

Do building renovation strategies live up to the name?

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Abstract

The majority of our buildings were constructed before minimum energy performance requirements were in place, at a time when energy was plentiful, cheap and not associated with the greenhouse gas emissions that are changing our climate in an unpredictable and damaging way. What is more, most of them will still be here for decades to come. In signing up to the 2012 Energy Efficiency Directive (EED), Member States agreed to develop national strategies to renovate their existing stock of buildings. This requirement spans all building types, whether residential or commercial, privately or publicly owned, rented or owner-occupied. First versions of strategies were due by April 2014.

BPIE has reviewed a cross section of strategies in order to determine whether the requirements set out in EED Article 4 have been met, and to assess whether they embody the level of ambition that is consistent with transforming Europe's existing building stock into a highly energy performing one. Member States are ranked according to their compliance levels. The findings make for sober reading – none of the strategies reviewed can be considered “best practice”, while a number are sufficiently deficient in their content as to be considered non-compliant.

The paper concludes with a set of recommendations on how the process of renovation strategy development, and subsequent implementation, needs to be improved if the vast economic, social and environmental benefits waiting to be secured through building renovation are to be attained.

Introduction

The importance of energy use in the building stock and its contribution to climate change is well known. There is also growing recognition of associated issues, ranging from fuel poverty and air quality (indoors and outdoors) to job creation and energy security. Yet despite the multiple benefits that accrue when existing buildings are deeply renovated, there has till now been a collective lack of commitment by governments, at national, federal, regional and local level, to put in place the necessary policies, strategies, action plans and support measures to deliver that potential.

With that in mind, the late inclusion of Article 4 on Building Renovation Strategies during the negotiations on the 2012 Energy Efficiency Directive (EED) was a welcome addition to the suite of measures aimed at improving the energy performance of the EU building stock. In particular, it complements requirements in the Energy Performance of Buildings Directive (EPBD) 2010 recast, notably Article 9 on the need for Member States to stimulate the transformation of buildings that are refurbished into nearly zero energy buildings.

The remainder of this paper examines the extent to which Member States have taken on board the requirements of Article 4 EED, and the resulting impact on the policy landscape for building renovation.

Requirements of energy efficiency directive Article 4

Article 4 specifies five requirements that need to be covered with renovation strategies. In summary, these are:

1. An overview of the national building stock;
2. Identification of cost-effective approaches to renovations;

3. Policies and measures to stimulate cost-effective deep renovation of buildings;
4. A forward-looking perspective to guide investment decisions;
5. An evidence-based estimate of expected energy savings and wider benefits.

Guidance¹ was provided by the Commission and other bodies^{2, 3, 4} on what should be addressed within each of these sections, yet as will be shown below, only a minority of Member States followed the guidance or provided information of a comparable nature that can be considered to have satisfactorily addressed the topics above.

First versions of the national strategies were due to have been published no later than 30th April 2014. Revised versions need to be submitted every three years thereafter.

As of 31st December 2014, 24 out of 28 Member States had submitted their building renovation strategies and had them published on the Commission's website⁵. Most of these were submitted late, yet even eight months after the April 2014 deadline for submission, four Member States: Greece,⁶ Hungary, Luxembourg and Slovenia, had still not complied with this basic requirement. This lack of willingness to adhere to commitments that all Governments made when signing up to EED immediately does not paint a picture of political engagement in, or prioritisation of, the building sector as a component of national and EU climate policies. By and large, and with a few notable exceptions, this is further borne out by the content of those strategies that have been published.

Scoring the strategies

In order to appraise the strategies on a common basis, each one was scored against the five component sections of Article 4 on a scale of 0–5, where:

- 0 = MISSING – the item is not covered at all, or only described in another source
- 1 = UNSATISFACTORY – only the most cursory coverage of the item
- 2 = INADEQUATE – item addressed poorly, with insufficient detail, or with important aspects missing
- 3 = ADEQUATE – meets the basic minimum requirements
- 4 = GOOD – topic is described in some detail
- 5 = EXCELLENT – exemplary coverage of the topic

These scores are then aggregated by section to derive an overall rating, expressed as a percentage of the maximum possible score.

A strategy is considered as being compliant with the minimum requirements of Article 4 if it achieves a rating of 70 % and each of the individual sections scores at least 3. Note, however, that the assessment of renovation strategies by BPIE is not an official analysis undertaken on behalf of the European Commission and therefore has no legal basis. Nevertheless, the intention is to provide the first ever comparison across what are highly variable documents (many of which are only available in the national language), and raise awareness of both the highlights and shortcomings of individual strategies.

Results

In November 2014, the Buildings Performance Institute Europe (BPIE) published its assessment of ten renovation strategies⁷. Only four out of the ten were deemed to have fully complied with the Article requirements. In this paper, the assessment has been extended to cover a further eight strategies that are available in English (the remaining strategies are only available in the national language).

The results are presented in tables 1 and 2, respectively, those that meet BPIE's compliance criteria and those that do not. This wider assessment, extended to 18 strategies, reveals that only five met BPIE's minimum requirements for a compliant renovation strategy.

In the descriptions of each strategy provided in the following section, the discussion of the additional eight strategies is more comprehensive than for the original 10 appraised by BPIE, since full details of these 10 can be read within BPIE's 2014 report "Renovation Strategies of Selected EU Countries". The additional countries appraised in this paper are: Bulgaria, Cyprus, Finland, Ireland, Italy, Malta, Poland, and Sweden. Of these, only Finland's strategy was considered compliant, joining Czech Republic, Romania, Spain and UK from the initial appraisal undertaken in 2014.

Discussion of individual renovation strategies

Austria – Overall, the Austrian renovation strategy leaves a lot to be desired. It consists largely of a summary of existing support measures for the housing stock by each of the nine regions, with hardly any reference to policies at a national level. The forward perspective to guide investment decisions and assessment of benefits are both inadequate. As such, this strategy is clearly non-compliant.

Brussels Capital Region, Belgium⁸ – The description of the building stock and the section on cost-optimality were among the best out of the strategies reviewed. The analysis of cost-effective opportunities at the level of individual buildings, and the description of measures that comprise individual renovations, were particularly detailed. The strategy includes some useful policies which can be expected to help grow the market for building renovation. However, it was quite weak in the forward perspective and quantification of benefits. These deficiencies mean the strategy is not fully compliant with the Article 4 requirements.

1. http://ec.europa.eu/energy/sites/ener/files/documents/20131106_swd_guidance_neeaps.pdf

2. http://bpie.eu/documents/BPIE/Developing_Building_Renovation_Strategies.pdf

3. http://www.eurima.org/uploads/ModuleXtender/Publications/96/Renovation_Roadmaps_for_Buildings_PP_FINAL_Report_20_02_2013.pdf

4. <http://www.epbd-ca.org/Medias/Pdf/EED-Article4-composite-document-final.pdf>

5. http://ec.europa.eu/energy/efficiency/eed/article4_building_strategies_en.htm

6. The Greek strategy was published in February 2015.

7. http://bpie.eu/benchmark_renovation_strategies.html#.VLzgmUff8do

8. Due to the federal structure of Belgium, each of the three regions published its own renovation strategy. Brussels Capital Region was selected for this study in order to consider building renovation from the perspective of the city level.

Table 1. Renovation strategies that meet BPIE's minimum requirements for compliance with EED Article 4 requirements.

COUNTRY	Overview of building stock	Identification of cost-effective approaches to renovation	Policies to stimulate cost-effective renovation	Forward-looking perspective to guide investment decisions	Estimate of expected energy savings and wider benefits	OVERALL compliance rating
Czech Republic	3	3	4	4	4	72 %
Finland	4	4	3	3	4	72 %
Romania	3	3	4	4	4	72 %
Spain	4	4	3	4	3	72 %
UK	5	4	3	3	3	72 %

Table 2. Renovation strategies that DO NOT meet BPIE's minimum requirements for compliance with EED Article 4 requirements.

COUNTRY	Overview of building stock	Identification of cost-effective approaches to renovation	Policies to stimulate cost-effective renovation	Forward-looking perspective to guide investment decisions	Estimate of expected energy savings and wider benefits	OVERALL compliance rating
Ireland	3	3	4	3	4	68 %
Belgium (Brussels Capital Region)	5	5	3	2	2	68 %
France	4	4	4	2	2	64 %
Netherlands	3	3	3	3	3	60 %
Cyprus	3	5	3	1	3	60 %
Denmark	3	3	4	2	2	56 %
Germany	4	2	3	2	3	56 %
Poland	4	3	2	2	2	52 %
Sweden	3	1	3	2	3	48 %
Austria	3	3	2	1	1	40 %
Italy	2	2	2	2	2	40 %
Malta	2	2	3	1	2	40 %
Bulgaria	2	1	2	2	2	36 %

Note that the scores for Austria, Denmark and The Netherlands have been adjusted since the publication of BPIE's November 2014 status report, on the basis of taking into consideration referenced material external to the strategy itself.

Bulgaria – Bulgaria's renovation starts promisingly with the assertion that: "The construction sector in Bulgaria has an especially important role to play in addressing the impacts of global climate change through the application of energy-efficiency improvement measures and by defining the quality of the living and working environment". However, the strategy does not set out what that role will look like, nor which policies will be implemented to deliver on that ambition.

Only a brief overview of the building stock is provided, along with the evolution of elemental energy performance requirements since 1964. While the cost optimality approach is described in some detail, no results are presented in a way that can be meaningfully utilised. Numerous funding sources for improving building energy performance are identified, though they are not put into context of a strategic approach. Forward perspective and energy savings are addressed to some extent in a table in the National Energy Efficiency Action Plan (NEEAP), though wider benefits are not quantified or identified. In conclusion, significant weaknesses in all areas of the Bulgarian renovation strategy mean that it cannot be considered compliant with Article 4 requirements.

Cyprus – As a country, Cyprus does not have a long standing background in implement energy-saving measures in buildings – the first organised attempt to do so was made in 2004, yet the need for concerted efforts in this regard is illustrated by the fact that 91 % of all buildings were erected prior to any formal energy performance requirements.

A particular strength of this strategy is its coverage of cost optimality. Details are provided for several illustrative properties of typical energy performance of different building elements before renovation, the measures that need to be applied, and the resulting energy and financial savings. There is also good coverage of the wider benefits that can be achieved as a result of implementing the strategy. By comparison, the forward perspective is weak, as it does not give a clear picture to investors of the evolution of the strategy or of individual policies.

Czech Republic – The strategy covers all aspects of Article 4 adequately, and can therefore be considered compliant. Particular strengths of this strategy lie in the technical analysis of energy saving opportunities, modelling of renovation scenarios, as well as the holistic approach to identifying policies and measures that could stimulate the market. The strategy could be strengthened considerably if greater clarity were given as to which policies will actually be implemented, and which of the presented scenarios is the one preferred by Government.

Denmark – The Danish building renovation strategy is short on technical details concerning the building stock, yet is among the most ambitious strategies in terms of what the Government plans to do. A package of 21 initiatives addresses all building sectors, as well as recognising the importance of skills and R&D. A comprehensive stakeholder engagement process was used to inform these policies. However, the forward looking perspective to guide investment and quantification of benefits are relatively weak.

Finland – Finland's building stock is characterised by migration over recent decades towards the commercial and industrial centres in the Helsinki region and elsewhere in the south of the country, leaving many empty buildings in the rest of the country. Systematic efforts to improve the energy performance of buildings began after the 1970s energy crises. The first uni-

versal U-value requirements were set for building components in 1976, as a result of which half of the floor area of Finland's building stock has been built with mandatory U-value requirements. These have improved progressively, since 1976, in some cases quite dramatically. For example, U-values for roofs have improved from 0.35 in 1976 to 0.09 in 2010. Energy supplied by district heating schemes increased almost 7-fold between 1970 and 2010, both due to new buildings and also the connection of existing stock to networks. The latest 2013 building regulations introduce cost-optimal levels of minimum energy performance requirements for renovations, also determine Finland's deep renovation / staged deep renovation levels. There is a very clear and concise exposition as to what that means for buildings where renovation work is being undertaken on fabric measures such as walls and windows, as well as technical systems such as heating, ventilation and air conditioning plant.

On policies, the strategy identifies the following key themes as essential components of a framework to support and encourage renovation activity: regulations, innovations, financing and financial incentives, communications, labour force, know-how/education, decision-making, and service provision. Each of these is discussed in the strategy, and suggestions on ways forward are made, for example, "financial incentives need to be targeted at renovations that make a bigger impact on energy performance". The energy savings and carbon dioxide emission reductions that could be achieved to 2050 are presented. The wider impacts of renovation on employment and the national economy are also quantified.

Overall, the Finnish strategy is one of the better examples of a concise (34-page) standalone document that meets all the Article 4 requirements. However, what is not clear is the action that government will take, and how the suggested ways forward (as illustrated above for financial incentives) will be implemented.

France – One of the key strengths of this strategy is the Presidential-level commitment to some ambitious goals in the building sector, such as the deep renovation of 500,000 dwellings a year and the desire to introduce a mandatory renovation requirement for the non-residential sector. The three-pronged approach of supporting households, facilitating finance and increasing professionalism points to a co-ordinated effort, supported by a significant number of initiatives. What is lacking in the French renovation strategy is a clear enunciation of how the 38 % energy saving goal by 2020 will be achieved. Also two elements specified in Article 4, namely the forward-looking perspective and quantification of energy savings and wider benefits, are dealt with only superficially, such that the French strategy is considered to be not fully compliant.

Germany – In the published report, the German Government states that it has yet to specify all elements of its strategy for renovating the national building stock. Accordingly, this strategy is not considered fully compliant with the requirements of the Energy Efficiency Directive. However, it is noteworthy that this strategy includes a significant number of actions focussing on research into how to achieve better renovations in the future. Such research is clearly an important consideration if we are to continually develop more effective ways of achieving deep cuts in the energy consumption of buildings.

Ireland – The report "Better Buildings" is presented as a preliminary version of the Irish renovation strategy. The Go-

vernment has commissioned research to provide a comprehensive overview of the entire commercial and industrial building stock in Ireland, as well as the most cost effective renovation measures for every category of building. It is the Government's intention that a more comprehensive strategy will be issued "later in 2014",⁹ taking account of the final research findings and the input from a public consultation. However, the ambition of the strategy is clear from the following extract: "It is clear that inaction is not an option. If Ireland is to remain an export focused economy, [...], if we are to limit our exposure to expensive imported fossil fuels, while ensuring that citizens can afford to light and heat their homes, we need to make sure that our buildings use as little energy as possible. This strategy is critical to achieving that."

Despite the preliminary nature of the Irish strategy, the document covers all the required sections adequately well. Indeed, the analysis of energy saving potential is among the best presented in any strategy, though the means by which the savings will be achieved are not spelt out.

Italy – The Italian building renovation strategy is included as a short section in the NEEAP (section 3.2.2). There is only a brief description of the building stock, comprising an overview limited to number and type of building, broken down to some extent by age and climatic zone. However, there is very little information on the energy performance of the existing stock. Potential energy savings to 2020 have been quantified, along with the investment required to do so.

There are significant shortcomings with the Italian strategy. No information is provided in the strategy section itself on three of the five required topics: cost effectiveness; policies and forward plan, though these are touched on elsewhere in the NEEAP. While the strategy identifies the economic and financial barriers to improving the energy performance of buildings and states that overcoming these barriers is a priority in order to exploit potential energy savings fully, there is no exposition of how the government intends to tackle the identified barriers. In conclusion, the Italian strategy does not satisfy the Article 4 requirements.

Malta – In overall terms, Malta's renovation strategy lacks sufficient detail in a number of areas for it to be considered compliant. To start with, the strategy only covers residential and office buildings, and not the entire stock as required by EED Article 4. In terms of cost effective opportunities for renovation, it refers to the cost optimality studies undertaken for EPBD, and compares cost optimal levels with current building energy performance. For residential buildings, the opportunity to utilise renewable sources is identified as having the ability to bring primary energy consumption down drastically, to close to zero or in some cases, producing more energy than the building requires – i.e. energy positive buildings. Whilst commercial buildings (offices) also have significant saving opportunities, their generally higher consumption means they cannot get close to zero primary energy use.

The strategy does not set out to achieve the level of savings identified, though it does identify a number of initiatives (some of which extend or replace previous ones) designed to stimu-

late the market. There is no investment profile mapping out the amounts required to achieve the potential savings, nor any explanation of the level of finance provided for the proposed initiatives. Neither is there a quantification of the savings potential. Wider benefits are described in general terms, but not quantified.

The Netherlands – The Dutch strategy is based around three key principles: informing and raising awareness; facilitating; and financial incentives. The aim is to help residents and businesses to help themselves and realise the benefits that energy renovation can bring, not only in cutting energy bills but also in terms of improved living conditions and increased property values. To stimulate this improvement in the quality of life for its citizens, the Government has identified a number of approaches that are quite innovative and with the potential to stimulate significant improvements in building energy performance. The fact that a wider Energy Agreement has been secured with a number of stakeholders bodies is encouraging.

Poland – The Polish building stock is described in some detail. It is clear from the discussion that the poor build quality of many buildings in the period 1945–1990 is a significant factor in any discussion of building renovation. Many of these buildings still need structural repairs and modernisation of facilities, and it is argued that undertaking energy performance improvement measures at the same time would be a logical approach. Cost optimality is covered extensively, however it reads more like a technical manual or training guide, rather than as a component of a renovation strategy.

The policy section is dominated by an exposition of existing sources of finance, as well as an indicative allocation of EU Structural Funds in the period 2014–2020. Finance is clearly a very important component of the policy mix, but it needs to be supported by complementary measures such as those identified in the Appendix of BPIE's "Renovation Strategies of Selected EU Countries". However, the main criticism of the policy section and the subsequent discussion on a forward looking perspective is that they do not constitute a strategic framework for advancement of building renovation activity in Poland. The final section identifies in qualitative terms the benefits that accrue from building renovation, and the typical energy performance improvement that can be expected in three example building types. The information provided is useful, but falls somewhat short of the requirements specified in Article 4.

Romania – A unique feature of the Romanian strategy is that it has sought to quantify the wider benefits from building renovation. Another positive aspect is the comprehensive appraisal of policy options that need to work together to address the underlying barriers. The strategy recognises that the benefits of renovation are felt across a number of different Ministries, including for example health, since poor quality housing has a cost to the nation in terms of lost working days and impact on health services. The policies section of the strategy recognises the importance of engaging across the political spectrum in support of the strategy for deep renovation of the building stock, including for example establishing an objective to eradicate fuel poverty through enhancing energy performance of the housing stock. Overall, the strategy complies with the requirements of Article 4.

Spain – The Spanish strategy includes a good technical appraisal of the building stock and energy saving opportunities. It notes the strategic importance of building renovation and

9. As of 17th February 2015, there is no evidence to suggest this more comprehensive strategy has been published.

Box 1. Ten Essential Features of a Transformational Renovation Strategy.

1. Involve all relevant stakeholders in the process of strategy development.
2. Provide a breakdown of the building stock that paints a clear and informative picture of the number, type, energy performance and floor area of the range of different types of buildings in the country.
3. Present the key conclusions on cost optimal renovation levels, based on the analysis undertaken to meet the EPBD requirements and the Commission regulations on cost optimality.
4. Clearly identify the suite of policies that, going forward, is designed to achieve deep renovation of the building stock.
5. Set out a roadmap to at least 2030 (ideally to 2050) indicating key dates (e.g. the introduction of new legislation or support mechanisms), investment requirements, funding sources and resulting impacts.
6. Work with the dynamic of the market, particularly trigger points when renovation works can more easily be undertaken, e.g. at change of ownership or when other works are being undertaken within the building.
7. Take greater recognition of the multiple benefits in areas such as health, fuel poverty alleviation, air quality improvements, economic stimulation and energy security when prioritising building renovation policies.
8. Ensure energy renovation goes hand-in-hand with delivering a healthier building stock.
9. Ensure identified policies and measures are implemented as planned, monitor progress and enforce non-compliances.
10. Update strategies on a regular basis – at least every three years, as required by EED.

identifies the need to provide information and advice, adequate finance, and a suitably trained workforce. Specific actions that reduce bureaucratic hurdles and help the financing of renovation measures have been identified. Building renovation is seen as a key component of improving the economic conditions in Spain, reviving the construction sector and revitalising urban areas. Multiple benefits are identified, including the improved quality of life that flows from reduced expenditure on energy and improved indoor comfort conditions for occupants. Overall, the strategy meets the basic requirements of Article 4 and comprises some encouraging intentions as regards renovating the Spanish building stock.

Sweden – The Swedish strategy is rather a short document, spanning just 17 pages. While coverage of the building stock is more or less adequate, the overall result is a strategy that is just too short on detail and where the section on cost effectiveness is essentially missing. The discussion on existing policies is useful, though there is no indication of whether they are adequate going forward. The fact that expected total energy consumption

of the building stock in 2020 and 2050 is broadly same as today's (taken as the average for the period 2009–2011) suggests more ambitious policies are needed.

United Kingdom – The UK renovation strategy includes a very detailed description of the building stock and presents a useful insight into the cost-effective renovation packages that might typically be adopted in different building types. The existing policy framework is clearly set out, while the forward plan is placed in the context of the 5-yearly carbon budgets which have been specified through to 2027. Energy saving potentials and existing funding sources are identified. While the UK has met the basic requirements for compliance with Article 4, it is of concern that no new policies have been introduced¹⁰, despite the fact that a large and cost-effective savings potential has been identified in the strategy and that existing measures are not resulting in cost-optimal deep renovations.

Conclusions and Recommendations

In its status report on renovation strategies published in November 2014, BPIE identified 10 recommendations on the content and ambition that strategies should embody if we are to achieve the required transformation of the European building stock. These recommendations are summarised in Box 1.¹¹

Extension of BPIE's analysis to a wider range of strategies has identified further scope for improvement, focused on presentational aspects of strategies. Member States have approached the process of renovation strategy development in very different ways. This makes it difficult for researchers to compare strategies – added to the fact that not all strategies are yet available in English. More importantly though, the way certain strategies have been written, and the level of detail provided, make it difficult for interested stakeholders to get a clear picture of the current and future renovation landscape in the Member State.

The following recommendations are made as to how Member States could improve the way in which strategies are prepared. As such, they complement the 10 “content” recommendations in the box above:

- Strategies should be written in plain, non-technical language with the target audience in mind. They should be pitched at the full range of professional stakeholders in the building sector, from real estate firms and building owners to construction companies, architects, engineers, financing organisations and others involved in building renovation activity.
- The structure should follow the five topic areas identified in Article 4.
- Each topic area should be addressed in sufficient detail for the reader to gain a clear picture of the state of play without having to refer to other documents (e.g. NEEAP, technical papers, cost optimality reports).

10. Other than the Energy Savings Opportunity Scheme (ESOS) for larger companies, in response to the energy auditing requirements of EED Article 8.

11. This list is based on the recommendations contained in BPIE's 2014 report “Renovation Strategies of Selected EU Countries”.

- Should more detailed information that is of relevance to the topic be available, for example statistical information on the building stock or a study into barriers, this should be clearly identified and links directly to the relevant documents provided. It is not acceptable to simply link to another organisation (e.g. statistics office, or the buildings research institute).
- The strategy should not contain overly-long descriptions of previous or existing policies, particularly if they are not relevant going forward.
- Complex calculations or formulae should be avoided.
- Clear, relevant and succinct tables and graphs, suitably referenced, should be used to illustrate key data and information.
- The distinction between specific actions to be taken (e.g. “Government will ...”) and statements of desire (e.g. “In future, more effort needs to be placed on ...”) should be made clear.
- In addition to being an annex to the NEEAP, the renovation strategy should be published as a standalone document in machine readable PDF format.

- Based on the analysis of published strategies, an indicative target length for the document should be 30–50 pages, though quality, rather than quantity, is of paramount importance.

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