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Hywel Davies
CIBSE, hdavies@cibse.org

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The Energy Performance of Buildings Directive – where are we going?



Dr Hywel Davies
TECHNICAL DIRECTOR, CIBSE
hdavies@cibse.org

Abstract

The EU adopted the Energy Performance of Buildings Directive in 2003 to help to measure, manage and reduce energy consumption and consequential carbon emissions related to buildings. It introduced the concept of energy certificates for buildings on construction, sale or rent. It required energy certificates for display in many public buildings across Europe and introduced regular inspections of heating and air conditioning systems. The Directive was recast in 2010, to include a number of amendments aimed at improving the effectiveness of the legislation. The Directive is now being reviewed again and the European Commission, the Parliament and the Council of Ministers are now engaged in a three-way process of negotiation to finalise the text.

This paper looks at the history of the implementation of the EPBD and considers how the recast might affect buildings in both Ireland and the UK. It also seeks to offer a wider perspective on how the Directive may be able to help address the energy challenges we face in both Ireland and the UK.

Keywords

EPBD, energy performance, emissions reduction, refurbishment, minimum energy standards.

Glossary

Building Energy Rating – BER

Committee on Industry, Research and Energy – ITRE

Electric Vehicles – EV

Energy Efficiency Directive – EED

Energy Performance of Buildings Directive – EPBD

Energy Performance Certificates – EPCs

Information and Communication Technologies – ICT

Member States – MS

National Energy Efficiency Action Plan – NEEAP

Nearly Zero Energy Buildings – nZEB

Summary

The Energy Performance of Buildings Directive^[1], or EPBD, came

into force on 4 January 2003, and was implemented across Europe between 2006 and 2008. It introduced the concept of an energy certificate for a building, required when a building is constructed, sold or rented out. It also introduced energy certificates for many public buildings, which should be displayed in an accessible location. And it introduced regular inspections of heating and air conditioning systems.

The Directive was recast in 2010, with various amendments which were implemented between 2011 and 2013. There were a number of changes to the detailed requirements of the EPBD, all aimed at improving the effectiveness of the legislation. The EPBD is now being reviewed again, with the European Commission and Parliament and the Council of Ministers now engaged in a three way process of negotiation to finalise the text of “EPBD 3”.

This paper looks at the implementation of the EPBD to date and considers how the recast might affect buildings in both Ireland and the UK. It also seeks a wider perspective on how the EPBD can help to tackle the energy challenges we face in each jurisdiction.

Background

The EPBD is almost 20 years old in concept. In 2000 the EU adopted an energy efficiency action plan, which led to a call for specific measures to address the energy efficiency of European buildings. It was then estimated that the EU had 160 million buildings which were responsible for over 40% of Europe’s energy consumption and associated carbon dioxide emissions, a proportion that was then increasing. Current EU figures suggest that buildings still consume 40% of energy and are responsible for 36% of carbon emissions

Fuel for space heating accounted for half of overall building energy use, with water heating accounting for a further third of which 25% was in domestic and 9% in non-residential buildings. The European Commission estimated a saving potential of around 22% of consumption in buildings in 2000 could be realised by 2010, on which basis the original EPBD was adopted

The primary aims of the EPBD were to raise awareness of energy use in buildings, encourage the building sector towards more ambitious energy efficiency standards, and increase the use of renewable energy sources. A key requirement was for member states to review their energy performance standards for buildings and report the findings to the commission at least every five years. It also set out to require member states within the EU to take steps to make energy use in buildings more transparent and widely understood.

Energy Certificates have played a prominent role in informing potential purchasers and tenants about the energy performance of building units, such as an apartment or office space, or of entire buildings. They allow comparisons of buildings or building units in terms of their energy efficiency. In theory they should influence the demand for buildings with better energy performance and using a high proportion of energy from renewable sources. This was expected to increase their market value and provide a market driver to stimulate building owners to renovate their buildings.

In both the UK and Ireland the EPBD changed the way that energy use in buildings is regulated, both for new buildings and refurbishments. While Northern Ireland and the Republic of Ireland, and indeed England, Wales and Scotland, all have their own building regulations and standards, each was significantly changed in response to the adoption of the EPBD. In particular, the introduction of energy certificates for construction, sale or rental of a building set in train the creation of a new industry dedicated to the provision of energy certificates and the training, certification and management of energy assessors, particularly in the domestic sector.

The Directive was recast in 2010 with strengthened targets for the adoption of low-carbon technology and the introduction of the concept of nearly zero energy buildings (nZEB), which the Directive requires to be adopted by member states throughout the EU by 2021 for all buildings, and 2019 for the public sector. The recast also required national plans for nearly zero energy buildings. Article 2 set out the full requirements, as follows:

- (1) The common general framework for a methodology for calculating the integrated energy performance of buildings and building units;
- (2) The application of minimum requirements to the energy performance of new buildings and new building units;
- (3) The application of minimum requirements to the energy performance of:
 - existing buildings, building units and building elements that are subject to major renovation;
 - building elements that form part of the building envelope and that have a significant impact on the energy performance of the building envelope when they are retrofitted or replaced; and
 - technical building systems whenever they are installed, replaced or upgraded;
- (4) National plans for increasing the number of nearly zero-energy buildings;
- (5) Energy certification of buildings or building units;
- (6) Regular inspection of heating and air-conditioning systems in buildings; and
- (7) Independent control systems for energy performance certificates and inspection reports.

The UK National Energy Efficiency Action Plan (NEEAP) was issued in July 2011^[2], updating a previous document issued in 2007. Scotland published “Conserve and Save: Energy Efficiency Action Plan (EEAP)”^[3], in October 2010, setting out Scottish Government policies and options on energy efficiency. Publication and periodic updating of NEEAPs is an obligation under EU Directive 2006/32/EC on energy end-use efficiency and energy services which has since been superseded by EU Directive 2012/27/EU on energy efficiency^[4]. The latter directive also includes a requirement for all member states to establish long-term strategies for energy efficient renovation of buildings.

Ireland was ahead of both, with its first *National Energy Efficiency Action Plan* published in 2009, and updated in June 2011 in

response to the EPBD recast, and again in 2014. The full set of documents is available online^[5] on the website of the Department of Communications, Climate Action and Environment. The Plan sets a clear vision for each sector it covers to enable both public and private sectors to mobilise. The Plan has been reviewed and updated and certain actions from the first version replaced as appropriate to endeavour to stay on target to meet national and EU targets.

The recast also placed a greater emphasis on enforcement. Article 27 of the recast required that “penalties provided for infringements against national provisions must be effective, proportionate and dissuasive.” There has been some controversy in England and Wales about whether this Article has been implemented in a meaningful way in practice.

What has the EPBD achieved?

There have been several achievements in energy policy in the EU, to which the EPBD has no doubt contributed in some part.

Decoupling of energy demand and economic growth

Energy demand and economic growth have been effectively decoupled in the EU, a point which is also made by the UK government in its recent Clean Growth Strategy. Whereas previously energy efficiency progress kept energy demand stable despite economic growth, the European Commission argues that Europe’s economy can now grow while also achieving energy savings in absolute terms, as shown in Figure 1. Between 2000 and 2014 the ratio of aggregate primary energy use to GDP fell by around 20%.

Even in the recent financial crisis energy savings from improved

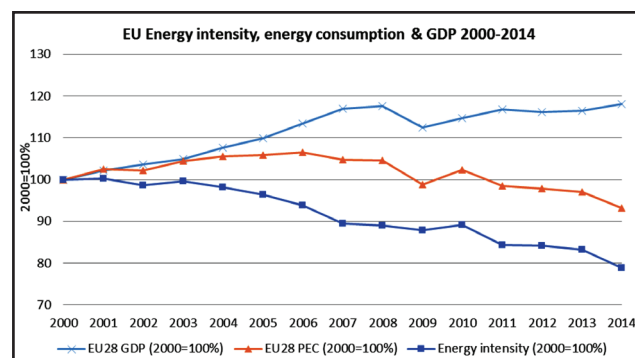


Figure 1. Evolution of energy consumption and GDP in the EU 2005- 2014

(Source: Eurostat).

energy efficiency appear to have outweighed reduced demand caused by the downturn. If this is not the case, then the challenges we face in meeting the future targets set out in national plans, in the EU energy strategy and by the Paris Agreement are even greater. However, energy efficiency actions can stimulate economic growth and counter the adverse effects of an economic downturn. Some EU member states’ (MS) energy efficiency action programmes actively seek to harness this macroeconomic benefit.

While consumption trends vary significantly across member states, this is largely due to supply and demand structures in the energy system and reflects successful experiences from early adoption of

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energy efficiency measures in certain sectors and member states. This suggests that analysis and exchange of good practice is essential to deliver further energy savings by 2030, in line with EU targets and indeed in line with UK targets set out in response to the UK Climate Change Act.

One excellent but possibly little-known example of this is the EU Concerted Action for the EPBD, which started at the time of the first Directive and has continued to this day, bringing together experts and officials to share experiences and best practice examples. The Concerted Action has produced valuable information on the implementation of the EPBD^[5].

Improved standards of building energy efficiency

The EPBD required member states to adopt a national minimum energy efficiency standard for new buildings. This was to be based on a set of specific properties described in an Annex to the EPBD, and member states were encouraged to adopt European Standards, but each member state was responsible for setting their own minimum. The EPBD did require each member state to undertake a "cost optimal review", effectively a life-cycle analysis of their minimum standard, using a Commission-prescribed methodology every five years, and report the results, and then to review the national minimum standard against that review. As a result a variety of standards apply across the EU.

In many countries this triggered interest in the private sector and, in some member states in social housing, to go beyond the minimum standards or seek to undertake energy-saving refurbishment of the existing building stock, an example being the KfW building programmes in Germany^[7].

The evaluation of the recast EPBD in 2016 shows clear progress in improving the efficiency of the building sector as the decrease in energy consumption per unit floor area accelerated markedly after 2006 when the original EPBD came into force. This was further reinforced by the effect of the recast EPBD in 2013 and 2014. There is evidence of around 37 million tonnes of oil equivalent (Mtoe) in additional final energy savings in 2013 compared to the 2007 baseline of the recast EPBD. This is taken by the EU to indicate that the Directive is likely to deliver the expected impacts by 2020. However, recent coverage in Ireland^[8] has suggested that Irish emissions may currently be rising.

Reduced energy demand in heating, hot water and lighting

It is hard to define just what the EPBD has achieved and what is due to minimum energy efficiency standards for energy-using products, such as heating and lighting appliances, as illustrated in the Figure 2. This shows that over half the savings in energy are due to improvements in lighting, space heating and water heating products, which together account for 55% of the savings.

It is essential to note that Figure 2 combines actual savings to 2016 with projected savings to 2050. Its purpose is to show the savings attributed to products as a consequence of the Ecodesign policy, which works alongside the EPBD and EED.

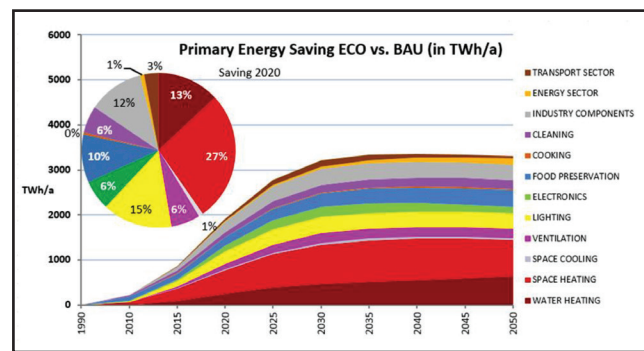


Figure 2. Primary energy saving of products in Ecodesign impact accounting
Source: "Ecodesign Impact Accounting – Status January 2016" Van Holsteijn en Kemna B.V. (VHK) for the European Commission.

These savings have been realised because of the specific requirements of the Ecodesign framework for these product families, and not as a result of the EPBD. However, more efficient products were a requirement to meet some of the more challenging aspects of energy certification, and the EPBD will have helped to drive the uptake of more efficient heating, hot water and lighting systems. While it is also arguable that the savings in lighting energy would have been realised without legislation as LEDs came into the market, the speed of adoption has been driven by the Ecodesign framework and the drive to improve standards under the EPBD.

It is also clear that without regulatory action on lighting sources there would have been a significant body of late or non-adopters of energy efficient-lighting, motivated in part by a dislike of change but also driven by the poor experience of some of the early energy-efficient light sources, which had performance and durability problems over time.

The "Clean Energy Package"

On 30 November 2016, the European Commission adopted a "Clean energy for all Europeans" package. It consists of eight legislative proposals and other actions to help the EU meet its 2030 energy and climate goals. These include a targeted revision of the 2010 Directive on the energy performance of buildings. The Commission proposal retains the main features of the existing EPBD and modernises and streamlines other requirements. It introduces binding obligations on electro-mobility requirements in buildings, introduces a "smartness indicator", and sets clearer requirements for national databases on energy performance certificates.

What changes could the proposed revision bring?

The Commission proposes a targeted revision of the EPBD, retaining the overall objectives while making limited changes to improve the way the Directive functions. This retains the main features of the current EPBD but modernises and streamlines some specific requirements. There are mandatory obligations on electro-mobility requirements in buildings and a new "smartness indicator", intended to indicate the technological capability or readiness of buildings for energy self-production and consumption and measurement.

There are also clearer requirements for national databases on energy

performance certificates. Ireland has already been identified as exemplary, along with Portugal, in following the Danish model in the way that it operates the national register of energy certificates and for its BER software. Although the UK opted to create a national database when implementing the EPBD, it was considered that it went beyond the strict requirements of the original Directive. If the EPBD had come into force after 2010 it is hard to imagine that a database would have been established.

While the overall evaluation of the EPBD^[9] was positive, there are areas which could be further strengthened. Energy performance certification schemes and their independent control could be enhanced in several member states. There is also a widespread feeling that in many member states more could be done to enforce the national provisions which implement the current Directive before making any further changes. While Ireland has a good BER system, there is a view that it is not so well applied or enforced in practice, a view which is widely held about the energy certification regime in the UK.

In the public consultation on the EPBD undertaken for DG Energy in 2015, many stakeholders were critical of the uneven implementation across member states. Three hundred and eight (308) stakeholders replied from all EU member states: 58% were organisations such as business associations and professional bodies; 20 % individual companies; and the remainder were public authorities, individuals or other groups. Stakeholders generally consider that the EPBD sets a good framework to improve energy performance in buildings and raise awareness of energy consumption. A third of respondents feel the EPBD has not been successful and fewer than half think it has been successful.

Several respondents felt it was too early to assess the achievements of the EPBD due to delayed implementation in member states, including: slow uptake, poor compliance and enforcement of measures, and low rates of building renovation. Most respondents consider that compliance is inadequate and could be improved through stronger procedures and sanctions. Energy performance certificates have only had a very limited impact on the rate and depth of renovation.

Other issues raised included an insufficient take-up of available financing (partly due to its complexity), insufficient awareness of benefits due to a lack of information and advertising, split incentives between landlords and tenants, lack of consumer demand (linked to absence of long-term goals on renovation), and a lack of trust about the financial benefits.

The Commission proposal therefore introduces targeted amendments to the EPBD while maintaining many provisions and implementation deadlines, for instance the requirement for all new buildings to be “nearly zero energy buildings” (nZEB) from 2021 onwards (from 2019 for the public sector).

The proposal incorporates existing provisions on long-term renovation strategies (which are currently part of the EED) into the revised EPBD. These strategies should now introduce specific milestones for 2030, aim to deliver the long-term goal of a decarbonised building stock by 2050, specify measures to alleviate energy poverty, and guide investment decisions by aggregating projects, de-risking energy

efficiency investments and using public funding to leverage private-sector investment.

The proposal requires member states to satisfy the general obligation that all new buildings meet minimum energy performance requirements. However, it is acknowledged that the mandatory regular inspection regime, which was first devised over 15 years ago, needs to be updated to take account of developments in continuous digital monitoring of building performance.

The revisions would introduce an obligation to document the overall energy performance after any technical building systems are installed, replaced or upgraded. This would be available for verification of compliance, passed on to the building owner, and included in national databases of energy performance certificates (EPCs), where such databases exist. EPCs should be regularly updated to track actual energy consumption data of any buildings covered. They would be obliged to cover all public buildings with a useable floor area over 250m². Aggregated and anonymised data would be made available for statistics and research.

The proposal streamlines and simplifies existing EPBD provisions on inspections of heating and air conditioning systems. The revised EPBD would seek to enhance the use of building automation, and to ensure continuous performance and monitoring of energy efficiency, thereby limiting the necessity and frequency of physical inspections.

The proposal promotes e-mobility through a new requirement for recharging points for electric vehicles in the parking spaces of new buildings. Non-residential buildings under construction or undergoing major renovation and with more than 10 parking spaces would have to provide a charging point for electric vehicles for one parking space in every 10 and install cables for all spaces. This would apply to all non-residential buildings with more than 10 parking spaces, including existing buildings, from 2025. However, EU energy ministers have agreed to propose a complete exemption from charging requirements for geographical areas with specific vulnerabilities and to reduce the requirements for non-residential buildings so that only one electric vehicle charging point is required in any non-residential building, and only one in three parking spaces would need to have cabling installed.

The proposal introduces a “smartness indicator” that assesses the technical capacity of the building to interact with its occupants and with the grid. The “smartness indicator” will be further defined by the Commission through a specific “delegated act” (quite possibly a Directive). The Ministers in the Energy Council have now proposed that the “smartness indicator” be a voluntary scheme whose key features (general framework) are outlined in the annex.

The legislative proposal was accompanied by a “Smart finance for smart buildings initiative”, which seeks to focus the use of existing EU funds, primarily regional development and cohesion funds, European Investment Bank loans and the European Fund for Strategic Investments, to improve energy performance in buildings, to increase use of renewables in self-generation and self-consumption, and to facilitate demand response through the adoption of advanced ICT.

The major goal of this is to improve the investment climate for energy efficiency and provide greater confidence for investors

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in energy efficiency-related activities. This may involve deploying financial instruments and flexible energy efficiency and renewable financing platforms to make more effective use of public funds. If adopted it will also require further assistance and aggregation to support the project pipeline at both an EU and local level, along with enhanced project development facilities, including a “One-stop-shop” to provide greater support for energy efficiency schemes. It is also proposed to provide information and a platform for de-risking investments in energy efficiency, and to help investors and financiers to understand the risks and benefits of such investments.

A 2016 study on boosting building renovation in Europe was carried out for the Committee on Industry, Research and Energy (ITRE) of European Parliament. It found that the current rate of building renovation is low, with 1-2 % of the building stock renovated each year. It considered that “the vast majority of these renovations do not use the full potential energy savings that could be achieved”. The study considers various policy options which have informed the committee in its scrutiny of the European Commission proposal.

The ITRE Committee reviewed the Commission proposals in considerable depth. In response to the draft ITRE report produced in April, there were 570 amendments tabled and 53 compromise amendments were subsequently proposed. The final report was adopted in October, allowing inter-institutional negotiations between the Parliament, Council and Commission to start.

The ITRE report seeks further requirements relating to the long-term renovation strategies, linking them explicitly to EU energy efficiency goals for 2030 and 2050, and introducing obligations for public consultation. The charging point requirements are reduced in line with the Council proposal. That said, on most other aspects the ITRE report is more demanding on member states than the Commission proposal. New buildings should have self-regulating devices to control room temperature in each room; more residential buildings would require inspections for air-conditioning, ventilation and heating systems; and building automation and control systems would become a requirement by 2023 in all non-residential buildings with an annual energy consumption of over 250MWh.

The ITRE report proposes that the Commission assesses the potential to harmonise national energy performance certificates and conducts a feasibility study on the introduction of building renovation passports. The ITRE proposes keeping the “smartness indicator” as an obligatory measure and to outline its key features and a general framework in the annex.

Conclusions

While this is an EU Directive, it is likely to come into force before the UK leaves the EU, and so it is likely to be included in the provisions of the UK's EU Withdrawal Bill. Existing requirements of the EPBD, such as nearly Zero Energy Buildings, are already written into UK legislation. Given the recent confirmation of the Government's commitment to the UK Climate Change Act, which is set out in the Clean Growth Strategy, it is inconceivable that these existing enactments of the requirements of the current EPBD will not be retained. In Ireland

the new version of the Directive will be adopted and should help to guide the development of new buildings and the refurbishment of the existing stock for the next decade or more.

It is clear that on issues of energy, emissions and buildings the UK and the EU are co-travellers on a journey to a decarbonised low-emissions future, and that is not dependent on the ongoing negotiations over Brexit. In this area of policy we have a degree of clarity about what needs doing.

CIBSE members have the knowledge and skills to deliver the proposed measures, and also understand that energy is not the only consideration in delivering safe, comfortable, healthy buildings which are well ventilated. This is one area where engineering knowledge and expertise transcends borders and where CIBSE members can combine to make tomorrow's buildings better than today's.

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