

An Evaluation of EU Member State Renovation Strategies

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Abstract

By end use, buildings consume more energy than any other sector. Across the European Union, 40% of energy is consumed in buildings, responsible for over one third of all CO₂ emissions. While new buildings can be constructed to consume very little or no energy, it is the existing stock of buildings already standing that will continue to be responsible for the vast majority of building energy use throughout this century. It is therefore timely that the EU Energy Efficiency Directive (EED), adopted in 2012, includes a requirement that Member States develop strategies for the renovation of their existing building stocks.

Through detailed evaluation of ten renovation strategies, this paper examines the extent to which Member States have complied with the EED requirements, and the level of ambition contained within the strategies. The findings are somewhat disappointing – the majority of Member States failed to meet the reporting deadlines, yet more concerning is the fact that most strategies are not fully compliant with the requirements of the Directive. Some Member States have done little more than restating existing initiatives, yet others have taken a more enlightened stance, with some interesting and innovative policies.

Overall, there remains a significant gap between the ambition expressed in Member State renovation strategies and the required level of activity if Europe is to realise the potential for energy saving and CO₂ emission reduction, as well as the myriad of economic, societal and environmental co-benefits that ensue.

The paper concludes with recommendations of how future renovation strategies, which need to be reviewed and revised every three years, can be improved.

Introduction

Legislative Context for Sustainable Building Renovation

Across Europe and other developed nations and regions, buildings represent the largest potential for cost effective carbon emission reduction and with it, improvement in energy security, as well as a myriad of other benefits - fuel poverty alleviation, improved air quality, increased comfort, increased property values, energy system benefits, together with energy bill savings¹. Yet historically, deep renovation of buildings to significantly improve their energy performance has not been a priority, either for policy makers or building owners and investors.

¹ Buildings Performance Institute Europe (2013). A Guide To Developing Strategies for Building Energy Renovation.

Part of the problem is the fact that many of the associated co-benefits accrue to society at large (e.g. energy security) and are not valued by the potential investor. However, others, such as improved comfort and indoor air quality, are perceived in a general sense by the building owner, yet are difficult to ascribe a financial value to and hence rarely factored into the economic appraisal. As a result, the true economic, societal and environmental benefits arising from building renovation are significantly undervalued.

Progressive waves of EU legislation over a period of 20 years have sought to address different aspects of energy use in buildings, starting with hot water boilers and household appliances, until, in the early 2002, the first comprehensive policy addressing building energy performance was enacted (Figure 1). The Energy Performance of Buildings Directive (EPBD 2002)² required EU Member States to implement a number of measures, including the introduction of Energy Performance Certificates and inspection of heating, ventilation and air conditioning (HVAC) systems, as well as energy performance requirements for new as well as existing buildings. Many of these requirements were strengthened in the 2010 recast of the Directive (EPBD 2010)³, which most notably introduced the requirement for all new construction to be nearly zero energy buildings from 2021 (2019 for buildings owned and occupied by public authorities).

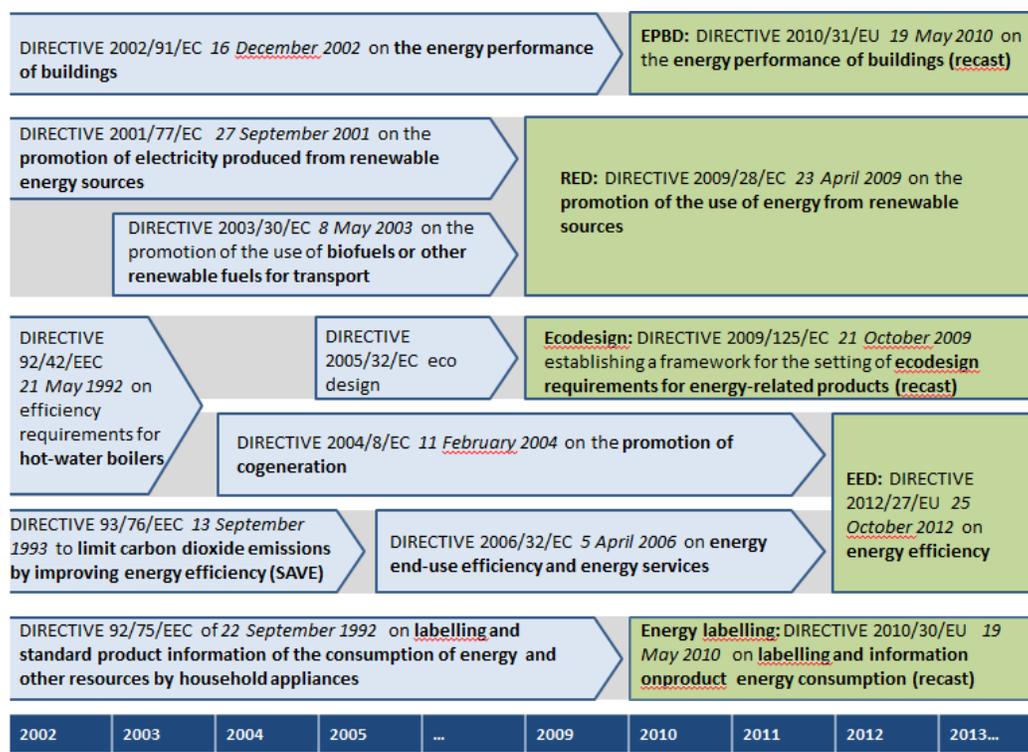


Figure 1. Timeline of Key EU Legislation Affecting Energy Use in Buildings⁴

² Official Journal of the European Communities (2002). Directive 2002/91/EC of the European Parliament and of the Council on the energy performance of buildings.

³ Official Journal of the European Communities (2010). Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings (recast).

⁴ Staniaszek & Kunkel (2014). EU policy for improving the energy efficiency of the existing building stock. *EU Law Series Volume VII: Energy Efficiency in the EU*. Claeys & Casteels Law Publishers. Deventer, Netherlands.

However, despite 20 years of legislation, the provisions for existing buildings have remained weak, relative to the requirements on new buildings. To a large degree, this is understandable, since a new building must secure approval from the relevant authorities before being constructed, and it is therefore easier to impose obligations. There are also fewer technical restrictions as to the installation of energy saving measures, other than those imposed by location, the plot of land and its immediate vicinity, and access to different energy carriers.

That said, EPBD does require certain energy performance requirements to be met when a building is undergoing a major refurbishment, though this leaves the vast majority of existing buildings not subject to any obligation to refurbish. In a similar fashion, the Renewable Energy Directive⁵ requires the use of minimum levels of energy from renewable sources in existing buildings that are subject to major renovation.

Building Renovation Strategies

The latest addition to the EU legislative framework in 2012 is the Energy Efficiency Directive (EED)⁶. Among its many provisions is the requirement for Member States to develop national building renovations, described in Article 4 of the EED (see box below).

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.

Figure 2. Energy Efficiency Directive, Article 4 – “Building Renovation”

Whilst stopping short of mandatory requirements, Article 4 is nevertheless a potentially powerful lever that could result in actions being taken that significantly increase the level of activity in building renovation, by virtue of requiring each Member State to undertake a strategic assessment of the potential for renovation of the building stock. The question is – has it done so?

⁵ Official Journal of the European Union (2009). Directive 2009/28/EC of the European Parliament and of the Council on the energy performance of buildings (recast) on the promotion of the use of energy from renewable sources.

⁶ Official Journal of the European Union (2009). Directive 2012/27/EU of the European Parliament and of the Council on energy efficiency.

In order to answer that question, the author has undertaken an assessment of ten Member State strategies that have been published on the European Commission's website⁷.

The first metric to consider is simply the number of strategies submitted. Only six out of 28 strategies were submitted on time, while a further four strategies were submitted during May. Over the following two months, ten further strategies were published, such that, three months after the official deadline eight Member States had still not published their strategies. Two further strategies were submitted in the first half of August 2014, leaving the following six Member States yet to submit their strategies, nearly four months after the deadline:

- Greece
- Hungary
- Luxembourg
- Poland
- Portugal
- Slovenia

In terms of the individual elements of Article 4:

- (a) overview of the national building stock* - For the most part, the strategies have covered this aspect reasonably well, though the level of detail varies by country.
- (b) identification of cost-effective approaches to renovations* - The degree to which opportunities for renovating national building stock were identified varied enormously, from a generic statement about cost optimality levels, through to a detailed enumeration of the number of measures that could be installed in different building types.
- (c) policies and measures to stimulate cost-effective deep renovations of buildings* - Perhaps the most important component of a strategy is the extent to which it identifies the opportunities, but then proposes and puts in place specific policies and measures. A number of Member States, among them the UK, Austria and Germany, have not introduced any new policies. Others, including Malta and Denmark, plan to introduce a significant number of initiatives. Romania and the Czech Republic both identify 15 or more policy initiatives, though the commitment to act on these measures is not clearly stated. Overall, this section includes some interesting aspects, yet falls short of a clear commitment by Member States to significantly increase renovation activity.
- (d) a forward-looking perspective to guide investment decisions of all stakeholders* - This is perhaps the weakest area of the strategies, with only a small number of Member States providing a quantification of investment requirements, or a forward plan on which stakeholders could base their own investment decisions.
- (e) an evidence-based estimate of expected energy savings and wider benefits* - Several strategies identify benefits in general terms, such as job creation, fuel poverty alleviation, reducing the need for supply side investment and improved energy security, yet for the most part, these benefits are not quantified to any significant degree. Where Member

⁷ http://ec.europa.eu/energy/efficiency/eed/article4_building_strategies_en.htm

States do identify an overall energy saving potential or goals, this is not accompanied with a stepwise roadmap that shows how the target saving will be achieved.

Overall, it can be seen that the renovation strategies do not fully meet the basic requirements set out in EED. This is a matter of some concern, since it suggests that there is little policy significance at a national level applied to the role that building renovation can play in terms of a nation's energy and climate change agenda.

Evaluation of Ten Member State Strategies

The following ten strategies have been selected for detailed assessment:

- 1) Brussels Capital Region, Belgium
- 2) Czech Republic
- 3) Denmark
- 4) France
- 5) Germany
- 6) Italy
- 7) Malta
- 8) Netherlands
- 9) Romania
- 10) UK

Brussels Capital Region, Belgium

As a federal nation, much legislation is devolved to the three regions (Wallonia, Flanders and Brussels Capital Region). Brussels has been selected for evaluation as an example of a highly urbanised "city state" region with a dense, mature building stock, much of which is of historical value.

The analytical aspects of the strategy (building stock and appraisal of cost effective renovation opportunities) is well executed, including details of cost optimal renovation costs for different building types. The core policy is the regional Plan Air-Climate-Energy (PACE), which provides a range of measures to stimulate the Brussels market for sustainable construction and buildings with a high energy and environmental performance. Strands of activity include strengthening the exemplary role of public authorities, implementation of incentive measures (such as the label "Green Building"), alternative financing systems, and development of a competent and qualified workforce.

The strategy identifies energy saving potentials only at the level of individual buildings (and then only for residential buildings). No attempt has been made to quantify the total energy saving potential, or to map out an investment horizon. In terms of wider impacts, only the employment benefit is mentioned.

Czech Republic

The Czech renovation strategy covers all aspects of Article 4 in a competent manner, and can therefore be considered a broadly compliant strategy. The ambition can also be seen in the opening paragraph of the strategy: *"Energy efficient building renovation represents an opportunity for the Czech construction and energy sectors. Implementation of this strategy will create new jobs [...] across the country. It will increase the living comfort and improve the use*

of buildings. Households, institutions and businesses will have more funds available for the purchase of non-energy services and goods. An energy efficient construction sector has a strong multiplier effect on the Czech economy and it can thus significantly contribute to its growth. It will also allow saving energy and thus decrease the need to use fossil fuels, which will in turn reduce local pollution and greenhouse gas emissions and increase energy security.”

Of the strategies evaluated, only the Czech and Romanian ones undertook detailed long term modelling of different renovation scenarios, based on BPIE’s renovation model. This is followed up with a comprehensive list of 17 policy initiatives, including embedding building renovation in the national energy strategy. If the measures are implemented in full, the Czech renovation market has a very promising future.

Denmark

The Danish strategy is published as a separate, full colour document, meant to appeal to a wider audience. The focus is on the policy opportunity, with 21 policy areas identified and clear Ministerial responsibilities identified.

From the perspective of the forward commitment, Denmark’s renovation strategy is perhaps the most comprehensive and ambitious, building as it does on previous long standing efforts to decarbonise the economy. This is to be highly commended, as is the extensive stakeholder consultation exercise that involved some 200 participants, which produced a list of recommendations for the government to consider. However, the absence of basic technical requirements means the strategy is the least compliant of those examined.

France

The French renovation strategy is technically competent, covering all dimensions of the article 4 requirements reasonably well. A characteristic of the strategy is the Presidential level commitment to ambitious goals. Overall, France has committed to reducing energy use in existing buildings by 38% by 2020. There are also specific sectoral commitments made by President Hollande. For the residential sector, he announced in 2012 the target to renovate 500,000 dwellings a year, while a year later, he committed to introducing a renovation obligation for the non-residential sector.

Germany

Like a number of Member States, Germany has a long term carbon reduction goal – to achieve a nearly carbon-neutral building stock by 2050. Its existing measures include perhaps the largest single initiative within the EU addressing improved building energy performance, namely the KfW support programme, providing grants and loans to new and existing buildings that significantly exceed minimum requirements. Funding for this scheme is set to continue as one of two main planks of the renovation strategy, the other being the Energy Saving Ordinance (i.e. regulations).

The German renovation strategy includes a comprehensive description of the building stock and its energy performance. However, it does not identify cost effective energy saving opportunities in different building types, instead merely stating that all buildings are different and that a toolkit of measures is required.

Italy

For the most part, the Italian strategy covers the technical aspects adequately, though the non-residential building stock is not fully described. Quantification of energy savings is done on a sectoral basis. In terms of policies, the strategy largely describes the existing measures in place, including tax relief, white certificates, finance for public sector buildings and support for renewable heat. There is also a new €100M fund provided by the National Institute for Work Injuries, linking energy savings with safety. Additional funds for different sectors are also described. In conclusion, the approach appears rather conventional, relying on a variety of funds, alongside the existing tax relief and white certificate scheme, to deliver the expected savings, with little in the way of policy innovation.

Malta

The Maltese renovation 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, negative – 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.

Whilst the strategy does not set out to achieve the level of savings identified, it does introduce a number of initiatives (some of which extend or replace previous ones) designed to stimulate 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.

In conclusion, Malta's renovation strategy fails to meet a number of the article 4 requirements. On a positive note, it identifies the very large cost effective energy saving potential from sustainable renovation of buildings, and recognises this leads to numerous benefits for the constrained island energy system, as well as for consumers. A number of policies are proposed, yet they lack coherence or any indication of scale, which begs the question as to whether they are sufficiently ambitious to achieve the savings potential.

The Netherlands

Like the Danes, the Dutch undertook a stakeholder engagement exercise, which resulted in the publication of an Energy Agreement, with a stated aim to achieve 80-95% reduction in CO₂ emissions by 2050.

The Dutch strategy includes two noteworthy initiatives, by virtue of their innovative nature. One involves an agreement between construction companies and housing associations to deliver 100,000 net zero energy dwellings by 2020. The essence of the concept, which is targeted at relatively poor tenants of homes with high energy bills, is that the savings on energy bills will be used to finance the building renovation. The other initiative is the so-called "Green

Deals”, (not to be confused with the UK Green Deal), whereby the government seeks to unblock specific barriers faced by businesses, civil society organizations and other public bodies in the realisation of sustainable energy projects. Such barriers may relate to legal or regulatory aspects, might concern finding suitable partners, or indeed the right sort of finance. In such situations, the government offers a service to overcome these barriers and facilitate the deployment of sustainable energy solutions.

The Dutch strategy does not cover much of the required technical aspects within the document itself, instead referring the reader to other documents. While the compliance aspect of this approach is questionable, it does at least allow the strategy to focus on the government’s overall approach to renovation, and on policies to stimulate the market.

Romania

The Romanian strategy closely follows the Article 4 sections, and as such is compliant with the EED requirements. It includes the best approach to quantification of non-energy benefits. Using a methodology derived by BPIE, factors are applied to benefits such as improved health and economic development, as a result of which the total societal benefits is nearly five times as great as the energy cost savings alone. Romania (along with Czech Republic) is one of only two Member States to have mapped out detailed long term renovation scenarios.

A comprehensive appraisal of policy options, using BPIE’s Renovation Guide⁸ has been undertaken, from which a prioritised list of policy options covering strategic, legislative, financial, technical and capacity building topics is set out.

UK

UK’s building renovation strategy sets out the country’s rich tradition in retrofitting buildings, often being a leader in the area, for example with one of the first (if not the first) Energy Efficiency Obligations on energy suppliers in Europe. Improving the energy performance of the UK building stock is described as a priority for the Government, since such investments:

- Lead to lower energy bills and increased comfort for occupants.
- Drive innovation and creates new business opportunities, including export potential; and
- Help deliver the UK’s energy security and climate change goals.

Barriers to renovation are described as: embryonic markets; difficulty of accessing relevant and trustworthy information; misaligned financial incentives; and undervaluing energy efficiency. The strategy sets out the complex policy mix that is already in place addressing all aspects of the renovation cycle. No new policies are introduced⁹, as analysis by the Committee for Climate Change indicates the UK is on track to meet its carbon reduction targets.

Overview

⁸ Buildings Performance Institute Europe (2013). A Guide To Developing Strategies for Building Energy Renovation.

⁹ A new Energy Savings Opportunity Scheme (ESOS) for larger companies was launched in June 2014, in response to the energy auditing requirements of EED Article 8.

The table below summarises the overall level of compliance by Member State for the ten strategies that have been evaluated.

Table 1. Evaluation of Member State Compliance with the Requirements of Article 4 EED

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 level of compliance with Article 4
Brussels	5	5	3	3	2	72%
Czech Republic	3	3	4	4	4	72%
Denmark	2	1	4	0	1	32%
France	4	4	4	4	3	76%
Germany	5	2	4	3	4	72%
Italy	4	3	3	3	4	68%
Malta	2	3	3	2	3	52%
Netherlands	3	3	4	3	3	64%
Romania	4	3	4	4	5	80%
UK	5	4	3	3	3	72%
AVERAGE	3.7	3.1	3.6	2.9	3.2	66%

It can be seen that the weakest area is in the forward looking perspective. No Member State set out a clear commitment and timeline as to when different policies will be enacted. In this regard, a roadmap showing policy interventions, investments, funding sources and expected energy savings would be a highly desirable addition to each renovation strategy.

Conclusions and Recommendations

The Energy Efficiency Directive introduced, in 2012, an important new dimension to the energy saving in buildings legislative landscape. Article 4 requires Member States, for the first time, to set out national strategies for the renovation of their building stocks, thereby filling a major gap in policy concerning the existing building stock, with which the vast majority of energy use and resultant carbon emissions will be associated for the foreseeable future. Article 4 stops short of requiring Member States to implement specific measures or policies, but the requirement to develop renovation strategies has stimulated Member States to think more strategically about the long term energy saving and carbon reduction opportunities in this sector.

Inevitably, the first strategies are a learning process in themselves, and so the experience gained here must be translated into a more mature and sophisticated response when the strategies are revised in 2017, and every three years thereafter. In the meantime, the priority for Member States is to implement the commitments made in their own strategies, but also to learn from other Member States' strategies. Furthermore, given the increasingly international nature of the

renovation supply chain (from research, through manufacture, to delivery and installation), Member States are encouraged to work together to effect an EU-wide transformation of existing buildings to highly energy performing ones.

Between them, the renovation strategies that have been considered within this paper present an interesting spectrum of approaches and activities. Based on the best examples identified, the following represents a **recommended approach to renovation strategy development**:

- 1) **Building stock** – a detailed breakdown by building type, age, energy carrier, climatic zone, energy performance, made available in a downloadable form.
- 2) **Cost effective approaches to renovation** – presentation of the results of cost optimality analysis in accordance with the Commission’s guidelines, identifying energy performance levels to be attained in different building types. Note that costs and savings will change over time, as technologies develop, as experience leads to price reductions, and as energy prices change, so cost optimality calculations need to be revisited every three years.
- 3) **Policies** – these need to be geared towards achieving deep renovations (including staged deep renovations) that meet the cost optimal levels identified in 2) above. Policies need to be comprehensive, addressing all six of the following dimensions:
 - a) Strategic
 - b) Legislative/Regulatory
 - c) Technical
 - d) Fiscal/Financial
 - e) Communication/Capacity Building
 - f) R&D
- 4) **Forward-looking perspective** – A roadmap with key dates, targets, milestones etc for the introduction of legislation and support mechanisms should be presented. The roadmap should take a long term perspective, to 2030 at least, with sufficient detail over the next 10 years for stakeholders to plan their business and investment strategies. The forward looking perspective should quantify the total expected investment in building renovation on an annual basis, including an indicative breakdown by expected source (EU funds, national/regional funds, Energy Efficiency Obligations, private investment funds, building owners). To support the forward perspective, modelling of different uptake scenarios should be undertaken.
- 5) **Quantification of benefits** – In addition to the energy, carbon and cost savings, Member States should factor in the quantifiable wider benefits in terms of economic impact (e.g. GDP growth, increased property values), societal impacts (e.g. improved health), and environmental benefits (e.g. a valuation of the reduction in greenhouse gas emissions and other air pollutants). Where national data sources are available, these should be used; otherwise, international sources, such as the IEA, respected research institutes or economic consultancies can be utilised.