proceedings/BS2011/P_1922.pdf and http://tapironline.no/fil/vis/619							

Case 17	Sustainable Energy Authority of Ireland: Irish Building Energy Performance Certificate Database and Search Tool							
Relevant strategy Steps			Step 3		Step 5			
Context	Ireland							
Status	On-going since 2007							
Main features	<p>In Ireland, an Energy Performance Certificate for a building is known as a Building Energy Rating (BER). As of mid 2013, over 350,000 BERs have been published and logged on the national register, representing almost one fifth of the national building stock. This database or register is managed by SEAI, the national energy authority and is a rich source of statistical information on the characteristics of building stocks, both housing and non-residential. This includes the detailed data file for each building covering all relevant energy</p>							

	<p>characteristics of the building – dimensions, detailed characteristics of building envelope and technical systems, energy supply systems, and overall energy and CO₂ performance.</p> <p>This rich data source is open to data mining by the research community to analyse technical and associated economic profiles and potential scenarios.</p> <p>Access (except for personal data) is now available for researchers and policy analysts for personal, research or education purposes. This can facilitate deeper studies of the state of Ireland's building stock, including permutations of correlations and the potential for energy and CO₂ performance improvement.</p> <p>With many EU Member States having established similar registries, the potential for such a search facility to provide significant data intelligence to inform the approaches to be taken in national strategies.</p>
Stakeholders involved	National energy authority, researchers, policy analysts
Further information	http://www.seai.ie/Your_Building/BER/National_BER_Research_Tool/

Case 18	Building Passports in Wallonia							
Relevant strategy Steps			Step 3	Step 4			Step 7	Step 8
Context	Belgium, Wallonia region							
Status	On-going							
Main features	<p>The Walloon experience is exemplary in its approach of integration, rationalization and optimization of the various pre-existing support schemes. The 'one-stop-shop' approach and the mutualisation of means to address and work with building owners are particularly interesting. The 'one-stop-shop' approach relies strongly on the implementation of a 'building passport' which aims at following all actions on a given building (energy audits, previous interventions, recommendations, etc.), independently of its owner.</p> <p>Ideally, all information relating to a dwelling should be gathered in one single database, having for entry point the address of the property and not the identity of the applicant (as it is the case today). It would in particular allow the new owner of a dwelling to know the history of the initiatives and the diagnoses already made on his property and thus, not have to redo them. However, in practice, the implementation of this unique database is complicated and comes up against technical obstacles (difficulties in crossing the information stemming from existing databases within various administrations, difficulties domiciling and maintaining a single database between different administrations) as well as legal obstacles (legal ban to gather in such database information on the financial situation of the owner, which is covered by bank secrecy and can only be accessible by credit institutions). It is thus possible that various databases will still exist in parallel.</p>							
Stakeholders involved	The initiative is part of the 1 st Alliance for Employment and Environment, coordinated by the Government of Wallonia.							
Further information	www.ufenm.be/IMG/pdf/Plan_AEE.pdf (in French)							

Case 19	EU Odyssee MURE database of energy efficiency policies and measures							
Relevant strategy Steps			Step 3		Step 5		Step 7	
Context	EU wide							
Status	On-going. NOTE that this is a subscription based service which requires user registration.							
Main features	<p>ODYSSEE MURE is an IEE project covering 29 countries which has developed a range of indicators of energy efficiency across all sectors, and monitors and benchmarks energy efficiency trends and policy measures in Europe.</p> <p>MURE (Mesures d'Utilisation Rationnelle de l'Energie) provides information on energy efficiency policies and measures across the EU and enables national level simulation and comparison of the potential impact of such measures. The MURE database has been designed and developed by a team of experts, led</p>							

	<p>and coordinated by ISIS (Institute of Studies for the Integration of Systems, Rome) and the Fraunhofer Institute for Systems and Innovation Research ISI (Germany). The database is structured by energy end-use sector, including the household and tertiary buildings sectors, and allows browsing the energy efficiency measures of each sector.</p> <p>ODYSSEE is a detailed database on energy efficiency data & indicators, and its website presents a large set of publications such as profiles of energy efficiency trends and policies by country and by sector.</p>
Stakeholders involved	EU Commission, 29 national energy agencies, researchers, policy analysts
Further information	http://www.odyssee-indicators.org/ and http://www.muredatabase.org/ NOTE Odyssee database is a subscription based service which requires user registration.

Case 20	Austria: Thermoprofit Initiative							
Relevant strategy Steps				Step 4		Step 6	Step 7	
Context	Austria, Graz region							
Status	On-going							
Main features	<p>The awareness and understanding of the ESCO concept has increased in recent years, creating more confidence in the market, where potential clients start to consider energy efficiency services more business-as-usual than as a specialty. Yet, still insufficient awareness of the specifics of the ESCO model and scepticism towards its advantages among both clients and financiers remains one of the most commonly reported barriers to the deployment of ESCO projects in the large majority of EU countries. The lack of standardisation is perceived as the most important motive for this mistrust. In addition, the lack of experience of clients, ESCOs and financial institutions and the inhomogeneous ESCO offer, which makes standardisation of contracts difficult, have been identified as reasons for mistrust.</p> <p>The Thermoprofit® network consists of energy services suppliers who commit themselves to the Thermoprofit® quality standards and are certified and regularly assessed by an independent commission, to confirm they comply with the pre-set standards. The aim is to improve confidence in the services offered by ESCOs and facilitate the marketing of their services to potential clients.</p> <p>The Thermoprofit® quality label guarantees reliable high quality proposals by ESCOs using the label. In addition, the “eco-label” denotes quality of ESCO services and compliance with Thermoprofit® standards.</p> <p>This example has already spread to other regions as well.</p>							
Stakeholders involved	The Graz Energy Agency coordinates the network and acts as a turntable for Thermoprofit® issues.							
Further information	www.managenergy.net/resources/700 and www.thermoprofit.at							

Case 21	France: Energ'Assur							
Relevant strategy Steps				Step 4		Step 6	Step 7	Step 8
Context	France							
Status	On-going							
Main features	<p>Energy conservation interventions on the building envelope are still considered too risky by most market players, even if they have been technically mastered for over a decade now in some European countries. Real and perceived technical and financial risks translate into higher interest rates or yield on equity, which results in lesser energy savings for a given payback time.</p> <p>Some insurance companies are currently developing specific energy performance insurances for ESCOs. In France, Verspieren proposes Energ'Assur, which covers the difference between the energy consumptions in the first year after retrofit and the yearly targeted consumption (i.e. adjusted on climate and in some cases use of the building) in the 4 following years. So far,</p>							

	this is restricted to interventions on HVAC systems.
Stakeholders involved	Versperien (private insurance company)
Further information	www.verspieren.com/verspieren/nos-expertises-sectorielles/batiment-durable/batiment-durable.5863.html

Case 22	France: OSER							
Relevant strategy Steps				Step 4		Step 6	Step 7	Step 8
Context	France, Rhône-Alpes region							
Status	Under implementation							
Main features	<p>The Region Rhône-Alpes initiated in 2011 the creation, in addition to traditional financing on budgetary resources, of a dedicated vehicle with high leverage.</p> <p>The objective of the Region through the creation of this operator is threefold: expand the dynamic of thermal rehabilitation in public buildings, providing a range of services (technical and financial) to local authorities for energy efficiency refurbishments; create and support the development renewable energy production projects initiated by public and private actors; pool skills and resources.</p> <p>The project should result in the creation of an operator with two additional intervention tools:</p> <ul style="list-style-type: none">• a local public company (French legal status of Société Publique Locale) whose activities will focus on ambitious energy retrofit operations in public buildings.• an investment fund, combining public and private capital to accelerate the technical and financial structuring of renewable energy projects on the regional territory. <p>The creation of the local public company is expected at the end of 2012, followed by the creation of the investment funds in early 2013.</p>							
Stakeholders involved	Initial shareholders: Regional Council of Rhône Alpes, cities of Bourg-en-Bresse, Chambéry, Cran-Gevrier, Grigny, Montmélian, Meyzieu, Romans-sur-Isère, Saint-Fons, Saint-Priest and SIEL (Syndicat Intercommunal d'Énergie de la Loire)							
Further information	http://www.rhonealpes.fr/include/viewFile.php?idtf=13511&path=89%2FWEB_CHEMIN_13511_1361524493.pdf							

Case 23	Le Coach Copro®							
Relevant strategy Steps				Step 4		Step 6	Step 7	Step 8
Context	France, Paris							
Status	Under implementation							
Main features	<p>The Paris Climate Agency has created Le Coach Copro® which supports condominiums (multi-family buildings) in structuring their energy refurbishment projects, and negotiates with contractors. Notably they provide template methods and documents as well as a secured database, only accessible to the co-owners of a given building, gathering all relevant information to follow the refurbishment project.</p> <p>This is a completely free and independent platform, accessible on the internet. This platform guides the registered co-owners, step by step, through three stages in the renovation project process: project preparation, energy audit, works, providing them the keys to success. The aim of this platform is to simplify the process of energy renovation, to satisfy the requirements of the local Energy/Climate Plan, in the formidable challenge of energy renovation of private real estate.</p> <p>Several Local Energy Agencies are going to test the platform in their areas. The condominium members will access the information relevant to their territory, including technical, building typologies, financial support and local regulations.</p>							

Stakeholders involved	Le Coach Copro® was devised and is coordinated by the Parisian Climate Agency and is developed in partnership with ADEME, Paris City, Nexity and Ericsson.
Further information	www.apc-paris.com/actualites/2013/coach-copro-le-nouveau-service-gartuit-et-innovant-de-l-apc-pour-les-coproprietes-parisiennes.html

Case 24	REQUEST Project and Database								
Relevant strategy Steps				Step 4			Step 7	Step 8	Step 9
Context	European – 20 Member States (principally AT, BE, BG, DE, DK, UK, EL, IT, PL, PT, SK) plus 3 non-EU countries								
Status	2012								
Main features	<p>Among the results of the REQUEST project are:</p> <ul style="list-style-type: none">• An inventory of 115 tools, techniques and schemes, collected from 28 countries that promote low carbon renovation, focusing on quality assurance schemes.• A user-friendly web tool - the Efficiency Assistant - to advise homeowners, policy makers, designers, builders and qualified experts on how to take action on energy performance certificate reports.• Detailed process guidelines for ensuring quality on-site during an energy efficient renovation, comprising a process overview diagram and a detailed series of checklists.• These tools were piloted in 11 Member States in projects relevant to the barriers identified.• An overview of the whole customer journey – comprising 11 steps, from energy assessment to installation of measures. This is important to the goal of making energy efficient renovation proposals as attractive as possible to the customer. <p>The REQUEST database is a repository of tools and policies across Europe (on incentives, communication, education, stakeholder participation) for increasing the uptake of low-carbon renovation measures in residential buildings and promoting an integrated supply chain for renovation.</p> <p>In total, it covers 115 existing case studies from the REQUEST project countries (AT, BE, BG, DE, DK, UK, EL, IT, PL, PT, SK) as well as 10 other EU countries plus Norway, Switzerland and USA.</p> <p>In the database dynamic search can be performed on the basis of: territorial level, key areas (communication, education, incentives, participation), stakeholder groups, stage of the renovation process, type of ownership, quality requirements (people, products), control/inspection, evaluation indicators, feedback from target groups, communication instruments, measures for energy efficiency, etc.</p> <p>The different tools/policies are also summarised in pdf factsheets.</p>								
Stakeholders involved	National energy agencies and universities from AT, BE, BG, DE, DK, UK, EL, IT, PL, PT, SK, HR, FR								
Further information	REQUEST project: http://www.building-request.eu/ REQUEST database: http://www.building-request.eu/it/info/review-and-research NOTE: Access to the database is on demand and restricted to Energy Agencies and relevant parties (e.g. Universities and research institutions): http://www.building-request.eu/it/content/request-access-extended-best-practices-database .								

Case 25	USA: Investor Confidence Project (ICP)							
Relevant strategy Steps				Step 4		Step 6	Step 7	Step 8
Context	U.S.A.							
Status	On-going							
Main features	<p>The ICP is a set of protocols established by the US ‘Environmental Defence Fund’ (EDF), aimed at enabling investment quality building energy efficiency projects, by taking the variability out of the process. This includes reducing transaction costs and engineering overhead, while increasing the reliability and consistency of savings. It has drawn on inputs from a network of equity and debt finance companies, building owners and managers, energy service providers, insurers, engineers, utilities, and a range of NGO and public sector bodies.</p> <p>These experts and the ICP have developed standardised protocols for a five-step evaluation for energy efficiency retrofits:</p> <ol style="list-style-type: none"> 1. Baselineing 2. Savings projections 3. Design, construction, and commissioning operations 4. Maintenance and monitoring 5. Measurement and Verification (M&V). <p>The project released its first protocol, the Energy Performance Protocol for Large Commercial (EPP-LC) in 2012.</p> <p>The protocols build confidence across the investment chain, enabling project developers to benefit from better access to capital resources, standardised origination processes, and the ability to benchmark projects. Building owners and managers can see a more competitive bidding process and get better rates and terms for their projects. Investors will be able to underwrite deals more efficiently by having reduced transaction costs and consistent yields.</p>							
Stakeholders involved	Commercial interests across the building energy efficiency investment chain							
Further information	www.eepperformance.org							

Case 26	International Performance Monitoring and Verification Protocol (IPMVP)							
Relevant strategy Steps				Step 4		Step 6	Step 7	Step 8
Context	30 countries							
Status	Under implementation							
Main features	<p>A common barrier to investments in building energy performance upgrading is the absence of suitable frameworks and instrument of evaluation, monitoring and reporting to make a convincing ‘business case’ and satisfy the needs and systems employed by the financing and investment community, and indeed of national exchequers in relation to introduction of market stimulus policies. There is a need to strengthen and normalise the monitoring and evaluation culture both in the preparing/‘selling’ and post delivery verification phases of projects.</p> <p>One example of a standardised, flexible protocol emerging internationally to cater for energy efficiency investments is the International Performance Monitoring and Verification Protocol (IPMVP). It is an open standard for measuring and verifying savings from energy and water efficiency projects, used by financial institutions and governments. Originating in the USA, it is now increasingly used in EU Member States, in both the industrial and building sectors. It has been seen as important in overcoming barriers, building credibility and helping the market acceptance and growth of the energy efficiency industry in several countries.</p> <p>It is applicable to verifying savings from both traditionally funded and third-party-financed energy and water efficiency projects. Institutions such as the World Bank and International Finance Corporation (IFC) have found the Protocol beneficial and are incorporating it as a required part of new energy efficiency projects.</p>							

Stakeholders involved	Governments, financial institutions, energy utilities, energy services companies, energy professionals
Further information	<p>The IPMVP is in three volumes, available at http://www.evo-world.org/ See http://www.evo-world.org/index.php?view=download&alias=641-overviewsummary-of-ipmvp-28-38&option=com_docman&Itemid=1585&lang=en</p> <p>The protocol has been translated into Bulgarian, Chinese, Czech, Japanese, Korean, Polish, Portuguese, Romanian, Russian, Spanish and Ukrainian. Translated versions of the IPMVP in some of these languages are available through the website www.ipmvp.org</p>

Case 27	EU BUILD UP Skills initiative							
Relevant strategy Steps				Step 4			Step 7	Step 8
Context	30 countries							
Status	Under implementation							
Main features	<p>BUILD UP Skills is a strategic initiative under the Intelligent Energy Europe (IEE) programme to boost continuing or further education and training of craftsmen and other on-site construction workers and systems installers in the building sector. 30 countries are participating. The goal is to increase the number of qualified workers across Europe to deliver renovations offering a high energy performance as well as new, nearly zero-energy buildings. The initiative addresses skills in relation to energy efficiency and renewables in all types of buildings.</p> <p>BUILD UP Skills has two phases:</p> <ul style="list-style-type: none"> • First, the objective is to set up national qualification platforms and roadmaps to successfully train the building workforce in order to meet the targets for 2020 and beyond. • Based on these roadmaps, the second step is to facilitate the introduction of new or extended existing qualification and training schemes. <p>Regular exchange activities are organised at EU level to underline the EU dimension of this important initiative and foster the learning among countries.</p> <p>National teams have been formed in 30 countries, with key public and private players working together to improve the qualification and skills of building workers, which are essential to deliver high energy performance buildings.</p>							
Stakeholders involved	Energy agencies, building industry and training authorities across EU Member States							
Further information	http://www.buildupskills.eu , including access to national programmes							

Case 28	UK: Registers of Competent Persons							
Relevant strategy Steps				Step 4		Step 6	Step 7	Step 8
Context	UK							
Status	Published and ongoing							
Main features	<p>Competent Person Schemes (CPS) were introduced by the UK Government to allow individuals and enterprises to self-certify that their work complies with the Building Regulations as an alternative to submitting a building notice or using an approved inspector.</p> <p>A 'Competent Person' must be registered with a scheme that has been approved by The Department for Communities and Local Government (DCLG). Schemes authorised by the DCLG are listed on its website at http://www.communities.gov.uk</p> <p>To find a person registered with a CPS is useful because many jobs in the home need to be notified to and approved by the Local Authority Building Control, unless carried out by an installer who is registered with a CPS.</p>							

	<p>The DCLG leaflet (http://www.competentperson.co.uk/Default.aspx) lists all the works where a Local Authority Building Control is required, and indicates the schemes that certify the installers.</p> <p>A booklet shows how to use the CPS to find the right person for 'Building work, replacements and repairs to your home'.</p>
Stakeholders involved	<p>Department for Communities and Local Government (DCLG), UK.</p> <p>Approved scheme providers provide the consumer with the ability to search for a Competent Person registered with one of the schemes.</p>
Further information	http://www.competentperson.co.uk/Default.aspx

Case 29	Germany: Database of Experts for Energy-Efficient Building and Refurbishment						
Relevant strategy Steps				Step 4			Step 8
Context	Germany						
Status	Launched 2011. Ongoing.						
Main features	<p>dena's online database of experts helps owners of residential and non-residential buildings to find qualified specialists in energy-efficient building and refurbishment. Since the launch of the online service at the end of 2011, over 5,000 energy efficiency advisers have registered in the database. Their qualifications are checked and updated continuously by dena.</p> <p>The registered experts qualify for the on-site consultancy programmes funded by the German Federal Office of Economics and Export Control (BAFA) and have the qualifications required to plan and supervise the construction of KfW efficient houses. The database also features experts for the new "Effizienzhaus Denkmal" funding programme for the energy-efficient refurbishment of protected historical buildings and homes with a structure worthy of preservation.</p> <p>Over 78% of the registered experts are architects and engineers while 13% work as independent tradesmen. To gain the right qualifications, they have attended comprehensive advanced training courses. Until the end of 2013, they can also prove their respective practical experience by submitting planning or construction projects that comply with the highest energy efficiency standards. Every two years, the experts are required to provide evidence that they have kept up with the latest developments and have implemented respective projects.</p>						
Stakeholders involved	National energy agency, professionals, tradesmen. Beneficial to financiers, building owners						
Further information	http://www.dena.de/en/projects/building/database-of-experts-for-energy-efficient-building-and-refurbishment.html?tx_dscoverview[list]=1&tx_dscoverview[pluginid]=7						

Case 30	Ireland: Methodology for energy efficient retrofit of existing dwellings						
Relevant strategy Steps				Step 4			Step 8
Context	Ireland						
Status	2012 - 2013 development and public consultation						
Main features	<p>This set of consultation documents for a draft code of practice for energy renovation of housing sets out the technical and professional practice requirements for specifiers and contractors responsible for delivering professional services to householders under national schemes. It is associated with a model form of contract to provide consumer assurance and protection. It is foreseen that compliance with this code or methodology will be a requirement in future incentive schemes for housing energy renovation.</p> <p>Detailed technical guidance is given on thermal improvement measures with the</p>						

	building envelope and equipment and on electrical measures. Guidance on project planning and management is also given.
Stakeholders involved	Government Ministries, national energy agency, national standards authority, property managers, designers, specifiers, installers
Further information	http://www.nsai.ie/NSAI/files/bf/bfef197b-c5b8-44bb-8a02-34b7f714f0b8.pdf

Case 31	UK: Responsible Retrofit of Traditional Buildings							
Relevant strategy Steps				Step 4	Step 5			
Context	UK							
Status	Ongoing							
Main features	<p>The Sustainable Traditional Buildings Alliance (STBA) is a collaboration forum for sustaining and improving traditional buildings in the UK, and is possibly typical of similar initiatives elsewhere in Europe in relation to this sensitive sector.</p> <p>The report on Responsible Retrofit of Traditional Buildings was carried out to address concerns regarding certain measures in the traditional building stock – representing almost one quarter of the UK housing stock. Concerns included: possible failures of financial and energy payback, building envelope integrity, human health issues, potential damage to heritage, and missed opportunities for radical performance improvement (deep renovation).</p> <p>The report identifies existing national and international research and guidance and highlights significant knowledge gaps. It concludes with a ‘Way Forward’ and makes suggestions as to how uncertainties within this field can be managed in order to ensure that traditional buildings can contribute to significantly reducing energy demand without creating undue risks.</p> <p>In addition, its ‘Responsible Retrofit Guidance Wheel’ is an assessment and planning tool which organises potential retrofit measures grouped by categories and assesses technical, heritage and energy concerns. The content of the Wheel has been reviewed by field experts and its usability is being tested with designers, local authority users, energy assessors and researchers.</p>							
Stakeholders involved	NGOs, construction industry, government agencies							
Further information	http://stbauk.org/							

Case 32	Scotland (UK): Refurbishing Strategies for Heritage Buildings							
Relevant strategy Steps				Step 4	Step 5			
Context	UK							
Status	Ongoing							
Main features	<p>Scotland legislation is committed to reducing greenhouse gas emissions by 42% by 2020; and 80% by 2050 relative to 1990. One fifth of Scotland’s building stock was built prior to 1919.</p> <p>This website is an example of a guidance resource for energy renovation of such buildings. It includes:</p> <ul style="list-style-type: none"> • Guidance on practical solutions to improving energy efficiency in traditional and historic buildings, through a range of specific improvement measures to different elements of a building (specifically roofs and lofts, floors, windows and doors, walls and chimneys). It emphasises the need to maintain healthy ventilation and moisture characteristics. • The results of a series of trials and pilot projects these projects are published as a series of <i>Refurbishment Case Studies</i>. • Specific measures are described in more detail in <i>Technical Papers</i>. <p>Many of the Historic Scotland pilot projects are receiving on-going monitoring, and further findings updates will be published in new versions of the guide.</p>							

Stakeholders involved	Scottish government agency, UK Energy Saving Trust (government agency), building professions and trades, NGOs
Further information	http://www.historic-scotland.gov.uk/fabric_improvements.pdf http://www.historic-scotland.gov.uk/technicalpapers http://www.historic-scotland.gov.uk/index/heritage/technicalconservation/conservationpublications/refurbcaseestudies.htm

Case 33	UK Department of Energy and Climate Change Strategy (DECC): Energy Efficiency Strategy - The Energy Efficiency Opportunity in the UK (2012)							
Relevant strategy Steps					Step 5		Step 7	
Context	UK							
Status	Published study							
Main features	<p>This is an example of structuring a national strategy, with several cost effectiveness considerations, covering both domestic and commercial building sectors.</p> <p>It compares both micro-economic (5 examples) and macro-economic (3 examples) approaches, including Energy Efficiency Marginal Cost Abatement curves showing lifetime NPV per unit energy saved versus volume of energy saved, ranked in order of cost per unit saved, analysing each technology applied in a sector. Some indicators for evaluating social and environmental impacts are also given.</p> <p>For lifecycle costing, the key issues afforded will be which lifecycle costs to include, and which discounting and price increment rates to adopt. Some indicators for evaluating social and environmental impacts are listed.</p>							
Stakeholders involved	UK government led. Energy sector and end use sector stakeholders, including construction sector							
Further information	https://www.gov.uk/government/organisations/department-of-energy-climate-change/series/energy-efficiency-strategy							

Case 34	Life Cycle Costing (LCC) for sustainable construction: a common methodology							
Relevant strategy Steps					Step 5		Step 7	
Context	12 countries							
Status	The project was developed between 2006 and 2007.							
Main features	<p>Life Cycle Costing is an important methodology for application in the challenge of establishing optimal strategies for energy renovation of the building stock. While carried out some years ago, this EC funded study "Life Cycle Costing (LCC) as a contribution to sustainable construction: a common methodology" (European Project No. 30-CE-0043513/00-47) is still relevant.</p> <p>The document is a review and comprehensive manual covering the LCC approaches in 12 countries, aimed at encouraging a new common methodology which is produced in draft and submitted to EC. Selected items of interest throughout the study are:</p> <ul style="list-style-type: none"> • Cost and time-based data (i.e. data relating to material/component durability, maintenance and operating needs and repair and replacement frequencies) is an ongoing area for research. • The recommended discount rates are typically between 2% and 5% net of inflation for public financial institutes, and more akin to investment hurdle rates (and vary between some 2-14% 'real') in the private sector; • In practice LCC is used for a wide range of analysis periods, which may include the life cycle (cradle to grave) from inception to disposal of a construction asset, and may also include the period of a long-term service 							

	<p>contract (eg 25-30 years), or a pre-determined period relating to the client's/user's interest in the constructed asset under consideration.</p> <ul style="list-style-type: none"> • It could also cover the period of Facilities Management (FM) or Public Private Partnership (PPP) contracts. • The new methodology needs to provide coverage of the workings and merits of risk and sensitivity analyses. • Recommendations for further research depend partly on the outcome of discussions now underway in relation the status of the Draft ISO/DIS 15686, Part 5 and in particular, the final status of the definitions and terminology in the document. <p>The proposed methodology is described in 18 steps, covering the purpose, scope, time horizon, environmental dimension, asset requirements, project requirements, sustainability requirements and options, financial parameters, cost effects and impacts, economic evaluation, risk analysis and sensitivity analysis.</p>
Stakeholders involved	<p>Author: Davis Langdon. Tripartite Meeting Group (Member States/ Industry/ Commission) on the Competitiveness of the Construction Industry recommended the production of this study. See http://europa.eu.int/comm/enterprise/construction/suscon/tgs/tg4/lcalccintro_en.htm</p>
Further information	<p>http://ec.europa.eu/enterprise/sectors/construction/files/compet/life_cycle_costing/final_report_en.pdf http://www.brita-in-pubs.eu/toolbox/LCC_files/LCC-methodology%20Rev1%205-3-07%20(2).pdf</p>

Case 35	IEA: Cost-Effective Energy and Carbon Emission Optimisation in Building Renovation							
Relevant strategy Steps					Step 5			
Context	Austria, Canada, Czech Republic, Denmark, Finland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland							
Status	2011-2015							
Main features	<p>This research project under the IEA Energy in Buildings and Communities initiative (Annex 56) is focussed on economic building energy renovation solutions. It takes a 'cost optimal' type approach in seeking to investigate where is the balance points between energy demand reduction and carbon reduction/ renewable energy supply types of measures from a cost/benefit perspective, i.e. nearly zero energy and nearly zero carbon. This includes two approaches: a market approach (private vs social cost/benefit) and a normative (targets driven) perspective.</p> <p>The research is testing different packages of renovation measures. Its scope is residential and office buildings. The project objectives include adapting tools to support decision makers in accordance with the developed methodology for establishing cost optimised targets. It is also producing exemplary case studies exhibiting this integrated approach. It also aims to characterise and understand the acceptance, motivation, needs, obstacles and drivers of the renovation process.</p>							
Stakeholders involved	Energy agencies, universities, research institutions, building industry. Target groups for the results are investment decision makers, building professionals and policy makers.							
Further information	<p>http://www.ecbcs.org/annexes/annex56.htm Presentation on http://www.seai.ie/News_Events/Events/SEAI_Events/IEA-Dr-Manuela-Almeida.pdf NOTE: Access to the full details is restricted to registered users</p>							

Case 36	Korytarova & Urge-Vorsatz: Risks and opportunities of building retrofit - Retrofitting public buildings in Hungary							
Relevant strategy Steps					Step 5			
Context	Hungary and Slovakia							
Status	2010							
Main features	<p>The paper illustrates different levels of cost effectiveness that can be achieved under varying conditions, and points out the opportunities and the risks of different trajectories in retrofitting public buildings. Its scenario analysis shows that although the rate of retrofit is a factor influencing the total energy savings potential, even more important is the level to which the buildings are retrofitted.</p> <p>If the whole stock of the existing buildings is retrofitted by 2030 only to the level of partial retrofit (assuming 30% energy savings), the resulting potential may be lost. The most striking conclusion is that a programme of deep renovation at current rates (1% per year of the existing buildings) is more cost effective than an accelerated rate of shallow renovation (with 30% energy performance reduction).</p> <p>Once the right transition strategy is developed, the rate of retrofit can be accelerated. The paper highlights the risk of falling into a 'lock-in' effect, when more than half of the potential can be lost due to suboptimal retrofit at an accelerated rate. This means that large amount of energy may be locked in the current suboptimal consumption patterns for several next decades until the next renovation cycle.</p>							
Stakeholders involved	Ministry of Economy of the Slovak Republic, Central European University Hungary							
Further information	http://www.salford.ac.uk/_data/assets/pdf_file/0005/142475/099-Korytarova.pdf							

Case 37	US Empire State Building refurbishment							
Relevant strategy Steps					Step 5			
Context	USA							
Status	2011							
Main features	<p>This is a deep opportunistic energy renovation with a marginal or incremental approach to cost effectiveness assessment within a holistic building renovation initiative. The project has highlighted the business case for pursuing relatively 'deep' energy efficiency improvements, well beyond the 10-20% level.</p> <p>The energy efficiency retrofit of New York's landmark 250,000 m² Empire State Building has revitalised this building. The owner assembled an expert team of energy specialists and property managers to develop a retrofit plan that would not only maximize energy savings, but build a strong economic case, saving 38% of the building's energy and \$4.4 million annually. The building exceeded its energy-efficiency guarantee by 5%, establishing a commercial real estate model for reducing costs, maximising return on investment, increasing property value, and protecting the environment.</p> <p>One key to success was an integrated approach to redesign, and a 'right-steps in the right-order' model that can be applied to any building of any size. Eight sets of efficiency upgrade measures to the building envelope, lighting, heating and air conditioning system yielded these savings.</p> <p>The business perspective of the team helped to ensure an informed financial decision-making process and a sound economic outcome and included the use of Life Cycle Cost Analysis and integrating energy upgrades on planned renovation improvements, particularly to the building envelope, and using a hybrid of the ESCO model and owner investments to finance the upgrades.</p>							
Stakeholders involved	Building owner, estate agency, technical expert team, ESCO							
Further information	http://www.esbnyc.com/sustainability_energy_efficiency.asp and http://blog.rmi.org/blog_empire_state_retrofit_surpasses_energy_savings_expectations							

Case 38	Chidiac et al: “A screening methodology for implementing cost effective energy retrofit measures in Canadian office buildings”							
Relevant strategy Steps			Step 3		Step 5			
Context	Canada							
Status	2011							
Main features	The paper describes a Canadian methodology developed to screen office buildings for their current level of energy consumption and potential for retrofit application. Selection of an optimal set of energy retrofit measures (ERMs) is influenced by climate, occupancy, heating and cooling systems, envelope properties and building geometry. When assessing the implications of applying ERMs to a large building stock it is vital to screen the complete building set for optimal retrofit opportunities.							
Stakeholders involved	Canadian authorities and university							
Further information	Energy and Buildings, Volume 43, Issues 2–3, February–March 2011 http://www.sciencedirect.com/science/article/pii/S0378778810003993							

Case 39	ENEA: Italian White Certificates							
Relevant strategy Steps					Step 5	Step 6	Step 7	
Context	Italy							
Status	Certified energy saving titles, sold in an electronic market							
Main features	The energy impact of this ‘white certificates’ programme applied to energy supply companies was a total saving of 26,000 GWh per annum at end 2011. About 1000 projects were in the building sector, with the main technologies supported by the scheme for buildings being efficient lamps, water saving and condensing boilers. A cost benefit analysis has been done.							
Stakeholders involved	Energy and gas Authority (AEEG), Manager of Electric Services (GSE), ENEA. Professional and industrial associations, Utilities (gas and electricity distribution).							
Further information	ENEA: RAEE Annual Energy efficiency Report for Italy, (also in English), http://www.enea.it/it/produzione-scientifica/rapporto-energia-e-ambiente-1							

Case 40	Comparative evaluation of incentive programmes in Saxony							
Relevant strategy Steps					Step 5	Step 6	Step 7	
Context	Saxony State, Germany							
Status	2013							
Main features	The aim of this study is to make a comparative quantitative evaluation of four incentive programmes: the Saxon Passive House Programme, change of central heating boilers, installation of solar thermal plants, and energy efficient interior and street lights. This is based on calculating indicators of performance including annual energy saving, avoided greenhouse gas emissions, cost per MWh of energy saved, cost per kg of CO ₂ avoided, cost to Saxony per kg of CO ₂ avoided, total cost of energy saved by consumers (assuming natural gas and without taxes).							
Stakeholders involved	Bautzen Innovation Centre, Landesamt fuer Umwelt Landwirtschaft und Geologie - Freistaat Sachsen, Technologie- und Gründerzentrum Bautzen GmbH, .							
Further information	ENERCITEE: GRACE Final Report on Grants and Other Incentives for Cost and Energy Efficiency, Bautzen Innovation Centre, Evaluation Report. http://energitee.eu/Sub-Projects/GRACE---Grants-and-other-incentives-for-cost-and-energy-efficiency.53/ Bautzen Innovation Centre: http://www.tgz-bautzen.de/projekte/laufende-projekte/grace.html							

Case 41	Thorne Amann: “Valuation of non-energy benefits to determine cost-effectiveness of whole house retrofit programs: A literature review”							
Relevant strategy Steps					Step 5			
Context	USA							
Status	Analysis of non-energy benefits in programme evaluation tests (2006, but still relevant)							
Main features	<p>This paper reports a wide set of US experiences in evaluating non-energy benefits of building energy performance improving investments for the final users. It is mostly addressed to the schemes managed by utilities which need to demonstrate a least cost advantage. There are a number of possible indicators to be used for assessing the cost benefit, which may or may not include non-energy benefits that the users expect.</p> <p>The economic value of the non-energy benefits is based on field surveys where the interviewed people declare the maximum amount of money they could have available to spend in order to obtain the indicated benefit.</p> <p>The data and methodologies indicate that the value of ‘non energy benefits’ from building energy renovation can range from 50% to 300% of the value of the direct energy cost savings.</p>							
Stakeholders involved	US EPA , New York State Energy Research and Development Authority and ACEEE							
Further information	ACEEE Report A061. http://psb.vermont.gov/sites/psb/files/projects/EEU/screening/Amann_ValuationOfNon-energy.pdf							

Case 42	EU Commission document “Financial Support for Energy Efficiency in buildings”							
Relevant strategy Steps					Step 6			
Context	EU wide							
Status	Publically available							
Main features	<p>This report gives an overview of various sources of EU funding, including:</p> <ul style="list-style-type: none"> • Cohesion Policy Funding (e.g. JESSICA) • Research Funding FP 7 (e.g. Concerto, E2B PPP, Smart Cities) • Enlargement Policy Funding (e.g. SMEFF, MFF, EEFF) • Programme for European Energy Recovery (EEPR) - European Energy Efficiency Fund (EEE F) • Competitiveness and Innovation Funding (CIP) - Intelligent Energy Europe Programme (including ELENA). <p>It presents a synthetic analysis on the effectiveness of EU funding, funds from the EIB and other public finance institutions, and the coordination of EU and national funding. It stresses that the EU needs to improve the financial support in this sector if it wants to meet its 2020 and 2050 targets and indicates how financial support for energy efficiency in buildings can be improved.</p> <p>It is accompanied by a Staff Working Document providing more details on the European building stock and the financial support instruments in place at EU and national level.</p> <p>In support of the analysis of the investment potential for energy efficiency in buildings and of the use of financial instruments at national level, two specific studies undertaken for the Commission by Ecofys can also be downloaded here.</p>							
Stakeholders involved	Report from the Commission to the European Parliament and the Council							
Further information	18.4.2013, Reference: COM(2013)225final http://ec.europa.eu/energy/efficiency/buildings/buildings_en.htm							

Case 43	IEA Insights Series: Mobilising investment in energy efficiency							
Relevant strategy Steps						Step 6	Step 7	
Context	OECD/ IEA countries							
Status	2012							
Main features	<p>This IEA report is an extensive review of the experience with economic instruments in energy efficiency policy, with a focus on coherent policy design to make such instruments most effective. It is targeted at policy makers developing energy efficiency policy in the buildings and other sectors.</p> <p>The report clusters economic instruments into four categories: fiscal, financial, trading schemes and direct investment by the State. It analyses how economic instruments are currently used in energy efficiency policy, and describes and compares the main design features of each instrument. It then considers how such instruments are used to improve energy performance in the buildings sector, providing insights as to which is likely to be effective in different circumstances or to overcome specific barriers. This has a focus on financing low energy buildings, particularly on policies for the deep energy efficiency refurbishment of existing buildings. The final section explores how economic instruments in energy efficiency policy can be funded where public outlay is needed, and/or raise revenue.</p>							
Stakeholders involved	National energy agencies, government authorities, financial institutions, NGOs, UN, business alliances							
Further information	http://www.iea.org/publications/freepublications/publication/name,33749,en.html							

Case 44	World Economic Forum: A profitable and resource efficient future - Catalysing retrofit finance and investing in commercial real estate							
Relevant strategy Steps						Step 6		
Context	International - Australia, Germany, USA, UK, Japan and China							
Status	Published 2011							
Main features	<p>This study is the product of a multi-stakeholder and cross-industry initiative of the World Economic Forum launched in 2010. It aims to equip policy makers and industry leaders with the information and tools needed to build and scale retrofit markets for commercial buildings around the world. Over 100 experts and leaders from the real estate, financial services, institutional investor, engineering & construction, equipment supply and energy industries provided input.</p> <p>The work comprised three core activities:</p> <ul style="list-style-type: none"> • An interview-based examination of drivers and financing vehicles underlying six regions perceived as active in retrofitting: Australia, Germany, USA, UK, Japan and China • A critical review of the spectrum of public and private financing vehicles for retrofit projects • An exploration of the role that data and standards for disclosure play in unlocking the retrofit market <p>It contains recommendations to enable and scale the market for building retrofit. It also provides:</p> <ul style="list-style-type: none"> - examples on standardised data collection as a basis for the measurement of the effects reached by retrofit activities - examples of possible ways of financing as well as tax structures in different countries aiming to stimulate investment in energy efficiency - examples of financing provided by ESCOs, Utilities, Equipment Manufacturers and related stakeholders - examples of investment funds - examples of pilot projects by major private holders - examples of green bonds investment products. 							
Stakeholders involved	Real estate and energy professionals							
Further information	http://www.weforum.org/reports/profitable-and-resource-efficient-future-catalysing-retrofit-finance-and-investing-commercial							

Case 45	The European Investment Bank (EIB): funding programmes, projects and studies							
Relevant strategy Steps						Step 6		
Context	EU							
Status	On-going							
Main features	<p>The EIB is the bank of the European Union and is owned by the 27 Member States, with subscribed capital of €232 billion in 2012. It supports investments which help towards the achievement of EU policy goals. Lending is its main activity, accounting for around 90% of its total financial commitment. EIB invests, provides technical and financial expertise and blends funding from other sources on projects in the fields of energy efficiency, renewable energy and in research, development and innovation. Its support can be central to attracting other investors. Projects include retrofitting and expansion of existing social and urban infrastructure and services.</p> <p>EIB also has a variety of sophisticated tools to help clients blend its financing with additional sources of investment. Its supports include:</p> <ul style="list-style-type: none"> - Project loans for large developments in excess of € 25 million - Intermediated loans are made via local banks - Structured finance provides additional support to priority projects - Guarantees: helping projects attract new investors - Project bonds: unlocking infrastructure funding - Equity & fund investment to catalyse further activity - Venture capital: helping fund managers invest in high-tech and growth SMEs - Microfinance has benefited from our long term commitment - Sustainable energy: maximising investment (ELENA) - Green-tech demonstration support (NER300) - Urban development technical assistance (JESSICA) - Public-private partnership optimisation (EPEC) - Flexible SME funding (JEREMIE) <p>EIB has increased its volume of intermediated lending, including framework loans, available through the banking sector or through public authorities, energy service companies or public-private partnerships. It also provides indirect financing to energy efficiency projects via investment funds with different geographical coverage that are established with the private sector and a range of international financial institutions. The Green for Growth Fund was launched in 2009 together with KfW and the EBRD to provide financing, including loans, equity and technical assistance, for sustainable energy projects in the Western Balkans and Turkey. EIB also makes use of risk-sharing instruments combining loans with grants and providing technical support, partnering with the EU Commission or national authorities. An example is the EEEF (European Energy Efficiency Fund) launched jointly with the European Commission and other investors in 2011 to provide finance for sustainable energy projects.</p> <p>There is a strong viewpoint that this financial mobilisation strategy by EIB needs to be accompanied by three vital elements for the development of the financing market:</p> <ul style="list-style-type: none"> • Aggregation- projects need to be “aggregated” to reach a minimum size to make them more attractive for financing. • Standardisation- EE projects technical documentation and distribution of risks needs to be “standardised” to develop an homogeneous asset class. • Financial support- EE projects need financial support to (i) make them more attractive to promoters in terms of returns and pay-back periods and (ii) reduce risks for financiers until the market reaches a more mature stage. <p>EIB has been working on defining a new comprehensive lending strategy for energy efficiency investments in the coming years. It aims to develop new offerings based on four pillars:</p> <ul style="list-style-type: none"> • Incentivising commercial banks to address the EE sector as a distinct financing segment. • Facilitating access of public sector counterparts to long-term funding. • Developing the ESCO financing market. 							

	<ul style="list-style-type: none"> Enhancing access to refinancing to utilities investing in EE with its clients. <p>Such developments could be in cooperation with the EU Commission and/or Member States, and there will be a particular focus on maximising EIB lending capacity to energy efficiency investments and leveraging a higher impact of EU funds on the European economy.</p> <p>EIB cooperates with the European Commission and others on several climate investment vehicles such as:</p> <ul style="list-style-type: none"> Green Initiative – energy efficiency investment by SMEs in new Member States and pre-accession countries Global Energy Efficiency and Renewable Energy Fund - risk capital in developing and transition economies European Energy Efficiency Fund - energy efficiency, small-scale renewable energy, clean urban transport <p>Its list of joint publications includes:</p> <ul style="list-style-type: none"> Joint MDB Report on Adaptation Finance 2011 Joint MDB Report on Mitigation Finance 2011 International Financial Institution Framework for a Harmonised Approach to Greenhouse Gas Accounting Bilateral Finance Institutions & Climate Change - A Mapping of Public Financial Flows for Mitigation and Adaptation to Developing Countries in 2010, UNEP EN Bilateral Finance Institutions and Climate Change - A Mapping of 2009 Climate Financial Flows to Developing Countries, UNEP EN
Stakeholders involved	EIB, EU Commission, banking institutions, public authorities in Member States, investors in energy efficiency projects
Further information	http://www.eib.org http://www.eib.org/projects/priorities/climate-action/index.htm http://www.eib.org/infocentre/publications/all/promoting_energy_efficiency.htm?lang=en

Case 46	Germany KfW: Public Promotional Bank for Energy Efficient Construction and Refurbishment							
Relevant strategy Steps						Step 6	Step 7	Step 8
Context	Germany							
Status	On-going							
Main features	<p>This well established programme led by KfW, a State bank leveraging 'wholesale' finance through other institutions, is facilitating promotional 'soft' loans and grants to all investors in the German residential housing sector. Beneficial loan conditions and/or investment grants are provided at graduated levels in relation to the energy efficiency level reached as a result of building or refurbishment measures. The energy efficiency level must be confirmed by an energy efficiency expert.</p> <p>It is a good example of a product with wide reach and influence, involving numerous stakeholder groups, transparent and measurable energy efficiency (the "KfW Efficiency House" has become a market standard) as well as proven and measurable beneficial economic, fiscal, labour and environmental effects.</p> <p>It is also a good example for high leverage of limited public funds, and has a proven long term track record.</p> <p>Similar KfW promotional programmes support energy efficiency in commercial buildings and public buildings; the offer comprises soft loans and grants for investment as well as grants for energy efficiency advisory services.</p> <p>KfW started in 1996 with promotional programmes for energy efficiency in the housing sector, and these were continuously developed further. They have a proven and very positive impact on climate and economy:</p> <ul style="list-style-type: none"> Positive impact on the climate by reduction of CO₂ 							

	<ul style="list-style-type: none"> • High volume of investment triggered. • High number of jobs created or conserved. • High visibility, reaching a high number of households. • Benefits for social housing.
Stakeholders involved	Federal Ministry of Transport, Building and Urban Development, KfW (State owned promotional bank), financial sector/financial institutions (commercial banks/savings bank), energy efficiency experts, property owners/property investors
Further information	<p>http://www.kfw.de and http://www.esd-ca.eu/good-practices/good-practice-factsheets/financing covering the structure and impacts of the programme.</p> <ul style="list-style-type: none"> • Monitoring and impact of KfW promotional programmes 'Energy Efficient Construction' and 'Energy Efficient Refurbishment' on public households: Promotional year 2011 (written in German) https://www.kfw.de/Download-Center/Konzernthemen/Research/PDF-Dokumente-alle-Evaluationen/Monitoring-EBS-2011.pdf and https://www.kfw.de/Download-Center/Konzernthemen/Research/PDF-Dokumente-alle-Evaluationen/STE-Research-Report-Wirkungen-der-Förderprogramme-Energieeffizientes-Bauen-Sanieren-und-Infrastruktur-der-Kfw-auf-öffentliche-Haushalte-2011.pdf • Determining the growth impact of KfW promotional programmes on energy efficient construction and refurbishment (written in German) https://www.kfw.de/Download-Center/Konzernthemen/Research/PDF-Dokumente-alle-Evaluationen/Wachstumseffekte-EBS-Endbericht.pdf

Case 47	Use of European Regional Development Fund (ERDF) in Estonia (Kredex)							
Relevant strategy Steps						Step 6	Step 7	
Context	Estonia							
Status	On-going							
Main features	<p>Established in 2001 by the Ministry of Economic Affairs and Communications, KredEx is an Estonian revolving fund that supports financing of energy efficiency projects (among other services). It notably aims to support the upgrade and renovation of domestic housing, including promoting energy efficiency through grants, loans and loan guarantees. A range of offers aim to ensure that various social groups in need of help can benefit from this funding.</p> <p>KredEx offers three types of mechanism for funding energy efficiency:</p> <ul style="list-style-type: none"> • Housing Loan Guarantees for the purchase of new living premises or renovation of existing ones, to decrease the down-payment obligation for certain eligible applicants • An Apartment Building Renovation Loan, introduced in 2009, to provide long-term low-interest loans specifically for apartment renovations. • An Apartment Reconstruction Grant, suitable for apartment associations planning full-scale reconstruction. <p>To develop the Apartment Building Renovation Loan, KredEx has received loans from the Council of Europe Development Bank (CEB), guaranteed by the Estonian state, and also receives funding from the European Regional Development Fund (ERDF), and income from the sale of Assigned Amount Units (AAUs) under the Kyoto protocol.</p>							
Stakeholders involved	<p>Kredex Estonian state European Regional Development Fund (ERDF) Council of Europe Development Bank (CEB).</p>							
Further information	<p>http://www.wec-policies.enerdata.eu/Documents/cases-studies/Financing_energy_efficiency_buildings.pdf Also:</p> <ul style="list-style-type: none"> • Mirja Adler. "Estonian Experience in Financing Renovation of Apartment Buildings" presented at the Roundtable "Blockhouse renoveerimiskogemus Lithuania and Estonia", 3 April 2013, Vilnius. • Susan Davies and Ingrid Holmes. European Perspectives on the Challenges 							

	of Financing Low Carbon Investment: Estonia. E3G, 2011. www.e3g.org/images/uploads/E3G_European_Perspectives_on_the_Challenges_of_Financing_Low_Carbon_Investment_Estonia.pdf
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Case 48	UK: The Green Deal							
Relevant strategy Steps						Step 6	Step 7	Step 8
Context	UK							
Status	2013 full launch and ongoing							
Main features	<p>The Energy Act 2011 includes provisions for the Green Deal which has been established by the UK government to enable British households to undertake building refurbishment. It is an organised market framework that provides support to building owners and users along the building refurbishment decision process.</p> <p>Primarily, it is a financing mechanism for energy renovation of dwellings, enabled through on-bill financing and repayment mechanism for professionally installed energy efficiency measures. It may ultimately be extended to non-domestic buildings also. It includes clear rules on who to contract with, how to contract them, and what is contracted, with accreditation of market players, contract standards, and measurement and verification (M&V) methodologies.</p> <p>Protection is provided on the amount that consumers will pay back through a 'Golden Rule', certification of assessors, installers and products/equipment to provide consumer confidence and additional financial support accessible through the Energy Company Obligation white certificate scheme. A private sector led Green Deal Finance Company is being established to provide finance at scale to Green Deal Providers.</p>							
Stakeholders involved	UK Government, installers, householders, utilities, Energy Saving Trust, Green Deal Oversight and Registration Body run by GEMSERV, Green Deal Finance Company							
Further information	<p>UK Government webpages on Green Deal: https://www.gov.uk/green-deal-energy-saving-measures</p> <p>Green Deal assessor and installer registers and the Oversight and Registration Body: http://gdorb.decc.gov.uk</p> <p>Green Deal Finance Company: http://www.tgdfc.org/</p>							

Case 49	Energy renovation of Bulgarian homes							
Relevant strategy Steps						Step 6		
Context	Bulgaria							
Status	2012 - 2015							
Main features	<p>A three year project (2012-2015) overseen by Ministry of Regional Development and Public Works supports implementation of energy efficiency measures in multifamily residential buildings in 36 urban centres. The total grant is BGN 50 million (€25.5 M).</p> <p>Financial assistance will be granted to registered associations of condominium owners. For each approved residential building the owners will receive 50% of the renovation cost as grant. This supports costs for construction and installation; preparing technical and executive designs; compliance assessment; supervision costs; commissioning costs; and compliance costs. Owners of individual units, which are used for economic purposes, shall pay 100% of the costs according to the share they have in the common parts. The programme will cover fully the survey costs to establish the technical characteristics of the building, including preparing a technical passport.</p>							
Stakeholders involved	Government Ministry, EIB, condominium owners							
Further information	http://www.eib.org/epcc/ee/documents/sofia_03_10_2013_2_stoichkova_energy_renovatio_of_bulgarian_homes.pdf							

Case 50	Berlin: "Energy Savings Partnership"							
Relevant strategy Steps						Step 6	Step 7	
Context	Germany, Berlin							
Status	On-going (initiated in 1996)							
Main features	<p>The "Energy Savings Partnership" in Berlin has been one of the catalysts of the EPC market in Germany and helped structure the demand for Energy Performance Contracts in the public sector.</p> <p>Mandated in 1996 by the Land of Berlin, the Berlin Energy Agency (BEA) developed a viable contractual model, involving private funding, in order to ensure the energy upgrade of public buildings. The "energy savings partnership" programme consists in providing technical assistance to local public building owners and launching tenders for the signature of EPCs. BEA manages the entire project until the signature of EPC (project development costs being covered at 50% by the Land of Berlin).</p> <p>Buildings are most often gathered in pools ranging from 4 up to 400 buildings, depending on the construction type and on the level of expected energy savings. On average, a pool includes 20 buildings with energy costs of €1.8m per year, a sufficient potential to attract ESCOs. A contract typically lasts 8 to 12 years, with an average of guaranteed energy savings after refurbishment of about 26% of the energy consumption baseline, with energy savings of 35% for the most comprehensive interventions.</p> <p>The success of the Berlin experience is the result of a mix of conditions, but more importantly, the result of local political support. The large number of municipal projects has a strong demonstration and multiplier effect on other sectors, particularly the commercial sector. The existence of market facilitators such as the BEA has been reported as an essential element for the development of energy services markets and the principle was adopted in the new European Directive on Energy Efficiency in 2012. The success of BEA is such that it has raised the interest of the private sector, to the point that BEA is now facing competition on its core activity of supporting public clients in the EPC signature process.</p> <p>The replication of BEA's best practices in market facilitation is starting in several capital cities across the EU.</p>							
Stakeholders involved	<p>The energy saving partnership was developed by the Berliner Energieagentur and Berlin's Senate Department for Urban Development.</p> <p>Berliner Energieagentur GmbH shareholders are:</p> <ul style="list-style-type: none"> • The Federal city state of Berlin • GASAG Berliner Gaswerke Aktiengesellschaft, • Kreditanstalt für Wiederaufbau Bankengruppe (KfW), • Vattenfall Europe Wärme AG. 							
Further information	www.berliner-e-agentur.de http://www.european-energy-service-initiative.net/fileadmin/user_upload/bea/Best_Practice/EESI_D34_Berlin_en.pdf							

Case 51	France: Energies Posit'if							
Relevant strategy Steps						Step 6		Step 8
Context	France, Ile-de-France region							
Status	On-going (created in January 2013)							
Main features	<p>Energies POSIT'IF is a public-private company that aims to pave the way and help structure the supply of deep renovation in the residential and public buildings:</p> <ul style="list-style-type: none"> • In the residential sector, Energies POSIT'IF complements the initial support provided to condominiums by local energy agencies and provides technical coordination of work with an energy efficiency commitment and a financing 							

	<p>offer.</p> <ul style="list-style-type: none"> In public buildings, Energies POSIT'IF provides consultancy to support local authorities in the negotiation process for EPCs with private operators. <p>Energies POSIT'IF is designed to finance deep renovation projects with contracts between 15 and 30 years. Energies POSIT'IF mainly negotiates the contracts and develops the financial engineering, while all technical aspects are subcontracted.</p> <p>Energies POSIT'IF is initially capitalised with €5.3m for the period 2012-2014. In the longer term (2020) capital should increase to €15.5m. The initial business plan aims to invest €40m for the period 2013-2015. The internal rate of return in multifamily buildings is expected to range around 4 to 9% over a 15 to 20 years term.</p>
Stakeholders involved	Initiated by the Ile-de-France region (France) and several local authorities, with the support of Caisse des Dépôts et Consignations and Caisse d'Epargne.
Further information	http://eaci-projects.eu/iee/page/Page.jsp?op=project_detail&prid=2652

Case 52	BgEEF : Bulgarian Energy Efficiency Fund						
Relevant strategy Steps					Step 6	Step 7	Step 8
Context	Bulgaria						
Status	On-going (established in February 2004)						
Main features	<p>Established in 2004, the Bulgarian Energy Efficiency Fund (BgEEF) is a public-private for-profit entity. It has the combined competences of a credit institution, a credit guarantee company and a consulting firm. It provides technical assistance to Bulgarian companies, municipalities and individuals in the development of investment projects in energy efficiency and then accompanies their financing, their co-financing or acts as guarantor to other financial institutions.</p> <p>BgEEF offers three main financial products: direct loans to projects, partial credit guarantees and portfolio guarantees:</p> <ul style="list-style-type: none"> It works as a revolving loan fund, whereby reimbursements from the first loans may be re-engaged in new projects. Financing operations began in 2005 with a capacity to handle 20 to 25 projects per year, for an average size of €200,000; In addition, it provides loan guarantees for ESCOs carrying out EPCs, meaning it will pay for the first losses in case of non-payment by an ESCO; It also provides EPC portfolio guarantees for ESCOs, which reduces the risk of payment delays thus reducing the overall cost of financing. <p>The portfolio guarantees is one of the most interesting features. ESCOs normally rely heavily on debt to finance their activities, which requires cash flows from their projects to be precisely coordinated and budgeted. Delays or defaulting in payment from clients are likely to seriously disrupt the debt service of the ESCO itself. Statistically, customer shortfalls do not exceed 5% of commitments and are more likely to be delayed than not paid at all. BgEEF provides ESCOs with a guarantee for delays in client payments up to 5% of the total payments due.</p> <p>As this guarantee is not project-based but portfolio-based, it allows risk distribution between all different projects. It acts as shock absorber and thus cuts the cost of financing as ESCOs and banks may accept a lower Internal Rate of Return (IRR) due to the lower risk. Such a product also provides excellent leverage for the equity of BgEEF. For example, a guarantee of BGN500,000 facilitates an investment portfolio of BGN10M - a leverage ratio of 20.</p>						
Stakeholders involved	<p>The BgEEF fund manager is a consortium formed by Econoler -enEffect-Elana. The four primary sources of financing are:</p> <ul style="list-style-type: none"> The Global Environment Facility (GEF); The Government of Bulgaria; The Government of Austria; Private donors and contributors 						
Further information	http://www.bgeef.com/display.aspx						

Case 53	Bulgarian Energetics and Energy Savings Fund (FEEI or EESF)							
Relevant strategy Steps						Step 6		Step 8
Context	Bulgaria							
Status	On-going							
Main features	<p>The investment capacity of ESCOs is limited to certain debt ratios, even with the help of guarantee funds. That is why ESCOs need to refinance their debt, i.e. to sell the claims they have over the future receivables of their contracts (energy savings). This may be complicated in markets where banks are still not confident in ESCOs and energy efficiency investments.</p> <p>Thanks to loans from the EBRD (a €7m initial loan followed by a €10m loan in 2012), the Bulgarian Energetics and Energy Savings Fund buys from ESCOs the future receivables of Energy Performance Contracts (the energy savings), once energy savings are proven, thus releasing them from the burden of debt and enabling them to develop more projects.</p>							
Stakeholders involved	Enemona European Bank for Reconstruction and Development (EBRD)							
Further information	http://www.ebrd.com/pages/news/press/2012/120302.shtml http://enemona.bg/english/index.php?97							

Case 54	Canada: Federal Buildings Initiative (FBI)							
Relevant strategy Steps						Step 6		Step 8
Context	Canada							
Status	Established 1991. Ongoing							
Main features	<p>A successful programme for engaging ESCOs in the delivery of energy efficiency investments in public sector buildings. The Federal Buildings Initiative (FBI) facilitates energy efficiency retrofit projects in buildings owned and managed by the Government of Canada.</p> <p>It helps government bodies to enter into third-party energy performance contracts (EPCs) that allow major retrofits to be self-financing and with no upfront financing required. This low-risk, turnkey approach delivers guaranteed energy savings and reduced overall operating costs. The FBI offers a range of products and services to help with planning and implementing EPCs and also provides opportunities to share energy management best practices, including:</p> <ul style="list-style-type: none"> • preliminary audits and facilitation services, consultation on environmental assessments, project financing options, tendering and awarding of contracts, and project monitoring • access to a qualified bidders list of energy service companies • seminars, publications, case studies, design and analysis tools, and contracting support to facilitate the procurement process <p>It has also established a networking and knowledge sharing group on energy efficiency best practices that brings together property and environmental managers from federal buildings.</p> <p>Since 1991, the FBI has enabled retrofits in one-third of federal-owned floor area, attracting hundreds of millions of dollars in private sector investments with average savings of 15-20%.</p>							
Stakeholders involved	Natural Resources Canada (government agency)							
Further information	http://oeenrcan.gc.ca/sites/oeenrcan.gc.ca/files/pdf/Publications/commercial/pdf/FBI_eng.pdf							

Case 55	USA: Property Assessed Clean Energy (PACE)							
Relevant strategy Steps						Step 6	Step 7	
Context	USA							
Status	On-going							
Main features	<p>Initiated in 2005, PACE is a means of financing energy efficiency upgrades or renewable energy installations for either commercial or residential buildings through a property tax mechanism. 31 states covering 80% of the US population have PACE legislation in place.</p> <p>Under these programmes, municipal governments or finance companies offer a specific government bond to investors in renovation or retrofit of properties. Conversely, they loan the money to consumers and businesses to put towards an energy retrofit. It helps home and business owners to pay for the upfront costs, which the property owner pays back by increasing property taxes by a set rate over 15 to 20 years. This allows property owners to save on energy costs while they are paying for their investment, usually resulting in net gains.</p> <p>A notable feature of PACE is that the loan is attached to the property rather than an individual. In the case of homes, it enables the homeowner to "mortgage" the improvements and pay only for the benefits they derive while they own the home. The owner can subsequently sell the property leaving the debt to be paid through the property tax assessed on the subsequent owners.</p> <p>However, since 2010 the financial difficulties of the US federal housing agencies have impeded the development of residential PACE programmes. But the commercial PACE market is active and growing.</p>							
Stakeholders involved	US State authorities, municipal authorities, finance companies, building owners.							
Further information	<p>http://pacenow.org/</p> <ul style="list-style-type: none"> • Deason J, 2012, 'Picking up the PACEs: approaches for evaluation of the mortgage market impacts of Property Assessed Clean Energy programs', Proceedings of 2012 ACEEE summer study on energy efficiency in buildings • Farrell J, 2010, Municipal Energy Financing: Lessons Learned, New Rules Project Policy Brief • Goldberg M, Cliburn JK, Coughlin J, 2011, Economic Impacts from the Boulder County, Colorado, ClimateSmart Loan Program: Using Property-Assessed Clean Energy (PACE) Financing, NREL • Palm Desert, 2011, Energy Independence Program Report and Administrative Guidelines • Sonoma County, 2012, Property Assessed Clean Energy (PACE) Replication Guidance Package for Local Governments 							

Case 56	Italian Tax Credit Programme							
Relevant strategy Steps						Step 6	Step 7	
Context	Italy							
Status	2007 - 2013							
Main features	<p>The tax credit programme over the period 2007-2013 for energy upgrading of existing buildings represented a subsidy of up to 55% on costs. It supported 1.5 million interventions and had an important impact on the building renovation industry and on national steps in improving energy efficiency (as recognised in the last National Energy Efficiency Action Plan).</p> <p>The analysis of the first years of the programme was published by CRESME in 2013 in: "Analisi sull'impatto socio-economico delle detrazioni fiscali del 55% per</p>							

	<p>la riqualificazione energetica del patrimonio edilizio esistente”, Cresme –ENEA, 2010 (in Italian). This was a detailed study on cost benefit at macro level, covering cost effectiveness and socio-economic impact evaluation, particularly aimed at the impact on the tax system and on the overall economy.</p> <p>A regional analysis is reported in the GRACE final report, in English. The key energy saving results are reported in the Annual Energy report of ENEA, in English. The overall energy impact at end 2011 reached 7,637 GWh per annum.</p>
Stakeholders involved	SMEs associations, ENEA, professional associations.
Further information	<p>Mercato Della Riqualificazione E Stima Degli Effetti Degli Incentivi Fiscali, CNA-CRESME, 2013 (National impact, in Italian)</p> <p>Analisi sull’impatto socio-economico delle detrazioni fiscali del 55% per la riqualificazione energetica del patrimonio edilizio esistente, Cresme –ENEA, 2010</p> <p>ENEA: RAEE Annual Energy efficiency Report for Italy, (also in English), http://www.enea.it/it/produzione-scientifica/rapporto-energia-e-ambiente-1</p> <p>ENERCITEE: GRACE Final Report on Grants and Other Incentives for Cost and Energy Efficiency, Energy agency of Modena, (regional impact in English). This compares the impact of four different incentive programmes.</p> <p>http://www.efficientaenergetica.enea.it/doc/pubblicazioni/rapporto-55-2011-WEB.pdf and</p> <p>http://www.aess-modena.it/it/progetti/grace.html</p>

Case 57	Netherlands: The Green Funds Scheme							
Relevant strategy Steps						Step 6	Step 7	
Context	Netherlands							
Status	Established 1995. Ongoing							
Main features	<p>The Green Funds Scheme is a tax incentive scheme launched in 1995 by the Dutch government to encourage green initiatives. It comprises the Green Projects Scheme (which establishes the conditions governing the projects), the Green Institutions Scheme (which regulates the role played by the financial institutions) and a tax incentive for individual investors in the funds (which gets the flow of funds moving). Each project is subject to government certification before proceeding. The majority of Dutch banks have a ‘green fund’ or ‘green bank’ that meets the requirements of the scheme. It has been a very successful business model, with over 6000 green projects funded to date and over €7 billion invested. In essence, it is a low cost scheme with every euro of public funds leveraging a private investment of €40.</p> <p>Sustainable construction is just one of the eligible fields under the scheme, and accounts for around €600 million in funds invested. While building energy renovation has not yet been a major sector under the scheme, it would seem to offer considerable future potential towards mobilising activity in this sector.</p>							
Stakeholders involved	Led by Ministry, with a range of institutional stakeholders							
Further information	http://www.agentschapnl.nl/sites/default/files/bijlagen/SEN040%20DOW%20A4%20Greenfunds_tcm24-119449.pdf							

Case 58	Germany: Monitoring of the KfW promotional programmes for energy efficient construction and refurbishment							
Relevant strategy Steps						Step 6		Step 9
Context	Germany (written in German)							
Status	2011 and on-going							
Main features	The study evaluates the effects of the promotional programmes offered by KfW for energy efficient construction and refurbishment in terms of:							

	<ul style="list-style-type: none"> - nature and scope of the energy savings measures carried out in the fields of heat insulation and heat supply - energy saving (reduction in energy consumption in terms of natural gas, fuel oil, electricity, long distance heating, biomass) - saving of heating costs - employment effect <p>The evaluation is carried out every year. From 2006-2009, KfW's financing activities deployed €27 billion in loans and grants leading to a total investment of over €54 billion in energy efficient homes. This funding has enabled the energy renovation of one million homes, as well as the building of 400,000 new highly efficient homes.</p>
Stakeholders involved	
Further information	https://www.kfw.de/Download-Center/Konzernthemen/Research/PDF-Dokumente-alle-Evaluationen/Monitoring-EBS-2011.pdf

Case 59	Grants Evaluation: The GRACE project							
Relevant strategy Steps						Step 6		Step 9
Context	Germany, Italy, Poland							
Status								
Main features	<p>These final reports, delivered as part of an EU Interreg IVE project, provide detailed information on three sets of schemes operational in Italy, Poland and Germany. The study examined schemes of grants and other incentives for cost and energy efficiency, including tax rebates, building permit policies, white certificates and low interest rate loans for SMEs.</p> <p>The study covers micro and macro economic elements, such as overall stimulus to economy, impact on employment, energy cost savings, fiscal returns, and increase in rents for improved property. The total investment cost and government cost of each saved kWh or kg of avoided CO₂ emission are the most commonly used indicators. The same indicators are also calculated per budget year of the State, to take account of payments distributed over time as the tax credit.</p>							
Stakeholders involved	Regional authorities and energy agencies in the three participating countries.							
Further information	http://energitee.eu/Sub-Projects/GRACE---Grants-and-other-incentives-for-cost-and-energy-efficiency,53/							

Case 60	SEAI, Ireland: Economic analysis of residential and small-business energy efficiency improvements (from grants)							
Relevant strategy Steps						Step 6		Step 9
Context	Ireland							
Status	2011							
Main features	<p>These studies include a pre and post billing analysis of the energy savings from the national domestic energy grants scheme, highlighting the favourable cost/benefit to householders of the measures supported. The grants scheme supported wall and roof insulation, high-efficiency boilers and heating controls.</p> <p>The key findings highlight the strong financial benefits to society that investments in improved energy efficiency bring. It shows that energy performance improvements will save more than they cost over their lifetime – as indicated by a positive net present value (NPV). The investments are projected to be fully repaid through energy savings within around 8 years; after this, a net saving to the economy accrues every year for the lifetime of the measures installed.</p>							
Stakeholders involved	National energy agency, surveyed households and businesses							
Further information	http://www.seai.ie/Publications/Statistics_Publications/Energy_Forecasts_for_Ireland/Economic_Analysis_of_Residential_and_Small-							

	Business Energy Efficiency Improvements.pdf http://www.seai.ie/Publications/Energy_Modelling_Group/Energy_Modelling_Group_Publications/Better_Energy_Homes_Impact_Report_Billing_Analysis.pdf
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Case 61	IEA Building Energy Policies Database (BEEP)							
Relevant strategy Steps							Step 7	
Context	Global array of International Energy Agency (IEA) member countries							
Status	Live online portal. Modernising building energy codes work launched August 2013.							
Main features	<p>This online database provides a standardised profiling of building energy efficiency policies worldwide, and incentive schemes for efficiency improvements, including most EU countries. It facilitates high level inter-comparison of the use of policy instruments and finance mechanisms. It covers a wide range of regulatory, incentive and promotional policies.</p> <p>It also includes links to relevant IEA publications.</p>							
Stakeholders involved	IEA, World Business Council for Sustainable Development (WBCSD), United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP)							
Further information	http://www.sustainablebuildingscentre.org/pages/beep							

GENERAL CASE EXAMPLES and REFERENCES:

Case A	BPIE Data Hub								
Relevant strategy Steps	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9
Context	EU wide								
Status	On-going								
Main features	<p>The Data Hub is an extensive user-friendly online repository for statistics and policy information on Europe's building stock. It includes a data search engine that allows cross-country comparisons and customised country profiles. It includes a building stock inventory (floor area, ownership structure, etc.) and performance statistics (energy consumption by end-user, envelope performance, energy supply). Users can browse data by selecting a combination of countries, topics, building types and owner profiles. It covers 30 European countries with up to 18 climatic zones per country and 10 building types.</p> <p>To monitor, compare and search for more buildings data and policies, BPIE has integrated other sources (websites, databases and tools) that provide additional information on the European and global scene, access country profiles and building energy ratings.</p> <p>At present, it serves as a portal to several collaborative web resources:</p> <ul style="list-style-type: none"> • IEA Policies & Measures Databases (PAMS) - on clean energy policies across all sectors in IEA member countries. • IEA Buildings Energy Efficiency Policy Database (BEEP) • GBPN Policy Comparative Tool - interactive tool for comparing energy efficiency policies for buildings • Eurostat Database - official European statistics on energy supply and use, energy prices and indicators • TABULA web tool - European database on national building typologies (IEE funded project). • ENTRANZE Data Mapping Tool - online data tool on the buildings structure and related energy systems in EU-28 • Mure Database - European energy efficiency policies and measures. • Reegle Database - clean energy info portal providing country energy profiles including key statistics • Buildingrating.org - hub for building energy performance rating and disclosure practices worldwide <p>The resources on the website are open to continuous updating on data and functionality and BPIE invites other organisations to contribute their data.</p>								
Stakeholders involved	National authorities, researchers, policy analysts, industry								
Further information	http://www.buildingsdata.eu/								

Case B	BUILD UP: European web portal for energy efficiency in buildings								
Relevant strategy Steps	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9
Context	EU wide								
Status	On-going								
Main features	<p>BUILD UP is the EU web portal for energy efficiency in buildings. It hosts an extensive library of information on issues pertaining to improving the energy performance of buildings, in the form of profiling and analysis reports on countries and sectors, case studies, conferences, seminars, workshops and webinars. These include a number of topics pertinent to renovation strategies, such as tackling technical, economic and financing challenges.</p>								
Stakeholders involved	National authorities, researchers, policy analysts, industry								
Further information	http://www.buildup.eu								

Case C	European Council for an Energy Efficient Economy (eceee)								
Relevant strategy Steps	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9
Context	EU wide and international								
Status	On-going								
Main features	<p>eceee, the European Council for an Energy Efficient Economy, is a membership-based non-profit association which engages in policy analysis and lobbying in relation to energy efficiency.</p> <p>It has organised Summer Studies for several years, which have a record of generating peer reviewed quality evidence and hands on experience in relation to energy efficiency policies and practices globally. It also transmits a wide range of relevant information through its workshops, seminars, reports and briefings on a range of energy efficiency topics. In its outputs over recent years considerable attention has been given to various elements of the challenge of energy renovation of buildings.</p>								
Stakeholders involved	National authorities, researchers, policy analysts, industry								
Further information	http://www.eceee.org/library/conference_proceedings/eceee_Summer_Studies								

Case D	EU Intelligent Energy for Europe programme: delivered projects								
Relevant strategy Steps	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9
Context	EU wide								
Status	On-going								
Main features	<p>Since 2004, the Intelligent Energy Europe programme of the European Commission has co-financed a wide array of collaborative projects across the EU to develop resources and tools to assist institutional and market actors in overcoming barriers to the deployment of energy efficient technologies and practices. This includes projects aimed at identifying and creating solutions to particular challenges in building energy refurbishment, in topic fields such as skills development, financial instruments and Energy Performance Contracting (EPC).</p> <p>This programme has also been the platform for the Concerted Action projects relating to the three directives EPBD, EED and RES, supporting the development of a knowledge base to assist the delivery by national authorities of actions to meet the requirements of the Directives.</p>								
Stakeholders involved	National authorities, researchers, policy analysts, industry								
Further information	http://ec.europa.eu/energy/intelligent/ and detailed information in its project database. For example: http://ec.europa.eu/energy/intelligent/in-action/energy-performance-contracting/index_en.htm .								

Case E	IEA Implementing Agreements: Energy in Buildings and Communities (EBC)								
Relevant strategy Steps			Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	
Context	EU wide and OECD wide								
Status	On-going								
Main features	<p>IEA 'Implementing Agreements' are multi-annual research collaboration initiatives between participating countries, generally involving several EU and non-EU member states, the results of which are publicly available on-line or through purchased publications. They are structured into 'annexes' and 'tasks' focussed on developing solutions to particular techno-economic challenges.</p> <p>The EBC Programme carries out research and development activities toward</p>								

	<p>near-zero energy and CO₂ emissions in the built environment. These projects are particularly directed at supporting technology application in practice. Results are also used in formulating energy efficiency policies and standards. Of relevance to building energy renovation, completed projects include:</p> <ul style="list-style-type: none"> • No 33 Advanced Local Energy Planning • No 36 Retrofitting in Educational Buildings - Energy Concept Adviser for Technical Retrofit Measures • No 50 Prefabricated Systems for Low Energy Renovation of Residential Buildings • No 51 Energy Efficient Communities <p>Ongoing projects include:</p> <ul style="list-style-type: none"> • No 55 Reliability of Energy Efficient Building Retrofitting - Probability Assessment of Performance and Cost • No 56 Cost-Effective Energy and CO₂ Emission Optimisation in Building Renovation • No 61 Business and Technical Concepts for Deep Energy Retrofit of Public Buildings • No 63 Implementation of Energy Strategies in Communities.
Stakeholders involved	National authorities, researchers, policy analysts, industry
Further information	http://www.iea-ebc.org NOTE: Access may be restricted to countries which are registered participants in the EBC.

Cases F, G, H	Concerted Action projects: EU Energy Efficiency Directive (EED), Energy Performance of Buildings Directive (EPBD) and Renewable Energy Sources Directive (RES Directive)							
Relevant strategy Steps			Step 3	Step 4	Step 5	Step 6	Step 7	Step 8
Context	EU wide							
Status	On-going							
Main features	<p>Concerted Actions are joint initiatives of the EU Member States and the European Commission. They involve representatives of national ministries or their affiliated institutions charged with preparing the technical, legal and administrative framework for the relevant Directive in each country. A key aim is to enhance the sharing of information and experiences from national adoption and implementation of the various requirements of the Directives.</p> <p>These initiatives are organised around meetings between national teams, regularly bringing together over 120 participants from 29 countries. It is accompanied by other measures to enhance communication, including a web platform and national update reports.</p> <p>Among the topics that have been examined and documented in the course of this work across the three Directives have been the development of the energy services market, experiences with regulatory and financial instruments, enforcement of regulations, and skills development and training issues.</p> <p>The Concerted Actions are funded under the EU Intelligent Energy-Europe Programme.</p>							
Stakeholders involved	National authorities, EU Commission							
Further information	http://www.esd-ca.eu http://www.epbd-ca.eu http://www.ca-res.eu NOTE: Each project has a further website containing proceedings of individual meetings and working groups. However, this is restricted to nominees from EU Member State authorities.							

Annex 2: Menu of detailed questions

Joint Working Group of CA EED, CA EPBD and CA RES

Assistance Documents for EU Member States in developing long term strategies for mobilising investment in building energy renovation

(per EU Energy Efficiency Directive Article 4)

ANNEX 2 – MENU OF DETAILED QUESTIONS

This is part of a set of documents developed by a Joint Working Group drawn from three EU 'Concerted Action' projects (EPBD, EED and RES) under the Intelligent Energy for Europe programme. It has been prepared as a resource to encourage and assist Member State authorities. However, it has a voluntary status and any views expressed herein are not to be attributed to the EU Commission or to any national or EU institutional party.

This Annex does not claim to identify all questions that may need to be addressed in developing a strategy, but aims to provide a useful reference point for those Member State authorities that choose to use it.

It contains active hyperlinks.

It will greatly assist navigation through this document in PDF if you include 'Previous View' and 'Next View' buttons in your toolbar. Depending on the version of Adobe Acrobat, you can do this by a menu sequence of 'View > Show/Hide > Toolbar Items > Page Navigation' and tick the 'Previous View' and 'Next View' options.

November 2013

1 Step 1: Vision and Time Horizon

Possible questions to consider in setting a vision and time horizon for the long term strategy, and associated targets and milestones.

1.1 Summary Questions

The following is a list of possible questions to be considered:

- [What is the purpose of the vision?](#)
- [What could be included in the vision?](#)
- [Who should lead the visioning process?](#)
- [What should inform the process?](#)
- [What are the boundaries of the vision?](#)
- [How long is a 'long term' strategy?](#)
- [What structuring, phasing and milestones are appropriate?](#)

1.2 Expanded Questions

1.2.1 What is the purpose of the vision?

The following criteria are suggested for consideration:

- 1.2.1.1 To provide level of ambition that is sufficiently challenging, in terms of the breadth and depth of investment and accompanying actions to be mobilised, while being accepted as realisable in practice by a wide cross-section of stakeholders.
- 1.2.1.2 To help to persuade and enthuse a wide range of stakeholders on the value of the strategy, and to secure their commitment to action in delivering the strategy.

1.2.2 What could be included in the vision?

The following elements are suggested for consideration:

- 1.2.2.1 The timescale of the strategy and accompanying target reduction in energy demand of the building stock.
- 1.2.2.2 A summary vision statement conveying the outcome of a radically transformed energy performance of building stock, expressed as a target improvement, and highlighting the national quality of life benefits from both the improved asset and the enterprise and innovation activity generated.
- 1.2.2.3 A detailed vision statement, which in turn may include:
 - A quantitative end state performance target for renovation of the entire building stock of residential, commercial and public buildings (and possibly particular categories of industrial premises)
 - Differentiated end state performance targets across different sectors
 - A phasing of intermediate stages and targets
 - Articulation of the societal, economic and environmental benefits resulting from the strategy.
- 1.2.2.4 A possible accompanying mission statement, summarising the accelerated mobilisation of resources and skills that will deliver on the vision, including investment costs.
- 1.2.2.5 A possible summary representation of the path/s that must be taken to reach the chosen target/s.

1.2.3 Who should lead the visioning process?

The following elements are suggested for consideration:

- 1.2.3.1 Consider the importance of visible government leadership in gaining and securing broad political, societal and building industry consensus for a strategy as long term and far reaching as is required here.
- 1.2.3.2 Consider that, while a Ministry or Ministries has the policy responsibility, the assignment of task of leading the visioning element of the strategy process may either be directly led from the Ministry, or assigned to a government agency, or assigned to a person or persons of high standing in the building, energy or finance stakeholder community. In either case, a core team drawn from such sources will be necessary to drive and support the process.
- 1.2.3.3 Given the unprecedented nature and ambition of the strategy, it may be appropriate for the consultation and development process to be led by policy specialists from the non-energy field.
- 1.2.3.4 Consider the possible distinctions and linkages between the public leadership process, the task of organising stakeholder engagement, the task preparing the script and the task of providing detailed analytical support to inform the vision.

1.2.4 What should inform the process?

The following elements are suggested as possible contributors of evidence and influence on the strategy:

- 1.2.4.1 A balance of 'top down' ambition and 'bottom up' analysis to generate and test a range of relevant scenarios or pathways to the widest and deepest level of building energy renovation that is found to be feasible in each case.
 - The top down ambition will be influenced by NEEAP targets and longer term national, EU and IEA perspectives and other studies.
 - The bottom up analysis will be informed by the work delivered in Steps 3 to 9 below.
- 1.2.4.2 The solicited views of the full range of stakeholders, per Step 2, which could be actively sought from the very beginning of the planning process.

1.2.5 What are the boundaries of the vision?

The following elements are suggested for consideration:

- 1.2.5.1 In the context of the target set in the vision, consider whether to include only thermal energy use or all energy use in buildings.
 - Non thermal energy use is significant in primary energy terms in all buildings, and is the majority of energy use in many non-residential buildings.
 - An energy systems approach is increasingly relevant, in the context of new developments in the electricity system, including macro and micro generation by renewable energies and smart grid policies likely to impact over the period of the strategy.
- 1.2.5.2 Consider that while a declared focus may be on meeting energy policy targets, the resource needs and beneficial impacts of the strategy extend well beyond traditional building industry and energy arenas– into environment policy, social policy, enterprise policy, finance policy and health and education policy areas.
- 1.2.5.3 Consider the additional interfaces with other policy aspects and aims including energy security, employment, reducing fuel poverty, with investment in building renovation being an instrument for meeting multiple goals.
- 1.2.5.4 In the context of cost-benefit analysis (Step 5), consider how helpful it is to the strategy and vision to highlight the wide range of economic and societal co-benefits that derive from extensive building energy renovation activity, and also the other non-energy benefits which may sensibly orient the choices of citizens towards energy renovation of their buildings (reducing noise, better comfort, aesthetic values, more advanced and convenient technology, etc.).

1.2.5.5 In particular, consider highlighting the significant contribution the strategy can make towards meeting current and future climate change policy goals to which EU Member States are committed.

1.2.6 How long is a 'long term' strategy?

The following elements are suggested for consideration in setting the time horizon for the strategy:

1.2.6.1 The interpretation of 'long-term' may be influenced by experience with other transformative national strategies and by political climate.

1.2.6.2 In setting the timeframe, a number of balancing considerations will apply:

- Setting a long-term perspective is often seen as important in order to provide the necessary policy stability to create and sustain investment commitment and market momentum. (This highlights the importance of maximising political consensus in the creation, delivery and updating of the strategy.)
- Conversely, it might be considered that a planning timeframe of 2050 is too distant, having regard to possible shifts in political climate and technological advances over such a timescale. However, this may be managed by suitable phasing of the strategy, strong early implementation and progress reviews, as indicated below.

1.2.6.3 A possible option to consider is year 2050:

- This would align with a number of emerging policy discussion documents and roadmapping perspectives.
- The EU 'Roadmap for moving to a competitive low carbon Economy in 2050' proposes a target to reduce energy demand of the EU building stock by 80% relative to 1990 levels. This offers a possible reference against which a Member State's ambitions can be set, and approximates to a tripling of building energy renovation volume (plus greatly increased depth) over present rates.
- It would offer a strong evolutionary vision whereby a relatively short term target is set to year 2020, but is seen as a checkpoint on the path to a longer term target.

1.2.6.4 Year 2030 would probably be the shortest feasible timescale for delivery of such a transformative strategy. In such a case, the 80% target would require a sixfold increase in building energy renovation volume (plus greatly increased depth) over present rates. Year 2040 would correspond to a fourfold increase in volume (plus greatly increased depth).

1.2.7 What structuring, phasing and milestones are appropriate?

The following elements are suggested for consideration:

1.2.7.1 Several considerations and options can apply in the approach to phasing of the strategy:

- Differential approaches and timescales will be appropriate for different sectors. Consider segmenting the strategy into a series of individual action plans to address the particular needs of the different market sectors or segments.
- Prioritising actions that give early 'victories', helping to build confidence and allowing time to build the infrastructure and systems that will enable delivery of the more challenging elements.
- This will be influenced by the existing state of readiness of the key actors to deliver, particularly in respect of finance.
- With the goal of extensive 'deep' renovation, would prior 'shallow' renovation make subsequent 'deep' renovation more difficult? A sequence of periodical shallow renovation steps may be the most likely and effective approach for achieving better energy performance, in line with the financial capacity of building owners and investors?

1.2.7.2 Within the long term time horizon of the strategy, short term and intermediate targets can act as key review milestones to help build the necessary sense of urgency and momentum.

1.2.7.3 Irrespective of the overall timeframe for the strategy, year 2020 is an important milestone under the Directive. Similarly, the strategy is required to be reviewed and updated every three years, with the first such review being required in 2017. While allowing adjustments to the detail of the strategy, the overarching vision and ambition should be sufficiently resilient to remain consistent.

2 Step 2: Stakeholder Engagement

Possible questions to consider in gaining and securing stakeholder engagement and commitment.

Particularly relevant to addressing clause (d) of EED Article 4.

2.1 Summary Questions

The following is a list of possible questions to be considered:

- [Who should be included?](#)
- [On what issues might they be engaged?](#)
- [When and how should they be engaged?](#)

2.2 Expanded Questions

Different Member States and different authorities will have different traditional approaches to stakeholder consultation and participation in relation to proposed public policies and initiatives in the built environment, in education and training, in finance measures etc. However, in the present context some common principles may be helpful.

2.2.1 Who should be included?

The following are suggested for consideration:

- 2.2.1.1 Any group of interests or responsibilities which might be expected to play a role in achieving the aims of the strategy can be considered a stakeholder. All need to be aware of the elements of the strategy, agree that the vision is realistic, contribute to tackling barriers and be committed to fulfilling its objectives.
- 2.2.1.2 Given the unprecedented nature and ambition of the strategy being developed, it is likely to be necessary to recruit the active participation of stakeholders well beyond the traditional community of energy and construction. Indeed it may be appropriate for the consultation and development process to be led policy specialists from the non-energy field (as per point 1.2.3.3 above).
- 2.2.1.3 The relevant categories of stakeholder participating in the strategy development network can include:
- The policy community – politicians, Ministries, analysts, think tanks, government agencies
 - Building owner groups – including property managers, public authorities, social housing companies
 - Consumer groups, social economy
 - Building industry –manufacturers and suppliers, builders, maintenance contractors, facilities managers
 - Building professions and trades
 - Financial community – banks, financial societies, insurers, fund managers, public authorities
 - Educational bodies
 - Energy utilities, energy services companies

2.2.2 On what issues might they be engaged?

Examples of issues requiring a range of information, insights and perspectives from stakeholders include:

- 2.2.2.1 Information: Data sourcing, quantifying and selling the benefits of scaling up investment in building energy renovation to their customers or relevant parties in the 'decision chain'
- 2.2.2.2 Insights: Approaches to assessing and tackling the barriers and constraints
- 2.2.2.3 Analysis: Micro level quantification of investment costs

2.2.2.4 Perspectives: Understanding the attitudes and motivations of different players with a view to mobilisation.

2.2.3 When and how should they be engaged?

This will depend on traditions and existing relationships, but the following should be considered:

2.2.3.1 The process can be an open and inclusive one, given the broad societal benefits being pursued through the strategy.

2.2.3.2 The earliest possible engagement can help to build the desired spirit of trust and partnership.

2.2.3.3 Task forces or working groups with key stakeholders to assist with developing elements of the strategy, on a sectoral/ subsectoral and thematic basis, should be considered.

2.2.3.4 Plenary and segmented information and consultation workshops, which can be composite, sectoral or regional, are likely to be useful.

2.2.3.5 These can be complemented by extensive on-line information and invitation of inputs. This efficient mode of communication may be particularly important in view of the tight timeframe for development of the strategy. When deciding the communication modes, consider that the participatory tools can be specialised, for example for developing new ideas (consultative tools), or for taking decisions (deliberative and quasi-deliberative tools), or to develop detailed documents and proposals (elaborative tools).

3 Step 3: Market Characterisation

Possible questions to consider in segmenting, profiling and seeking to understand the marketplace of existing buildings, their owners/ occupiers/ investors, in order to identify the potential for energy performance improvement.

Particularly relevant to addressing clauses (a), (b) and (e) of EED Article 4.

3.1 Summary Questions

The following is a list of possible questions to be considered:

- Status: Do you have a national building stock model that covers all sectors?
- Potential: What information can this yield on the technical potential of energy renovation?
- What information can this yield on the required number and pace of energy renovations?
- For each sector, do you have research information that profiles the energy attitudes and capacity of building owners and investors?
- For each sector or subsector, can this data be used to estimate cost-effective potential and the financing needs?
- From either statistical sources or from stakeholders, what is the existing level of building energy renovation?

3.2 Expanded Questions

3.2.1 Status: Do you have a national building stock model that covers all sectors?

Responses to the following sets of questions can greatly inform the analyses required in the steps to follow, particularly the techno-economic evaluation in Step 5.

3.2.1.1 Do you have a sectorally segmented knowledge base ?

- Housing -single units, multiple units, apartment blocks
- Commercial - offices, retail, hotels, restaurants/pubs, sport and leisure, warehouses
- Public – schools, colleges, public administration, healthcare, sport/ leisure/ culture, military
- Industrial – where the main energy demand is for maintenance of the environment within the building (rather than a production process).

3.2.1.2 Typically, housing accounts for around 70% of building stock floor area and around 60% of building sector energy usage.

3.2.1.3 For each sector, do you have a building stock model – or research information - that profiles some or all of the following?

- Size
- Density/ clustering: urban, suburban, rural
- Usage patterns
- Age, associated standards & associated energy performance (EPC) profiles:
 - Building elements – roofs, walls, floors, windows
 - HVAC systems
 - Lighting systems
 - Other energy systems
- Energy sources
- Energy prices
- Tenure: Owner occupancy versus social rental (public authority, housing association, cooperative) versus private rental
- For owner occupants: level of indebtedness on the asset

- For landlords and tenants: terms and responsibilities of rental agreements concerning energy investments
- Heritage buildings
- Additional for housing: poverty factor

3.2.1.4 For each sector, do you have a relevant statistical sample of the building stock energy features?

- From the database of Energy Performance Certificates under the EPBD?
- From another source?
- Showing the distribution profile of energy performance ratings?
- Showing associated characteristics of building envelope and technical energy systems?

3.2.1.5 For each sector, do you have a multidimensional model of the building stock to allow scenario exploration exercises to be conducted?

3.2.2 Potential: What information can this yield on the technical potential of energy renovation?

3.2.2.1 For each sector or subsector, can you modify the above baseline status data on the basis of current best practice energy technology applications in order to assess the theoretical technical potential?

3.2.2.2 Can this analysis yield any preliminary insights (before techno-economic appraisal) into:

- Which sectors or subsectors should be highest priority for improving in the long term, and in the short term?
- The possible scheduling of energy renovations as single packages or staged over time?
- Which categories of technical improvement can yield the most energy savings?

3.2.2.3 Can a Pareto type analysis be applied for targeting/ concentrating upon the highest potential areas of opportunity? – such as identifying that 80% (or more) of the potential savings may come from 20% (or less) of the market of building owners?

3.2.3 What information can this yield on the required number and pace of energy renovations?

3.2.3.1 Across all sectors, and within individual sectors, what level of energy renovation is needed to meet NEEAP targets for 2020?

3.2.3.2 Across all sectors, and within individual sectors, what level of energy renovation is needed to meet scenario targets for 2030, 2040, 2050?

3.2.4 For each sector, do you have research information that profiles the energy attitudes and capacity of building owners and investors?

- Economic capacity of the building owners to invest
- Attitudes, motivations and declared needs of building owners and investors:
 - Towards energy in their homes
 - Towards financial savings and investments
 - Towards energy in their business or organisation
- Correlation of building owner and investor capacity and attitudes to building energy performance
- Energy as a proportion of running costs or profits
- Sales and rental turnover rates
- Renovation turnover rates (including non energy specific)
- The best trigger/ opportunity points for energy renovation.

This can help to inform the design of financial measures and packages (Steps 6 and 8) to meet the needs and desires of building owners.

3.2.5 For each sector or subsector, can this data be used to estimate cost-effective potential and the financing needs?

This is the task of Steps 5 and 6.

3.2.6 From either statistical sources or from stakeholders, what is the existing level of building energy renovation?

3.2.6.1 By the following:

- Sector and sub-sector
- Volume
- Depth
- Most frequent types of technical measure
- Level of investment cost

3.2.6.2 Some estimates suggest that as little as 20% of building renovation at present is combined with significant energy efficiency measures.

4 Step 4: Key barriers and challenges to mobilising investment in building energy renovation

Possible questions to consider in assessing and overcoming key challenges and barriers to mobilisation of this sector.

4.1 Summary Questions

The following is a list of possible questions to be considered:

- [Have you identified actual and possible barriers to the upscaling of building energy renovation in your country?](#)
- [How do you resolve the dichotomy between societal and private investment perspectives?](#)
- [What are your particular challenges with older buildings?](#)
- [Do you have a national code of practice for building energy renovation?](#)
- [Do you have a national skills plan for building energy renovation?](#)
- [Is there a suitable support system for developing new products/services for building retrofit?](#)
- [Do you have a monitoring and verification system or guidelines for energy efficiency programmes?](#)
- [Is there a forum to co-ordinate the different ministries involved in building retrofit?](#)

4.2 Expanded Questions

4.2.1 Have you identified actual and possible barriers to the upscaling of building energy renovation in your country?

The following is a menu of possible barriers to be considered, all of which can diminish the confidence of decision makers in investing in building energy renovation, and particularly deep renovation:

4.2.1.1 What information and marketing barriers have you identified?

- Project complexity for decision makers
- Information, awareness of benefits, motive
- Competing priorities
- Customer unfamiliarity with innovative solutions
- Visibility of energy services offer for decision makers
- Energy services business models in diffuse markets – packaging of the offer and its delivery
- Market organisation – attention, disruption, fragmentation
- Market interest for ambitious retrofits
- Level of confidence in consumer protection – certification, warranties, performance guarantees

4.2.1.2 What technical barriers have you identified?

- Shallow vs deep – technical limits of what is practical – how high to aim? Level A ratings may often not be feasible. Compromises will often be unavoidable
- Technical constraints in building envelope and building services – e.g. architectural, accessibility, group heating infrastructure....
- Industry unfamiliarity with innovative solutions
- Technical risks – e.g. ventilation, moisture...
- Consequential maintenance requirements and service support
- Energy and construction product standards and certification: energy performance, wider fitness for purpose (structural, fire, moisture etc.)
- “Problem” technologies: lack of awareness, information, technical support, reliability

4.2.1.3 What supplier/service skill and motivational barriers have you identified?

- Motivation:
 - Time, effort, unfamiliarity
 - Lack of confidence of gaining a visible competitive advantage
- Lack of technical familiarity, competence and quality
- Adaptation from established practices to new demands
- Professionals – architects, engineers, surveyors, facilities managers, estate agents
- Building tradespersons:
 - Core skills – design, installation, maintenance
 - Coordination
- Are there codes of conduct?
- Support services – energy auditors/ assessors, air leakage control,
- Registration systems
- Maintenance support

4.2.1.4 What economic barriers have you identified?

- Macro: adequacy of energy price signals
- Competing investment options and priorities: Energy not a significant or visible enough running cost
- Purchase and lease turnover rates and relationship of energy performance to asset value
- Time horizons – housing, commercial, public sectors
- Public finances and national debt, accounting rules
- Dichotomies in cost effectiveness perspectives and expectations:
 - Investor vs society
 - Landlord vs tenant
- Long nominal payback periods (for example on building envelope improvement)
- Split incentive issue: Landlord vs. tenant
- Multiple stakeholders involved
- Shallow renovation pre-empting or constraining deep renovation (a technical barrier also)

4.2.1.5 What financial barriers have you identified?

- Financial capacity of building owners – lack of confidence and cash, unwillingness to borrow, difficult state of the general economy
- Access to finance – loan policies of financial institutions limiting building owners' capacity to borrow
- Limited knowledge and in-house skills of financial institutions on energy efficiency
- Scaling and aggregation of a fragmented building ownership base
- Lower business attractiveness of deeper investments for private ESCOs
- Diversity of energy efficiency projects - lack of standardisation, administrative complexity
- Loan policies coupled to circumstances of person/ business rather than of the building
- Assurance of verified energy savings

4.2.1.6 What institutional, administrative and organisational barriers have you identified?

- Coordination
- Policy discontinuity and uncertainty
- Delivery infrastructure
- Regulatory:
 - Product standards and certification
 - Skills accreditation for deep energy renovation
 - Legal and grid code for electricity microgeneration

4.2.2 How do you resolve the dichotomy between societal and private investment perspectives?

- #### 4.2.2.1
- A critical challenge to be addressed arises from the often very different investment perspectives taken by public policy makers and by investors (even sometimes public sector investors). Policy makers can apply a long term societal or 'public good' perspective, assessing investments on the basis of life

cycle analysis and more holistic considerations. In contrast, private investors – who will be the predominant decision makers regarding building stock renovation – often take a short term, narrower stakeholder and ‘payback’ or simple ‘return on investment’ criterion to investments. Without intervention, this dichotomy is a significant barrier to the adoption of ‘deeper’ renovations at the scale and pace necessary to deliver a successful strategy.

4.2.2.2 Bridging the gap between these two perspectives is a significant challenge and suggest a need for some form of policy intervention.

4.2.3 What are your particular challenges with older buildings?

4.2.3.1 Constraints – risks of disruption and damage

- Issues with heritage or historic buildings
- Windows, doors, walls, roofs
- Ventilation
- Materials and finishes, controlling moisture risk
- Lighting requirements?

4.2.4 Do you have a national code of practice for building renovation?

Covering:

- Compliance with good technical practice?:
 - Building envelope renovation
 - Building technical services renovation
- Compliance with good conduct in marketing and business practice?

4.2.5 Do you have a national skills plan for building renovation?

4.2.5.1 Relevant parties:

- For construction professionals?
- For technicians and tradespersons
- For product and service suppliers
- For financial community familiarisation?

4.2.5.2 What are your national plans arising from the BUILD UP Skills initiative?

4.2.6 Is there a suitable support system for developing new products/services for building retrofit?

- To achieve better technical quality and performance?
- To achieve cost savings in product or installation?
- To improve service quality?

4.2.7 Do you have a monitoring and verification system or guidelines for energy efficiency programmes?

- Appropriate to the sector or sub-sector
- With minimal administrative burden?
- Suitable for giving confidence to investors and financial institutions?
- Possibly with international recognition?

4.2.8 Is there a forum to co-ordinate the different ministries involved in building retrofit?

- Such a co-ordinating forum would engage a number of Ministries, with the detail depending on the individual structures in different Member States
- Such a forum may emerge as part of the process of Step 2.

5 Step 5: Technical and economic appraisal

Possible questions to consider in assessing the technical, economic and other costs and-benefits of building energy renovation, from individual investor, national exchequer and societal perspectives. This includes tackling of risks, constraints and conflicts.

Particularly relevant to addressing clauses (b), (c), (d) and (e) of EED Article 4.

5.1 Summary Questions

The following is a list of possible questions to be considered:

- [Based on the building stock model \(Step 3\), have you assessed the limits of technical feasibility for each market segment?](#)
- [How do you approach and define cost-effectiveness with a 'forward looking' perspective?](#)
- [How well does cost-effectiveness correlate with the depth of energy renovation?](#)
- [How useful is the 'Cost Optimal' assessment methodology?](#)
- [From the assessment for each market segment, is it possible to produce a prioritised list \(or 'league table'\) of individual energy efficiency investments based on cost-effectiveness?](#)
- [Is it possible to produce a league table of 'bundled' energy renovation investments based on composite cost-effectiveness?](#)
- [How to reconcile and connect the public policy and individual investor perspectives, and bridge the gap?](#)
- [How might building energy renovations be 'staged' or phased?](#)
- [How does cost-effectiveness of a measure correlate with the merit or demand of an incentive scheme?](#)

5.2 Expanded Questions

5.2.1 Based on the building stock model (Step 3), have you assessed the limits of technical feasibility for each market segment?

5.2.1.1 For each sector and each initial building typology (including by climatic zone) within each sector:

- Individual and collective thermal improvements to the building envelope
- Individual and collective improvements to the HVAC systems
- Individual and collective improvements to the lighting and electrical systems
- Embedding of renewable energy sources.

5.2.1.2 For each of the above:

- What are the technical or practical constraints on deep renovation?
- In such cases, are any innovative solutions possible?
- What is the scope for a staged approach to energy renovation?
- What is the scope for opportunistic approaches to integrate with other renovation or retrofit actions?
- What is the range of uncertainty in relation to actual energy performance improvement?
- How sensitive are the predicted savings to user behaviour and how relevant is this?

5.2.1.3 What are the immediate priorities and what segments or issues will take longer to resolve?

5.2.2 How do you approach and define cost-effectiveness with a 'forward looking' perspective?

Underpinning the strategy, there is a need for a consistent and appropriate methodology for assessing cost effectiveness. Differing perspectives and key assumptions strongly determine the outcome of the assessment:

5.2.2.1 What frame of reference for individual investors or projects that is forward looking?

- Boundary: Organisational or household cost-benefit?
 - Private sector investors
 - Public sector investors (in the context of needing to show leadership under the EU Energy Efficiency Directive)
- What time horizon on projects?
 - Life of building?
 - Life of equipment?
 - Other? (e.g. based on company policy)
- Scope of benefits:
 - What energy benefits? – and with what confidence?
 - What non-energy co-benefits? – e.g. comfort, health, productivity, asset value, marketing, corporate social responsibility
 - Total benefits?
- Scope of capital costs:
 - Energy: Ranges of marginal costs attributable to the energy dimension?
 - Total costs arising from the renovation project?
- What energy prices and CO₂ valuation?
 - Current?
 - Projected over the life of the investment?
- What cost of capital/ interest rate?
- What parameter and criterion of investment return?
 - Payback, internal rate of return, NPV, other?
 - Attitudes to 10, 20, 30 year energy paybacks?
 - Attitudes of financiers to 10, 20, 30 year energy paybacks?

5.2.2.2 In the above, what differing perspectives apply to the differing market segments?

- Housing:
 - Owner occupied homes
 - Rented homes
 - Private landlords
 - Social landlords
 - Rental periods and conditions
 - Economic circumstances of household
 - Social/ demographic circumstances – age groups, disability etc.
 - Vulnerability to energy poverty?
- Commercial:
 - Owner occupied
 - Rented – rental periods and conditions
 - Business conditions
 - Corporate accounting and financing policies
- Public sector:
 - Owned
 - Rented – rental periods and conditions
 - Corporate accounting policies and public finances

5.2.2.3 What frame of reference for public policy that is 'forward looking'?

- Boundary: Societal cost-benefit? – inclusive, holistic
- What time horizon on the assessment?
 - In the context of deep retrofit, the residual life of the building
 - Life cycle analysis
- Scope of benefits:
 - What energy benefits?
 - What non-energy co-benefits? – e.g. improving health, energy affordability, jobs, enterprise, GDP, energy security, competitiveness
 - Total benefits from the renovation strategy
- Scope of investment costs:
 - Energy: Ranges of marginal costs attributable to the energy dimension?
 - Total costs arising from the renovation strategy
- What energy prices and CO₂ valuation?
 - Current?
 - Projected over the residual life of the building?

- What discount rate? – having regard to the state of national finances
- What parameter and criterion of investment return?
 - Payback, internal rate of return, NPV?
 - What cost of capital/ interest rate?

5.2.3 How well does cost-effectiveness correlate with the depth of energy renovation?

- Does it correlate positively or negatively?
- In relation to particular building envelope measures?
- In relation to HVAC measures?
- In relation to lighting or other electrical measures?

5.2.4 How useful is the 'Cost Optimal' assessment methodology?

To what extent does the 'Cost Optimal' assessment required of all Member States under the EPBD – and completed in Spring 2013 - provide useful insights and guidance on the feasibility of deep energy renovation levels across different building typologies, and on the priority individual renovation actions from an investor and/or societal perspective?

5.2.5 From the assessment for each market segment, is it possible to produce a prioritised list (or 'league table') of individual energy efficiency investments based on cost-effectiveness?

- This could also be based on the economic capacity of the building owners.
- It could provide valuable clarity to the task of engaging the stakeholder communities and in recruiting both committing both market players and policy makers to taking the next steps and delivering on the strategy.
- As suggested in question 3.2.2.3, can a Pareto type analysis be applied for targeting/ concentrating upon the highest potential areas of opportunity? – such as identifying that 80% (or more) of the potential savings may come from 20% (or less) of the market of building owners?

5.2.6 Is it possible to produce a league table of 'bundled' energy renovation investments based on composite cost-effectiveness?

- This could also be based on the economic capacity of the building owners.
- It could simplify the array of options appropriate for each market segment and provide valuable clarity to the task of assembling packages of renovation investments for engagement both with building owners and financiers.

5.2.7 How to reconcile and connect the public policy and individual investor perspectives, and bridge the gap?

This equates to the question: 'How to make a 'forward looking' perspective a practical reality?'

5.2.7.1 Parallel assessments of representative ranges of renovation measures from each perspective would highlight the extent of the gaps for different circumstances or scenarios.

5.2.7.2 The gap analysis could be followed by a scenario exploration of what different individual or combined policy stimulus options, particularly financial or fiscal incentives, could convert energy renovation measures that have significant positive societal impact potential, but weak attraction to prospective individual project investors, into sufficiently favourable investment propositions.

5.2.7.3 In terms of the lifetime of a building as an asset, and the principles of sustainable development, does an 'opportunity cost' perspective apply?

- The risk of not investing, given that renovation opportunities may occur less than once every 20 years (e.g. re-glazing) – opportunistic and transient decision windows
- 'Opportunity cost'? –Relative attractiveness and priority of competing investments
- Consistency? – Is the same rigour applied to competing investments ? e.g. car purchase, new kitchen, painting the building

5.2.7.4 In the roadmap represented by the strategy, is there provision for cost efficiency improvements in products and services based on technical or service innovation and economies of scale? This could be relevant in the context of staged approaches to renovation, but should not be to encourage deferment of investments that in cost-benefit terms should be taken in the early years of the strategy.

5.2.8 How might building energy renovations be ‘staged’ or phased?

For each market segment:

5.2.8.1 Development of packages based on the technical feasibility assessment and ‘league tables’ above?

5.2.8.2 Development of packages based on the economic feasibility assessment and ‘league tables’ above?
– and also attuned to the economic capacity of the building owners.

5.2.8.3 Based on targeting opportunity windows in the property market, e.g:

- Directly following the purchase of a building by a new owner?
- Sale by an existing owner?, or
- Between rentals?

5.2.9 How does cost-effectiveness of a measure correlate with the merit or demand of an incentive scheme?

Based on experience with or analysis of incentive schemes, by market segment:

5.2.9.1 Can you correlate cost-effectiveness levels (and investment size) with particular types or levels of incentive to identify the most suitable type of incentive?

5.2.9.2 Are there indications as to what is the appropriate relationship between the level or percentage proportion of incentive relative to investment size?

5.2.9.3 How might incentives be graded to align with cost-effectiveness (risk) and/or level of energy performance improvement (depth)?

5.2.9.4 How might the timescale of an incentive be graded to align with cost-effectiveness (risk) and/or level of energy performance improvement (depth)?

6 Step 6: Sourcing and Delivering Finance

Possible questions to consider in quantifying, sourcing, designing and delivering the necessary finance, and in managing risk.

6.1 Summary Questions

The following is a list of possible questions to be considered:

- [How much investment is needed, over what timescale and from whom?](#)
- [To what extent is national public funding available to support building energy renovation at the necessary scale?](#)
- [For each market segment, what types of financial instrument are most appropriate?](#)
- [What is required to source 'wholesale' funds of the necessary scale – including from EU institutions?](#)
- [How to engage and gear 'retail' funds of the necessary scale?](#)
- [What sort of support do financial institutions and investors need from government?](#)
- [What do/ should financial institutions require from proposers of programmes, schemes or projects?](#)
- [How can efficient fund distribution mechanisms be set up for broad access to financing?](#)
- [How to 'stage' the level of incentive or financing?](#)

6.2 Expanded Questions

6.2.1 How much investment is needed, over what timescale and from whom?

How much investment is needed in order to reach energy efficiency objectives in the building sector? What is the timeframe for the estimation? How is the required investment volume split between the different investor groups?

6.2.1.1 For each market segment, based on the analysis and phasing indicated from Step 5, what is the size of investment needed:

- Phased and profiled over the term of the strategy?
- Annually to year 2020 (and beyond)?

6.2.1.2 In aggregate, what is the size and profile of investment needed?

6.2.1.3 Indicatively in each market segment, over different phases of the strategy what proportions need to be:

- From the building owner's own resources?
- From incentives from public funds?
- From loan finance?
- From other sources?

6.2.2 To what extent is national public funding available to support building energy renovation at the necessary scale?

6.2.2.1 What are national circumstances, legal frameworks, exchequer / budget constraints? e.g. inability to increase debt on the national exchequer accounts?

6.2.2.2 How well articulated are the arguments for this priority relative to competing priorities?

6.2.2.3 What constraints might EU State Aids regulations place on the provision of public funds for particular market segments?

6.2.2.4 What scope might be available for directly recycling revenues from energy or carbon taxation?

6.2.2.5 What scope might be available for raising revenues through levies on energy utility bills?

6.2.2.6 How should national public funds for building energy renovation be most effectively distributed/allocated?

6.2.3 For each market segment, what types of financial instrument are most appropriate?

In many instances, to resolve the dichotomy highlighted in Section 4.2.2 and encourage the deepest feasible renovation, some form of incentive is likely to be necessary. The following options should be considered and evaluated, per market segment or niche.

6.2.3.1 What criteria of appropriateness might be considered in evaluating options?

- The culture, perspectives and previous responses to incentives or other measures in that market segment – particularly the household vs the business sector?
- Cost-benefit to the State (on a holistic basis, including jobs and tax revenue benefits)?
- Intensity of burden on public funds?
- Administrative ease and efficiency?
- Conditions from funding sources e.g tax revenues, levies, EIB etc.?
- Societal cost-benefit?

6.2.3.2 What kind of non-fiscal, market based financial instruments are in place/can be put in place and what is the potential financing volume?

6.2.3.3 What types of financial instruments are available and are they appropriate to cover the need of the different market segments?

6.2.3.4 What kind of financial incentives (promotional programmes/tax incentives) exist for the different investor groups?

6.2.3.5 What roles for incentives - 'free' finance or subsidies?

- Grants – what scale, proportion of support?
- Tax reliefs – tax credits, capital allowances, differential VAT rates etc.:
 - To building owners and/or
 - To service providers
- Grading of finance to the level of investment or ambition in energy renovation?

6.2.3.6 What roles for favourable loan finance?

- Possibly as matching funds to the incentives?
- Soft loans – with interest rate or credit risk support?
- Grading of finance to the level of investment or ambition in energy renovation?

6.2.3.7 What roles for dedicated investment funds?

- 'Green' investment funds?
- Pension funds?
- Other?

6.2.3.8 What roles for energy supplier obligations ('white certificates')? – also under the aegis of the EU Energy Efficiency Directive.

6.2.3.9 What role for specialised market based funding instruments?

- Pay as You Save (PAYS) or Save as You Pay (SAYP) schemes, for example with householder repayment of loans through energy utility bills?
- ESCO private third party financing of energy performance contracts, for example for public sector buildings?
- Other?

6.2.3.10 Are there particular support instruments required for the most financially challenging sectors? – for example:

- Low income or 'fuel poor' homes?
- Elements of the private rented home or business sector?
- SMEs?
- Heritage buildings?
- ESCO based financing?

6.2.4 What is required to source 'wholesale' funds of the necessary scale - including from EU institutions?

6.2.4.1 From where is 'wholesale' finance potentially available?

- Public:
 - National?
 - Regional?
 - Local?
- Private institutional: e.g. pension fund managers?
- Utilities?
- Others?

6.2.4.2 What kind of support is needed from EU institutions? What EU funding sources should be explored?

Examples:

- ERDF?
- Other Structural or Cohesion Funds?
- Forthcoming energy efficiency components of EU MFF 2014- 2020?
- EEFF?
- EIB?
- EBRD?
- ELENA, Jeremie, etc.?
- Others?

6.2.4.3 How much finance is potentially available? In what timescale?

- To year 2020?
- Beyond 2020?

6.2.4.4 What are the requirements or conditions of the 'wholesale' funding sources?

- What time horizon?
- What scale of programme/scheme/ project loan is required for them to be interested?:
 - Aggregation of projects through intermediary 'multipliers' or 'retail' actors will often be required
 - Who are suitable 'aggregators' or 'multipliers'? – banks, utilities, municipalities, agents.....
- What level of matching funds?
- What return on investment?
- What levels of performance guarantee?
- What other levels of security?
- What levels of standardisation in techno-economic evaluation?
- What levels of administration are involved in approving investment?
- What levels of administration are involved in monitoring an investment?

6.2.4.5 On what terms might funds be available?

- Graded by perceived risk?
- Graded by depth and level of energy performance ambition?
- What mechanisms are appropriate to reach 'retail' financial institutions?

6.2.5 How to engage and gear 'retail' funds of the necessary scale?

How can (mainly private) investors be motivated to provide 'retail' funds/equity -of the necessary scale?
Specifically:

6.2.5.1 How to leverage 'wholesale' funds to raise matching funds from capital markets?:

- Through specialised investment funds?

- Through commercial retail banks?
- Through other structured financing instrument, such as leasing or Public Private Partnership?
- Other?

6.2.5.2 What entity is responsible for sourcing funds?

- Is there a public or promotional bank with access to refinancing at favourable conditions which could refinance and offer soft loans?
- Where no such promotional bank is available: what kind of credit enhancement techniques (for example: public guarantees) could be provided to a refinancing entity (for example a commercial bank) to source funds from capital market at favourable conditions?
- How can securitisation techniques be used to provide capital relief to a refinancing institution or to raise funds from capital markets or institutional investors?
 - Example: bundling of loans and transfer of the portfolio (via true sale or synthetic securitisation) to a separate entity/special purpose vehicle.

6.2.5.3 What are 'retail' financier requirements in funding individual programmes, schemes or projects?

- How do the requirements differ by market segment?
- What time horizon?
- What scale of programme/scheme/ project loan is required for them to be interested?:
 - Aggregation of projects through intermediary or 'retail' actors will often be required
 - Who are suitable aggregators or multipliers? – utilities, energy services companies, municipalities, agents.....
- What level of matching funds?
- What return on investment?
- What levels of performance guarantee?
- What other levels of security?
- What levels of standardisation in techno-economic evaluation?
- What levels of administration are involved in approving investment?
- What levels of administration are involved in monitoring an investment?

6.2.5.4 On what terms might funds be available?

- Graded by perceived risk
- Graded by depth and level of energy performance ambition
- What mechanisms are appropriate to reach 'retail' financial institutions?

6.2.6 What sort of support do financial institutions and investors need from government?

Possible issues to consider:

- Information, awareness and promotion to stimulate market appetite to invest?
- Legal/ regulatory provisions to drive market action?
 - Example: minimum building energy performance standards for social housing rental or public sector leasing
 - Example: possible provisions to link the investment to the property rather than the person or organization (so that the debt can traverse any turnovers of ownership)?
 - Example: rules on accounting and asset treatment of ESCO financed public sector energy efficiency projects.
 - Example: the possibility for ESCOs to refinance their debt (i.e. sell the claims they have over the future receivables of their contract).
- Long term finance?
- Subsidised finance?
- Are institutional arrangements (e.g. national energy efficiency fund, 'green banks') needed to ensure sufficient access to finance for investors?
- Are institutional arrangements needed to provide financial guarantees?
- Standardisation:
 - Guidance on technical packages?
 - Registers or regimes to ensure product and service quality
 - Guidance on performance guarantees?
 - Administratively efficient evaluation, monitoring & verification systems?

6.2.7 What do/ should financial institutions need from proposers of programmes, schemes or projects?

- Programmes, schemes or projects with a sufficiently clear 'business case' and business model to be worthwhile?

- Programmes, schemes or projects of sufficient financial scale to be worthwhile?
- Intermediaries and multipliers/ aggregators to:
 - Administer funding or financing programmes or schemes?
 - Administer the marketing and technical dimensions?
 - 'Bundle' projects?
- Technical packages?
- Independent assurances on quality of products and service providers?
- Performance guarantees?
- Administratively efficient monitoring & verification systems?

6.2.8 How can efficient fund distribution mechanisms be set up for broad access to financing?

6.2.8.1 Who are the target clients for financing?

6.2.8.2 How can finance get to those who need it?

6.2.8.3 What levels and forms of finance are most suitable to each market segment, based on?

- Type of client (primary or intermediary): householders, landlords, housing associations, small and medium enterprises, corporates, utilities, public sector entities, municipalities
- Type and scale of investment project identified?

6.2.8.4 What are the appropriate distribution channels?

- What is the usual access route to financing for the market sector in question?
- How can existing distribution channels be used to enhance customer access to financing?
- What are the appropriate information channels used by the different sector?

6.2.8.5 What are possible ways of aggregating building owners into groups representing an attractive scale for the delivery of finance?

6.2.9 How to 'stage' the level of incentive or financing?

Is it appropriate or possible to provide finance for building energy renovation projects, schemes or programmes on a graduated basis? For example:

- On the basis of traditional risk funding criteria – capital investment and repayment capacity of applicant?
- According to resulting energy efficiency level?
- According to extent of improvement in energy performance?
- According to the depth of renovation action (rewarding the difficult)?
- With single or combined incentives or financing instruments?

7 Step 7: Policy measures

Possible questions to consider in assessing options and formulating policies to stimulate, coordinate and regulate large scale delivery of quality renovation activity.

Particularly relevant to addressing clauses (c) and (d) of EED Article 4.

7.1 Summary Questions

The following is a list of possible questions to be considered:

- [What systems are in place to plan, monitor and evaluate policy effectiveness?](#)
- [Have you conducted an assessment of the existing suite of policies and initiatives?](#)
- [Have you conducted an assessment of options for new or amended policies?](#)
- [What policies are needed to tackle information barriers or deficits in the different market segments?](#)
- [What policies are needed to tackle economic barriers in the different market segments?](#)
- [What policies are needed to tackle technical barriers in the different market segments?](#)
- [What policies are needed to tackle skills barriers in the different market segments?](#)
- [What policies are needed to tackle financing barriers in the different market segments?](#)
- [What policies are needed to encourage innovation in the different market segments?](#)
- [Are new or modified institutional arrangements necessary?](#)

7.2 Expanded Questions

7.2.1 What systems are in place to plan, monitor and evaluate policy effectiveness?

- What criteria are used to determine effectiveness/success?
 - numbers of buildings renovated, amount of investment made, cost effectiveness, progress against targets?
- What systems are in place to collect comprehensive and timely data on energy use in the buildings sector, as well as data on building characteristics, technology deployment, market breakdown, costs and efficiency – to inform policy development and allow the monitoring of progress.

7.2.2 Have you conducted an assessment of the existing suite of policies and initiatives?

- Have policies been evaluated by sector?
- Where existing market initiatives (e.g. certification of products or competence) are already in place? – and hence where public policy intervention may be unnecessary
- Have policies been evaluated by effectiveness?
- What are the most policy mixes? Are they cross sectoral, or do they need to be defined by sector-market segment?
- Are all relevant Ministries engaged, ensuring that priorities are aligned and do not face barriers because of conflict with other policy goals?
- How best can energy utilities be engaged? – having regard to the provisions of Energy Efficiency Directive?

7.2.3 Have you conducted an assessment of options for new or amended policies?

- Evaluated by sector?
- Evaluated by effectiveness?
- Are all relevant Ministries engaged?

7.2.4 What policies are needed to tackle information barriers or deficits in the different market segments?

- What awareness, information and education measures are already in place?
- How effective are they?
- What new or improved measures are needed?
- In particular, how can the instrument of building energy certification (and accompanying recommendations for improvement) be mandated by the EPBD be leveraged to mobilise investment action?
- Consider developing a variety of standardised information packages, tailored to individual decision makers' needs, to allow decision makers to compare the potential and features of different renovation technology options.

7.2.5 What policies are needed to tackle economic barriers in the different market segments?

- What economic stimulus measures are already in place to improve cost-effectiveness or facilitate capital investment?
- How effective are they?
- What new or improved measures are needed?

7.2.6 What policies are needed to tackle technical barriers in the different market segments?

- What technical support and enforcement measures are already in place? (e.g. quality registration schemes for energy efficiency products)
- How effective are they? – including how standardised and suitable are they for providing assurance to non-technical decision makers (e.g. financiers)
- What new or improved measures are needed in different market sectors - apartment blocks, single homes, small shops, historic buildings, etc.

7.2.7 What policies are needed to tackle skills barriers in the different market segments?

- What skills development, certification, accreditation and inspection measures are already in place across the supply chain?:
 - Across all relevant supply chain actors?
 - Foundational training?
 - Supplementary in-career training for upskilling to adapt to new performance demands?
 - Registration schemes for competent persons?
- How effective are they?
- What new or improved measures or initiatives are needed?

7.2.8 What policies are needed to tackle financing barriers in the different market segments?

- Over and above economic stimulus measures, what measures are already in place to improve financial access and attractiveness to facilitate capital investment?
- How effective are they?
- What new or improved measures are needed?

7.2.9 What policies are needed to encourage innovation in the different market segments?

- Innovation measures to:
 - Reduce investment costs?
 - Improve product or service quality?
 - Create new business models?
 - Tackle particular sectors, e.g. heritage buildings (e.g. superinsulation materials), fuel poverty, rental market, ESCOs
 - Reduce other risks.
- How much and how quickly can the capacity of the industry to adapt and innovate be improved?

7.2.10 Are new or modified institutional arrangements necessary?

For example:

- Green Funds to underwrite retail loan finance?
- Legal or accounting rules?
- Registration systems for product or service quality?

8 Step 8: Shaping the offer – growing market confidence

Possible questions to consider in developing solution packages to create confidence and accelerate action by relevant investors and decision makers across the market segments.

Particularly relevant to addressing clauses (d) and (e) of EED Article 4.

8.1 Summary Questions

The following is a list of possible questions to be considered:

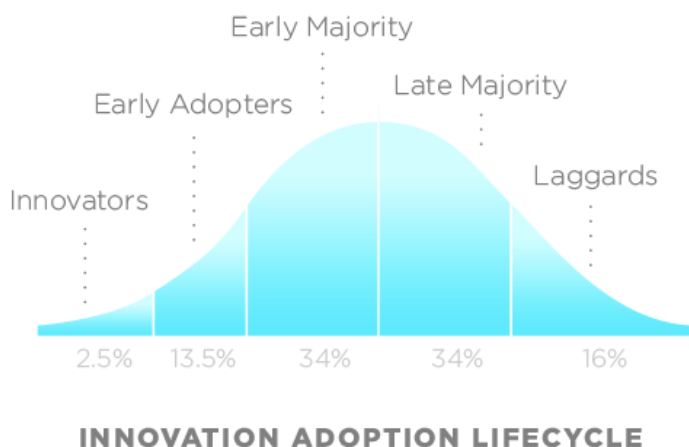
- [Where is building energy renovation positioned in a marketing context?](#)
- [How can trust and confidence be built in the market?](#)
- [How can these elements be created and packaged?](#)
- [How can specific business models be created and assisted?](#)

8.2 Expanded Questions

8.2.1 Where is building energy renovation positioned in a marketing context?

Figure 2 shows a classic diffusion profile commonly used to characterise the evolving state of adoption of a particular technology or market offering. Those segments to the right hand side of the diagram generally require different responses than those to the left. To deliver building renovation across all segments, a mixed set of policies and measures (Step 7) delivering market push and regulatory pull are likely to be required. A phased approach is likely to be appropriate, with evaluation of progress and deployment and adjustment of different measures being required as part of the periodic review process for the overall strategy.

Figure 2: Standard market diffusion profile



8.2.1.1 Where is building energy renovation generally positioned on the Figure 2 curve across different building types (or market segments)? Depending on market segment and national circumstances, possibly in either the latter part of 'early adopters', in the 'early majority' or in the beginning of the 'late majority' category. However, this may be mainly 'shallow' energy renovation, engaging those already most persuaded and disposed towards energy efficiency and environmental considerations.

8.2.1.2 Where is deep building energy renovation positioned in most market segments? It is likely to be predominantly in the 'innovators' or 'early adopters' category, so the task of gaining the attention, trust and commitment of the early adopters and early majority is a challenging one.

8.2.1.3 Building confidence in new approaches and technologies, and demonstrating the outcomes and results of renovation improvements, can aid the shift between segments. Consider what actions can be developed to accelerate this shift, e.g. the influence that good demonstration projects with visible benefits can have in encouraging deeper energy renovation in different market sectors or niches.

8.2.1.4 Early priorities: How to move the volume of deep renovation activity into the ‘early adopters’ phase?

8.2.1.5 What path is foreseen to mobilising the ‘early and late majorities’?

8.2.1.6 Do existing institutions, legislation and systems have the capacity to deliver the renovation that is required?

8.2.2 How can trust and confidence be built in the market?

8.2.2.1 For financial institutions: to what extent are the following needed?:

- Aggregation to achieve scale? – what mechanisms or intermediaries?
- Graded packages?
- Smooth delivery mechanisms?
- Technical assistance (experts)?
- Financial guarantees?
- Performance guarantees?
- Standardised evaluation, monitoring and verification systems?

8.2.2.2 For building investors: to what extent are the following needed?

- Project scoping and technical assistance?
- Incentives?
- Sourcing of finance?
- Smooth delivery mechanisms?
- Property valuation systems that better account for ongoing energy performance?

8.2.2.3 For all: Underpinning actions: to what extent are the following needed?

- Confidence in policy stability?
- New business models?
- Well designed information and marketing packages?
- Products and technology certification?
- Systems to ensure service quality?
- Registers of competent persons?

8.2.3 How can these elements be created and packaged?

8.2.3.1 What elements might a packaged solution contain?

- Packaging and coordinating the customer offer through a “One Stop Shop” type system ?
- Standardised approaches attuned to the needs of that particular customer sector or subsector?
- Creation of a brand mark or marks?
- Good information (including persuasive case examples, panels of trusted products and service providers) to motivate and empower the decision maker?
- Finance – including incentives, guarantees, insurances
- Contractual/ legal provisions and safeguards
- Flexible package with options, packaged as a quality of life offering (beyond the confines of energy)?
- Targeted marketing at trigger points of decision making opportunity? - points of sale/ purchase/ rental, points of planning, points of extension, points of replacement. Integrating energy renovation with other, generally larger, renovation motives and actions.
- Co-ordination service for project delivery

8.2.3.2 How can they be packaged for different building owner and investor types?

- Homeowners? – and sub-sectors
- Business sector? – and sub-sectors
- Public sector? – and sub-sectors

8.2.4 How can specific business models be created and assisted?

8.2.4.1 What roles can energy supply companies play?

8.2.4.2 What roles can ESCOs play?

- In the public sector?
- In the private sector?
- What do they require to undertake deep renovation projects?
- What is the appropriate assignment of risk?
- How can building owners be equipped to negotiate competently with ESCOS?

8.2.4.3 What roles can domestic 'Pay as You Save' (or 'Save as You Pay') systems play?

- How to reconcile with energy payback realities?
- Assignment of risk

8.2.4.4 What underpinning elements are required?

- Bank finance – Green Funds ?
- Standardised verification/ certification protocols?
- Other?

8.2.4.5 What approach to social housing where in some cases householder cannot contribute to funding capital works?

8.2.4.6 What scope is there for engaging with master planning initiatives at district or neighbourhood level (e.g. local regeneration plans), and at city level ?

- To facilitate good co-ordination and governance?
- To facilitate aggregation of customers?
- To facilitate efficient procurement of services, reducing transaction costs?
- To exploit new and emerging opportunities from successful experiences of innovation in the Smart Cities and Communities?

9 Step 9: Publishing and implementing the strategy

Possible questions to consider in the process of mobilising the full breadth and depth of action for effective delivery in the short term and on the long term vision.

9.1 Summary Questions

The following is a list of possible questions to be considered:

- [What will be published?](#)
- [Who will oversee?](#)
- [How?](#)
- [Phasing?](#)
- [What arrangements are needed for monitoring, evaluation and adjustment?](#)

9.2 Expanded Questions

9.2.1 What will be published?

Consider the following elements:

- The vision
- The analysis
- The clear action plan
- The metrics
- The review processes

9.2.2 Who will oversee?

Consider:

- The lead organisations (Ministries, agencies) in compiling the strategy?
- Inclusive steering group to oversee implementation?
- Support resources to assist steering group and/or lead organisations
- Other?

9.2.3 How?

- Ministries
- Stakeholders

9.2.4 Phasing?

- In terms of prioritising/ sequencing of implementation in different sectors or sub-sectors
- In terms of growing scale and depth of renovation ambition over time

9.2.5 What arrangements are needed for monitoring, evaluation and adjustment?

9.2.5.1 What systems are required for efficient monitoring, reporting, review and adjustment?

9.2.5.2 Member States are required to update the strategy every three years. Typically, adjustments to the strategy might reflect corrections arising from policy successes or failures, technological advances, or institutional developments.

