Challenges to improving the energy performance of the European Union's buildings

A Discussion Paper

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Foreword

I have been following the progress of energy performance in buildings since I was asked in 2004 to write a report for EuroACE on the status of energy efficiency in buildings in the EU. At the time, it was the first such study that included the initial wave of new member states this century and followed the approval of the first EU directive promoting the energy performance of buildings. I also followed the progress of the adoption of the recast of the Energy Performance of Buildings Directive on behalf of the European Council for an Energy Efficient Economy (eceee) and was closely involved with the Buildings Performance Institute Europe (BPIE) in its early days.

This current report expands on work undertaken for the World Bank where I was asked to provide the non-EU countries of the Western Balkans my perspectives on the challenges of member states in implementing the EPBD.

I would like to thank Randall Bowie and Yamina Saheb for their thoughtful comments.

This is a discussion paper and I look forward to continuing this discussion.

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The main challenges to improve the energy performance of the European Union's building sector

Introduction

Member states face many challenges to significantly improve the energy performance of their buildings. While the legislative framework at the European level has greatly improved, much more action is required at the member state level to achieve effective implementation.

There are big policy challenges. The 2010 Energy Performance of Buildings Directive (EPBD) (Council Directive 2010/31/EU) widens the challenge to both new and existing buildings. Recital 3 of that directive states: "Buildings account for 40 % of total energy consumption in the Union. The sector is expanding, which is bound to increase its energy consumption. Therefore, reduction of energy consumption and the use of energy from renewable sources in the buildings sector constitute important measures needed to reduce the Union's energy dependency and greenhouse gas emissions." The 2012 EU Energy Efficiency Directive (EED) (Council Directive 2012/27/EU) also included aspects to improve the energy performance of buildings. Recital 17 of the EED states: "The rate of building renovation needs to be increased, as the existing building stock represents the single biggest potential sector for energy savings. Moreover, buildings are crucial to achieving the Union objective of *reducing greenhouse gas emissions by 80-95 % by 2050 compared to 1990*." [author's italics]

There is also a challenge as to where to put emphasis. New buildings add about 1% of the total building stock annually, meaning that existing buildings represent a far greater potential for energy savings.

This short note reviews some of the main challenges that MS are facing in both setting up their policy framework and undertaking effective implementation. First it is useful to see what progress has been made in the past couple of decades because there has already been quite impressive progress.

Progress in improving the energy performance of buildings in Europe

There has been good progress in reducing the energy consumption in buildings. The IEA provides an excellent comparison of improvements by square metre and by dwelling since 1990. The Slovak Republic made the greatest percentage improvement per square metre since 1990. Two countries had an increase – Greece (+49%) and Spain (+2%) mainly because of the high penetration of room air conditioners in the residential sector. Of the rest, only Finland had improvements less than 15%. Both Ireland and Portugal had impressive improvements of -35%. Figure 1 compares many EU countries with selected other IEA countries according to floor area.

Figure 2 considers progress in energy consumption but according to dwelling. Greece remains the same in terms of increased energy consumption but Spain is worse when considering the entire building. While there is progress in the other EU countries, the progress per dwelling is not as good as it is according to floor area because during this period the number of square metres per dwelling increased in almost all EU countries.

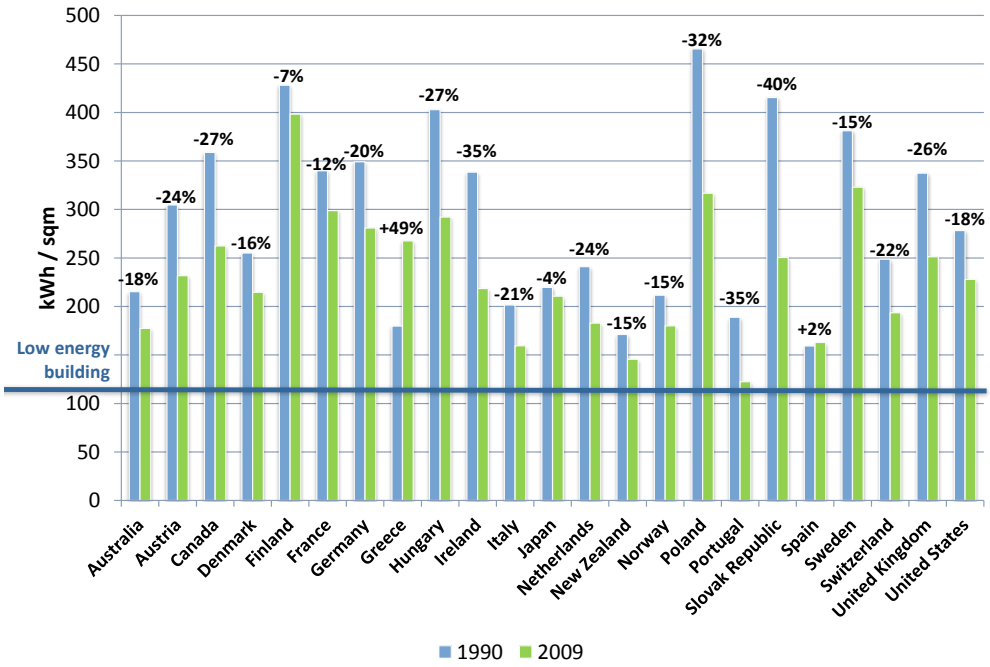


Figure 1: Residential primary energy consumption per square metre in the IEA since 1990.
Source: IEA

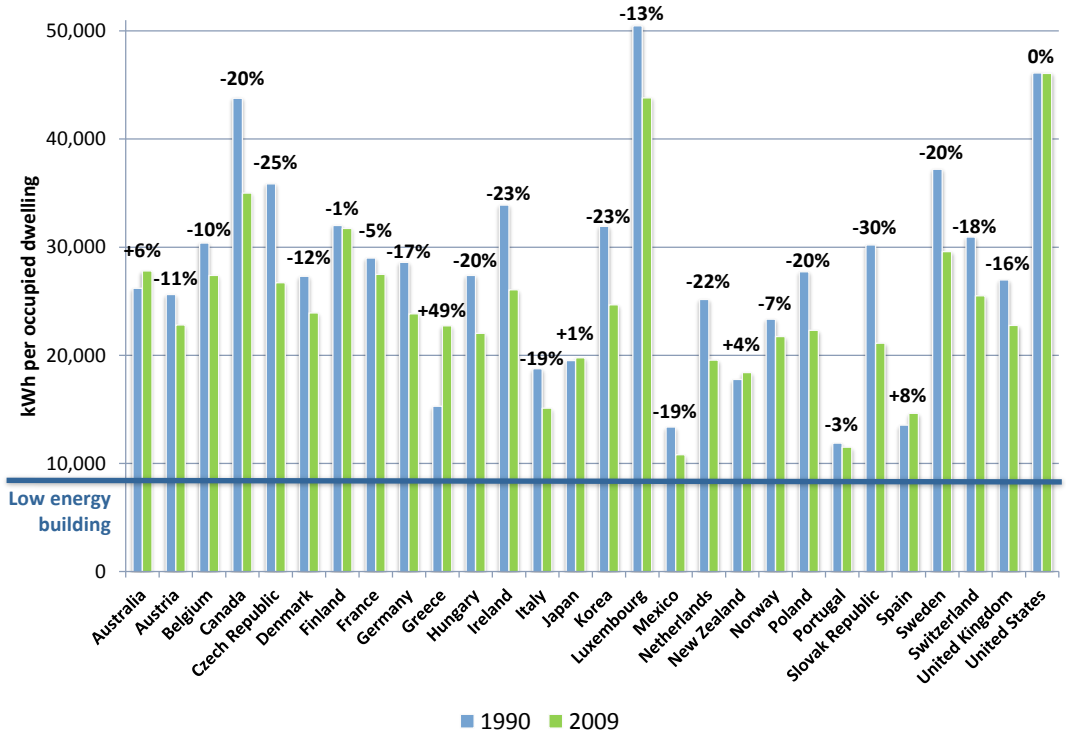


Figure 2: Residential primary energy consumption per dwelling in IEA countries since 1990
Source: IEA

What is striking in the two graphs is the wide range of energy consumption per square metre or per dwelling. Much can be explained by climate zones, but not all. This has to largely be a reflection of the policies and programmes put in place over the years, in part from the EU directives on energy

efficiency since the early 1990s. But many countries have during this period strengthened their building energy codes and implemented measures well beyond the scope of the EU's framework directives. Any analysis is beyond the scope of this paper.

Review of EU-wide legislative framework

The main EU directives influencing the energy performance of buildings are:

- Directive 2010/31 of the European Parliament and of the Council of 17 May 2010 on the energy performance of buildings and its amendments, known as EPBD (the recast Directive entered into force in July 2010;

- Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (recast);

- Directive 2010/30/EU of the European Parliament and of the Council of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products (recast); and

- Council Directive 2012/27/EU on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC known as EED [The Energy Efficiency Directive repeals the Energy Services Directive and the Cogeneration Directive]

These are the directives in place now and being implemented. Energy labelling and Ecodesign were in place before the EPBD recast and EED directives were approved. Essentially, however, the directives started in the early 1990s, with momentum building after 2000.

Since the original 2002 EPBD, there has been much support to help MS implement the directive. Concerted Action (CA) EPBD was launched by the European Commission to promote dialogue and exchange of best practice amongst the experts in MS. The key aim was to enhance the sharing of information and experiences from national adoption and implementation of this important European legislation.[1]

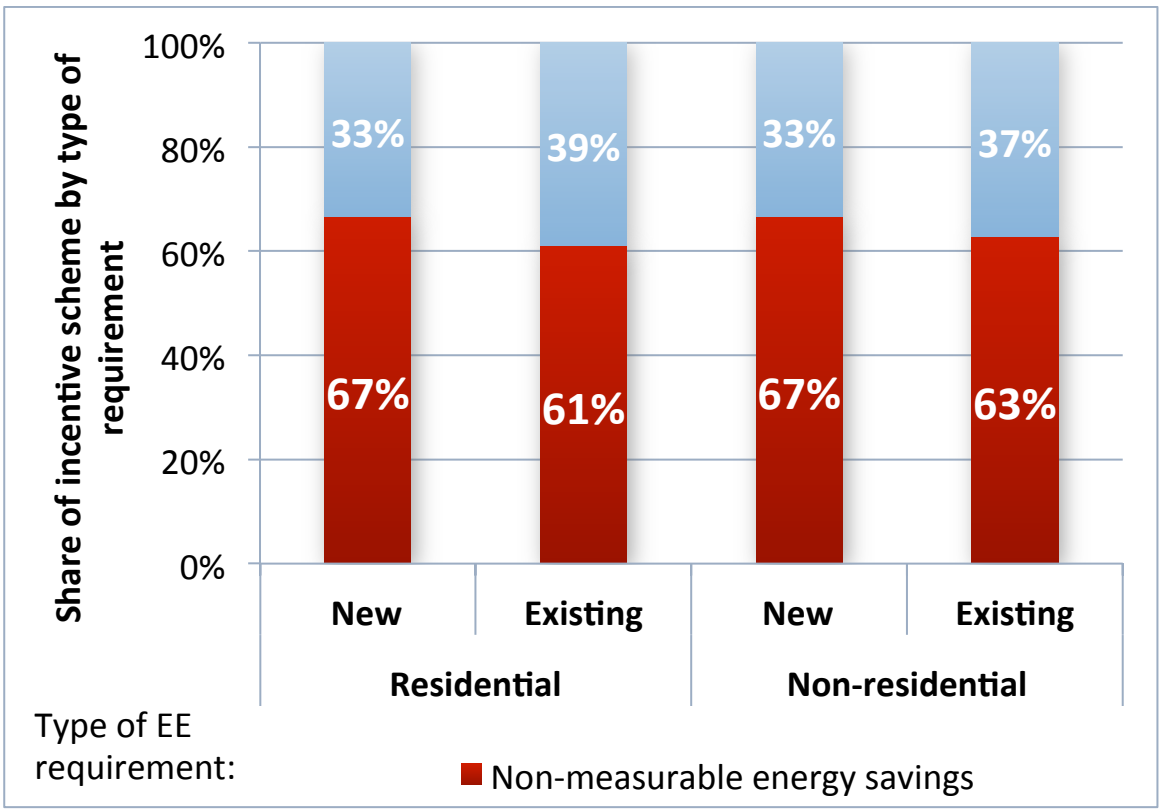
National energy agencies also meet through the European Energy Network (EnR) to discuss implementation issues.[2] EnR is a voluntary association of European organisations having a responsibility for the planning, management or review of national research, development, demonstration or dissemination programmes in the fields of energy efficiency and renewable energy.

There is also a wealth of best practice support from such as the BPIE,[3] its global partner, the Global Buildings Performance Network,[4] the International Energy Agency's Sustainable Buildings Centre[5] and from the papers prepared for the eceee Summer Studies.[6] For example, at the 2009 summer

[1] For more information, go to http://www.epbd-ca.eu/
[2] http://www.enr-network.org/
[3] www.bpie.eu
[4] http://www.gbpn.org/
[5] http://www.sustainablebuildingscentre.org/
[6] The European Council for an Energy Efficient Economy (eceee) holds biannual summer studies on energy efficiency, with a major emphasis on buildings. The European Council for an Energy Efficient Economy (eceee) also has its bi-annual Summer Study that has two panels dedicated to aspects of buildings policies. There are also separate panels for evaluation, policy, behaviour, etc. See http://www.eceee.org/summerstudy

study, there was an informal session on the issue of cost optimality that played an important role in overcoming an impasse during the negotiations for the recast of the EPBD.

In 2011, the Buildings Performance Institute Europe (BPIE) identified 333 separate financing schemes in the EU (plus Norway and Switzerland)[7] although many had terminated in recent years. In a separate study, the BPIE identified 132 discrete financial programmes being implemented in 2011 in the EU.[8] This is a sign of significant activity. None of those programmes was "mandated" by EU directives, although some of them were funded by EU programmes such as cohesion funds. However, two-third of existing financing programmes do not have a clear energy saving target and for the last third of the existing schemes, energy savings targets lack ambition that may lock the savings potential for decades (IEA, 2013)



Even with all the activity, there are many challenges facing member states to significantly improve the energy performance of buildings. There are many obligations that must be met in implementing the EU directives. The specific obligations for member states are provided in an annex. One of the conditions of the recast of the EPBD was to reduce the administrative burden. Member states had complained about the extra work that was required. A review of the obligations shows that, while it could have been harder, the obligations are significant. However, there was a realisation that to have a significant impact, much has to be done.

The next section reviews some of the major challenges facing EU member states to significantly improve the energy performance of their building stock.

[7] BPIE, *Europe's Buildings under the Microscope*, 2011
[8] BPIE, *Energy Efficiency Policies in Buildings: The Use of Financial Instruments at the Member State Level*, 2012

The main challenges

Europe is in transition concerning its energy system and energy efficiency policy as a whole and its buildings sector, in particular. Currently, there is only an indicative target for 2020 for energy savings and another indicative target proposed for 2030 (GHG emissions and renewables have binding targets). The legislative framework is quite comprehensive now for both new and existing buildings. There are many required elements in the legislative framework, although there is also considerable flexibility in how MS define their level of ambition.

At the same time, the European Union published roadmaps for reducing GHG emissions by 2050 and there is a specific roadmap for energy.[9] The objectives for 2050 are not mandatory but are in the range of an 80-95% improvement. Because buildings consume about 40% of total final energy and represent about 35% of Europe's GHG emissions, there are great expectations that this sector needs to make a significant contribution.

Gaining and maintaining long-term policy priority

The first EPBD was approved in 2002 and MS were given several years to transpose it to national law. During that period, there were concerns that only a few would transpose the legislation and to help the process, Concerted Action was created, as mentioned above.[10] This brought together experts from all MS to discuss implementation issues. There was considerable reluctance to be aggressive in implementation but slowly the level of commitment improved.

Many MS have received infringement notices from the Commission for not meeting all the obligations under the Directive. This will undoubtedly affect overall implementation and impact.

There is a problem getting the necessary long-term policy commitment from government and parliaments today in many countries. Much of this relates to the current financial crisis but it also relates to the short-term approaches that many governments take in their policymaking. The renovation strategies that must be developed together with the National Energy Efficiency Action Plans (NEEAPs) that must be produced on a regular basis should help. Also, MS have to show how they will phase in nearly zero energy buildings. The EPBD recast has deadlines for 2019 and 2021 that allow for long-term development.

The priority in Brussels has increased significantly by the working together of the full range of stakeholders from NGOs to energy efficiency industry associations. One of the important new groups is the Coalition for Energy Savings that brings together business, professional, local authorities and civil society organisations.[11] Through their members, they represent over 400 associations, 150 companies, 15 million citizens, 1.5 million employees, and 1,000 cities and towns in 30 countries across Europe. It recently published with a guide to the implementation of the Energy Efficiency Directive that will be of value to the European Commission and MS as well as empowering stakeholders to take an active role in monitoring implementation.[12]

There is also a growing realisation that the priority has to be seen in the context of the full range of benefits, and not those for just energy or climate change policies. Priority is given to energy efficiency if the following benefits are analysed and explained: these include such as job creation, health, macroeconomic, fuel poverty, increased local manufacturing, etc.

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[9] European Commission, *Energy Roadmap 2050*, December 2011, http://ec.europa.eu/energy/energy2020/roadmap/index_en.htm. There is also a separate one for climate - http://ec.europa.eu/clima/policies/roadmap/index_en.htm

[10] http://www.epbd-ca.eu/

[11] http://energycoalition.eu/

[12] http://energycoalition.eu/guidebook-strong-implementation-0

Improving data quality and analysis

Europe has been poor in developing a comprehensive database on its building stock related to energy performance. Eurostat has never undertaken the work. The Commission realised the need but did little. It was left to a not-for-profit organisation and private companies such as ENERDATA[13], encouraged by the Commission nonetheless, to start the initiative. The EC has also funded several projects through Intelligent Energy Europe[14] such as Tabula and PERISCOPE that provide data on building characteristics.

Developing a long-term strategy for improving the energy performance of existing buildings is complex. There are many data requirements: knowing the structure of the buildings stock (residential, non-residential, age, quality, etc.) The Buildings Performance Institute Europe (BPIE), in 2011, undertook the first major survey of data for the entire EU (as well as Norway and Switzerland). An important lesson was about how much was not known. There were poor data on non-residential buildings for example.[15] The BPIE is now organising a second survey to improve data quality and to develop a better time series. The BPIE is now trying to work with the European Commission, MS and others to improve the quality of the data. Prior to this work, ENERDATA was used to update every year its database on building stock. This database is more comprehensive than what BPIE provides. However, BPIE's data are available for free of charge while ENERDATA's data are not free of charge.

The EED has a requirement to renovate 3% of central government buildings (when they are owners occupiers only) annually and they are to start with the least efficient. One problem is that most governments do not have a good database of their own building stock and they do not know the energy performance of those buildings.

Good data and analysis is also needed for the next challenge, developing a long-term renovation strategy, as required under the EED.

Under Article 5, MS have submitted to the EC their plans to implement this measure. An initial review of the proposals of member states shows that they lack ambition.

Developing the required long-term renovation strategy

Under Article 4 of the EED, MS are required to 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:

- An overview of the national building stock based, as appropriate, on statistical sampling;
- Identification of cost-effective approaches to renovations relevant to the building type and climatic zone;
- Policies and measures to stimulate cost-effective deep renovations of buildings, including staged deep renovations;
- A forward-looking perspective to guide investment decisions of individuals, the construction industry and financial institutions; and

[13] http://www.enerdata.net/enerdatauk/
[14] http://ec.europa.eu/energy/intelligent/
[15] This became a problem when the Energy Efficiency Directive was approved because there was no to poor data on public buildings, a sub-set of non-residential buildings.

- An evidence-based estimate of expected energy savings and wider benefits.

The strategy must be updated every three years.

MS are being supported by two initiatives, from the BPIE and the insulation industry association, Eurima. BPIE produced a guide to help the MS develop their first version of their renovation strategies that must be published by April 30th 2014.[16] Eurima published "A practical guide to Renovation Roadmaps" for buildings for policy makers.[17]

Ensuring building codes are revised to meet cost-optimality and NZEB obligations

The recast of the EPBD had two important elements that have to be integrated into building energy codes at some point. These relate to the concept of cost-optimality and nearly zero energy buildings.

The EC was late providing its regulation on the comparative methodology framework for calculating cost-optimal levels of minimum energy performance requirements for buildings and building elements. It is now out and for MS to use in the revision of their building energy codes.[18]

As of 31 December 2020 new buildings in the EU will have to consume 'nearly zero' energy and the energy will be 'to a very large extent' from renewable sources. Public authorities that own or occupy a new building should set an example by building, buying or renting such 'nearly zero energy building' as of 31 December 2018. The definition is left to member states to individually define and so far, they have not presented their objectives on NZEB to the Commission. It is expected that some will be very ambitious and others less so.

MS were to report progress in implementing NZEB strategies. In October 2013, the Commission produced a communication (not available on the website) that reported on the progress of implementing NZEB. It included only eight national plans that MS had submitted by November 2012. By the time of publishing the October report, a further six MS had submitted their plans. Overall, the results were disappointing.

Recently the BPIE published a report on "Implementing the cost-optimal methodology in EU countries." This follows earlier work it did on explaining cost optimality. This work has been closely co-ordinated with the Commission.

Altogether, the need to integrate cost optimality is a major one for all member states. There are still many issues that are not fully defined.

Ensuring the necessary capacity and structure to implement ambitious renovation strategies

Renovation strategies mean that there is a need for strong capacity for public agencies because they have a major role to play and a need for a strong, skilled workforce to do the necessary renovations.

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[16] http://www.bpie.eu/renovation_strategy.html
[17] http://www.eurima.org/
[18] On 16 January 2012, the EU adopted the Delegated Regulation (EU) No. 244/2012 supplementing Directive 2010/31/EU on the energy performance of buildings. This regulation concerned the comparative methodology framework for calculating cost-optimal levels of minimum energy performance requirements for buildings and building elements. For more information, go to http://ec.europa.eu/energy/efficiency/buildings/buildings_en.htm

MS know how serious this is but there has not been information provided to date about how big a problem it is. The capacity issue is not only for new MS. For example, even countries such as the Netherlands has had severe budget cuts that have also affected implementation.

On training, the Commission is providing significant support through the Intelligent Energy Europe programme (now replaced by Horizon 2020), in particular.

As for the structure of a possible financing mechanism, a one-stop approach is explained later in this paper.

One major issue at the member state level is to ensure compliance checking and enforcement of the existing regulations.

Constantly improving implementation

All too often, directives were approved and then the Commission, Parliament and Council gave little attention to implementation. This has slowly changed. The abovementioned Concerted Action EPBD has played a major role.

There is a great emphasis on sharing experience and learning from best practice examples. Understandably, there is no template and how a programme in one country may not work the same in another country. But there can be lessons learned.

In the original EPBD, there were over 30 harmonised standards developed through CEN. Many of the member states used them, but there were others that did not.[19] The following figure shows how member states have used the standards developed.

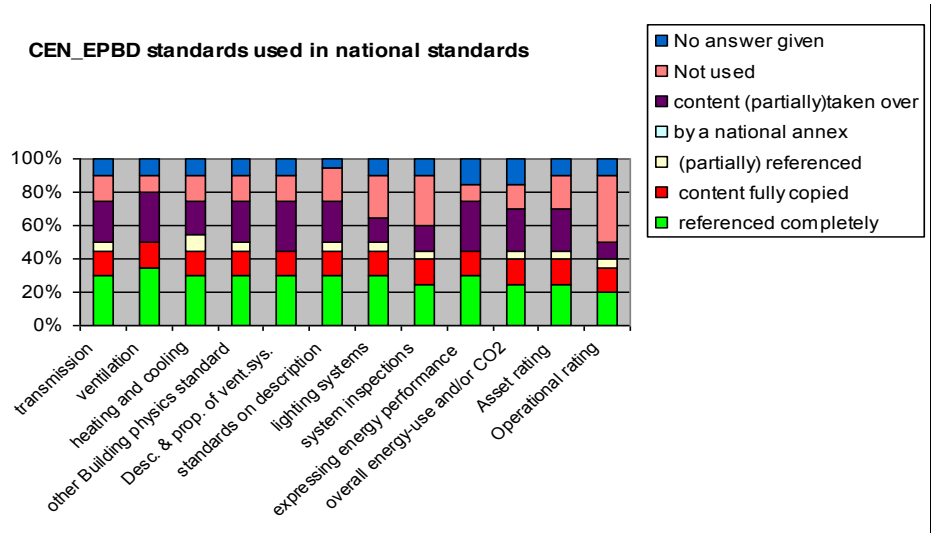

Figure 3: CEN EPBD standards used in national standards
Source: Presentation by Jaap Hogeling, Implementation of CEN-EPBD standards EU Mandate (M480) for CEN to develop the second generation, 2011

[19] For a review of the standards development for EPBD, go to http://www.buildup.eu/news/31463

There are many other ways that best practice is shared. One is through Concerted Action (CA) EPBD as mentioned above.

National energy agencies also meet through the European Energy Network (EnR) to discuss implementation issues, also mentioned above.

As stated above, there are also several non-governmental and inter-governmental sources of information on best practice to help governments in their implementation.

The annexes list the relevant EU directives related to buildings, outlining the main obligations and when they are due. Annex 1 has an overview of the main obligations for the relevant directives. Annex 2 provides more detail for the EBPD and EED. There is a column that provides comments on the obligations, often showing the main challenges facing member states in implementation. Obviously, for longstanding directives such as for Ecodesign or energy labelling, most of the "challenges" have been dealt with already.

Improving implementation also means that member states must give the buildings sector the necessary policy priority. Unfortunately, there were 21 infringement proceedings started by the Commission against member states in 2013 for failing to implement adequately.[20]

Ensuring there is a sustainable flow of financing and an effective financing infrastructure for ambitious renovation strategies

There is no need to explain here all the efforts underway to find sustainable financing. The recast of the EPBD was stalled because some in Parliament wanted a stronger commitment of the use of EU structural funds that are available to all member states. The stalemate was overcome when it was agreed to better monitor financing measures. The EED included financing, particularly through Energy Efficiency Obligations and promoting energy service companies.

The role of international financial institutions, such as the European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD), are playing an increasing role, together with the structural/cohesion funds managed through DG Regional Policy.

DG Energy now has a unit that co-ordinates work and analysis on the use of financial instruments, although not only for energy efficiency.

Financing is probably the single most challenge for MS, particularly since deep renovations are being encouraged and they, by definition, are more expensive from short-term perspective but much more cost-effective for the longer run. Government budgets have a poor track record of providing long-term financing for energy efficiency measures. In many ways they are turning to energy efficiency obligations, requiring energy companies to provide financing. They are also promoting energy service companies (ESCOs) but they normally will not finance deep renovations (70-80% improvements).

Without going into detail here, the IEA has been promoting the following approach. It has gained considerable interest in the Commission. Essentially, it tries to "bundle" funding together to be able to do ambitious deep renovations. The following diagram gives an indication of some of the recent thinking.

[20] For more information on the infringement proceedings go to the Commission's website: http://ec.europa.eu/energy/infringements/proceedings/efficiency_en.htm

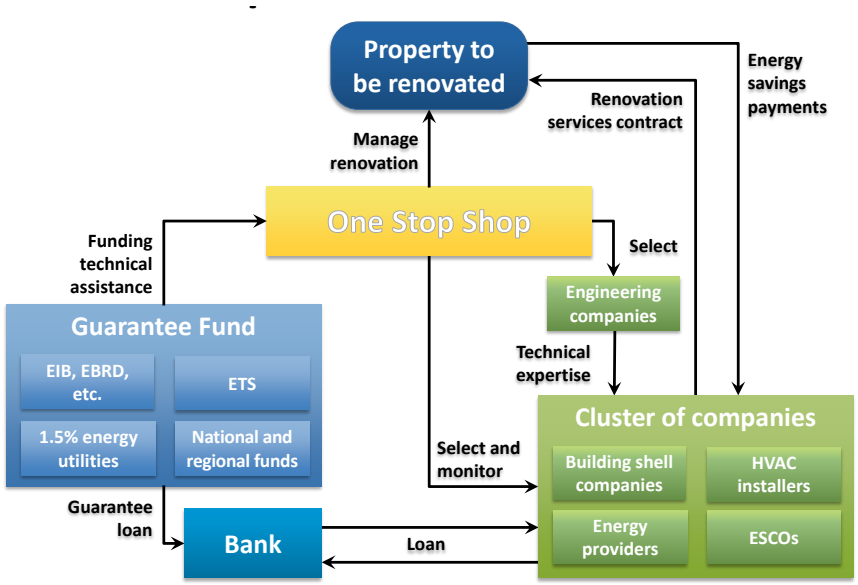

Figure 4: IEA Sustainable Building Centre Market Framework Proposal to Enable Deep Renovation
Source: Presentation by Y. Saheb, IEA

The United Nations Environment Programme also has a Finance Initiative[21] that has many work streams covering the range of environmental issues, including climate change. Energy efficiency issues are covered there.

Conclusions

Improving the energy performance of buildings is complex. The individual MS developed their buildings sectors separately over decades and they all have their own traditions, norms and approaches. There is no effort at this point to ensure MS follow the same approach. There is a need for experimentation and innovation. Some MS are leading and others are struggling.

Until recently, the policy and legislative framework did not include specific quantitative targets, but increasingly such targets are starting to take shape. The buildings sector with about 40% of total final energy consumption and about 35% of GHG emissions for Europe as a whole is seen as a priority end-use sector for significant savings. There is an indicative target for 2016 under the Energy Services Directive and its NEEAPS (now under the EED) but that does not specify buildings. There is also a non-binding target for 2020 that is also not specifically for buildings. However, the recently approved EED has a binding measure for improving the energy performance of public buildings and this approach will increasingly be used, from all indications. Member states are almost entirely against binding targets.

The buildings sector is only going to gain in importance in energy and climate change strategies. While each country will have a different emphasis, there is a realisation that new buildings represent only 1% of the building stock annually and the demolition rate is small. Most buildings today will still be standing in 2050.

Steps are needed now to ensure that governments are prepared to take a leading role and that the sector delivers what it is capable of. Member states know this but know this is not easy.

[21] For more information, see http://www.unepfi.org/index.html.

Governments also realise that there is the need for a strong partnership with the private sector. All know that there is much more work to do.

It is essential that there be closer monitoring of the implementation both from within EU institutions and from third parties. There is a lot of evidence that implementation is far from optimal. Since the EPBD was recast, the policy priorities within Brussels switched to the development of the Energy Efficiency Plan and the follow up Energy Efficiency Directive, which was approved in 2012. The EED gave more emphasis to building retrofit and thus complements the EPBD, which was not designed to deliver a low-energy building stock.

Following the approval of the EED the Coalition for Energy Savings put in considerable effort to follow implementation of the EED, but there was no equivalent for the EPBD. There are scholarly papers prepared for the bi-annual eceee summer studies that give an indication of the implementation issues and impact, but that is not sufficient.

There is simply no systematic and comprehensive monitoring of the implementation of the EPBD. This is unsatisfactory and if the expected impact is not achieved, this could seriously affect how decision-makers and the population as a whole treat the importance of energy efficiency policy. The Commission does follow the obligations of member states and, as shown in the previous section, has started many infringement proceedings. The 21 member states cited show that there is obviously a lack of priority and adequate resources to do the minimum to implement the Directive. This is symptomatic of serious problems that must be addressed if improving the energy performance of buildings is to have the impact that is needed to meet Europe's energy and climate goals.

Annex 1

Summary of main obligations on MS arising from main energy efficiency directives

EPBD recast	EED	Ecodesign	Labelling
establish energy performance of buildings certification system. Ensure certificates for public bodies are prominently displayed	set an indicative national energy efficiency target	ensure that products comply with ecodesign measures and bear CE marking	prohibit non-compliant labels; provide educational /promotional information
establish regular inspections of heating and Air Conditioning systems	ensure that, as from 1 January 2014, 3 % of the total floor area of heated and/or cooled buildings owned and occupied by its central government is renovated each year to meet at least the minimum energy performance requirements	designate authorities responsible for market surveillance	ensure that information relating to energy consumption is brought to the attention of end-users by means of a fiche/label
apply a methodology for calculating the energy performance of buildings	ensure that central governments purchase only products, services and buildings with high energy-efficiency performance, insofar as that is consistent with cost-effectiveness, economical feasibility, wider sustainability, technical suitability, as well as sufficient competition	ensure interested parties are given an opportunity to submit observations on compliance	require suppliers to provide evidence concerning accuracy of information supplied on labels or fiches
ensure that minimum energy performance requirements for buildings are set with a view to achieving cost-optimal levels	set up an energy efficiency obligation scheme. That scheme shall ensure that energy distributors and/or retail energy sales companies that are designated as obligated parties	in case of indications of non-compliance, MS shall publish a substantiated assessment of product's compliance	endeavour to procure only products which have highest performance levels in the highest EE class
when buildings undergo major renovation, ensure the energy performance is upgraded in order to meet minimum requirements	promote the availability to all final customers of high quality energy audits which are cost-effective	enable interested parties to be consulted on the process of preparing and monitoring harmonised standards	Where MS provide any incentives for a product they shall aim at the highest performance levels (incl. highest class of EE)
ensure that after 31-Dec-20 all new buildings are nearly zero-energy buildings (31-Dec-18 for public authorities)	develop programmes to encourage SMEs to undergo energy audits and the subsequent implementation of the recommendations from these audits.	Ensure that they encourage SMEs and very small firms to adopt environmentally sound approach as early as at the product design stage and to adapt to future European Legislation	submit a report to the Commission including details about their enforcement activities and the level of compliance
draw up national plans for increasing the number of NZEBs	ensure that enterprises that are not SMEs are subject to an energy audit carried out in an independent and cost-effective manner and at least every four years from the date of the previous energy audit.	Participate in Consultation Forum which assists the Commission establish working plan, etc.	
develop policies and take measures to stimulate the transformation of public sector buildings that are refurbished into NZEBs	carry out and notify to the Commission a comprehensive assessment of the potential for the application of high-efficiency cogeneration and efficient district heating and cooling	Lay down rules applicable to infringement . . . and take all measures necessary to ensure that they are implemented.	
draw up a list of existing and proposed measures and instruments (incl. Financial) which promote the objectives of this Directive.	ensure that certification and/or accreditation schemes and/or equivalent qualification schemes, become or are available for providers of energy services, energy audits, energy managers and installers of energy-related building		
	Member States shall promote the energy services market and access for SMEs to this market		
	submit National Energy Efficiency Action Plans		

Annex 2 – Obligations for the EU Energy Performance of Buildings and Energy Efficiency Directives

Directive: 2010/31/EU – Energy Performance of Buildings (recast)

Specific Obligations to MS	Article in Directive	Timetable/ Milestones	Action Required	Comments
Energy Performance Methodology	Article 3	On-going	Member States shall apply a methodology for calculating the energy performance of buildings in accordance with the common general framework set out in Annex I.	
Cost-optimality	Article 4	On-going after Commission provides calculation methodology	Member States shall take the necessary measures to ensure that minimum energy performance requirements for buildings or building units are set with a view to achieving cost-optimal levels. The energy performance shall be calculated in accordance with the methodology referred to in Article 3.	This is a definite challenge and MS are currently assessing how they can integrate cost-optimality into their building codes
New Buildings	Article 6	On-going	Member States shall take the necessary measures to ensure that new buildings meet the minimum energy performance requirements set in accordance with Article 4.	This is a challenge as MS revise their current building codes
Existing Buildings	Article 7	On-going	When buildings undergo major renovation, the energy performance of the building or the renovated part thereof is upgraded in order to meet minimum energy performance requirements set in accordance with Article 4 in so far as this is technically, functionally and economically feasible.	Not all MS have done this well. This is a major challenge.
Technical Building Systems	Article 8	On-going	Member States shall, for the purpose of optimising the energy use of technical building systems, set system requirements in respect of the overall energy performance, the proper installation, and the appropriate dimensioning, adjustment and control of the technical building systems which are installed in existing buildings. Member States may also apply these system requirements to new buildings.	The systems approach is proving a challenge.
NZEB	Article 9	by 31 December 2020, all new buildings are nearly zero-		There is considerable work involved in undertaking this. This is one of the major

		energy buildings; after 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings		challenges of the EPBD recast. There are issues over the level of ambition that have to be resolved. MS have considerable flexibility since definitions are mainly left to national governments.
	Article 9	In 2012 in time for Commission to evaluate before the end of 2012	Member States shall draw up national plans for increasing the number of nearly zero-energy buildings. These national plans may include targets differentiated according to the category of building.	These plans are very important. They have not been made public to date.
			Member States shall furthermore, following the leading example of the public sector, develop policies and take measures such as the setting of targets in order to stimulate the transformation of buildings that are refurbished into nearly zero-energy buildings, and inform the Commission thereof in their national plans referred to in paragraph 1.	
Financial Incentives and Market Barriers	Article 10	By 30 June 2011 and to be updated every three years thereafter	Member States shall draw up . . . a list of existing and, if appropriate, proposed measures and instruments including those of a financial nature, other than those required by this Directive, which promote the objectives of this Directive.	Can be included in NEEAPs
EPCs	Article 11	On-going	Member States shall lay down the necessary measures to establish a system of certification of the energy performance of buildings.	Some MS have done an excellent job while others have not. EPCs are very important
		For (b) have threshold changed by 9 July 2015	Member States shall ensure that an energy performance certificate is issued for: (a) buildings or building units which are constructed, sold or rented out to a new tenant; and (b) buildings where a total useful floor area over 500 m 2 is occupied by a public authority and frequently visited by the public. On 9 July 2015, this threshold of 500 m 2 shall be lowered to 250 m 2 .	

			Member States shall require that, when buildings or building units are constructed, sold or rented out, the energy performance certificate or a copy thereof is shown to the prospective new tenant or buyer and handed over to the buyer or new tenant.	Some are doing this well but not all.
Display of EPCs	Article 13	July 9, 2015 for second part	Member States shall take measures to ensure that where a total useful floor area over 500 m 2 of a building for which an energy performance certificate has been issued in accordance with Article 12(1) is occupied by public authorities and frequently visited by the public, the energy performance certificate is displayed in a prominent place clearly visible to the public. On 9 July 2015, this threshold of 500 m 2 shall be lowered to 250 m 2	Fairly easy to implement.
Inspection of Heating Systems	Article 14		Member States shall lay down the necessary measures to establish a regular inspection of the accessible parts of systems used for heating buildings,	Not a major challenge
		30 June 2011. These reports will be submitted every three years thereafter.	Where Member States choose to apply the measures referred to in the first subparagraph, they shall submit to the Commission a report on the equivalence of those measures to measures referred to in paragraphs 1, 2 and 3 of this Article by 30 June 2011 at the latest.	Not a major challenge
Inspection of Air Conditioning Systems	Article 15	30 June 2011. These reports will be submitted every three years thereafter	Where Member States apply the measures referred to in the first subparagraph, they shall, by 30 June 2011 at the latest, submit to the Commission a report on the equivalence of those measures to the measures referred to in paragraphs 1, 2 and 3 of this Article. Member States shall submit these reports to the Commission every three years.	Not a major challenge
Transposition	Article 28	By July 9, 2012	Member States shall adopt and publish . . . the laws, regulations and administrative provisions necessary to comply with Articles 2 to 18, and with Articles 20 and 27.	

Directive: 2012/27/EU Energy Efficiency Directive

Specific	Article in	Timetable/	Action Required	Comments

Obligations to MS	Directive	Milestones		
Energy efficiency targets	Article 3	The targets should have been communicated to the Commission by 30 April 2013	Each Member State shall set an indicative national energy efficiency target, based on either primary or final energy consumption, primary or final energy savings, or energy intensity. Member States shall notify those targets to the Commission	By 30 June 2014, the Commission shall assess progress achieved and whether the Union is likely to achieve energy consumption of no more than 1 474 Mtoe of primary energy and/or no more than 1 078 Mtoe of final energy in 2020.
Exemplary role of public bodies' buildings	Article 5	By 1 January 2014	Each Member State shall ensure that, as from 1 January 2014, 3% of the total floor area of heated and/or cooled buildings owned and occupied by its central government is renovated each year to meet at least the minimum energy performance requirements.	Big challenge to undertake inventory of all qualifying buildings together with their energy performance. Then need to develop strategy (including funding) for actual implementation
		By 31 December 2013	Member States opting for the alternative approach shall notify to the Commission, by 31 December 2013, the alternative measures that they plan to adopt, showing how they would achieve an equivalent improvement in the energy performance of the buildings within the central government estate.	
Purchasing by public bodies	Article 6	On-going	Member States shall ensure that central governments purchase only products, services and buildings with high energy-efficiency performance, insofar as that is consistent with cost-effectiveness, economical feasibility, wider sustainability, technical suitability, as well as sufficient competition	Not all MS have implemented this but are working towards it.
Energy efficiency obligation schemes	Article 7	From 1 January 2014	Each Member State shall set up an energy efficiency obligation scheme. That scheme shall ensure that energy distributors and/or retail energy sales companies that are designated as obligated parties under paragraph 4 operating in each Member State's territory achieve a	As an alternative to setting up an energy efficiency obligation scheme under paragraph 1,

			cumulative end-use energy savings target by 31 December 2020	Member States may opt to take other policy measures to achieve energy savings among final customers. While the EU has promoted EEOs, MS had been reluctant to introduce them. This will be a major challenge in working with energy companies.
		5 December 2013	Member States shall notify to the Commission, by 5 December 2013, the policy measures that they plan to adopt for the purposes of the first subparagraph and Article 20(6)	
Energy audits and energy management systems	Article 8	On-going	Member States shall promote the availability to all final customers of high quality energy audits which are cost-effective	Not a major challenge
		On-going	Member States shall develop programmes to encourage SMEs to undergo energy audits and the subsequent implementation of the recommendations from these audits.	Not a major challenge
		On-going	Member States shall also develop programmes to raise awareness among households about the benefits of such audits through appropriate advice services	Not a major challenge
		On-going	Member States shall encourage training programmes for the qualification of energy auditors	Not a major challenge
		By 5 December 2015	Member States shall ensure that enterprises that are not SMEs are subject to an energy audit carried out in an independent and cost-effective manner by qualified and/or accredited experts or implemented and supervised by independent authorities under national legislation by 5 December 2015 and at least every four years from the date of the previous energy audit.	Not a major challenge
Metering	Article 9	In multi-apartment and multi-purpose buildings with a central heating/cooli	Member States shall ensure that, in so far as it is technically possible, financially reasonable and proportionate in relation to the potential energy savings, final customers for electricity, natural gas, district heating, district cooling and domestic hot water are	Could be a challenge. It partly depends on roll out of smart meters already as required under internal market

		ng source or supplied from a district heating network or from a central source serving multiple buildings, individual consumption meters shall also be installed by 31 December 2016	provided with competitively priced individual meters that accurately reflect the final customer's actual energy consumption and that provide information on actual time of use.	directives
Billing Information	Article 10	31 December 2014	Where final customers do not have smart meters as referred to in Directives 2009/72/EC and 2009/73/EC, Member States shall ensure, by 31 December 2014, that billing information is accurate and based on actual consumption	Not a major challenge
Cost of access to metering and billing information	Article 11	On-going	Member States shall ensure that final customers receive all their bills and billing information for energy consumption free of charge and that final customers also have access to their consumption data in an appropriate way and free of charge	Not a major challenge
Consumer information and empowering programme	Article 12		Member States shall take appropriate measures to promote and facilitate an efficient use of energy by small energy customers, including domestic customers. These measures may be part of a national strategy.	Not a major challenge
Penalties	Article 13	Member States shall notify those provisions to the Commission by 5 June 2014 and shall notify it without delay of any subsequent amendment affecting them.	Member States shall lay down the rules on penalties applicable in case of non-compliance with the national provisions adopted pursuant to Articles 7 to 11 and Article 18(3)	Shouldn't be a major challenge.
Promotion of efficiency in heating and	Article 14	By 31 December 2015	Member States shall carry out and notify to the Commission a comprehensive assessment of the	Challenge if just starting. But work should

cooling			potential for the application of high-efficiency cogeneration and efficient district heating and cooling, containing the information set out in Annex VIII. If they have already carried out an equivalent assessment, they shall notify it to the Commission	have been done under previous Cogeneration Directive
			Member States shall adopt policies which encourage the due taking into account at local and regional levels of the potential of using efficient heating and cooling systems	Depends on starting point
			Member States shall carry out a cost-benefit analysis covering their territory based on climate conditions, economic feasibility and technical suitability	Should not be a major challenge
			Member States shall ensure that the origin of electricity produced from high- efficiency cogeneration can be guaranteed according to objective, transparent and non-discriminatory criteria laid down by each Member State.	Should not be a major challenge
			Member States shall ensure that any available support for cogeneration is subject to the electricity produced originating from high-efficiency cogeneration and the waste heat being effectively used to achieve primary energy savings. Public support to cogeneration and district heating generation and networks shall be subject to State aid rules, where applicable	Should not be a major challenge
Availability of qualification, accreditation and certification schemes	Article 16	by 31 December 2014	Where a Member State considers that the national level of technical competence, objectivity and reliability is insufficient, it shall ensure that, by 31 December 2014, certification and/or accreditation schemes and/or equivalent qualification schemes, including, where necessary, suitable training programmes, become or are available for providers of energy services, energy audits, energy managers and installers of energy-related building	Should not be a major challenge
Information and training	Article 17	On-going	Member States shall ensure that information on available energy efficiency mechanisms and financial and legal frameworks is transparent and widely disseminated to all relevant market actors, such as consumers, builders, architects, engineers, environmental and energy auditors, and installers	Should not be a major challenge

			of building elements	
Energy services	Article 18	On-going	Member States shall promote the energy services market and access for SMEs to this market	Should not be a major challenge
			Member States shall ensure that energy distributors, distribution system operators and retail energy sales companies refrain from any activities that may impede the demand for and delivery of energy services or other energy efficiency improvement measures, or hinder the development of markets for such services or measures, including foreclosing the market for competitors or abusing dominant positions.	Should not be a major challenge
Other measures to promote energy efficiency	Article 19		Member States shall evaluate and if necessary take appropriate measures to remove regulatory and non-regulatory barriers to energy efficiency, without prejudice to the basic principles of the property and tenancy law of the Member States	Should not be a major challenge
Energy Efficiency National Fund, Financing and Technical Support	Article 20		Member States shall facilitate the establishment of financing facilities, or use of existing ones, for energy efficiency improvement measures to maximise the benefits of multiple streams of financing.	
			Member States may set up an Energy Efficiency National Fund. The purpose of this fund shall be to support national energy efficiency initiatives.	
Review and monitoring of implementation	Article 24	By 30 April each year as from 2013	Member States shall report on the progress achieved towards national energy efficiency targets	
		By 30 April 2014, and every three years thereafter	Member States shall submit National Energy Efficiency Action Plans	Should not be a major challenge since next NEEAP is the third one prepared.
		before 30 April each year	Member States shall submit to the Commission before 30 April each year statistics on national electricity and heat production from high and low efficiency cogeneration, in accordance with the methodology shown in Annex I of the Directive	
Transposition	Article 28	5 June 2014	Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 5 June 2014	