Energy performance of buildings


Background

This note seeks to provide an initial analysis of the strengths and weaknesses of the European Commission's impact assessment (IA) accompanying the above proposal, submitted on 30 November 2016 and referred to Parliament's Committee on Industry, Research and Energy. With this initiative, the Commission aims to update the current Energy Performance of Buildings Directive (EPBD)\(^1\) to help promote the use of smart technology in buildings and to streamline the existing rules.

The proposal, which was published as part of a comprehensive energy package and is one of the REFIT initiatives in the area of energy, seeks to engineer the clean energy transition, 'while remaining competitive'. Currently, buildings account for approximately 40% of final energy consumption in the EU and contribute about 36% of EU greenhouse gas (GHG) emissions.\(^2\) The level of investment in energy efficiency in Europe is still below its economic potential and the cost-effective saving potential in the building sector is significantly higher than the savings achieved so far (IA, p. 5).

Problem definition

The IA identifies as the basic problem that 'under business as usual, large amounts of cost-effective saving potentials and economically viable investments in energy efficiency in buildings will not take place. This is damaging in its own right, given the benefits for security of supply, the environment, reduced energy costs for households and businesses and potential for increased jobs and economy-wide economic activity. It is all the more problematic given that the achievement of a significantly higher rate of energy savings is a key part of the EU 2030 energy and climate targets (IA, p. 8).' Moreover, the IA identifies the importance of the electrification of transport for decarbonising the sector and raising the share of renewable energies. In this context, the Commission considers the availability of recharging stations for electric vehicles in private parking spaces essential (IA, p. 9). Finally, the IA emphasises 'a large potential for tapping other economic, social and environmental benefits' referring to a 2014 report of the International Energy Agency (IA, p. 10).\(^3\)

The problem drivers are categorised as 'structural', 'market failures', and 'regulatory failures' (IA, pp. 12-16, see also table 1, p. 13 and the problem tree, p. 35). Structural drivers relate to the low replacement and refurbishment rates of buildings as well as a differing building stock across the Member States (IA, pp. 14-15). With regard to market failures, the IA notes 'a general lack of understanding among households and building


\(^2\) For further information, see N. Šajn, 'Energy Efficiency of Buildings', Briefing, EPRS, May 2016.

owners of their energy use, and potential savings related to different energy efficiency measures as well as insufficient knowledge on financial and other benefits related to building renovation. In addition, the IA states that there is a lack of attractive financing products on the market and a lack of data on building characteristics, energy use, and financial implications of renovation in terms of cost savings or asset values, which has negative consequences (IA, pp. 15-16). Regulatory failures relate to gaps in the implementation, enforcement or compliance of the EPBD, the key provisions of which include the requirement that new or majorly renovated buildings meet nearly zero energy standards (nZEB) by 2021 (2019 for public sector buildings) (IA, pp. 15-16).

In terms of financing, the IA explains in its section 2.6 that the smart finance for smart buildings (SFSB) initiative would contribute to the development of an improved financing environment for energy efficiency investments. More specifically, the SFSB initiative would channel and combine existing EU funds from a range of sources, with project management and financial advice coming from the Commission. The public funds would seek to attract further private financing. The IA notes that this initiative would bring practical solutions to address the remaining barriers to capital mobility and affordable access to finance (IA, pp. 17-21).

Objectives of the legislative proposal

The overall objective of the Commission proposal is 'to promote the improvement of the energy performance of buildings within the Union, taking into account outdoor climatic and local conditions, as well as indoor climate requirements and cost-effectiveness' (IA, p. 29). The general objective of the review of the EPBD, including the 'smart finance for smart buildings' initiative, is to promote greater take-up of energy efficiency in the buildings sector and deliver cost-effective GHG emission reductions, as well as to contribute to ensuring security of energy supply in the Union. The specific objectives of the initiative are (IA, p. 30):

1. To address the shortcomings identified by the evaluation of the EPBD so as to ensure it remains fit for purpose (REFIT component);
2. To consider the need for additional measures relating to energy efficiency and the use of renewable energy in buildings, with a 2030 perspective;
3. To deliver improved access to funding and stimulate investments ('smart financing for smart buildings').

Range of options considered

The IA proposes a number of measures and groups them into three policy options, including a non-regulatory one (see IA, table 2, p. 36). These measures concern: (1) the decarbonisation of buildings by significantly increasing renovation rates; (2) the implementation of minimum energy performance requirements; (3) the use of smart technologies and simplification of outdated provisions for the benefit of citizens; (4) financial support and information to users through reinforced energy performance certificates (IA, pp. 32-34; Annex 6). The reference scenario assumes a set of boundary conditions for the policy environment, since the EPBD is co-delivering in synergy with other energy efficiency legislation and financial support measures (IA, p. 36; Annex 4).

No-change option (baseline scenario)

This option would imply the continued implementation of the current EPBD and related regulatory and non-regulatory instruments and support measures, such as sharing of good practices, but no additional EU measures as a result of a revised EPBD. The IA emphasises that 'this option would not [however] enable addressing the conclusions of the recent evaluation of the EPBD and would prevent simplifications of outdated provisions to be introduced, enhancing compliance through fine tuning of existing provisions and better linking them with financial support; and modernising the EPBD in light of technological developments and the need to accelerate renovation rates and support decarbonisation of buildings' (IA, p. 31, see also section 2.6, p. 23).

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4 Including from regional and structural funds, such as the European Structural and Investment Funds (EFSI) as well as from the European Investment Bank (EIB).
5 The IA also proposes two simplification measures, which are explained below in the section on 'Simplification and other regulatory implications'.
Option I: Enhanced implementation and further guidance
This option would provide for enhanced implementation of the existing regulatory framework without amending the directive. This option would build on the work carried out at EU, national and regional levels to implement the directive. The Commission clarifies that, compared with the no-change option, option I goes one step further in proposing soft law and guidance that could improve the implementation and enforcement of the legislation and the use of voluntary measures which have not yet been explored by Member States (IA, p. 36).

Option II: Enhanced implementation, including targeted amendments for strengthening current provisions
This policy option would go beyond measures in option I and would require targeted amendments of the current EPBD. However, the IA points out that this option would stay in line with the intervention logic of the current EPBD (IA, p. 37). Option II would address most drivers associated with market failures by:
- sending a clear signal to the market regarding existing buildings, by placing the long-term renovation strategy within the ambition to decarbonise the building sector by 2050, with milestones in 2030;
- developing a framework to support the flowing of financial resources into the buildings sector, in particular for building renovation;
- developing a smartness indicator that informs consumers about the ability of buildings to operate more efficiently, monitor and control energy use and interact with users and the grids;
- support the development of infrastructure to support the roll-out of electro-mobility solutions.

Option II would also address drivers associated to regulatory failures by:
- improving the effectiveness of energy performance certificates (EPCs) with measures that strengthen, modernise and further integrate the EPC schemes within a framework that aids compliance checking and effectiveness of financial support;
- simplify the EPBD with measures that modernise the provisions related to regular inspections with information and communications technologies (ICT) and repeal of the provisions related to mandatory documented feasibility study for efficient systems (IA, pp. 37-38).

Option III: Enhanced implementation towards further harmonisation and higher ambition
This option would imply significant legislative revisions and include the most ambitious measures explored, 'some of which going beyond the current intervention logic of the EPBD' (IA, p. 38). Option III would address drivers associated with market failures by having a more direct market action to boost the activity and investments. In requiring buildings to reach a given standard before they are sold or rented, the intervention goes beyond the logic of setting minimum energy performance standards in building codes. Option III would also further address drivers associated with regulatory failures by harmonising aspects so far left to subsidiarity:
- additional sustainability co-benefits in the cost-optimal calculation framework;
- new targeted ambition for new buildings in 2030, beyond cost-optimality and including the mandatory setting for minimum requirements for the indoor environment;
- further harmonisation of the EPCs (IA, p. 38).

It appears that the IA discusses Option II in greatest detail, by providing a table listing drivers and indicating concrete measures to address them (IA, Table 3, p. 37). Detailed descriptions of the measures are provided in Annex 6 of the IA. Option II is the preferred option because the Commission considers it to be 'the best aligned with the outcome and findings of the evaluation of the EPBD and the existing European framework for climate and energy towards 2020 and 2030. [...] This option introduces significant improvements to the EPBD and the overall regulatory framework for improved energy performance of buildings via targeted amendments, while allowing a high level of flexibility for the implementation at national level' (IA, p. 44). The operational objectives of the preferred option are to maximise the role of the directive in raising renovation rates; to enhance further the removal of barriers to energy efficiency in buildings; and to make the building stock in the EU smarter, integrating technological developments and promoting electro-mobility (see executive summary of the IA, p. 2).
Scope of the impact assessment

The IA first assesses and then compares the various impacts of each option (IA, pp. 38-44). It is pointed out that the impacts have been assessed with models and underlying assumptions, which are explained in Annex 4 of the IA. As far as environmental impacts are concerned, the implementation of all options would, to varying degrees, contribute to the reduction of the demand for space and water heating final energy consumptions in residential and non-residential buildings by 2030 relative to the reference scenario. For Option I, the reduction would amount to about 2 Mtoe, which would be a result of improving the national calculation methodologies, and progress towards cost-optimal and easier enforcement of minimum requirements. By contrast, for Option II the estimated reduction of final energy consumption for space and water heating final energy consumptions in households and services would be around 28 Mtoe by 2030 (see Annexes 4 to 9 of the IA). For Option III, in turn, the estimated reduction of final energy consumption for space and water heating final energy consumptions in households and services would be around 72 Mtoe by 2030 (IA, pp. 38-41).

As to economic impacts, the IA assesses economic growth, investment, industrial competitiveness, SME growth, public budget, consumers and households, energy independence, value of buildings and administrative costs for each option (see Annex 8 of the IA). The macroeconomic impacts of Option I are considered modest, with a slight positive impact on GDP. By comparison, Option II is assessed as having a slightly more positive impact on GDP than Option I. Regarding investment, only €1 billion to €4 billion would be directly mandated by the measures under Option II (the majority of estimated additional activity would result from decisions taken by actors based on better information). Just as Option II, the Commission regards Option III as a cost-effective policy option considering the economic impacts with, however, uncertain impact on the real estate market, and it would probably step outside the subsidiarity and proportionality limits of EU intervention (IA, pp. 39-42). The IA assesses the additional energy-related activity (roof insulation, windows replacement, building system upgrade, etc.) for the EU construction sector under Option III at approximately €101 billion. 'Amongst these, €52bn to €59bn would be directly mandated by the measures of this option, mainly by the Measure 1B that introduces mandatory requirements to significantly reduce the number of very inefficient buildings' (IA, p. 42).

In terms of social impacts, Option I would have small impacts. According to the IA, Option II would entail positive impacts, with employment increased by approximately 220 000 persons and the reduction of energy poverty for between 515 000 and 3.2 million households compared to the 2030 reference scenario (IA, Table 8, p. 42). The Commission finds that Option III would retain or create more than 500 000 additional jobs, and reduce energy poverty for between 1.5 and 8.3 million households (IA, p. 42). Regarding budgetary implications, the IA makes clear that Option II would reduce the administrative burden of the directive by €98.1 million per year (IA, p. 41 and Annex 9). By comparison, the overall net burden reduction would be slightly higher under Option III, and would amount to €0.7 million per year, mainly on the public sector, under Option I (Annex 8 of the IA).

The impacts on health of the different options are specified in Annex 8 of the IA. While mortality, morbidity and healthcare costs due to indoor climate, as well as loss of productivity at work, are only marginally reduced under Option I, such costs would be significantly reduced under Option II (€211 million cost savings from lower mortality and €36 million lower healthcare costs in 2030) and Option III (€793 million cost savings from lower mortality and €133 million lower healthcare costs in 2030). In respect of the territorial/regional dimension, the IA states that a pilot assessment of potential territorial impacts of the EPBD7 showed rather positive effects in the fields of economy, society, environment and governance. However, these effects would largely depend on the quality of transposition and enforcement (IA, p. 22). According to the IA, the EPBD sets a common minimum framework, but leaves implementation and adaptation to national and local conditions to Member States, with significant margin to take into account the local conditions (and would therefore respect subsidiarity) (IA, p. 23). The Commission in the end compares the options in view of their effectiveness, efficiency, coherence and

6 See also section below on 'Quality of data, research and analysis'.
subsidiarity, and comes to the conclusion that Option III should be excluded due to subsidiarity and proportionality concerns (IA, see comparative Table 8, pp. 42-45).

**Subsidiarity / proportionality**

The proposal is based on Article 194(2) TFEU, which stipulates competence for a Union policy to promote energy efficiency and energy saving (IA, p. 23). The IA explains that 'EU intervention on energy efficiency of buildings expanded prudently, only where it was justified and leaving significant flexibility to Member States. The EPBD respects subsidiarity by setting a common minimum framework and leaving implementation and adaptation to national and local conditions to Member States, with significant margin for taking into account the local conditions.' The IA states that the EPBD works through a combination of minimum standards (driving the market towards higher efficiency) and labelling (stimulating the creation of a market for energy efficient buildings). 'However, the EPBD leaves the development of these instruments to the national/regional/local authorities, under the principle of subsidiarity' (IA, p. 23).

For example, Member States are free to adopt a calculation methodology for the energy performance of buildings, at national or regional level, provided that it respects the general framework. Member States can also define the set-up and management of the EPC schemes, in light of achieving the objectives proposed in the directive. The IA points out that Member States remain responsible for taking appropriate measures to avoid negative effects on the quality of the indoor environment, and to design the supporting measures in such a way that they, for instance, contribute to reducing energy poverty, split incentives for tenants and landlords, and offer effective financial support (IA, p. 24). It is further highlighted that the EPBD addresses the information barrier by ensuring informed decisions on buying, renting and investing in buildings. 'The Directive does not directly mandate investments and, under the EPBD, building owners remain single decision-makers to invest or not' (IA, p. 24) except for new or majorly renovated buildings, which need to meet nZEB requirements by 2021 (2019 for public-sector buildings). The IA examines the subsidiarity and proportionality of the preferred option in its section 6.3, as well as in Annex 6 with regard to individual measures.

Two reasoned opinion were submitted by the Dutch Senate and the Dutch House of Representatives before 27 January 2017, the deadline for submissions by national parliaments. Both chambers contest the compliance of the proposal with the principle of subsidiarity stating that although European cooperation in the area of energy saving can be beneficial, the implementation of the applicable measures must allow for national appreciation in order to take account of local conditions and developments.

**Budgetary or public finance implications**

According to the explanatory memorandum to the legislative proposal, there are no implications for the EU budget (explanatory memorandum, p. 9). For the Member States’ administrations, the IA specifies the estimated reduction of administrative costs (IA, Annexes 8 and 9) because of streamlined and simplified requirements for inspection of buildings, as well as removing the study of the feasibility of high-efficiency alternative systems.

**SME test / Competitiveness**

The IA underscores that EU action on energy performance of buildings has a positive impact on the competitiveness of related sectors, and ultimately on growth and jobs (IA, p. 25). It is also highlighted that ‘increasing building renovation depth and rates can contribute to the sustainability and competitiveness of the construction sector, e.g. by improving environmental performance and creating business opportunities in line with the Strategy for the sustainable competitiveness of the construction sector and its enterprises’ (IA, p. 29). In general, the Commission observes that SMEs would benefit from investment in building renovation and higher demand from consumers (Annex 8 of the IA). Option I would only contribute marginally to the competitiveness of European industry (mainly insulation and flat glass) by increasing their market, and have some impact on

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8 See the Platform for EU Interparliamentary Exchange (IPEX).
SMEs in the renovation market. Moreover, the IA indicates that additional energy-related activity for the EU construction sector associated with this option is approximately €2 billion (IA, p. 39). Option II and Option III would contribute significantly to the competitiveness of European industry by increasing their market. For Option II, this increase would amount to €23.8 billion at EU level in 2030, and Option II would also create a renovation market for SMEs with a value between €80 billion and €120 billion, involving about 220 000 retained/created jobs compared to the 2030 reference scenario. For Option III, the market increase would amount to €30 billion at EU level in 2030, and Option III would create a renovation market for SMEs with a value between €167 billion and €250 billion (IA, pp. 40-41).

**Simplification and other regulatory implications**

The IA suggests two specific measures to simplify the current EPBD. These measures envisage removing the mandatory study of the feasibility of high-efficiency alternative systems in light of the nZEB obligation for all new buildings, and simplifying the provision on regular inspections to ensure that their objective is achieved more effectively in respect of technological progress (IA, p. 32). According to the evaluation of the EPBD, the latter directive is in synergy with other EU legislation (IA, p. 28):

- the objective of the EPBD to support the increase of building renovation depth and rates is supported by other EU legislation; inter alia, by the Energy Efficiency Directive (EED)\(^9\) and by the European Structural Investment Funds (ESIF) regulatory framework;
- the obligations arising from the EPBD to set and ensure minimum energy performance requirements for building elements, on the one hand, and the EU legislation on ecodesign and energy labelling of energy efficiency of products, on the other hand, were found to be coherent;
- the provisions of the EPBD naturally drive the use of renewable energy sources, consistent with Directive 2009/28/EC;\(^10\)
- in order to achieve the 40% reduction target for GHG emissions in 2030, established in line with the cost-effective pathway described in the 2050 Roadmaps, the non-ETS sectors (buildings, transport and agriculture) need to cut emissions by 30% (compared to 2005 levels);
- the EPBD and Directive 2014/61/EU\(^11\) can be mutually supportive by creating the demand and the offer, respectively, for high-speed electronic communication networks.

The IA refers to the energy union and the 2030 EU climate and policy framework establishing EU commitments to save at least 27% energy [as suggested by the European Council in October 2014\(^12\) with a review 'having in mind an EU level of 30%' to increase Europe’s energy security, competitiveness and sustainability (IA, p. 4). In this way, the IA refers to the 27% indicative reduction target of the European Council, while hinting at the more ambitious proposed 30% binding target in the revised EED proposal.

**Quality of data, research and analysis**

It appears that the IA has been prepared on the basis of sound research and analysis, taking into account the findings of the ex-post evaluation of the EPBD. The IA states that "additional studies in support of the ex-post evaluation of the EPBD, ex-ante analysis of policy options and modelling including of "smart financing for smart buildings" and modelling were launched in the first quarter of 2015 in the light of the evaluation and Inception Impact Assessment roadmaps, which were published respectively in July and November 2015" (IA, Annex 2, p. 49). However, no further references to these additional studies were provided in the IA. The IA points out that "the robustness of the results and their policy implications is ensured by the combination of a bottom-up

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The overall modelling results were calibrated using the 2014 energy efficiency cost-effective potentials study, conducted by Fraunhofer ISI. This comprehensive study used a wide set of modelling tools of primary/final energy demand (e.g. Invert/EE-Lab model, run by TU Wien, for residential and non-residential buildings, Forecast platform electricity uses in the residential and service sector, etc.) (IA, p. 72; Annex 3). The estimate of the administrative costs imposed by EU legislation was conducted using the Standard Cost Model, in the sense that the administrative burdens are calculated on the basis of the average cost of the required administrative activity (price) multiplied by the total number of activities performed per year (quantity) (see IA, Annex 9).

**Stakeholder consultation**

The IA identifies various stakeholders affected by the initiative, including public authorities (national, regional and local), entrepreneurs, labour-market participants, households, investors and other financial actors (IA, p. 22). Except for a stakeholder event on 14 March 2016, the section on ‘Consultation with stakeholders’ in Annex 2 of the IA refers essentially to Annex 4 of the evaluation report (published with the IA) for consultation activities.

The Commission consulted broadly for the evaluation of the EPBD. The Commission conducted an open internet-based consultation (containing 79 questions) on the evaluation of the EPBD from 30 June to 31 October 2015. According to the synthesis report of the consultation, of the 308 respondents, more than half (58%) were organisations, mainly representing the construction sector industry, followed by companies (20%) operating in the Member States. Individuals, public authorities and others represented 7.8% of the respondents. Many of the respondents state that the EPBD has set a good framework for improving energy performance in buildings and that it has raised awareness on energy consumption in buildings, giving it a more prominent role in energy policy and its necessary contribution to 2030 and 2050 energy and climate targets. Almost half of the respondents think the EPBD has been successful, while a third believes it has not. Several respondents said that it is too early to say how successful the EPBD has been, or that it is difficult to isolate its effect. Many were rather critical, stating that it is not as effective as it could be due to the delayed implementation in Member States, the slow uptake of measures, the low renovation rate, poor compliance and enforcement, as well as the effects of the economic crisis (see synthesis report of the consultation).

Overall, the information on stakeholders’ views in the IA could have been more precise. It appears that the IA does not provide a breakdown of the stakeholder support for each option; it is merely specified that Option II ‘is supported by stakeholders, including Member States’ (IA, p. 44). Member States were also consulted through the EPBD Concerted Action on 26-27 November 2015, and a meeting of the committee (set up under Article 26 of the EPBD) on 1 February 2016. The Commission moreover organised seven workshops between November 2015 and January 2016 (EPBD evaluation, pp. 40-46).

**Monitoring and evaluation**

In 2016, the European Commission put in place the EU Building Stock Observatory as a key tool for monitoring and steering the improvement of energy efficiency in buildings, and supporting the implementation of the EPBD;

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12 Study evaluating the current energy efficiency policy framework in the EU and providing orientation on policy options for realising the cost-effective energy efficiency/saving potential until 2020 and beyond, 2014, Fraunhofer ISI.
external contractors collect data from readily available sources at European and national levels. The IA states that the Observatory includes indicators on building stock, in-use energy consumption, fuel mix, technical systems; certification, financing and energy poverty (Annex 13 of the IA contains a detailed list of indicators, which was drafted with the collaboration of national authorities and industry stakeholders). The IA presents extracts of the data already available in the EU Building Stock Observatory in Annex 11 of the IA (IA, p. 46).

In addition, the Energy Statistics Regulation (EC) No 1099/2008 was amended in 2014, in order to ‘cover the final energy consumption in households not only by type of fuel but also by type of use (space heating, space cooling, water heating, cooking, lighting and appliances, and other uses). The first legally binding data collection will cover the reference year 2015; in the meantime, Eurostat has encouraged Member States to proceed to a voluntary data collection – one third of the Member States have participated’ (IA, p. 46). In addition, a methodology to evaluate the energy performance of existing and new buildings at municipal scale is being developed, and would contribute to filling information gaps in future evaluations (IA, p. 46).

**Commission Regulatory Scrutiny Board**

The European Commission’s Regulatory Scrutiny Board (RSB) first delivered a negative opinion on a draft version of the IA of 3 May 2016. The RSB highlighted shortcomings related to (1) the problem definition and key drivers; (2) the description and analysis of options, compliance with the principles of subsidiarity and proportionality, as well as the expected impacts; (3) the links between the options, the associated investment needs and the financing sources/incentives; (4) a more elaborate analysis and, where possible, a quantification of administrative costs and burdens. In its second, positive opinion on a re-submitted version, of 1 July 2016, the RSB acknowledged some improvements, but also emphasised that a number of shortcomings identified in its first opinion were not satisfactorily dealt with. These concern the analysis of subsidiarity and proportionality, an overall assessment of the regulatory costs, and financing related to the impacts of the preferred option. It seems that the final IA report has appropriately addressed the RSB’s recommendations (see Annex 2, pp. 51-52).

**Coherence between the Commission’s legislative proposal and IA**

The Commission’s legislative proposal seems to follow the recommendations expressed in the IA.

**Conclusions**

The IA appears to provide a thorough analysis of the current situation and of the likely impacts of the proposed options, based on sound and comprehensive research. The Commission explains the models used for the analysis and is open about the key assumptions. The IA relies largely on the wide stakeholder consultation activities carried out for the ex post evaluation of the EPBD (published on the same day as the IA). However, generally speaking, the information on stakeholders’ views in the IA could have been more precise; the stakeholder support for each option is not readily apparent from the IA.

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