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Economic and Scientific Policy

STUDY ON ENERGY PERFORMANCE OF BUILDINGS

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EXECUTIVE SUMMARY

This study aims to address key issues regarding energy efficiency of buildings and make recommendations to the European Parliament Committee on Industry, Research and Energy (ITRE). It focuses on the implementation of the Energy Performance of Buildings Directive (EPBD) that makes certificates for the energy performance of buildings mandatory and requires minimum energy performance requirements for new buildings and existing buildings that undergo major renovation. Furthermore, the Directive requires regular inspections of boilers and air-conditioning systems in order to guarantee an energy efficient operation of these appliances. This study also aims to provide input into ongoing discussions on the potential recasting of the EPBD.

Study Scope

The study has reviewed, and addresses the following key topics:

Current Status of Implementation of the EPBD

On the basis of our research and interviews, we consider that only 17 of the Member States have successfully implemented the requirements of the EPBD or are in the process of rolling out certification/inspection requirements in January 2009. A further 7 Member States (Bulgaria, France, Latvia, Lithuania, Malta, Poland and Slovenia) are yet to meet all the requirements but have made significant progress in implementation. This leaves 3 Member States still struggling with the implementation of most or all elements of the Directive (Hungary, Cyprus and Greece).

Impacts of the EPBD

The status of implementation is not necessarily a good indicator of the impact the legislation has had on improving energy performance of buildings in each Member State. There is little evidence to date on the impacts of the EPBD on the efficiency of the European building stock. Most of the Member States who implemented the Directive quickly and easily already had substantial policies in place to improve energy efficiency, and the others have not yet implemented all measures. There is also a lack of firm evidence on the impact that measures are having, for example, whether and how Energy Performance Certificates influence decisions taken by those selling, buying and leasing property. Moreover there appears to have been limited monitoring or enforcement of compliance with the Directive at the national level, and no comprehensive assessments of impacts.

To allow any subsequent revision of this Directive or any other appropriate legislation aimed at achieving carbon reduction targets it is imperative that the Member States and the EU are clear about what the current situation is with regard to the building stock.

There is anecdotal evidence that the EPBD has significantly raised awareness of the issue of energy performance of buildings amongst stakeholders, and that it has indirectly led to the introduction of some new national legislation that goes beyond the requirements of the Directive. Implementation is also thought to have raised the numbers and skills of inspectors and to have led to development or wider usage of appropriate software tools.

Horizontal Issues Relating to Buildings Energy Efficiency

AEA believes that further work is needed in providing a unified approach to the delivery of the EPBD throughout the Member States, and in line with other Directives and legislative requirements.

For example, harmonisation and facilitation of building assessment tools/methodologies is needed if the Commission are to provide clarity of the application of the setting of minimum energy performance requirements that are also ‘cost-optimal’. The tools must be transparent and easy to use.

Specific Issues and Options for the Existing Housing Stock

The current economic situation has resulted in a significant slow down in the housing market, and a rise in the number of private rental leases taken on properties, both of which could mean that the impact of dwelling EPCs issued at point of sale/lease will be lower than anticipated. Further consideration needs to be given to an alternative mechanism for the certification process in housing, particularly how it can be legislated in the rental markets.

Linkages to Other Legislation and Policy Areas

The EPBD should be viewed in the context of other EU policies and measures to improve energy efficiency and reduce carbon emissions, as framed in the 20:20:20 objectives. There are a number of other Directives that include within their remit action to reduce the energy consumption of buildings. AEA assesses that these various directives are complementary to each other, e.g. the Energy Services Directive sets indicative targets for national energy savings and actions taken under the EPBD will contribute to meeting these targets. Similarly the Ecodesign Directive should improve the energy performance of products used in buildings.

Best Practice Examples

AEA recognise that there are some countries that are already implementing above and beyond the levels of efficiency laid out in the Directive. It is important that this information is now shared, at EU level to allow for easy replicability throughout all Member States to achieve maximum benefit from the implementation of the EPBD. AEA recommend that the findings of Concerted Action, the Energy Efficiency Watch Initiative, together with the Buildings Platform, could form the basis for such a review.

The Member States interviewed were keen to have a forum available for open, honest sharing of experiences, and other support mechanisms to enhance information exchange, as they felt it did give them a clearer view of the possible approaches and potential for collaboration.

Commission Proposal for Recasting the EPBD

AEA assesses that there would have been benefits in fully implementing and enforcing the current EPBD before any substantial recast, although we appreciate that this would have delayed any resulting improvements in the energy performance of the EU housing stock. *Given the current lack of evidence on the impacts of the EPBD to date, the following observations are based on our research and the comments provided by stakeholders during this study, and our own professional judgment:*

EC recommendation: clarification and simplification of definitions & methodologies

We support the move to clarify and add to the definitions in the EPBD text. Lack of clarity has been a major cause of concern for some Member States. We note that it will be particularly important to define "cost-optimal" in the context of energy performance improvements and benchmarking calculations.

The success of the proposed amendments to minimum performance requirements and ‘cost-optimal’ benchmarking will depend on the successful development of a harmonised calculation methodology and the willingness of each individual Member State to adopt appropriate measures to improve their performance.

There may be additional advantages in the Commission developing a common toolkit for calculating cost-optimal levels, based around the International Standard.

EC recommendation: removal of 1000 m² threshold for existing buildings when they undergo major renovation

AEA supports this recommendation, which will extend the coverage of the EPBD to a much bigger proportion of the existing housing stock. The Commission's impact assessment of the recast shows that this measure would make a major contribution to energy savings and CO₂ emissions reductions. Again the careful definition of "major renovation" will be important.

EC recommendation: low and zero emissions buildings

Member States are required to actively promote the higher market uptake of low & zero carbon buildings by producing national plans with clear definitions and targets for their uptake. Member States are also required to set targets for the minimum percentage which such buildings shall constitute in 2020 (with interim targets in 2015) of the total number of buildings in relation to the total useful floor area. Such targets should see public authorities taking a leading role in buildings that they occupy. AEA is in favour of a stronger formulation of the text, with the introduction of clear deadlines. Moreover, we believe that – even at this stage - the recast should provide at least some minimal guidance (in an Annex) with regard to criteria/ parameters etc. to be considered by Member States when attempting to define such buildings (i.e. upper limits for CO₂ emissions, respectively primary energy consumption [kWh/m²] etc.).

EC recommendations relating to energy performance certificates

The recast requires that competent authorities or bodies are required to make a random selection of at least 0.5% of all energy performance certificates issued annually and subject these to verification. AEA believes this should lead to a higher confidence of the general public regarding the information presented in the certificates and make people more aware of the possibilities for improvements and of their cost-effectiveness, leading to a higher rate of renovations, and consequently to enhanced energy savings.

AEA believes that Member States should implement all cost-effective measures of the certificate within a certain time period in all public buildings as a minimum practice. All other buildings should be encouraged to implement all cost-effective measures, provided financial mechanisms can be set in Member States. This is already current practice in Denmark.

AEA also strongly holds that requirements for the display of EPCs should be on the same basis for privately-owned commercial buildings frequently visited by the public as for public buildings. This would contribute significantly to raising public awareness.

In addition, AEA believes that the recast should include a requirement for all certificates to be registered at national level, if not EU level, to provide the opportunity for improving the knowledge about the energy performance of the European building stock and the ongoing refurbishment processes.

EC recommendation: inspection of systems

AEA supports the recast requirements and in addition support the recommendation made by CONCERTO, that this article includes ventilation systems in the existing regular inspection procedures of boilers and air-conditioning systems.

The recast proposes that an 'inspection report' is drawn up by an independent expert and given to the building owner or tenant. The report would include recommendations for cost-effective measures.

Having this information, the building owner could make informed decisions on retrofitting the building, decisions that ultimately would significantly improve the energy savings and lower the costs. AEA believes that an energy efficiency rating should also be part of an inspection report.

It is proposed that random sampling checks of at least 0.1% of all the inspection reports will be performed. AEA agrees that the introduction of compliance checks would support the usefulness and credibility of the inspections.

EC recommendation: independent experts

We support the proposed addition that the accreditation process of the competence and independence of experts who carry out the certifications and inspections are taken into account. AEA believes that terms like “qualified/ qualification”, “accredited/ accreditation”, “competence” and “independent [manner]/ independence” should be more detailed in the recast.

EC recommendation: penalties

We recommend that some basic guidance on penalties/ procedure should be provided by the Commission and the recast should provide for this, together with a requirement for reporting on the application of penalties applied and demonstration of how funds received could be subsequently spent to improve the implementation of the Directive.

Additional recommendations

AEA recommends that the following additional changes are considered for the recast or subsequent amendments to the EPBD:

- Further harmonisation of the calculation methodologies between Member States. This should incorporate feedback from practical experiences and cross comparisons on the different approaches taken during the next few years to try and reach a standard EU/International methodology.
- Further concerted awareness raising campaigns, and the provision of clear guidance on the value and relative costs of implementing higher energy performance standards at construction/refurbishment stages.
- Further consideration and research into how the economic situation in countries is influencing the purchasing criteria and occupier behaviour.

1. OVERVIEW

EU Member States had a deadline of January 2006 to transpose the current Directive into national law. At the time of the 2006 deadline, only two countries had implemented the legislation. In general, countries that already had energy savings measures in place, such as Denmark, Germany or the Netherlands found it much easier to integrate these measures into the new EPBD requirements. Progress has been made since 2006. Certification of buildings is running in many Member States and the number of inspectors operating in the market is growing. However, some of the new Member States still face substantial problems largely due to their legacy of a highly inefficient prefabricated building stock. Most of these countries are making use of the additional three year period and are not going to fully implement much before 1 January 2009. The inspection of boilers and air conditioning systems in particular seems to have been one area where most Member States have needed more time to fully meet the requirements of the EPBD.

To provide comprehensive background information and advice for the Members of the ITRE Committee, this report addresses the following key issues:

- Implementation of current Directive (status and effect);
- Horizontal issues for new and existing building mass, plus specific issues for the existing building stock;
- Linkage with other policy areas;
- Best practice – examples and possibilities (inside and outside EU);
- An analysis and assessment of energy performance of buildings, including the upcoming revision of the EPBD. (A detailed breakdown of the elements proposed in the recast is placed in Annex 5).

1.1 Study Methodology

The study involved a review of existing reference sources complemented by a short survey of views from selected Member State experts using a combination of face-to-face, email and telephone methods¹. Ten Member States provided information to the study: Bulgaria, Czech Republic, Denmark, France, Germany, Greece, Lithuania, Spain and the UK. These countries were selected to provide a mixture of countries that implemented the EPBD quickly and easily and those that found it harder, old and new Member States, a range of northern and southern climates and some examples of novel policy approaches.

Our plan was to review a cross-section of Member State approaches and experiences so that we can comment effectively on the status and impacts of implementation of the EPBD, identify best practice examples and review different approaches to, for example, financial instruments. We believe this has allowed us to provide the crucial elements of the review without requiring a full assessment of each of the 27 Member States' experiences and approaches which would not have been practical within the timescales set for this study.

¹ Most interviews were carried out in native languages.

2. IMPLEMENTATION OF THE CURRENT EPBD

2.1 Current situation analysis

The current Directive is set to promote the improvement of the energy performance of buildings with four requirements to be implemented by the Member States:

- General framework for a methodology of calculation of the integrated performance of buildings (Art. 3);
- Setting of minimum standards in new and existing buildings (Art. 4, 5, 6);
- Energy Certification of buildings (Art. 7);
- Inspection and assessment of heating and cooling installations (Art. 8, 9) by Independent experts (Art. 10).

Table 1 on the following pages provides a summary of progress to date for each Member State, showing the responsible bodies, latest status update on the EPBD Buildings Platform, and overall indication of implementation status. Green cells indicate that good progress has been claimed. Amber indicates significant progress but a vulnerability to achieving targets. The red cells reflect poor progress to targets.

In summary, AEA found that 17 of the Member States have successfully implemented all the requirements of the EPBD, or are in the process of rolling out certification/inspection requirements as of January 2009. A further 7 Member States are still in discussion or 'due' to roll out one or two of the elements, but have made significant progress in implementation; there are only 3 Member States - Cyprus, Greece and Hungary - still struggling with the implementation of most or all elements of the Directive.

The main reasons given by countries for delays in implementation were:

- The primary barrier for the Member States interviewed were issues surrounding finance. In some cases this was finance and resource availability for getting methodologies and new legislation in place; in some it was more issues around the availability of finance for implementing the required higher energy performance standards.
- The Directive is open for interpretation in certain areas and this has caused confusion and delay.
- The lack of existing calculation methodologies and mechanisms for delivery took longer than anticipated to develop.

The following is a summary of the areas which Member States have found more complex and problematic to implement than others:

2.1.1 Certification of Existing Buildings:

Austria, Belgium, Estonia, Finland, Hungary, Ireland, Latvia, Lithuania, Malta, Poland, Slovenia, Spain and Sweden have all stated that certification for existing building sales/rentals are expected to only come into force from 1 January 2009. Romania is anticipating certification requirements at point of sale/rent will be in place by 1 January 2010. Cyprus, Malta & Greece are still in discussion with regards to elements of what buildings require certification.

2.1.2 Inspections:

In Bulgaria, air-conditioning inspections have been required since July 2008, but the inspection procedure is still under discussion. In France measures to establish an inspection regime for boilers and air-conditioning systems are still under discussion. The implementation texts regarding the measures on boilers and air conditioning systems' inspections are being prepared. In Italy the procedures for inspection of air conditioning systems are still under discussion, In Malta and Poland the requirements for boiler/air-conditioning systems were due to come into force from January 2009.

2.1.3 Methodology:

In Latvia the building energy efficiency calculation methodology is in place but only as a draft version. In Malta a decision about the national calculation methodology was expected in July 2008. In Greece software tools for the National Calculation Method are still under development. They will be based on CEN 832, with minimum energy performance requirements for new and refurbished buildings coming into force in January 2009. In Cyprus it was anticipated that software would be ready by October 2008. The situation in Poland is unclear, as there is no information available post 2006. Similarly, in Slovenia the latest status report of August 2006 states that the methodology of calculation of integrated energy performance of buildings is under development.

2.1.4 Accredited persons:





















In Greece the energy auditors' certification procedure is still under discussion, but it is likely that certified organizations will undertake preparatory training courses. Cyprus is yet to issue details of a training course, but have outlined the types of qualified persons who would be expected to carry out the EPCs. In Hungary although about 1500 practicing engineers and architects joined the training courses no licenses have been issued, due to the lack of the relevant regulation on the certification. When the certification method is formalised, the procedures should be restarted. The requirements for auditors in Latvia are currently in draft phase, until the methodology is confirmed. In Malta a programme was being formulated for holding training programmes for assessors and certifiers in mid September 2008.

The one area which all Member States appeared to implement quickly and with relative ease was the setting of minimum energy performance requirements, although these levels and targets vary considerably.

Table 1: Overview of EPBD Implementation status

Member State	Latest Status Report	Overview of Status
Austria	June 2008	
Belgium	March 2008	
Bulgaria²	March 2008	
Cyprus	June 2008	

² Member States in bold are the selected countries for in-depth review in this study.

Czech Republic	June 2008	
Denmark	November 2008³	
Estonia	May 2008	
Finland	August 2008	
France	March 2008	
Germany	March 2008	
Greece	May 2008	
Hungary	March 2008	
Ireland	August 2008	
Italy	June 2008	
Latvia	July 2008	
Lithuania	May 2008	
Luxembourg	September 2008	
Malta	March 2008	
Netherlands	June 2008	
Poland	August 2006	
Portugal	March 2008	
Romania	May 2008	
Slovakia	May 2008	
Slovenia	June 08	
Spain	May 2007	
Sweden	June 2008	
UK	September 2007	

Annex 1 provides detail on progress achieved so far in each of the Member States. This has been drawn from the EPBD Buildings Platform and literature review, updated with the results of stakeholder interviews for the 10 countries analyzed in further detail. Annex 3 contains the full findings from the Member States interviews.

³ The latest status report has not yet been edited and cleared for publication on the Buildings Platform, however, Søren Aggerholm agreed to provide a copy for information.

2.2 Differences found in implementation

Central to the EPBD is the principle of subsidiarity, since buildings and other local technical, market, social and climatic conditions vary widely across Europe. The assumptions and simplifications required for implementation of the Directive can therefore vary widely. It is key to note therefore that the degree to which compliance has been achieved in the various articles, the measurement parameters, and targets established for improving energy performance of buildings, all vary greatly from country to country.

In its March 2007 conclusions⁴, the European Council identified energy efficiency as an essential part of the comprehensive strategy on climate change and energy, and stressed the need to achieve the objective of a 20% saving of EU energy consumption by 2020. The buildings sector is the largest energy user and CO₂ emitter in the EU and is responsible for about 40% of the EU's total final energy consumption and CO₂ emissions. The sector has significant untapped potential for cost effective energy savings, which, if realized, would mean that in 2020 the EU will consume 11% less final energy⁵

2.2.1 Minimum Energy Performance targets

The Directive requires the application by Member States of minimum requirements on the energy performance of new buildings and for large existing buildings that are subject to major renovation, based on the development of an appropriate national calculation methodology, as specified in Article 3. In order to facilitate the application of Article 3, a mandate was given to the CEN committee to develop appropriate calculation procedures to support Member States for the national implementation of a calculation methodology of energy performance. In terms of application, neither the Directive nor the draft standards specify that a single calculation method must be used. In order to maintain consistency, there are advantages in using a common method for all buildings. Some Member States have subsequently based their methodologies on the CEN standards, however many have developed or utilized existing software systems.

In addition, as Member States may differentiate their requirements between new and existing buildings and different building categories, the issues span a wide range of items such as: strategies on national minimum energy performance requirements, which building categories are considered in the different Member States, how the requirements take into account the general indoor climate conditions, what building types are exempted from energy requirements, what kind of requirements are there for major renovations, are these requirements based on benchmarks, is the rating based on measured or calculated data, not to mention how are compliance checks organised and what kind of legal sanctions are there.

To date, the different Member States use a variety of the following minimum energy performance requirements:

- CO₂/primary energy requirements (most comprehensive type of requirements);
- Final energy requirements;
- Net energy requirements (excluding building service systems + environmental influences);

⁴ Council document 7224/07 REV1.

⁵ Proposal For A Directive Of The European Parliament And Of The Council On The Energy Performance Of Buildings (Recast) {Sec(2008) 2820} {Sec(2008) 2821}.

- Component and system requirements (U-values, mean U-values, service system efficiencies);
- Special indicators (e.g. for prevention of overheating in the summer).

Analysis of the approaches shows that the minimum requirements are limited to:

- A specific number (e.g. in the case of maximum U-values);
- A function of some indicators (maximum energy demand dependent on the surface-to-volume-ratio and/or the floor area);
- The comparison with a reference building;
- The ratio between the calculated energy performance and the reference energy performance.

The following is a summary of what we have found in terms of methodology and performance specifications for a selection of the Member States, to give a flavour of the range of variation.

Member States who have incorporated into existing Regulations/calculation methodologies:

Denmark: The new energy requirements were issued June 16, 2005 as an addendum to the Danish Building Regulations. The requirements came into force January 1, 2006 with a transition period of 3 months until April 1, 2006 when the new requirements must be fulfilled in order to obtain a building permit. This was the quickest adoption of new requirements for any Member State. The new energy requirements impose stricter energy performance requirements in accordance with current Danish action plans for an increased 25% energy saving in new buildings, compared to requirements before 1 January 2006.

Finland: Since 1985 Finland's National Building Code has included guidelines for calculating the power and energy demand for the heating and cooling of buildings. These guidelines can be used for calculations for all building types. The calculation method was refined because of the implementation of the EPBD and it follows the main principles of prEN13790. The new calculation method was published in the National Building Code in June 2007, when the level of the requirements also was tightened. The energy requirements are to be amended again, in order to tighten the requirements by 30–40% and will come into force at the beginning of 2010.

Germany: Germany has not made use of either the calculation standards or the inspection standards released by CEN under the EPBD mandate. Principally, the German approach via reference buildings allows the additional use of a consolidated set of CEN standards at a later stage. It is expected that EnEnv 2009⁶ will tighten requirements for primary energy demand by 30%, and again in 2012 by another 30%.

France: Calculation procedures pre-existed: they had been introduced by the preceding regulation on new buildings (RT2000). They had been based on the same principles as prEN 13790. For new buildings, the methodology is being revised every 5 years and with every revision buildings are required to consume 15% less energy.

Sweden: The revision of the Building code regulations BFS 1993:57 states the method of calculating the energy use and on what level the energy use may not be exceeded. A maximum energy consumption per m² of useful floor area is given (for heating, cooling and domestic hot water demand) along with other advice about comfort and indoor environment.

⁶ Ordinance on Energy Saving Thermal Insulation and Energy Saving Appliances in Buildings“ (Energieeinsparverordnung – EnEV).

UK: The requirements were incorporated into the existing Building Regulations, although new calculation methodologies were created based on calculating CO₂ emission per m² for an actual design and comparing this with the CO₂ emissions per m² for a notional building. The new energy standards are intended to achieve an improvement of around 23-28% lower emissions on the previous standards.

In summary: In most cases, the pre-existing regulations and methodologies have allowed for easier and quicker implementation of the requirements. However, this is not always the case, as the UK laboured to agree on new methodologies, and France are still discussing the implementation texts for boiler and air-conditioning inspections. With these Member States the predicted improvements in energy performance are also more clearly seen, yet even here they range from 15% to 28%.

Examples of Member States with new regulations/methodologies

Austria: A sophisticated calculation system has been developed. The user of this system can do the calculation either using all available details or using default values based on the experience of more than 100,000 already existing energy certificates. As far as they have already been available all CEN-standards have also been implemented and will guarantee a high compatibility of the Austrian calculation methodology to a future harmonised European methodology. The existing requirements are to be tightened in January 2010 as the methodology current uses mainly the same default values for new and existing buildings.

Luxembourg: The regulation fixes a maximum average U-value for the whole building taking into account several aspects such as the ratio volume/surface and the inside temperature for buildings with a floor area greater than 200 m². For smaller buildings, the average maximum U-values are determined for each part of the building (roof, external walls, windows, etc.). The requirements for new buildings require an improvement of about 30%-50% in comparison to the former standards.

Czech Republic: The minimum energy performance requirements are based on benchmarked performance against a reference building. The calculation methodologies are based on the EN standards, with energy performance expressed by the total annual delivered energy consumption, including heating, cooling, DHW preparation, mechanical ventilation, lighting and auxiliary energy needed for the building operation.

Lithuania: The calculation methodologies are based on the EN standards. Minimum energy performance requirements require new buildings to achieve at least level C, and existing buildings >1000m² undergoing major refurbishment at least level D.

Slovakia: The calculation procedure is strictly based on the EN standards, however there is only software for parts of the calculations. The majority of the calculations are worked out using a spreadsheet. In the near future there should be some reference buildings prepared for validation of the results of the calculations (software). The global indicator is the total delivered energy in kWh/(m².year). The requirements brought additional energy savings compared to the standardized requirements, e.g. 28.6% for residential buildings.

In summary: As can be seen from the above, there is a wide range of level of sophistication of the calculation methodologies. This does not necessarily correlate directly with the performance requirements set, for example Slovakia has set an improvement requirement of 28.6%, one of the highest recorded, although Luxembourg have set the highest requirement of up to 50%.

For comparison, a breakdown of EU Member States' energy saving targets to 2016 can be found at Annex 5.

2.2.2 Examples of variance in method of delivery, costs, incentives and accreditation:

Germany: Unusually, in comparison to the other Member States, Germany has allowed a lot of people to be energy assessors to avoid bottleneck effects, especially at the beginning of the Directive's implementation. Engineers or any other professionals dealing with buildings or people that studied building related topics are allowed to be assessors.

The German authorities have also tried to keep the costs of certification as low as possible, by adopting a flexible approach allowing energy certificates to be produced based on different methods. Currently two methods can be used, one based on energy demand, the other on consumption, using benchmarking.

In Germany there is also no 1000m²-threshold. Extension of more than 50 m² heated or cooled space added to existing buildings have to meet the requirements for new buildings. The same applies to a new installation or the modernisation of appliances and their main components (boilers, air-conditioning-centrals, pumps in heating systems etc.)

Denmark: There are 3 types of energy inspectors: a) single-family residential building, b) multi-family residential/commercial/public buildings, and c) in-house commercial/public buildings. Inspectors must have at least 5 years relevant experience and must complete a special training course (with an annual 'reminder' training).

In the case of existing buildings being sold or rented out, the buildings must have an energy label of not more than 5 years old, whilst other Member States only require certificates to be no older than 10 years. In addition, the 1000m² limit has never been applied.

France: The EPCs are not controlled by the State, but the notaries (legal expert in charge of the real estate sales acts in France) have to make sure that they are included in the sale contract. They are, however, concerned about the policing of ensuring certificates are issued for rentals, as often these are not undertaken through notaries.

UK: The UK has three separate certification schemes, calculated using different methodologies and delivered through different mechanisms. These are:

- a) The domestic certificate, required whenever a dwelling is built, purchased or leased, is calculated using a revised existing programme rdSAP⁷.
- b) For new buildings, major renovations or sale of non-domestic properties an EPC based on asset rating must be produced.
- c) For public buildings over 1000m², a Display Energy Certificate (DEC) based on operational rating must be produced, accompanied by an advisory report, and must be on display.

Each process has a different requirement for becoming an accredited expert, as does the requirement for air-conditioning system inspections.

Finland: In Finland, most apartment blocks are owned by housing companies. In these housing companies, people living in their own dwellings are shareholders. All decisions to improve the efficiency of the building are taken at a meeting of the shareholders. The shareholders also share the costs generated by energy certification or energy efficiency improvements.

⁷ Reduced Data Standard Assessment Procedure.

Czech Republic: The costs for purchasing a domestic EPC are borne by the owner, and are set at approximately 5% of the value of the property. This is considered to be in the region of €1,500 – 6,000, and appears to be much higher than any other Member States' indicative costs.

Romania: The Government and Local Public Authorities meet 67% of costs for private residential multi-storied buildings annually nominated within national refurbishment programmes and 100% of costs for state-owned residential multi-storied buildings annually nominated within national rehabilitation programmes. The remainder of the costs are covered by owners.

In addition, certification has been carried out for buildings with floor area less than 1000m², as a result of a Government Ordinance⁸ which requires that any feasibility study related to buildings should have an energy audit as basic documentation.

Bulgaria: Tax cuts are being given for buildings that achieve an 'A' or 'B' rating⁹.

Spain: There is a minimum contribution of solar thermal and photovoltaic energy required for new buildings, based on type and size (minimum requirements ranges from 30% to 70%).

2.2.3 Conclusions & recommendations on implementation

In conclusion AEA found that the current Directive, whilst allowing for a degree of subsidiarity, has led to large variations in targets and ambitions, and calculation methodologies. Although there are examples of similar metrics used in calculation methodologies, such as u-values, this has not necessarily resulted in similarity of targets or minimum performance requirements. On the other hand, there are some similar performance requirements but they have been calculated using completely different methods and metrics.

It is this level of variation amongst the Member States that limits any realistic, meaningful EU wide benchmarking comparison of the relative impacts that implementation that the EPBD has had between Countries.

However, the flexibility has also resulted in varied and innovative methods of implementation. These, in combination with the best practice examples should be strongly promoted and explored further with other Member States, particularly those who are struggling with implementation.

2.3 Key barriers to implementation

2.3.1 Member State level barriers

- The primary barrier identified by the Member States interviewed was finance¹⁰.
- In countries where regulations on buildings' energy efficiency already exist (e.g. Germany), Member States have commented that the constantly changing, additional European requirements and legislation makes it complex to modify existing national rules and creates regulatory instability.

⁸ Government Ordinance 28/2008.

⁹ No further details on the amount of tax relief was available.

¹⁰ There was no evidence of any country currently subsidising implementation from funds collected from penalties applied.

- In addition, another difficulty for some of the more progressive Member States has been that of implementing EPBD in a cost efficient manner. When a building stock has little room for improved efficiency measures, it could be considered that the costs incurred for implementing EPBD have had little benefit. For example, very little of the building stock in Denmark still has potential for increased energy efficiency through the application of simple, short-payback measures such as thermal insulation.
- In countries where little or no regulations on energy efficiency in buildings exist, creating new methodologies is time and investment consuming, thus delays in the implementation of inspections of boilers and air-conditioning systems in France for instance.
- Major client institutions separate and fund capital costs and running costs into separate budgets, thus making it difficult to cross subsidize budgets and implement cost-optimal levels. In addition, buildings are often non-standard and complex. To evaluate the relationships between the many different services and structural elements involved requires a close-knit partnership between all parties which, traditionally, does not exist.
- Identifying, training and re-educating all parties in the building chain, from architects to engineers to auditors, on the new regulations and requirements, has taken significant time and effort in many of the Countries.
- Another difficulty faced by some Member States, such as Denmark and the UK, has been their decision to base energy certificates for existing buildings on calculations using actual consumption data. This presents problems for old building complexes that may comprise buildings of widely varying types, with different heating types and joint metered supplies. It has also proven difficult to then produce appropriate grade levels at generic building type levels. An example of this is with the labelling of schools in the UK, which come under one benchmark building type. However, this encompasses nurseries, primary schools, schools with pools, large secondary schools, universities, schools catering for children with special needs, which all have completely different consumption profiles.
- Lastly, interpretation of the Directive and subsequent consultations within Government as to how the Directive should be implemented has caused delays and frustration in some Member States. These countries felt that the lack of clarity with the wording has led to numerous interpretations with the stakeholders involved. An example of this is that within the three distinct governing bodies of the UK (England & Wales, Northern Ireland & Scotland) the interpretation has led to significant differences in delivery methodology and requirements.

2.3.2 Barriers at owner/occupier level

- EPCs are not typically taken into account as a selection criterion when buying/renting a building. This appears to be directly related to the building market situation. If there is a lack of available buildings, with demand exceeding supply, then the buyers/renters have limited choice.
- It was felt that many homeowners in particular, in the current economic climate, are unable to finance the necessary large investments in energy saving measures. It was considered by many that financial institutions should offer attractive financing programmes and governments should set up supporting programmes. For example the French government are about to launch 0% interest rate loans.

- A combination of the lack of awareness of the financial savings that can be made by energy saving, together with a lack of clarity and guidance about the relative lower costs as a result of implementing energy efficiency, have led to poor uptake. In addition, there is a high level of uncertainty and distrust about the amount of financial savings claimed. This has been compounded by the fact that to keep costs low many of the accompanying EPC advisory reports are not savings specific, with measures advertised having as high/medium/low investment and savings potential. Unified accreditation of experts and quality management/inspections of certification should help to increase the confidence in the predicted savings of energy efficiency measures.
- Householders are still not fully aware of the relationship between their energy use and costs, and how this relates to which services within their households. Smart meters (and sub-metering) would help to inform the occupier of their present energy consumption and encourage monitoring to ensure savings are achieved. In the longer term this will also help provide accurate data on equipment performance.
- Commercial developers and the leasing market feel that they have no need to incorporate high specification energy efficiency as they are only interested in initial capital costs. Immediately after these costs are incurred they hope to sell the asset (and, hence, incur no recurring costs). It is important that both of these elements are tackled in the requirements, through concerted awareness raising campaigns and the provision of clear whole life costing guidance on the value and relative costs of implementing high energy performance standards at construction/refurbishment stages.
- Following on from the above, refurbishment of dwellings is considered to be low priority for landlords because of the higher costs involved for lower benefit. Information campaigns and support programmes should focus on natural investment opportunities, especially when occupants move out. Energy saving measures for dwellings should be offered in combinations of easy and more difficult measures, and could also be combined with district upgrading programmes.

2.3.3 Conclusions & recommendations on barriers

With the changing markets and economic crisis, it is essential that the benefits of energy efficiency are thoroughly publicised, raising awareness and promoting confidence in any claims of savings. Further consideration should be given to making smart metering mandatory (in some Member States this is already the case, e.g. Italy) as a means of educating and empowering the user once a building is occupied. This would also allow for accurate measurement of the buildings' performance, rather than relying on predicted consumption or estimated billing data.

Campaigns should be linked with financial incentives and fiscal measures, including penalties were appropriate, to increase uptake of certificates and the measures advised for improvements. Widespread dissemination of best practice within Member States would also help provide guidance on how other countries have overcome barriers within.

Alternative, innovative routes to market for certification should also be considered as the housing and construction markets slow down. Suggested methods include linking local taxation rates to performance of buildings – similar schemes have been launched throughout the EU to encourage recycling rates.

2.4 Effects of the implementation

Many countries have commented that it has taken more time than anticipated to revise national building regulations, set up the certification schemes and train experts. Many countries have also referred to the difficulty of technical implementation, a lack of proper national administration, a shortage of qualified experts. In short, many feel that the EPBD is behind schedule.

Most importantly however, there is no coordinated monitoring of the impact of the EPBD on actual energy savings, although there are examples of national monitoring studies. The Danish Energy Authority, Ministry of Transport and Energy, for example, is about to undertake a study of the measures and opportunities for improving buildings energy efficiency that may also contain an evaluation of the cost-benefit ratio of EPBD. However, in general it is very difficult to qualify and quantify what effects the implementation of the EPBD has had.

In Countries that had existing building efficiency requirements, methodologies and guidance in place, it is clear that the transposition has been easier and quicker. This is particularly true in the area of air-conditioning and boiler inspections.

Countries that had existing programmes for energy efficiency have also experienced very little change in the situation post implementation. For example, in the Netherlands¹¹, a performance certificate has been compulsory from January 2008, whenever a dwelling is constructed, sold or rented out. However, research carried out within the Netherlands suggests that, in reality, a certificate has so far been available in no more than 15% of all housing sales in the country. This could be in part due to the lack of penalties applied in most Countries, and as such is something that should be given much more consideration with the recast.

France and Germany commented that the main effect of the EPCs that they have experienced was not quantitative, i.e. saving substantial energy and redirecting the demand towards more energy efficient buildings, but more that they have helped raise public awareness on the issue of energy saving in buildings because of all the debates and discussions generated.

One overall positive impact is that implementation of the EPBD, for example in Spain, allowed the Government to update current national legislation on energy efficiency and include more measures which in some cases go beyond the requirements of the EPBD; for example there is a minimum contribution of solar thermal and photovoltaic energy required for new buildings.

The programme Concerted Action¹² summarized the additional positive effects as a result of the EPBD in Member States:

- New building regulations are in force throughout the EU - more stringent requirements are in force in almost every Member State, new summer requirements have been introduced for the first time in many Member States, and new software tools are available.

¹¹ CONCERTO (2008) Position Paper on the *Proposal to recast the EU Energy Performance of Buildings Directive*, December 2008.

¹² Concerted Action (CA) EPBD was launched by the European Commission to promote dialogue and exchange of best practice between Member States. The CA is funded under Intelligent Energy–Europe under the European Union's Competitiveness and Innovation Programme.

- Most Member States have established a working administrative system for issuing certificates and inspecting boilers and air-conditioners, as well as to train and/or recognize qualified experts.
- There are now clear targets for what can be considered a high-performance building in most Member States, recognised by a special label, that can inform consumers and lead to progress in the market.
- Awareness of the importance of building energy efficiency is now much higher throughout the EU.

2.4.1 Conclusions & recommendations on effects of implementation

The levels of quality controls, independence of experts and monitoring requirements vary among Member States, and a critical evaluation of the effectiveness of the different systems after implementation will allow identification of desirable adjustments and improvements to make them more effective and to maximise their real impact.

It is imperative that the Commission take steps to ensure that the energy certificate and performance data is being captured and monitored at an EU level and if they are to assess the impact effectively, and forward plan for future developments.

3. HORIZONTAL ISSUES FOR NEW & EXISTING BUILDINGS

3.1 Life Cycle Analysis and impacts of buildings¹³

3.1.1 Definition

The capital cost of a building or the services within a building is only (a small) part of the total economic pie. The operating and maintenance costs associated with that capital cost can outweigh the initial investment several times over, taking into account construction, usage, demolition. The objective of life cycle analysis (LCA¹⁴), together with the technical, environmental, social and other evaluations, is to provide the decision maker with sufficient information on which to base a reasoned judgement - none of the evaluations are designed to *make* the decision. The use of whole life costs makes good sense if all parties are to achieve long-term economic systems and buildings. The *lowest cost now* culture¹⁵ is incompatible with long-term profitability and long-term energy efficiency. Maintenance costs of building engineering services and the cost of energy are key components of a building's life cycle costs. In life cycle analysis, the savings from incorporating energy efficient materials and ensuring maximum energy efficient performance are greater, and capital costs less, if options are chosen at design stage and integrated with the main building work.

Even though the backbone of the EPBD is to promote the cost effective improvement of the overall energy performance of buildings, there is no requirement at present under the EPBD for Countries to show in a clear and transparent manner that the minimum energy performance requirements have been set in accordance with life cycle analysis (cost-optimal levels). Many of the calculation methodologies are very comprehensive and robust; however it is not clear that LCA has been taken into account. We have found that generally LCA is dealt with on a project, building or product specific basis with completely separate software. This is in part due to the fact that there is currently very little synthesis on thinking, or clear guidelines on exactly how LCA should be calculated and therefore how it can be transposed into existing regulatory requirements. This is due in the main to what is perceived to be its complicated nature. In the last 6 months guidance has been issued by the International Standard Organisation (see chapter 4.1.3), however it is unlikely that this guidance has been taken up and used much of the buildings sector.

Therefore, the production of the comparative methodology, as outlined in the proposed recast (see Annex 3) requiring Member States to report on how close their national performance requirements are to cost-optimal levels, will also need to include clarity on how to incorporate LCA into the requirements and national methodologies, with a clear definition of how to calculate cost-optimal levels.

The Commission is hopeful that the introduction of the comparison reporting will encourage all Member States to achieve cost-optimal levels. However, AEA believe that without clear guidance or setting of a minimum achievement level, with penalties attached, this will become just another reporting exercise on benchmarks and will not drive forward change.

¹³ Also often referred to as Whole Life Costing.

¹⁴ LCA compilation and evaluation of the inputs, outputs and the potential *environmental impacts* of a product system throughout its *life cycle* [EN ISO 14044:2006]

¹⁵ The ethos of choosing the cheapest option in the short term, without assessing best value long term.

3.1.2 Barriers to implementation of whole life costing/cost-optimal levels

- Commercial developers leasing property feel that they have no need to compare life cycle costs as they are only interested in initial capital costs. Immediately after these costs are incurred they hope to sell the asset (and, hence, incur no recurring costs).
- Major client institutions separate and fund capital costs and running costs into separate budgets.
- Manufacturers of capital equipment are unable to provide cost and longevity data in sufficient detail and with sufficient contextual information to enable the recurring operation and maintenance costs and periodicity to be accurately estimated.
- Lack of framework for collecting relevant data, together with standard techniques for modifying rule of thumb data to specific projects.
- Buildings are often non-standard and complex. To evaluate the relationships between the many different services and structural elements involved requires a close-knit partnership between all parties which, traditionally, does not exist.

3.1.3 Whole Life Cost Analysis guidance

In order to provide a set of principles to enable practitioners to produce consistent lifecycle costing analysis the International Standard Organisation issued the following standard on Whole Life Cost Analysis (WLCA) in July 2008.

BS ISO 15686-5:2008: Buildings and Constructed Assets. Service Life Planning. Lifecycle Costing.

More recently, January 2009, the following standard was also issued:

ISO 23045:2008, Building environment design.

These are guidelines to assess energy efficiency of new buildings, provides energy-related requirements for the design process, or to achieve targeted values of energy efficiency for new buildings. The objectives of the standard are to assist designers and practitioners when collecting and providing the useful data that are required at different stages of the design process and to fulfil building design objectives. ISO 23045:2008 applies to new buildings and is also applicable to systems for heating, cooling, lighting, domestic hot water, service water heating, ventilation and related controls. ISO 23045:2008 will assist in:

- collecting and providing information regarding the energy efficiency of the building under consideration;
- conducting the iterative process to ensure improved energy efficiency of buildings;
- obtaining the target values for energy efficiency ratios used in labelling or information to public or/and consumers.

In response to the recast the CONCERTO¹⁶ Communities suggest that the EPBD should consider the evaluation of the energy embedded in the construction components, the results of which should be reported in the energy performance certificate. This would provide another mechanism for embedding whole life costing into the process.

The following are toolkits currently used throughout the EU for life cycle analysis in buildings:

- EQUER (ARMINES, France)
- ENVEST (BRE, United Kingdom)
- OGIP (EMPA, Switzerland)
- BeCost (VTT, Finland)
- ECO-QUANTUM (W/E Sustainable Building, The Netherlands)
- Eco-Soft (IBO, Austria))
- ESCALE (CSTB, France)
- SIMA-PRO (BDA Milieu, The Netherlands)
- LEGEP (ASCONA, Germany)

Each of these toolkits carry out a different level of analysis on a variety of scenarios, some product based some whole building based, and as a result produce varying results.

A full analysis of these existing tools is outside the scope of this study. However, we conclude from the interviews and analysis done that further work is needed to harmonise building assessment tools and that they could be made more transparent and easier to use. At present, we understand that interpretation of the results with most of the existing software programmes requires a fully trained practitioner. AEA has no evidence as to whether one or more of these tools would provide a suitable basis for an EU harmonised tool, and suggest that the European Commission undertakes a research study to investigate this possibility.

3.1.4 Case study: United Kingdom

With the introduction of *Building Regulations Part L2* and the growing awareness of clients of the need to minimise on-going operation and maintenance costs, there is a need for even commercial developers to understand and provide whole life cost information.

The UK government has taken a decision to make all construction procurement choices on the basis of whole life costs - HM Treasury guidance stipulates this specifically¹⁷. This general ruling has been crystallized in Private Finance Initiative (PFI) and Public Private Partnerships (PPP) contracting. In addition, the Government have been pushing for all new builds to undertake BREEAM¹⁸ and Code for Sustainable Homes assessments.

¹⁶The CONCERTO initiative, launched by the European Commission, is a Europe wide initiative proactively addressing the challenges of creating a more sustainable future for Europe's energy needs. CONCERTO is part of the framework research programme supervised by the DG Energy and Transport of the European Commission.

¹⁷The Office of Government Commerce (OGC) Procurement Guide 07 (1) provides public-sector procurers with guidance on whole-life costing.

HM Treasury's Green Book (2) states that when valuing the costs and benefits of options, such costs and benefits should normally be extended to cover the period of the useful lifetime of the assets being evaluated (i.e. whole-life costing).

¹⁸ Building Research Establishment's Environmental Assessment Method.

These assessments cover a much wider environmental impacts assessment, and include whole life impacts of various choices including location, construction and maintenance. However, interestingly, none of this work has been directly linked into the requirements of the EPBD.

The Office of Government Commerce and other public and private sector organisations took a keen interest in the international standard, but it was felt that it did not provide the UK practice guidance that was needed. So, a working group was set up to produce guidance to the standard. This is called the standardised method of lifecycle costing (SMLCC) for construction procurement, also published July 2008.

In addition, financial incentives are available in the UK to help improve the implementation of life cycle analysis through an Enhanced Capital Allowances (ECA) scheme, which enables a business to claim 100% first-year capital allowances on their spending on qualifying energy-saving plant and machinery. Businesses can write off the whole of the capital cost of their investment in these technologies against their taxable profits of the period during which they make the investment. This can deliver a helpful cash flow boost and a shortened payback period.

3.2 Improving and embedding skills and awareness

At present there is no harmonisation in the training and or skills required for implementing the EPBD in the various Member States. Most countries agree that certification and inspections have to be through technically competent persons, who should undertake additional training/qualifications to verify their competency. However, there are some Member States who limit the accreditation of experts to specific professional groups or companies, neither of which guarantees their competence and prevents other skilled professionals, for example ESCOs and energy agencies, from entering the market, limiting competition. The Commission is suggesting that *“in the accreditation process the operative and technical skills of experts who carry out the certifications and inspections and their ability to carry out the service in an independent manner are taken into account”* – however, there is no benchmark set for qualification requirements.

In addition, there is no clear guidance on training requirements for enforcement and planning authorities. As enforcement is not an area currently reported on, there is very little information available with regard to how this is being carried out in each of the Member States. Such a key element of the EPBD appears to be currently overlooked.

Currently within the requirements, countries do not have to specify how they propose to raise awareness amongst the overall population, or throughout the value chain. There was an assumption that the embedding of the requirements into the regulatory framework would naturally raise awareness and encourage the uptake of energy efficient building and measures. However as there is no consequence in many Member States for sellers who fail to comply with the requirement of making available a certificate, the potential of the energy performance certificate is lost. AEA would recommend that the recast propose that penalties be applied at this stage, and that further guidance is needed for national awareness campaigns or for publication of certificates. This is becoming even more of an issue in the current economic climate, as building sales fall, alternative and innovative routes to market for the energy performance certificates will be required.

3.2.1 Case studies: (Germany, France & United Kingdom)

Germany: In Germany many professions are allowed to become assessors and undertake certifications. This was set up to avoid any “bottleneck-effects” especially in the beginning. Before the EPBD implementation, there were different voluntary schemes, which allowed people that were not experts but underwent special training to become assessors. After the EPBD, rules were changed allowing engineers and any other professionals dealing with buildings or people that studied building related topics to be assessors. The Länder have a list of authorized assessors.

There is no certification body or authority enforcing a code of conduct among the experts however the creation of the certificate is strictly regulated, so the influence of experts on the result of the assessment is very limited.

Inspections for air conditioning and boilers have existed for 30 years in Germany, so there is no problem in expert availability and training.

France has a centralized system. No specific diploma or proof of experience is required but assessors must have appropriate knowledge and competence. In order to demonstrate this they have to pass an exam certified by the French Committee of Accreditation. The companies that organize such exams then make the results public.

Boilers and air conditioning system inspections haven't been set up yet. There are concerns on how to train the required number of inspectors in a short period of time and the investment it will require with the amended Directive.

The **UK** also has a centralized system, requiring assessors to pass required examinations. The competencies are broken down into three areas (i) competent to produce Display Energy Certificates for existing buildings (ii) competent to produce Energy Performance Certificates for new/refurbished buildings (iii) competent to carry out system inspections. Details of all assessors are maintained by registered training providers.

The Office of Trading Standards have been tasked with enforcing the requirements of the EPBD, however there is no set training requirement for them. The same applies to the Local Authority planners and the Building Control department. The majority are aware of their new powers, but only as a result of news feeds or attending seminars.

Public awareness campaigns are run by two organizations, The Carbon Trust for business and the Energy Saving Trust for domestic. However, to our knowledge neither organization has been tasked with specifically raising awareness about certification requirements. They have incorporated an element of this within their normal offerings.

In conclusion, AEA recognise that there is a need for clear guidance on the level of expertise required for ‘accredited person’ status, broken down into each of the categories, including enforcement. We suggest there should be cross Member State harmonisation of the training providing, and qualifications received, allowing for stricter regulation and higher confidence within the marketplace that a quality service is guaranteed. This would also allow for freedom of movement between Member States.

3.3 Minimising administrative burden (bureaucracy) in schemes

Due to the transposition of the Energy Performance of Buildings Directive (EPBD) several millions of Energy Performance Certificates are expected to be issued in the European Member States.

The implied large-scale acquisition of buildings' data by energy experts offers the opportunity to improve the knowledge about the energy performance of the European building stock and the ongoing refurbishment processes. This is essential if we are to achieve the strident targets set for reducing carbon emissions.

To enable such knowledge sharing at this level an important precondition is the introduction of a central energy certificate registration and an accurate definition of the data to be collected. Denmark, Portugal, France, UK, Romania, Belgium, Austria and the Netherlands already have established national databases for energy certificates in place.

Recently, a study of 12 European countries was carried out through a project called DATAMINE¹⁹. The objective of DATAMINE was to compare basic experiences in data collection and analysis on a practical level and to draw conclusions for establishing harmonised monitoring systems aims at improving the knowledge about the building stock's energy performance, intended to stimulate large-scale monitoring activities using Energy Performance Certificates as a data source. The project illustrates the variety of monitoring tasks in the European countries, the capability of the DATAMINE data structure and the benefit of a common language to be used for cross-country comparison.

3.3.1 Case studies (Germany & Romania)

Germany: There are currently no requirements for lodging energy certificates. Germany consider that it would be very costly and time consuming to start keeping track of certificates, bearing in mind the significant number already produced pre EPBD.

Romania: Starting 1 January 2009, all certificates must be deposited at National Institute for Building Research (INCERC). INCERC should also monitor the impact, being the data repository. Currently, there is no verification by trials of the certification and audit projects. A Commission will be established - consisting of specialists that do not work in the Ministry – to monitor the EPBD implementation.

3.4 Financing

Member States, in their replies to a questionnaire prepared by the Commission for the revision, estimated that the budgetary implications resulting from the Directive were not too substantial. In addition, the administrative impact is reported to be moderate. The EC appreciates that the investment requirements are not equally distributed amongst EU citizens, i.e. there will be additional costs for those who make major renovations to their buildings or are engaged in property transaction. However, with high energy prices these initial investments will generate attractive returns and will reduce energy bills. This will have positive direct and indirect effects throughout the whole economy. Interestingly, according to Eurostat, the Statistical Office of the European Communities, the countries with the highest potential for financial energy savings, such as Greece, Malta and Cyprus where household consumption represented between 50 and 70 % of GDP²⁰, are the three countries who are yet to fully transpose and implement the Directive.

¹⁹ DATAMINE project – see www.meteo.noa.gr/datamine/.

²⁰ Europe in figures — Eurostat yearbook 2008

3.4.1 Existing financial instruments

At the European level, for the 2007-2013 period, €4.2 billion of the Cohesion policy funding has been allocated to energy efficiency for the housing sector projects in Bulgaria, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Slovenia. A change in the minimum energy performance requirements for existing and new buildings will increase the investment needs for the buildings' owners but reduce ongoing energy costs.

On 7 July 2008 the Commission adopted a proposal on reduced VAT rates. This Proposal provides for the option for Member States to apply reduced VAT rates to the whole housing sector and certain services relating to some non commercial buildings. Consequently, the supply of services including the combined supply and installation of equipment which aims at increasing energy efficiency and saving or using sustainably generated energy relating to the buildings mentioned, would be eligible for reduced rates, if the Proposal is adopted by the Council.

Under the revised Community Guidelines on State Aid for Environmental Protection which were announced as part of the Climate Action package of January 23, 2008, energy savings are eligible for State Aid. It is up to the Member States to develop schemes for the support of energy savings activities.

Many countries have established their own financial and fiscal schemes to stimulate energy saving investments. The spectrum of financial incentives for the industry and tertiary sector is quite broad throughout the EU Member States. They are offered as:

- soft loans;
- grants;
- direct subsidy schemes;
- tax reductions.

All these incentives aim at reducing (and sometimes compensating) the additional costs for energy efficient technologies or components compared to standard investments. Examples of incentives include:

- Rebate in taxation for investments in energy efficiency (Belgium, France);
- The energy investment deduction (EID) provides a tax rule allowing additional deductions on taxable profits after investments in energy efficiency (Netherlands);
- The enhanced capital allowances (ECA) provide businesses in the tertiary sector with a first year 100% tax allowance on investments in designated energy efficient equipment (UK);
- Implementing a scheme of direct subsidies for apartment buildings and (semi) detached houses (Finland);
- Issuance of extensive loan and credit based programmes (Austria, Germany), e.g. the expanded CO₂ Building Retrofit Programme of the KfW Bank (Germany);
- Companies which have signed the “energy conservation agreement” can get higher rates of subsidies for energy audits (Finland).

3.4.2 Case studies: (Germany, France, Romania, Bulgaria)

Germany: The main part of the financial help for energy efficiency comes from the KfW , the German bank for subsidies (largest bank specialised on funding within the EU). The KfW manages a lot of programmes funded by the federal governments to help the individuals finance the work carried out to improve their home's energy efficiency. For that, the bank offers reduced interest rates, direct funding and lower payback loans (i.e. they do not need to pay the integrality of the loan back).

As EPCs are mandatory, the building owner has to pay, and there is no subsidy. However, the government tried to keep the EPC price low by allowing a certain flexibility to carry it out.

France: A tax credit is available when acquiring energy efficient equipment - this has been in place for over 3 years. In addition, there is financial help from government when buying newly built dwelling with low energy consumption, and there are subsidies from different state agencies for renovation projects. Regions also have their own subsidy programmes (e.g. PACA giving out an energy subsidy when an individual installs solar panels).

Romania: Owners, government and local public administrations bear the costs. The government and local public authorities meet 67% of costs for private residential multi-storied buildings annually nominated within national rehabilitation programmes and 100% of costs for state-owned residential multi-storied buildings annually nominated within national renovation programmes. The energy audit, the feasibility study and the design of the renovation works are financed mostly from the state budget.

Bulgaria: Generally owners bear the costs; and state budget partially (even up to 100%) covers costs for public buildings. The energy audit of public buildings above 1000m² is subsidized by the state budget. For renovations, the fiscal incentives are mainly reduction of building tax and profit tax for corporations.

In both Romania and Bulgaria the difficulties in implementation are mainly due to lack of financing, in that although limited [state/local] budgets are allotted in many cases, private owners cannot cover their percentage because of low incomes.

3.5 Recommendations for the future

AEA considers that there would have been benefits in fully implementing and monitoring the enforcement of the current EPBD before any substantial recast. Member States commented that it was too early to tell what the impact of the EPBD had been in their country, and therefore too early to comment on how the Directive should be amended. Also without firm evidence on impacts or compliance levels it is difficult to judge which proposed amendments are likely to have the greatest impact on energy savings and carbon emissions. However, we appreciate that this would have delayed any resulting improvements in the energy performance of the EU housing stock.

To allow any subsequent revision of this Directive or any other appropriate legislation aimed at achieving carbon reduction targets it is imperative that the Member States and the EU are clear about what the current situation is with regard to the building stock. This can only be realized if data is collected on:

- Energy Performance Certificates issued;
- Measures implemented and progress as a result.

Many Member States are already ensuring that Certificates are registered centrally; however this should also be coordinated at an EU level. At present there is no similar registration scheme, or national level monitoring of implementation and progress.

AEA would recommend that the recast propose that penalties be applied for non-issue of certificates at the appropriate sale/lease point. Further innovation is needed for national awareness campaigns and advertising of certificates. This is becoming even more of an issue in the current economic climate, as building sales fall, alternative and innovative routes to market for the energy performance certificates will be required.

It is apparent that large scale comprehensive renovation programmes can be realised only under the following conditions:

- Any policy packages should include a good set of organisational support measures for energy refurbishment of buildings (audit, communication, helpdesk and training);
- Financing integrated concepts for specific target groups (including banks, public institutions, insurances) are necessary.
- Easy realisable and cost effective concepts are needed;
- Marketable solutions are needed (products should be available and construction companies should include all measures as a package in their portfolio: thermal insulation / replacement of windows / ventilation system / replacement of heating system).

Clarity on how to incorporate life cycle analysis into the requirements and national methodologies, with a clear definition of how to calculate cost-optimal levels is required. AEA would recommend that the Commission undertakes further work in harmonisation and facilitation of the building assessment tools currently available for LCA, ensuring they are transparent and user friendly.

EU wide information on all applicable legislation, all public programmes promoting low CO₂ emissions and energy-efficient buildings, with details of any applicable financial and fiscal instruments should be provided by the Commission as part of a centralised database toolkit. This should provide a forum for sharing best practice and as well as details of initiatives that have been unsuccessful, to prevent others squandering resource on similar actions.

The recast should specifically take into consideration the EU structural funds, cheap loans from the European Investment Bank, temporary VAT reductions and economic recovery plans, as funding sources to improve buildings' efficiency.

The recast should encourage Member States to introduce one or more fiscal incentives, which should be linked to the energy performance certificates, and drawn from a list attached to a new Annex to the recast Directive. These should specifically encourage recipients to implement measures recommended to improve EPC ratings.

Also, more efforts should be made in order to ensure a linkage between the certificates and financial support (or discouragement) mechanisms.

AEA recommends that additional clarity on the level of expertise required for 'accredited person' status, be provided. This should include a requirement for training of enforcement authorities. There should be EU level harmonisation of the training providing, and qualifications received, allowing for stricter regulation and higher quality service. This training should be mutually recognised throughout Member States.

4. SPECIFIC ELEMENTS FOR EXISTING HOUSING STOCK

4.1 Improving rate of renovation & renewal

The JRC Report on environment improvement potential from residential buildings²¹ stated that the current situation of the European residential buildings stock in terms of environmental performance is far from the currently discussed low-energy standards and there lies a tremendous potential for improvements. The report concluded that the emissions of greenhouse gases from these buildings may be cut by around 30% to 50% over the next 40 years. The expected benefit in both environmental and socio-economical aspects is huge: by including private houses, CO₂ emissions will be reduced, higher housing quality will be achieved and the building value will be increased. Therefore, active promotion and strong actions from all stakeholders have to be undertaken in order to seize this environmental opportunity.

In France, a study performed within the Renaissance project demonstrated that the most practicable way to ensure a high renovation rate of one-family houses towards high energy standards is to propose a “universal technical solution” which would be valid for the whole country. Households cannot afford energy consultants to customize their renovation concepts but need “ready to use concepts” which can be applied at low cost but with high quality. The “universal technical solution” has to be defined in terms of performance of single components and not in terms of overall energy performance. The “universal technical solution” would not be an optimal solution for each building as it cannot be customised, but it would guarantee on average in the whole country a significant reduction of energy use in the residential sector.

4.2 Regional structures and differences in housing stock

One of the fundamental flaws in the aspirations of the European Commission is that the labelling of houses will influence purchaser choice, pushing the market demand for more efficient homes from the bottom up. However, the following case studies indicate that the differences in regional structures and housing stock have more influence currently in most MS than the certificates.

4.2.1 Case studies: (Denmark, the Netherlands, Germany, France)

Denmark: According to a study published by the Danish Institute of Governmental Research (AKF), Denmark's mandatory energy labelling scheme for homes has not led to any significant savings since it was introduced in 1996. It found no real difference in consumption levels between houses with a label and those without one. Previous research showed owners of labelled houses did not invest significantly more than others in energy efficiency. The A-to-C label is delivered to about 50,000 houses each year.

Netherlands: In the Netherlands, a performance certificate has been compulsory as from January 2008, whenever a dwelling is constructed, sold or rented out. However, research shows that, in reality, a certificate has so far been available in no more than 15% of all housing sales in the country. Currently, no consequences exist for sellers who fail to comply with the requirement of making available a certificate.

²¹ Environmental Improvement Potentials of Residential Buildings (IMPRO-Building) EUR 23493 EN - 2008.

Positive incentives or penalties are absent. Hence, the potential of the requirement concerning the energy performance certificate is lost.

Germany: The housing policy is the responsibility of the Länder (regions). The housing sector is mainly part operated by large housing companies, partly by private owners. They have a dual approach regarding homes' energy performance. The housing situation varies substantially between regions. Some regions, have sufficient housing stock, so the housing market is competitive, which allows the home buyers/tenants to base at least part of their choice on the dwelling's energy performance, encouraging the housing companies to improve energy efficiency. Other regions with a less competitive market (e. g. Munich, Stuttgart or Frankfurt regions) lack quality dwellings, so even homes that have a poor energy performance find renters/buyers.

France: The housing market in France is currently more demand than supply driven as a general rule, so energy performance is not considered a key criterion of selection. Social housing is where the most ambitious renovation measures are carried out – it is also easier because of the unique owner and access to funding and subsidies.

It is worth noting that in almost all Member States the current economic crisis is having a significant effect on housing markets, with reduced levels of sales and increased take up of rentals. Most Member States have a mechanism in place for including EPCs as part of sales and construction, however similar mechanisms are not in place for the rentals market and even where they are there is limited policing capability.

4.3 Recommendations for the future.

Clarity should be provided by explicitly stating that the 'ensure' in article 7.1 requires legislation that guarantees that the certificate is available in all relevant transactions, sales and leases. Member States could, for instance, require that a third party (such as the notary) authorizes a transaction only when a certificate is made available.

However, for the certificates to have an impact there must be:

- A mechanism for checking non compliance must be put in place, together with penalties;
- A mixture of penalties and financial support for social housing providers, to ensure that they implement all cost-optimal measures identified within a certain timeframe;
- Incentives provided to householders to implement recommendations.

Consideration should also be given as to how to address the change in the overall housing market given the current economic conditions, with guidance on a mechanism that could be put in place for ensuring EPCs are included as part of a rental agreement.

Alternative mechanisms should be considered for encouraging voluntary take up of energy certificates. For example, Denmark is considering a buildings tax associated with the energy performance of building, where the energy certificate classification (A, B, C etc.), may be used to guide tax advantages. Adoption of this type of tax incentive would require a very good level of confidence with the measurement of the rating level and a regime of regular auditing to check standards.

5. LINKAGE TO OTHER POLICIES

5.1 Linkage with existing legislation

Energy use in buildings is influenced by a variety of factors. For this reason, in addition to the EPBD there are a number of other Directives dealing with energy aspects in the building context. Annex 4 details existing policies that support the EPBD and influence the energy performance of buildings.

Even though most Member States have transposed the Directive into national law, its practical implementation is not necessarily ensured and there is reliance on complementary legislation and vice versa. For example, the Eco-design Directive can implement measures establishing eco-design requirements for a product but it does not, itself, address how a system is put together; it relies on the EPBD to pick up on this by setting minimum energy performance requirements for buildings.

In Summary, the following directives include reducing energy consumption of buildings within their remit, notably the Energy End-Use and Energy Services Directive (ESD), the Ecodesign Directive, the Energy Labelling Directive and the Cogeneration Directive. The Renewables Directive and associated national targets are also relevant. AEA assesses that these various directives are complementary to each other, e.g. the ESD sets indicative targets for national energy savings and actions taken under the EPBD will contribute to meeting these targets. Similarly the Ecodesign Directive should improve the energy performance of products used in buildings.

5.2 Broader policies and policy issues

With growing concern about the threats of climate change and dependable energy supply, Europe has agreed a forward looking political agenda to achieve its core objectives of sustainability, competitiveness and security of supply²². The EC have proposed a wide-ranging energy package to boost energy security in Europe, such as putting forward a new strategy to build energy solidarity among member states and a new policy on energy networks to stimulate investment in more efficient, low carbon energy networks. The building sector accounts for approximately 40% of EU energy demand and it is estimated that currently available energy efficiency measures if properly adopted could, cost effectively, save around 28% of this²³.

To achieve the targets set in policies such as the Energy Efficiency Action Plan²⁴, Energy Policy for Europe²⁵ and the Strategic Energy Review²⁶ the Commission has proposed a revised EPBD. However, this will have a social impact on EU citizens which will need to be assessed; as stated several times in the EPBD the health and comfort of the population must not be sacrificed for energy savings.

The current EPBD floor area threshold of 1000m² to meet minimum energy performance requirements means that the requirements mainly apply for the tertiary sector and about a third of multi-family dwellings.

²² European Climate Change Programme, see http://ec.europa.eu/environment/climat/pdf/eu_climate_change_prog.pdf.

²³ COM (2006) 545 – 19.10.2006.

²⁴ See COM(2006)545 final - Action Plan for Energy Efficiency: Realising the Potential.

²⁵ COM (2007) 1 – 10.1.2007.

²⁶ EU Energy Security and Solidarity Action Plan: 2nd STRATEGIC ENERGY REVIEW – Unofficial version.

In Europe this accounts for around 28% of the total building stock. The high threshold is likely to limit the impact of the EPBD considering the main contributor to carbon emissions is the residential (77%) not the tertiary sector. Lowering the 1000m² limit for existing buildings undergoing major renovation would therefore tap into potentially unexploited energy savings. Research by Ecofys²⁷ shows that energy savings from energy related renovations of an increasing number of buildings will have a significant impact by 2020, helping reach national targets and those set out in the “20-20-20” initiative.

Smaller buildings and more households taking energy saving into consideration before renovation will have a variety of social implications. There will be economic benefits for the building supply industry with higher demand for energy-saving appliances and passive material such as insulation and double-glazed windows. However, the impact on the public will vary according to social and economic conditions. Realizing energy efficiency measures when retrofitting costs, on average, between two and three times less than when done in isolation. In general this means that for every renovation below 1000m² which is not combined with efficiency measures, an opportunity for cost-efficient energy savings is lost for the owner¹¹. The level of requirements and the related additional costs vary from one country to another but normally remain moderate when planned properly. Implementation of this Directive will target private households, some of them low-income who cannot afford the investment or pay increased rent after renovations are undertaken, the purchasing of high efficiency boilers or high specification insulation requires appreciable investment however, pay-back time from reduced energy costs is comparatively short.

A social barrier which currently affects Romania, are the exaggerated costs charged by construction companies for implementation works, as reported by the Romanian expert interviewed for this study.

Cogeneration, which has potential to save a considerable amount of energy, is a top priority mentioned in the Strategic Energy Review¹³. Article 5 of the EPBD requires this technology to be considered for new buildings exceeding 1000m² however, the Commission is proposing to extend this requirement for all new buildings, where appropriate. There is a potential risk that cogeneration could lock households into a single heat supplier, which conflicts with EU policies to promote energy liberalisation and competition.

Increasing the amount of buildings subject to minimum energy performance requirements when undergoing major renovations and encouraging construction that meets minimum energy standards will likely improve indoor climatic conditions, through insulation and acclimatization, and therefore improve quality of life. Buildings can be designed and used in such a way that they do not consume more energy than they are able to produce. Airtight construction combined with well-designed ventilation will improve energy efficiency and comfort levels. It is also feasible to adopt these measures during early stages of construction and renovations because once buildings are constructed or renovated, changes become more expensive, and thus the opportunity for low cost improvements becomes limited.

²⁷ The European Commission – Impact Assessment of the Proposal for a Recast of the Energy Performance of Buildings Directive, Brussels, Unofficial Version, 2008.

5.3 Recommendations on future linkages

Despite the actions already undertaken, very large cost-efficient energy saving potential remains unexploited. Research demonstrates that 90% of the potential to reduce emissions from buildings lies outside current EU rules²⁸.

At the moment the EPBD focuses on the end-use of energy and cutting space heating by insulation and better installations; however carbon reductions could also be achieved with the use of renewable energy sources in meeting the energy demand. Article 5 of the Directive refers to renewable energy but the requirement accounts for buildings with a floor space exceeding 1000m². Although the article suggests that this general form of generation should be considered there is no suggestion that it will become mandatory. Together with the current high costs and long paybacks of renewable energy measures means that many member countries are predictably giving this a very low priority. Following the coming into force of the new Renewable Energy Directive member states are required to adopt national targets for renewables that are consistent with achieving the Commission's target of reaching 20% agreed in the "20-20-20" initiative. In order to make a contribution towards meeting these ambitious targets renewable energy may become a requirement at least for new buildings. High efficiency, hybrid fossil-renewables heating systems offer potential as recognized by the European Parliament in its Renewable Energy Roadmap²⁹.

The Commission is revising the energy labelling Directive and intensifying the Ecodesign Directive which could make future linkage with the EPBD stronger. The scope of the Ecodesign Directive will be extended to cover all energy-related products and minimum requirements will be set for products with significant environmental impacts. Energy related products are those products which have an impact on energy consumption during use; this encompasses not only direct energy-using products but also other products such as window frames, whose insulation properties influence the energy required for the heating and cooling of buildings. The Energy Labelling Directive will also be further developed to apply labelling to a broader range of energy using products. As both of these directives take into account energy use on a whole life cycle basis, use of products meeting the criteria should be encouraged through the EPBD and potentially detailed when used in the EPCs as an extra commitment to achieving lowest, whole life environmental impact.

In addition, the environmental criteria proposed by the European Green Public Procurement Training tool kit³⁰ are presented in order to consider the issues mainly elaborated at European level for the building's environmental performance evaluation. In July 2008 the Commission presented a proposal³¹ to set ambitious targets for green public procurement linked to common green procurement criteria, this included looking at energy labelling of buildings. Discussions are currently underway to include an EcoLabel for buildings, in addition to the EPBD requirements. AEA believes that if this new label goes ahead, it must build on the EPBD requirement, and not be seen as a replacement or alternative.

²⁸ Warren, A (2004) in an Energy Performance of Buildings Directive special edition of EC Inform-Energy; <http://www.euroace.org/bDirective.htm>.

²⁹ COM (2006) 848 – 10.1.2007.

³⁰ http://ec.europa.eu/environment/gpp/toolkit_en.htm

³¹ COM (2008) 396 – 16.7.2008.

Lack of information has been stated as a barrier affecting implementation of energy efficiency measures in buildings by some of our interviewees, such as Romania. The provision of a central forum for sharing knowledge and practice, including information on all other relevant legislation and policies, will be particularly beneficial to these Member States, and essential to achieve stated objectives of raising energy efficiency awareness as set out in the Energy Efficiency Action Plan¹¹.

Romania also mentioned interactions with other EU initiatives as adding complexity to the introduction of the EPBD but we have been unable to substantiate this and it was not raised as a significant issue by other interviewees.

6. BEST PRACTICE – IMPLEMENTATION & ENERGY EFFICIENCY IN BUILDINGS

6.1 Our Findings

The following examples are taken from a combination of the findings of our interviews and literature review, some of which we have referred to earlier, and from the National Energy Efficiency Action Plans. This list is by no means exhaustive, but does provide a good overview of the work being carried out throughout the EU.

6.1.1 Improving Building Energy Performance beyond EPBD requirements

1000m² threshold: Neither Germany nor Denmark have enforced the 1000m² threshold. In Germany, any extension of more than 50 m² heated or cooled space added to existing buildings has to meet the requirements for new buildings. The same applies to a new installation or the modernisation of appliances and their main components (boilers, air-conditioning-centrals, pumps in heating systems etc.). In Denmark multi-family houses and non-domestic buildings, the 25% rule (preamble 13) in the EPBD applies to all buildings, independent of floor area. Cost efficient energy saving measures are required if renovation of the building shell, or the energy installations, is higher than 25% of the value of the building, excluding the value of the land, or if more than 25% of the building shell undergoes renovation. Also cost efficient energy saving measures not included in the original renovation plan have to be installed. Only churches, museums or protected buildings or those buildings worthy of preservation are exempted from the requirement.

In Romania additional certification has been carried out for buildings with floor area less than 1000m², as a result of a Government Ordinance³² which requires that any feasibility study related to buildings should have an energy audit as basic documentation.

New Builds: As a result of the EPBD, two low energy classes of buildings have been designated for new build in Denmark: Class II (75% of normal energy demand) and Class I (50% of normal energy requirements). The objective is that Class II should be the norm by 2010 and Class I by 2015. Local Authorities often set building development requirements such that Class I or Class II must be adhered to for the development to proceed/ gain approval. This can result in investments in the design and construction of the building, rather than investing in connection to the local district heating or gas grid.

Inspections: The regular inspection of boilers has been mandatory in Germany for many years, namely to a much larger extent and with shorter intervals than foreseen in the EPBD. The requirements are mainly included in an ordinance within the scope of the Emission-Act, energetic aspects by limiting the flue-gas losses are also covered. If a boiler does not comply with the requirements, it has to be replaced. The inspections are carried out by the local master chimney sweep on behalf of the responsible authorities. The chimney sweep keeps a register of all the boilers in the region. The operator of the boiler has to pay a fee, which is officially fixed according to the extent of work (e. g.: gas boiler with ranged output of 24 kW about 25 € per year). In this way, thousands of boilers are due for replacement every year which results in a reduction of the average age of the boiler stock in Germany.

³² Government Ordinance 28/2008.

Certificates: In Denmark, in the case of existing buildings being sold or rented out, the buildings must have an energy label not more than 5 years old; half the agreed age of other Member States certificates. In Sweden, by the end of June 2008, more than 8100 Energy Certificates had been registered in the web based central registration system that experts must access and use to issue certificates. This national database of certified buildings is being continually supplied with information that will be useful for monitoring the progress of different aspects of the implementation of the Directive, from basic statistics such as the number of declared buildings, to producing studies for the future possible tightening of minimum requirements that the EPBD demands on a periodic basis.

Finland has had a voluntary energy audit programme for residential buildings since 2003 and for other building types and sectors since 1992. Energy audits include very detailed inspection of the building, many measurements, calculations, recommendations for the improvements and reporting on a specified form. A state grant covers 40% of the auditing costs. The programme has produced very good results in energy savings. In order to achieve good results in the future, and to maintain grants, the energy audit cannot be mandatory in the energy certification legislation. Since the energy audit is the most detailed alternative to issuing an energy certificate, the legislation states that energy auditors may issue the energy certificates in connection with energy audits. In this case, the energy certificate does not include recommendations, because they are already described in more detail in the energy audit report.

Implementing measures: Through its Economic Energy Management Programme, Poland is placing an obligation on the public sector to implement the necessary measures to achieve energy savings at a level not lower than the national target. In Denmark all buildings are required to implement all cost efficient energy saving measures identified, with a payback of less than 5 years.

Austria plans for its public sector buildings to be shining examples, with energy performance always going beyond the legal requirements. Austria has a similar buildings programme targeting both the public and the private sectors.

The UK also vies to show public sector leadership and to ensure that it plays an exemplary role. For example, it will apply the Code for Sustainable Homes to all its housing developments, requiring all new homes built with government funding to comply with the Code's Level 3 – a 25% energy performance improvement compared to the 2006 building code.

Germany is putting in place a major retrofit programme for its federal buildings, allocating 120 Million Euro per year to it over a four year period, from 2008-2012. In addition it will expand its CO₂ Building Retrofit Programme, with the goal of doubling its rate of thermal retrofitting of buildings from 1.3 to 2.6% per year by 2016. Considerable expansion of *passive* or low energy buildings is being promoted in the private sector as well as at the federal, regional and local government level. In addition, the Energy Agency in Berlin has launched a campaign on turning existing homes into low energy homes. The campaign is funded by the federal government and private companies, and finances actions like old buildings' green refurbishment to show the public what can be achieved in terms of energy saving.

French regulations require higher energy performance standards than those laid out in the EPBD. Improvements to energy efficiency are required every time work is carried out on a building, such as improving boiler efficiency, U-values of windows, etc.

This has been a common requirement since 2007.

In Spain there is a minimum contribution of solar thermal and photovoltaic energy required for new buildings, based on type and size (minimum requirements range from 30% to 70%).

6.1.2 Financing Energy Improvements

Commercial Sector

The Bulgarian Energy Efficiency & Renewable Energy Credit Line (BEERECL) was developed by the European Bank for Reconstruction and Development (EBRD) in 2004 in close co-operation with the Bulgarian Government and the European Union. The facility extends loans to participating banks for on-lending to private sector companies for industrial energy efficiency and small renewable projects.

Lithuania is proposing a reduced value added tax rate of 9% - the standard rate is 18% - to be applied to suppliers of services relating to construction, renovation and insulation of residential houses financed with state and municipal budget resources as well as with soft credits granted by the state and special state funds for the building sector.

The Netherlands is putting in place an Energy Investment Deduction, a tax rebate scheme for private companies, which can be applied to the purchase or production of energy efficient equipment and sustainable energy.

In Bulgaria the fiscal incentives for renovations are mainly reduction of building tax and profit tax for corporations.

Domestic Sector

In 2007 Italy set up a scheme that provides for a gross tax deduction of up to 55% of the amounts payable by taxpayers for a wide range of equipment such as condensing boilers, A+ rated refrigerators, electric motors, lighting equipment and for energy efficiency building refurbishment.

In Finland, they are implementing a scheme of direct subsidies for apartment buildings and (semi) detached houses.

In France a tax credit is available when acquiring energy efficient equipment - this has been in place for over 3 years. In addition, there is financial help from government when buying a newly built dwelling with low energy consumption, and there are subsidies from different state agencies for renovation projects. Regions also have their own subsidy programmes (e.g. PACA giving out an energy subsidy when an individual installs solar panels).

In Germany the main part of the financial help for energy efficiency comes from the KfW, the German bank for subsidies (largest bank specialised on funding within the EU). The KfW manages a lot of programmes funded by the federal governments to help individuals finance the work carried out to improve their home's energy efficiency. The bank offers reduced interest rates, direct funding and lower payback loans (i.e. they do not need to pay the entirety of the loan back).

In Romania the Government and Local Public Authorities meet 67% of costs for private residential multi-storied buildings and 100% of costs for state-owned residential multi-storied buildings annually nominated within national renovation programmes. The energy audit, the feasibility study and the design of the renovation works are financed mostly from the state budget. However, even with this in place they are experiencing difficulties in implementation as in many cases, private owners cannot cover their percentage because of low incomes.

Voluntary agreements

In Finland, voluntary agreements between the national government and public and private sector actors are common. They currently cover around 60% of final energy use in the eight sectors they cover. The objective is that 90% will be covered by 2016. Government subsidized energy audits are used to determine the potential and set targets to be achieved. Monitoring and evaluation ensures bottom-up feedback on the energy savings achieved. The Netherlands also uses such voluntary agreements²² in pursuit of energy efficiency improvements in the industry, tertiary and agricultural sectors. The Danish “A-club”, where public and private organisations commit to energy efficient procurement, is an example of a less complex voluntary agreement.

Spain and Poland also plan to introduce voluntary agreements as a key instrument to achieve energy saving in the industrial sector. In 2008, Romania foresees the signature of voluntary agreements with industrial operators.

Market Based Instruments

A number of Member States indicate that a major part of their saving obligation will be met through the continuation or expansion of market based instruments for the promotion of energy efficiency.

In the United Kingdom the Energy Efficiency Commitments (EEC), which imposes obligations on energy suppliers to implement energy efficiency in the residential sector, will be extended until 2020. It has been renamed the Carbon Emission Reduction Target and will have a savings target almost double that of its predecessor, the EEC, for the period 2008-2011. In addition a voluntary cap-and-trade scheme, the Carbon Reduction Commitment, which will cover large non-energy intensive sectors, and the private and the public sector, will be implemented.

In Italy its white certificates scheme will be in place until 2014. Poland is also proposing to put in place a white certificate scheme to encourage energy savings in combination with an obligation placed on suppliers of electricity, heat or gas fuels to end users.

Denmark places an obligation on distribution companies to achieve a fixed amount of energy savings each year.

Energy Service Companies (ESCOs)

A number of Member States (Italy, Spain, Ireland, Austria, Poland, and Germany) mention the importance of promoting ESCOs and the use of performance contracting to expand the market for energy efficiency and energy services. The provision of commercial energy services and a market for energy efficiency are important objectives of the Directive. Bulgaria has established the credit facilities targeting the commercial and residential sectors respectively.

Romania has initiated a national programme for thermal rehabilitation of multi-storey residential buildings, 34% of the financing stems from the national budget, 33% from local authorities and 33% from resident associations' maintenance funds. Romania will also develop bonus-type support schemes for high efficiency co-generation.

The United Kingdom, through its Carbon Trust, has established a range of financial mechanisms or revolving funds. The Trust provides loans to organisations that provide matching funding and establish a ‘ring-fenced’ energy efficiency fund. Recycled energy savings are split between the revolving fund and front-line services. SMEs and industry are targeted in these funds. For the public sector, there is a Revolving Loan Fund (SALIX).

6.1.3 Awareness raising & training

Providing information, education and training requires a certain institutional structure and capacity, often including networks of public and private sector organizations, all working together to deliver energy efficiency. Most Member States have energy agencies. They play an important part in the implementation of energy efficiency policies and programmes. Agency mandates and scope differ. For example, in Denmark the Electricity Saving Trust addresses the residential and public sectors, mostly focusing on appliances and behaviour through campaigns and rebates.

In Italy, regional and local energy agencies act on behalf of the national government in the field of information and communication. This is a decentralized approach allowing proximity to target groups. As there are more than 350 local and regional agencies in the EU, this approach could be replicated in other Member States to make better use of the resources that these agencies represent. In addition, Italy has made SMART metering mandatory for all buildings, providing accurate information on consumption levels and educating and empowering owners to take responsibility for monitoring and improving their performance.

Ireland is putting in place a comprehensive programme of measures and will communicate this via its national Power of One campaign. The Irish Power of One campaign is an example of a very comprehensive multi-media campaign, encompassing different types and sources of energy; impacts of inefficient use in terms of costs to users, the economy and the environment; best practices at home and at work; and a broad array of communication channels - press ads, website, road show, direct mail, utility bill inserts, schools programmes, seminars and sponsorship, TV-programme, and qualification, accreditation and certification schemes. Consumer feedback is being developed, with smart meters, improved energy bills or various calculators.

Malta is providing for public sector leadership through the appointment of Green Leaders in each Ministry. The Green Leaders will champion energy efficiency and renewables initiatives something which is likely to significantly improve progress and performance.

In the United Kingdom, a carbon footprint calculator³³ has been established to provide consumers with a better view of how their energy use impacts the environment as well as suggestions on how consumers can reduce their energy use.

Estonia is planning to improve billing information by providing comparative consumption data to different consumer groups for the most significant fuels and energy carriers. This should raise awareness and trigger action.

In the Netherlands there was a national information campaign focused on home-owners and consumers, informing the public about the Energy certificate. The campaign consisted of short commercials on radio and TV, items in housing TV-programs, advertisements in national newspapers, and a campaign site with an Energy certificate test. In the second half of 2008 a campaign specifically for real estate agents and notaries was carried out.

³³ Act on CO₂ calculator – see <http://actonco2.direct.gov.uk>.

6.2 European mechanisms for sharing best practice

To support EU countries in the task of promoting best practice, the *Concerted Action* (CA) EPBD was launched by the European Commission to promote dialogue and exchange of best practice between them. An intensely active forum of national authorities from 29 countries³⁴, it focuses on finding common approaches to the most effective implementation of this EU legislation. The countries use this forum to share real operating experience³⁵. The CA is funded under Intelligent Energy–Europe under the European Union's Competitiveness and Innovation Programme.

The key strategic goals of the Concerted Action are to:

- enhance and structure the sharing of information and experiences and to promote good practices;
- create favourable conditions for an accelerated degree of convergence of procedures;
- complement the work of the Energy Demand Management Committee, which oversees implementation, and the related CEN standards and certification exercises

In addition, the European Parliament also funded the *Energy Efficiency Watch Initiative* (EEW) in 2006. The EEW will follow the political process in the field of energy efficiency especially related to the Energy Services Directive and the following national Energy Efficiency Action Plans (EEAPs). The objective is to bring energy efficiency technologies into action wherever and whenever possible. The EEW will show best/ worst policy practice and highlight missing pieces in the EEAPs.

An on-line project centre, an electronic webzine and direct links to other related actions, were also adopted as complementary support mechanisms to enhance information exchange, which ultimately give the Member States a clearer view of the possible approaches, the activities in other countries and potential for collaboration.

6.3 Programmes in non-Member State countries

6.3.1 NABERS/Australian Building Greenhouse Rating³⁶

NABERS (the National Australian Built Environment Rating System) is a performance-based rating system for existing buildings. NABERS rates a commercial office, hotel or residential building on the basis of its measured operational impacts on the environment. NABERS also incorporates The Australian Building Greenhouse Rating (ABGR) which uses a one to five star rating to benchmark a building's greenhouse impact, with one star being the most greenhouse intensive and five stars the least. Current industry best practice is represented by three stars. NABERS and ABGR are voluntary, although they are endorsed by the Property Council of Australia and supported by other major industry associations and property owners.

³⁴ Norway & Croatia are participants in the programme.

³⁵ There was an opinion of some of the interviewees that this was the only forum/platform where they felt comfortable to share their concerns and realistically report progress.

³⁶ <http://www.nabers.com.au/> .

6.3.2 Green Buildings for Africa

Implemented between 1997 and 2003 this was a voluntary energy audit programme focusing on existing commercial buildings. It was the first and only energy labelling programme in Africa. Subsequently the Green Building Council of South Africa (GBCSA) was established as an independent, non-profit organization spearheaded by leaders from all sectors of the commercial property industry. Launched in 2007, the green building council aims to promote and facilitate green building practices through market-based solutions. This has resulted in the development of the Green Star SA rating. To achieve certification, building owners submit documentation to the GBCSA who employ independent assessors to assess the submission and score the building. Certification is awarded for 4-Star, 5-Star or 6-Star Green Star SA ratings (based on the Australian system). Again, however, the system is voluntary.

6.3.3 USA

Energy Star: ENERGY STAR is a joint programme of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping to save money and protect the environment through energy efficient products and practices.

To earn the ENERGY STAR, a home must meet strict guidelines for energy efficiency set by the U.S. Environmental Protection Agency. These homes are at least 15% more energy efficient than homes built to the 2004 International Residential Code (IRC), and include additional energy-saving features that typically make them 20–30% more efficient than standard homes.

EPA ENERGY STAR also provides an innovative energy performance rating system for businesses and it has already been used for more than 62,000 buildings across the country.

RESNET Standards: RESNET's standards are officially recognized by the U.S. mortgage industry for capitalizing a building's energy performance in the mortgage loan, certification of "White Tags" for private financial investors, and by the federal government for verification of building energy performance for such programmes as federal tax incentives, the Environmental Protection Agency's ENERGY STAR programme and the U.S. Department of Energy's Building America Programme.

6.3.4 Switzerland

In view of the positive experiences in the EU, the Swiss Federal Office of Energy has examined the feasibility of introducing an energy certificate for buildings in Switzerland. A recent study carried out by the Energy Economy Principles (EWG) research programme³⁷ has shown that:

- The implementation of an energy certificate for buildings would be feasible in Switzerland, and would lead to positive results (in terms of improving the energy efficiency of buildings).
- It would be possible to incorporate the necessary provisions into Swiss national energy legislation, and integrate them into the existing federal enforcement structure.

³⁷ Energy certificate for buildings in Switzerland: potential implementation models. Rieder/Lienhard, October 2006

- If the certificate were made obligatory, this would involve a substantial proportion of existing residential buildings and result in a large number of renovation projects.

The authors of the study recommend initially gathering findings from the implementation of the new instrument on a voluntary basis up to 2010, and thereafter proceeding to enforce the energy certificate by incorporating it into the relevant legislation.

6.3.5 Canada

In 2006 Canada's Green Building Council set up a Buildings Energy Labelling sub-committee. Subsequently, in October 2008, a pilot study of their labelling system was rolled out to five communities, in over 240 buildings, across Canada before deciding how to roll out a full programme across Canada. The system being developed capitalizes on the success of building labels in the European Union and of Canada's EnerGuide labelling programme. It is anticipated that the labelling programme will be ready for interested jurisdictions to adopt by September 2009.

6.4 Conclusions & recommendations on best practise

Whilst there are issues around the level of implementation of the EPBD, it should be recognized that the energy labelling of buildings as required by the EPBD is the only mandatory scheme of its type in existence.

The EPBD has resulted in numerous new best practice principles, in all the key areas covered by the legislation. It is important that this information is now shared, reviewed and revised at EU level to allow for easy replicability throughout all Member States to achieve maximum benefit from the implementation of the EPBD. AEA would recommend that the Concerted Action and Energy Efficiency Watch Initiative, together with the Buildings Platform, could form the basis for this review.

The Member States that were interviewed were keen to have a forum available for open, honest sharing of experiences, and other support mechanisms to enhance information exchange, as they felt it did give them a clearer view of the possible approaches, the activities in other countries and potential for collaboration.

There are a variety of non-EU examples of other building labelling schemes in operation, or under consideration. However, our research suggests that the EPBD is currently the only mandatory scheme for energy labelling of buildings worldwide.

Many other countries are also looking to the implementation of the EPBD and its successes as the building block for creating similar legislation within their own territories. There is a unique opportunity for sharing of best practice amongst all of the labelling schemes in place that could be informative on issues suggested in the recast.

7. SCOPE OF REVISION & RECOMMENDATIONS FOR ENERGY PERFORMANCE OF BUILDINGS

7.1 Scope of the review & summary of the EC's proposal for EPBD recast

The European Commission acknowledges that there is still a large cost-efficient energy saving potential that remains unutilized in EU's buildings sector, and that there is room to improve the current legislative framework on energy efficiency in buildings governed by the EPBD. The EC considers that, in its current form, EPBD's wording and the 'openness' of its provisions allow for various interpretations in its implementation, while EPBD limitations do not allow for the exploitation of many of the potential social, economic and environmental benefits at national and EU level, leading to the conclusion that its full impact may not be realized.

The Commission analysed three policy alternatives for the improvement of the current legislative framework and came to the conclusion that the largest contribution towards meeting the EU policy goals could be achieved through the revision of the EPBD, by keeping its principles and essence and modifying the provisions in order to significantly improve their efficiency. The idea was to keep the current Directive as a 'backbone'/ starting point for the revised instrument. This would ensure the continued implementation of the EPBD, considered of crucial importance.

In the EC proposal the objectives and main principles of the current EPBD are retained and the role of Member States in setting up the concrete requirements is also the same as in the current EPBD.

The EC proposal clarifies, strengthens and extends the scope of the current EPBD's provisions by:

- Introducing clarification of the wording of certain provisions;
- Extending the scope of the provision requiring Member States to set up minimum energy performance requirements when a major renovation is to be carried out;
- Reinforcing the provisions on energy performance certificates, inspections of heating and air-conditioning systems, energy performance requirements, information, and independent experts;
- Providing Member States and interested parties with a benchmarking calculation instrument, which allows the nationally/regionally determined minimum energy performance requirements ambition to cost-optimal levels to be compared;
- Stimulating Member States to develop frameworks for higher market uptake of low or zero energy and carbon buildings;
- Encouraging a more active involvement of the public sector to provide a leading example;
- Extending the scope to cover a portion of 72% of buildings in the EU that are under the current 1000m² threshold of the Directive;
- Measures to facilitate Member State financing of investments leading to energy performance improvements in the building sector.

A full breakdown of the modifications suggested in the EC proposal is given in Annex 2, complemented by comments regarding current status of the issue and potential effects of the modifications.

7.2 Discussion of the context

It is common sense that improving the energy performance of buildings leads to important cost savings for expenditure on electricity, gas and other fuels. Speeding up energy investment in buildings would reduce the occurrence of fuel poverty, reduce overall expenditure on utilities, create job creation, positive health and labour productivity to play a key role in stabilising the EU economy. In addition it would reduce reliance on energy imports, and overall contribute to achieving the EU ambitious targets for a sustainable future.

To put it into context, at the EU level, the electricity prices for households³⁸, expressed in current prices (euro) per 100kWh raised in the last two years by 15%, the heating gasoil prices for households, expressed in current prices (euro) per 1000 litres raised in the last two years by 21% and the natural gas prices for households, expressed in current prices (euro) per GJ(GCV) raised in the last two years by 28%. EU-27 has an energy dependency rate³⁹ of 51%, only Denmark being an energy exporter. GDP declined by 0.2% in both the euro area (EA15) and the EU27 during the third quarter of 2008, compared with the previous quarter, according to estimates from Eurostat. In the second quarter of 2008, growth rates were -0.2% in the euro area and 0.0% in the EU27. The euro area (EA15) seasonally-adjusted unemployment rate was 7.8% in November 2008, compared with 7.7% in October 2008 and 7.2% in November 2007.

The European Commission calculate that the implementation of the revised Directive would lead to at least 60– 80 Mtoe/year energy savings in 2020, (reduction of 5-6% of the EU final energy consumption in 2020), 160 to 210 Mt/year CO₂ savings in 2020 (i. e. 4-5% from EU total CO₂ emissions in 2020), and 280,000-450,000 new jobs. However, since then there has been a sea of change in the global economic situation. The economic crisis experienced by Member States has meant a slow-down in the construction and housing markets, and fewer people re-locating to take up new jobs. As a result the anticipated numbers of EPCs to be issued at point of sale, transfer or lease has fallen. This could significantly reduce the impacts of the EPBD and of the recast.

AEA believes this further strengthens the case for (a) improving compliance rates, particularly in the private rental sector, and (b) exploring for innovative ways to stimulate the market for EPCs. Compliance rates in the private sector may be improved by offering incentives such as lower local taxes for those households or businesses with a certain rating on their EPCs (Denmark is considering this). This “carrot” approach would be complementary with tougher enforcement of legal requirements to issue EPCs (the “stick”). This sort of innovative measure may also stimulate householders and businesses to pay for EPCs even when they are not required to, i.e. when they are not buying, selling or leasing. However it wouldn't be effective for those householders/businesses who expect to get a poor energy rating. Another possibility would be to make an EPC a condition of transferring from one energy supplier to another, although this would need to be considered carefully to avoid any negative impact on market liberalisation and energy prices.

³⁸ EU energy and transport, statistical pocketbook 2007/2008.

³⁹ Expressed in % of net imports in gross inland consumption and bunkers, based on tonnes of oil equivalent.

AEA recommends that innovative measures such as the Danish example are shared with other Member States and that the European Commission is asked to study other options for stimulating EPCs, including the possibility of requiring an EPC when a business or household changes its energy supply contract.

7.3 Challenges of the sector and market failures

High diversity of buildings sector between Member States and regions

Because of different climates, building traditions and cultural, historic and economic factors, there are significant variations between the buildings sector in the EU Member States and even between the regions. As such, detailed regulation and complete harmonization at EU level would not be possible. However, a certain level of harmonization of the approaches and specific instruments is needed in order to ensure that energy efficiency in buildings is seriously addressed, that there is a possibility for comparison of the achievements and transfer of experience, but also to facilitate the companies that operate at EU level. At the same time, the diversity and disaggregation of the buildings sector poses significant difficulties in obtaining quantitative data about the sector at the EU level.

Market failures (imperfect market conditions)

The *lack of complete internalization of all externalities in energy prices* has led to a low priority for energy efficiency in buildings in many countries. Although most of the investments in energy efficiency improvements have low pay-back times, especially if done within the renovation cycle, they still require substantial upfront costs for citizens and companies. Therefore both the low priority of energy considerations and the lack of sufficient initial investments are main challenges. The EU and a number of individual Member States have realised/are starting to realise, that some societal benefits may have high private costs. To partially compensate for these market failures, some financial and fiscal support mechanisms are already established, but additional financing tools are needed.

Incomplete information

The general lack of good quality and understandable information on energy performance of buildings and on potential energy savings - is another market failure that is addressed in the EPBD recast (new requirements for information in the energy performance certificates and their display, introduction of inspections reports and control). The provision of clear and reliable information at affordable cost, at the correct time and at low transaction costs to prospective tenants and buyers is crucial for making energy efficiency investments more attractive. It is of a seller's or leaser's advantage not to provide information on energy consumption if the property they offer is of poor energy performance quality. As the tenant normally pays the energy bill, the incentive for the owner to invest in energy efficiency is weak.

The *low uptake of new and innovative technologies* is one of the main consequences of the rather incomplete information registered up to date. The lack of sufficient information limits the uptake of these technologies and the cost of some is prohibitive for their higher market uptake.

Lack of trained professionals

Currently there is a rather low number of trained professionals (such as architects, energy auditors, builders, installers) that can successfully integrate, evaluate, construct and maintain a low energy consuming building.

The EPBD recast introduces new provisions in this field, but they only refer to qualified and accredited independent experts that perform energy certification and inspections of heating/air-conditioning systems. Even for these categories, there is still room for improvement.

Behaviour

The behaviour *of the inhabitants* is of significant importance as even a zero energy house can turn into an energy waster. The rebound effect of having bigger houses occupied by less people but also subject to excessive heating or cooling are other general problems that, although very important, are also very difficult to tackle.

7.4 Potential

It is the Commission's assessment that the following changes have the most potential within the recast:

- The largest energy saving potential in the buildings sector lies with the existing buildings when they undergo major renovations. Thus, eliminating the threshold of 1000m² for meeting of the national/ regional minimum energy performance requirements when the buildings undergo major renovation - which excluded 72% of the EU buildings stock – is the change with greatest potential.
- Introduction of quality and compliance requirements for certificates; together with a requirement for registration of certificate information to allow for knowledge improvement.
- Inspection and reports of the inspection of heating and air-conditioning systems and introducing compliance requirements.
- The requirement for penalties and provision of fiscal measures.

However, it is AEA's view that without a coordinated approach to collecting and reviewing the data on energy performance certificates, and methodologies in place for monitoring implementation of measures it will be impossible to justify and quantify these thoughts.

In addition, without an EU wide standardised methodology, comparison of performance from one country to the next will also continue to prove troublesome, therefore genuine consideration needs to be given to furthering development of this.

It is AEA's assessment that the potential as a result of removing the 1000m² threshold will also not be fully realised if the recast does not take into consideration the sea of change in the economic environment. The recast must consider alternative routes for implementing labelling requirements, and these must be matched with the requirement for Member States to provide more financial instruments to help owners implement suggested measures.

The quality and quantity of trained professionals, and the information provided, must also be addressed in the recast, to ensure that owners can be confident of the recommendations made and the savings that should be realised. An EU wide qualification scheme, with quality assurance, would be beneficial.

A full analysis of the proposed recast, together with further deliberations on other issues to be considered, can be found at Annex 6. Section 8 contains a summary assessment of the scope of the recast, together with AEA's recommendations for going beyond the recast.

8. CONCLUSIONS & RECOMMENDATIONS

The following are conclusions and recommendations drawn from a combination of our interviews with Member States, literature review, notably the CONCERTO Communities' position statement, the EC EPBD Impact Assessment and AEA's thoughts. Many Member States did not comment in depth on the proposed recast. We do not know why this was not a key discussion point for them. It may be that they still have issues around implementation of the current requirements, or it may be that many Member States were not fully aware of the proposed recast. Both Denmark and Germany, by contrast, are already implementing most of the measures recommended by the recast, or were confident that the proposals would not impact greatly on what they are currently delivering. The UK and Germany, however, were also keen for the Commission to simplify the legislation, providing clarity on the overall objectives of the EPBD.

8.1 Clarification and methodologies

Art. 2. Definitions: Clarifications to several terms are introduced and new definitions are added wherever necessary.

All Member States strongly agreed with the proposed recast on this element, as the initial EPBD text left room for interpretation at the Member State level. Our research highlighted this, particularly the interviews with Bulgaria, Lithuania and the UK. It is very important that the recast ensures high accuracy of text, avoids ambiguities etc., as this text will be approximated in national legislation. Any uncertainties in the recast would propagate in the national laws and regulations that enable the enforcement of the recast Directive, either making the implementation difficult and not in accordance to the intended spirit of the recast, or very different from one Member State to another.

Art. 3. Adoption of a methodology: The text is adapted and the technical details it contained are moved to Annex I. However, the methodology is still to be applied by Member States for the calculation of the energy performance of buildings and be adopted at national or regional level.

AEA would support a move towards a harmonised EU methodology. Our research found that there are numerous metrics used for calculations and this has resulted in large variations in the energy performance requirements set. These differences have also led to differing approaches in the balance between accuracy and simplicity. AEA accept that regional differences in climate, building tradition and user behaviour in Europe will have an impact on the calculation procedures, the input data and consequently on the energy performance. However, many Member States have only limited experience with integrated EP calculation procedures in the context of building regulations. Therefore, AEA believes that there is a need for further harmonisation between the calculation methodologies employed by Member States. This should incorporate feedback from practical experiences and cross comparisons, on the different approaches taken during the next few years to try and reach a standard EU/International methodology. This will be of particular help to those Member States still struggling with their methodologies, in terms of expertise, time and investment.

Global consensus on such methods provides transparency for all interested parties. It enables meaningful comparisons of actual energy use and the potential of energy saving and renewable energy technologies at EU and global level.

Art. 4. Setting of minimum energy performance requirements: At present, the energy performance requirements are established by Member States. The text has been modified to ensure that the minimum energy performance requirements of buildings as set by Member States gradually align with cost-optimal levels.

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Art. 5. Calculation of cost-optimal levels of minimum energy performance requirements

AEA supports these articles on the basis that very clear guidance is given on cost-optimal levels and their calculation.

While initially the EPBD provided for “setting energy performance requirements”, the recast proposes “setting of *minimum* energy performance requirements”. Member States would be required to take the necessary measures to ensure that minimum energy performance requirements for buildings are set with a view to achieving cost-optimal levels calculated in accordance with the methodology introduced in Annex I of the recast. AEA support this stance, however we would also recommend that the Commission ensures there is very clear guidance, and possibly even develop a toolkit for calculating cost-optimal levels. Currently there are various member specific toolkits available; however these require harmonization and could be much more transparent and easier to use. This would ideally be based around the International Standard, and could, longer term, incorporate environmental aspects and embedded energy aspects. France raised concern over the definition of the expression ‘cost-optimal’ in their interview.

Our research also shows that there may be difficulties for Member States specific to implementing cost-optimal levels; see section 3.1.2, in addition to barriers already experienced such as lack of trained parties in the building chain and lack of finance.

The CONCERTO communities see the definition of minimal performance standards for single components of new buildings as more practicable. Standard parameters, such as “U value”, could be set, and maximum allowable levels of heating, cooling, ventilation and lighting energy levels defined for different building categories. CONCERTO feels this would assure a unified approach all over Europe. If a building-wide approach cannot be adopted, e.g. through a harmonized EU toolkit, then AEA would support this recommendation for minimal performance standards at the component level.

Art. 8. Technical building systems in existing buildings: Requirements are included for Member States to set up minimum energy performance requirements for the installation of new, or the replacement of existing, technical building systems, or their major retrofit.

AEA supports this article, and proposes that clear links are established with the Eco-Design Directive by providing guidance on and promoting the use of products that have gone through the Eco-Design marking and declaration of conformity⁴⁰.

8.2 1000m² Threshold

Art. 6. New buildings: The obligation to consider alternative systems for new buildings is extended to all buildings.

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Art. 7. Existing buildings: The threshold of 1000 m² for meeting of the national/regional minimum energy performance requirements when the buildings undergo major renovation is deleted.

⁴⁰ A CE conformity marking should be fixed to the product.

AEA supports these articles of the recast. Member States were generally in support of either reducing or removing the threshold. Two Member States, Denmark and Germany, have already removed the threshold for implementation. According to the experience of the CONCERTO German communities, single or multi-family houses, and medium size flats or commercial buildings have enormous energy saving potentials. Including these properties would also generate environmental and socio-economical benefits, with higher housing quality and increased building value.

AEA strongly supports this amendment. However, it is AEA's assessment that the potential emissions savings from removing the 1000m² threshold will fall short of those indicated in the Impact Assessment because of the economic downturn. The downturn has severely reduced the construction rate for new buildings and the rate of movement in the rental market, and so fewer buildings will require EPCs. To counteract this effect, we recommend further actions at Member State level to ensure compliance in the private rented sector. We also recommend that information on innovative measures, such as the Danish proposal for linking higher energy performance ratings to reductions in local taxes, are shared with other Member States. We further suggest that the European Commission is asked to study other possible options for stimulating the market for EPCs, e.g. requiring an EPC when a business or household changes its energy supply contract.

8.3 Low or zero carbon buildings

Art. 9. Buildings of which both carbon dioxide emissions and primary energy consumption are low or equal to zero: Member States are required to actively promote the higher market uptake of such buildings by producing national plans with clear definitions and targets for their uptake.

AEA supports this article of the recast but considers that a deadline should be set for national plans. The Commission is required to establish common principles for defining the buildings of which both carbon dioxide emissions and primary energy consumption are low or equal to zero, but the recast does not specify any time horizon for this.

The recast requires the Commission to publish a report on the progress of Member States in increasing the number of such buildings. However, there is no deadline for this action. AEA believes that, a clear deadline for this action would help to focus Member State attention on this requirement and accelerate the introduction of low and zero carbon buildings. This recommendation is based on our own experience of other policies that are not time-bound, rather than any evidence available from the literature or stakeholder consultation, as no Member State specifically covered this issue during the interview process. Although there is no direct evidence that Member States would welcome such a move, there is some evidence that Member States currently view this Article to be of lower priority than other aspects of the Directive. For example, a survey for EuroACE by the Danish Building Research Institute (SBI)⁴¹ showed that only seven EU Member States have adopted an official definition of very low energy buildings and incorporated it as a target for new buildings in their future national Building Regulations, and only a very few are currently planning to strengthen the requirements for existing buildings.

⁴¹ European national strategies to move towards very low energy buildings, EuroACE.

8.4 Certificates

Art. 10. Energy performance certificates: The role of the recommendations of the certificate is strengthened and clarified by emphasizing that they shall be an indispensable part of the certificate and by including provisions on the information they shall contain.

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Art. 11. Issuing of energy performance certificates: The requirements related to the provision of the certificate are reformulated to ensure that the certificates are provided every time there is a property transaction and the prospective buyer or tenant is informed of the energy performance of the building (or its parts) at an early stage (i.e. in the sale/rent announcements). A requirement that if the total useful area over 250 m² of a building is occupied by public authorities, a certificate should be issued by 31 December 2010, is introduced.

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Art. 12. Display of energy performance certificates: The scope of the obligation to display the certificate is extended: i.e. if the total useful area of a building occupied by a public authority or frequently visited by the public is over 250m², the certificate shall be displayed in a prominent place clearly visible to the public. For the latter, the requirement shall be imposed only if the certificate is already available.

AEA supports all of the above articles of the recast and believes there is scope for the recast to go further. Our research found that Member States and the CONCERTO Communities were in support of Article 11 & 12 in reducing the threshold, and it was felt that the threshold should be removed completely for public buildings. The CONCERTO Communities also felt that the Article 12 should be extended, on the same basis, for privately owned commercial buildings frequently visited by the public as for public buildings. AEA believe this would significantly enhance public awareness.

It was found that some Member States were keen to extend practices, such as the current practice in Denmark, which require implementation of all cost-effective measures of the certificate within a certain time period, and this should be required for all public buildings as a minimum practice. AEA believe that Member States should be encouraged to implement all cost-effective measures all other buildings, provided financial support mechanisms can be set in place within Member States. There are existing examples of innovative financial schemes and funding mechanisms given by the Member States in the Best Practice section. Details of these schemes should be assessed for replicability throughout Member States and information disseminated as appropriate.

In addition more efforts should be made to ensure a linkage between the certificates and financial support or discouragement mechanisms. There are again good examples of financial incentives, such as a 40% discount for voluntary audits in Finland. However, some Member States are lacking in a system for enforcement, or subsequent issuing of penalties.

The recast provides for Member States to put in place a system for issuing penalties; however Member States were keen that there should be guidance issued on the appropriate levels of penalties.

Our research found that many Member States are already collecting certificate information in a central repository. For example in Sweden energy certificates have been registered in a web based central registration system. Swedish authorities are then going to use this national database of certified buildings to monitor the progress of different aspects of the implementation of the Directive.

AEA recommends that the recast should include a requirement for all certificates to be registered at national level, and subsequently at EU level, to provide the opportunity for improving the knowledge about the energy performance of the European building stock and the ongoing refurbishment processes. Without this knowledge it will be impossible to accurately map opportunities for carbon reduction, which is going to be essential if the EU is to achieve the challenging targets set for reducing carbon emissions.

It is worth noting that in many Member States the requirement for certification of existing building sales/rentals have only just come into force (January 2009), so a further review of their experiences may be beneficial at a later date.

Art. 17. Independent control system: A requirement for an independent control system for the energy performance certificates and for the reports on the inspection of heating and air-conditioning systems, i.e. via random sampling checks of the quality, is introduced. The certificates and the inspection report shall be registered, if requested.

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Art. 19. Information: Member States are required to provide information to building owners or tenants on energy performance certificates and the inspection of heating and air-conditioning systems.

AEA supports this proposal, and consider that further work should be undertaken for these articles to be effective. Some Member States, for example France, are concerned that the level of sampling suggested represents a large volume and so implementation will require additional investment. In addition, some Member States were concerned about the additional requirement of training for inspection authorities, bearing in mind the shortage of qualified personnel available to carry out certification.

AEA found that there is a high level of uncertainty and distrust about claims made in advisory guidance provided alongside EPCs relating to potential energy or cost savings from implementing improvement measures. This has been compounded by the fact that many Member States have tried to keep costs of certification low. An example of this, is the Advisory Report which accompanies the Public Display Energy Certificate in the UK: primarily the choice of measures recommended are subjective, selected from drop down lists in the software. The potential energy measures then chosen do not give specific savings or impact details. Measures are reported as having a high, medium or low investment and savings potential. Unified accreditation of experts and quality management/inspections of certification should help to increase the confidence in the predicted savings of energy efficiency measures. It is important to improve upon the quality of the information contained in advisory guidance, to provide the occupier with a clear energy measures opportunities guide that he can have confidence in. Finland, in contrast, produces energy audits that include very detailed inspection of the building, many measurements, calculations, recommendations for the improvements and reporting on a specified form.

AEA found that Member States are keen to see further concerted awareness raising campaigns at EU level and the provision of clear guidance on the value and relative costs of implementing higher energy performance standards at construction/refurbishment stages. Lithuania and Romania clearly cited these as examples of where they felt the scope of the recast was weak.

Article 11 Issuing of EPCs: The recast text strengthens this provision: certificates shall be handed over to the buyer/ tenant at the moment of conclusion of the sales contract/ lease at the latest.

AEA supports this article; however the recast must provide advice on regulatory mechanisms and penalties. Our research showed that the Member States welcome making certificates a mandatory part of property advertisement and/or property transaction documents, entailing a numeric energy performance indicator (of the certificate) to be stated in all advertisements for sale or for rent. It was believed that this measure would significantly increase the awareness about the certificates and energy efficiency. However, Member States felt that guidance needs to be provided on how to police the private rental sector, as many countries have limited regulatory frameworks in this sector. France in particular expressed their concerns over this area.

8.5 Inspections

Art. 13. Inspection of heating systems & Article 14. Inspection of air-conditioning systems: Clarifications on the frequency of inspections are introduced in order to stress the importance of proportionality between inspection costs and anticipated energy savings (benefits) stimulated by the inspection. A requirement for an independent control system for the inspection reports, i.e. via random sampling checks of the quality, is introduced.

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Art. 15. Reports on the inspection of heating and air-conditioning systems (new): The requirement for an inspection report to be handed over to the owner or tenant of a building is introduced, in order to appropriately inform them about the inspection result and recommendations for cost-effective improvements.

A recommendation was made by the CONCERTO communities, which AEA supports, that Article 14 includes ventilation systems in the existing regular inspection procedures of boilers and air-conditioning systems, as mechanical ventilation systems are often major energy consuming plant in a property. This is particularly true in the cooler climatic regions, where air conditioning is not required, but because of building depth or because the building is a sealed unit, air handling is. AEA would also support the development of existing CEN standards for inspections to allow for an efficiency rating of the installation systems and the EPBD recast could refer to European standards. This would also link the EPBD with the Ecodesign Directive.

8.6 Training

Art. 16. Independent experts: A requirement is added that in the accreditation process the operative and technical skills of experts who carry out the certifications and inspections and their ability to carry out the service in an independent manner are taken into account.

In addition to our comments on Article 3, AEA recommends that harmonization of the training programmes should be done at EU level, and the training programmes in Member States should be mutually recognized. The quality and quantity of trained professionals, and the information provided, must also be addressed in the recast, to ensure that owners can be confident of the recommendations made and the savings that should be realised. Provision of EU wide qualification criteria, and quality assurance, would be beneficial to ensure that all skills are encompassed and training schemes can be developed with common methodology.

8.7 Wider context

The Commission should provide clear, practical guidance on how the EPBD can be integrated with other existing policy requirements, such as linking in with the Directive on the Promotion of the Use of Energy from Renewable Sources or the EcoDesign Directive.

This should distinguish between areas which can be, or may already be, met through existing legislation and areas of opportunities for furthering implementation and leveraging finance.

AEA believes that it would be valuable for an EU wide support forum to be developed further - to ensure that it is well publicised, readily accessible and provides key information on both good practice and areas where countries are struggling, or have made fundamental errors that other countries should avoid, with practical advice on how barriers have been overcome. This forum could also be extended to non-EU countries who are also implementing similar legislation so that we can learn from their experiences and vice-versa.

Further consideration and research is required into how the economic situation in countries is influencing the purchasing criteria and occupier behaviour. This was felt to be a key barrier into why the implementation of certification has not resulted in the market transformation that was foreseen.

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DEFINITIONS & ABBREVIATIONS

<i>Asset rating</i>	Rating based on calculations and standardised use of the building or the activity areas concerned. It represents the intrinsic potential of the building under standardised conditions of weather and internal environment
<i>CEN</i>	European Committee for Standardisation
<i>DHW</i>	Domestic Hot Water
<i>DPE</i>	Diagnostic de performance Energetique (French equivalent of EPC)
<i>Energy performance of a building</i>	Amount of energy actually consumed or estimated to meet the different needs associated with a standardised use of the building, which may include, <i>inter alia</i> , heating, hot water heating, cooling, ventilation and lighting
<i>EPC</i>	Energy Performance Certificate
<i>EPBD</i>	Energy Performance of Buildings Directive
<i>LCA</i>	Life Cycle Analysis: compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle
<i>Operational rating</i>	Rating based on measured energy use. It is a measure of the in-use performance of the building. This is particularly relevant to certification of actual performance
<i>Passive measures</i>	Examples: Super Insulation that is airtight and minimizes thermal bridging Highly Efficient Windows Mechanical Ventilation with Heat Recovery Innovative & Efficient Heating Technology
<i>Smart metering</i>	Meters which transmit automatic pulses on consumption, so manual reading of meter is not required, and data can be collected and viewed centrally (generally online).
<i>U-Value</i>	Thermal conductance of a building component

ANNEX 1: CURRENT STATUS OF IMPLEMENTATION OF EPBD FOR ALL MEMBER STATES

Member State	Adoption of Methodology	Setting of Energy Performance Requirements	Certification of Energy Performance of Buildings	Boiler and A/C Inspections	Training of Independent Experts
Austria	A sophisticated calculation system has been developed, with all CEN standards implemented; and an Energy Index is in use. Methodology adopted in April 2007, updated October 2007	Requirements set in the OIB Guideline, however these are to be tightened in January 2010 as the methodology current uses mainly the same default values for new and existing buildings	<p>Obligatory for new buildings since January 2008.</p> <p>Existing buildings when rented or sold must have a certificate as of 1 January 2009</p> <p>Public Buildings must be displayed by 1 January 2009</p> <p>A database for all Austrian building certificates was expected to be in place in August 2008</p>	<p>Inspection of boilers were already in place.</p> <p>A/C inspections came into force from Jan 2008</p>	<p>A common system of information and training has been put in place; however requirements to become 'an expert' vary in the different Bundesländer (Austrian Federal Provinces) allowing existing architects, engineers and master builders to gain accreditation without any further training requirement.</p>
Belgium	Calculation procedures and software In place in all regions that checks compliance with energy efficiency an indoor climate requirements	Agreed for all regions	<p>The majority of certification requirements are in place, however certification for non-residential buildings in Flemish region are being 'introduced' in 2009; and certificates for new buildings in Walloon will become mandatory once minimum requirements have been agreed</p> <p>All certificates registered & stored for Brussels & Flemish Regions. Process not detailed yet for Walloon.</p>	To be mandatory from 2009 in all regions	<p>Brussels Region: Energy Councilors must be architects or civil engineers, and must be accredited by the Brussels Energy Agency</p> <p>Flemish Region: Type A inspectors must undertake technical training course; Type B are audit trained to understand legislation and software</p> <p>Walloon: 5 day training course for accreditation.</p>
Bulgaria	In place based on European (Norwegian) standards – it is unknown, however, if there is software developed for the methodology . Minimum Energy Performance Standards (MEPS) set via a special regulation , sub-act to the Energy efficiency law	New buildings and renovations requirements in force for building permits requested after 1 March 2005. Minimum Energy Performance Standards (MEPS) set via a special regulation , sub-act to the Energy efficiency law	Adopted with the Ordinance for 'Energy Efficiency Certification of Buildings' in force since Jan 2005, again via a sub-act to the EE law	<p>Boilers & A/C sub-act of the EE Law is in draft form, but still in discussion.</p> <p>The inspection of new boilers concerning their energy efficiency at the manufacturers and dealers is covered by the execution order adopted by the Government on 22 March 2005 mandatory from 1 April 2005.</p>	<p>Public register in place since 28 Dec 2007.</p> <p>A common set of training, evaluation and information are standard throughout the whole country and are prepared by accredited high schools in coordination with the executive director of the EEA and are approved by the ministry of Economy and Energy.</p> <p>At the end of the training course the assessors have a two-part final exam – an individual test and a presentation of the individual project.</p>

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Cyprus	<p>Methodology being evaluated.</p> <p>Since the 21st of December, 2007 two ministerial orders regarding the methodology for the calculation of the energy performance of buildings and the minimum requirements for the energy performance of buildings have been published,</p> <p>The MCIT has recently signed a contract with a local software company for the development of the methodology and user friendly software which should be delivered to the Energy Service by the 13th of October 2008. The software will produce the certificate as well as the advisory report. It should also take into account within the calculation procedure any form of energy that the building will use</p>	<p>The enactment of the legislation concerning the minimum energy requirements for all new buildings and existing buildings exceeding 1000 m2 total useful floor area undergoing major renovation has been in force since the 21st of December 2007</p>	<p>Cyprus plans to extend implementation until the 4th of January 2009</p>	<p>Inspection of boilers and A/C is covered by the 'Law for the regulation of the energy performance of buildings' of 2006 (L142(I)/2006) and will become mandatory as of the 4th of January.</p>	<p>The energy performance certificate is intended to be issued by experts registered under the authority of the Energy Service. Experts can be any Architect, Civil, Mechanical or Electrical engineer registered in the Technical Chamber of Cyprus who have 3 years experience in the related fields for residential buildings, and 6 years for non residential buildings and have a certificate for the successful completion of the training course related to the knowledge of the methodology, software and legislation. More details concerning the training scheme are not yet available.</p>
Czech	<p>One methodology is used for all regions and all building types in the Czech Republic. Procedure is based on published CEN Standards and applicable Czech Technical Standards.</p> <p>The National Calculation Tool (NKT) was published in October 2007.</p>	<p>Energy performance of New Build well be benchmarked with an equivalent existing reference building and will take into account the maximum U-values, the properties and the operation of the building's technical equipment and lighting. Major renovation is also clearly defined</p>	<p>The certification will be obligatory after 1st January 2009 for new buildings and renovated buildings (larger than 1,000 m2). All public buildings have to display certificates.</p>	<p>The inspection of boilers has been mandatory since 1st January 2007, the inspection of air-conditioning systems has been mandatory since the 1st January 2009.</p>	<p>Experts for building certification and inspections are authorised by Ministry of Industry and Trade.</p> <p>Experts in building certification, inspectors of boilers and AC systems have to pass different examinations, but the same expert can be simultaneously authorized to perform more than one of these activities.</p>

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Denmark	The calculation method is described in SBI-Directive 213 'Energy Demand' which includes the software program Be06. The calculation core from this program must be used by all other software programs to ensure an identical calculation of buildings. Be06 comprises calculations for different types of buildings.	The new energy requirements were issued June 16, 2005. The requirements came into force January 1, 2006 with a transition period of 3 months until April 1, 2006 when the new requirements must be fulfilled in order to obtain a building permit. They impose stricter energy performance requirements in accordance with current Danish action plans for an increased 25 % energy saving in new buildings, compared to requirements before 1. January 2006.	The requirements regarding the energy labelling (certification) of buildings has been in place since 2006 In the new energy labelling scheme buildings need an energy label: > when they are new constructed, > when they are sold, > if rented out. Or every 5 years for all public buildings	The inspection of boilers and heating systems were implemented on September 1, 2006, on the same date as the energy labelling scheme. The inspection of A/C systems has become mandatory since 1 Jan 2007.	There are 3 types of energy inspectors: >For single-family residential buildings >For multi-family residential buildings, commercial and public buildings >In-house inspectors for commercial and public buildings Requirements: >At least 5 years relevant experience >A successful completion of a special training >Compulsory participation in an annual 'refresher' course >A mandatory professional indemnity insurance (needs to be kept in force for at least 5 years after ceasing activity as inspector).
Estonia	In Estonia, compliance with the requirements for a building is checked before the issue of building permit by the local government. Minimum energy performance requirements are a part of requirements for the building. The calculation procedure stipulates the input data (data of standardised use) that should be used in calculations. The results of calculation must be submitted in the form of cumulative energy use to maintain an indoor climate in a building (heating, cooling, ventilation and lighting), preparation of domestic hot water and use electrical equipment.	The minimum requirements for new buildings, and renovations and extensions to existing buildings came into force for permits requested after 1 January 2008. Proof of compliance must be made 2 years after completion of the building.	Certification of new buildings will become mandatory with building permits requested after 1 January 2009. If the building is rented or sold, it must have an energy performance certificate from 1 January 2009. For public buildings, certification is mandatory from 1 January 2009.	Boilers >Inspection will be mandatory as of 1 January 2009 >At the present time new boilers must be registered when they are purchased. Air conditioning >Still in discussion	According to the Building Act, only registered legal persons can issue the energy certificate or perform the energy auditing of buildings: They should be in the register of economic activities; they should have legal relationship (a contract) with a competent person, who is a specialist in charge. There should be at least one specialist in charge in each company; they should keep records of issued energy audits and/or energy certificates and linked documents. It is expected, that there will more than 50 active energy auditors in 2009, the number of energy certifiers could be within the same range. It is expected that more than 200 persons eligible to perform energy certification of buildings before the end of year 2010.
Finland	Since 1985 Finland's National Building Code has included	Finland has set minimum requirements in the National Building Code for thermal insulation	The Act on Energy Certification of Buildings was approved by Parliament	Boilers >Finland chose the	Certifiers must be architects, engineers or technicians with

Member State	Adoption of Methodology	Setting of Energy Performance Requirements	Certification of Energy Performance of Buildings	Boiler and A/C Inspections	Training of Independent Experts
	<p>guidelines for calculating the power and energy demand for the heating and cooling of buildings. These guidelines could be used for calculations for all building types. The calculation method was refined because of the implementation of the EPBD and it follows the main principles of prEN13790. The new calculation method was published in the National Building Code in June 2007.</p> <p>The only restriction is that the calculation method has to be in line with the guidelines given in the National Building Code and with the additional rules given in the Energy Certification Decree.</p>	<p>and ventilation of new buildings since 1976. The requirements have been changed several times in order to improve energy efficiency in buildings. The latest changes were made in 2003, when the level of the requirements was tightened by 25-30%, and in 2007, when the requirements were changed because of the implementation of the EPBD. The new requirements are mandatory for building permits requested after 1 January 2008.</p>	<p>on 13 April 2007. According to the new act, the certificate must be presented when applying for a building permit for all new buildings from 1 January 2008. Existing buildings when rented or sold must have an energy performance certificate from 1 January 2009.</p> <p>Energy certificates will be valid for 10 years for most buildings, and 4 years for new apartment blocks and commercial buildings.</p> <p>There is no specific mention of display certificates for public buildings, however there has been a voluntary energy audit programme for residential buildings in place since 2003, and this now includes voluntary energy certification.</p>	<p>option B (advice, voluntary inspections) instead of the mandatory boiler inspections for the implementation of Since the beginning of 2003, Government subsidies have been given for changing old heating systems in residential buildings to such systems that utilise renewable energy sources.</p> <p>Inspection of Air-conditioning Systems, inspections will be compulsory for cooling equipment with a nominal cooling efficiency of at least 12 kilowatts, and will only be needed where cooling systems are based on the use of compressors. Such equipment must be duly inspected at least every ten years. The new act came into force on 1 January 2008.</p>	<p>education in building, HVAC or electrical engineering. The professional examination can be replaced by at least three years' experience in energy efficiency in the building sector. Furthermore, qualified experts must pass an exam arranged by an accreditation body. The exam tests their knowledge of the certification legislation and the certification system itself. Attendance at training courses is not mandatory.</p> <p>Qualified experts will get an accreditation that is valid for 7 years. By June 2008, there were 150 qualified experts for energy certification.</p>

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France	<p>There are two different calculation methods, using different softwares: the 3CL method and the Th-C-E from the Thermal Regulation 2005 (RT2005 in French).</p> <p>The 3CL (v15c) is a simplified method used for the Energy Performance Certificate (Diagnostic de Performance Energetique, DPE in French) for existing households being sold or rented out.</p> <p>The Th-C-E is a complex method used to check the compliance of new buildings with the RT2005 (the RT is revised every 5 years), and for their DPE.</p>	<p>The RT2005 sets the energy performance minimum requirements for new buildings. It applies to every building permit requested after September 1st 2006.</p> <p>Energy performance requirements for important refurbishments/renovations of buildings exceeding 1,000m² are included in the RT for Existing Buildings and have been mandatory since April 1st 2008.</p> <p>Furthermore, a feasibility study on different solutions for the building's energy supply – including renewable energies, is demanded for renovations and constructions of buildings exceeding 1,000m².</p>	<p>The implementation of the certification activity has been transposed into French legislation through the Building Code (amended by laws in 2005 and an ordinance in 2006).</p> <p>The energy performance certificate labels both of the following aspects:</p> <ul style="list-style-type: none"> >The energy consumption of the dwelling or building; >The impact of this consumption on greenhouse effect. <p>Certification is mandatory:</p> <ul style="list-style-type: none"> >As of 1 Nov 2006 when buildings are sold >As of 1 July 2007, when dwellings are rented >As of July 2007 for new buildings with a building permit required <p>Public buildings over 1,000m² will need to display a certificate as of 2 January 2008</p>	<p>The Government will lay down different measures to establish a regular inspection of boilers and air conditioning systems.</p> <p>The implementation texts regarding the measures on boilers and air conditioning systems' inspections are being prepared.</p>	<p>Since the 1st of November 2007, only qualified experts can issue a Certificate. The experts have to pass a test of certification, to verify their competence.</p> <p>The organisations in charge of the exam have to be certified by the Cofrac. The French Government published a list of competences that experts must prove they have in the exam. Candidates are not required to attend any course before taking this exam.</p>
Germany	<p>The software calculation tools are based on DIN V 18599 for non-residential buildings.</p> <p>Software for residential buildings is currently based on DIN V 4108-6 and DIN V 4701-10. However, a new calculation methodology will be introduced in 2009. This new methodology will cater both for New and Existing buildings.</p> <p>The calculation method is a holistic assessment of the building's thermal envelope, built-in lighting systems and appliances for heating, ventilation, cooling and hot-water supply.</p>	<p>Requirements for new residential buildings depend on the surface-volume-ratio and in case of central hot-water supply of the building floor area.</p> <p>For existing buildings, the requirements have to be met whenever building fabric elements of heated or cooled space are installed for the first time or changed in a way that allows energetic improvement.</p> <p>There is no threshold on building size</p> <p>EnEnv 2009 will tighten requirements for primary energy demand by 30%, and again in 2012 by another 30%</p>	<p>Since 2002, energy certificates have been mandatory for new buildings and in certain cases of major refurbishments. The EnEV 2007 has only introduced new forms to achieve a uniform design of certificates for new and for existing buildings. Nevertheless, certificates issued according to the former ordinance remain valid as well as other certificates (normally with different lay-out) issued in the course of voluntary campaigns – especially those from the field studies carried out by the German Energy-Agency (dena) prior to the EnEV. These certificates are consistently valid for 10 years.</p> <p>Public buildings greater than 1000m² are required to display their certificates.</p>	<p>Boilers: Germany has chosen to implement according to „option B“, because the additional introduction of a mandatory inspection of heating systems was considered not justifiable. With boilers installed before 1978 a replacement is generally mandatory by a certain date.</p> <p>A/C maintenance duties are mandatory for air-conditioners. Furthermore, every air conditioning unit with more than 12 kW rated thermal output has to undergo an inspection by a specialized engineer every 10 years.</p>	<p>Due to the fact that numerous certificates need to be issued, a wide-range of qualifications are permitted to issue energy performance certificates. The required qualification is described within the EnEV in a comprehensive and conclusive way. Implemented in 2007</p>

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Greece	Software tools for the National Calculation Method are still under development. They will be based on CEN 832. Minimum energy performance requirements for new and refurbished buildings will come into force in January 2009.	<p>The Government of Greece is completing a study on minimum requirements for all new buildings and extensions and renovations of existing buildings. The task is being undertaken by the Ministry of Development with the help of the Regulatory Authority for Energy. The requirements will come into force for building permits requested after 1 January 2009.</p> <p>The requirements regarding the certification of buildings will be adopted by the Government 6 months after the Law has been passed by the parliament (ie. end 2008).</p>	<p>Certification, accompanied by a building permit, will be obligatory for new buildings after 1 January 2009. There is an ongoing debate as to whether the certificate will be obligatory for buildings to be rented or sold. The main argument against this requirement is the large number of inspectors needed in the early stages of implementation.</p> <p>A certificate will be mandatory for all public buildings as of 1 January 2009</p>	<p>The plan for Inspection of boilers has been prepared and is under review by the Ministries of Development and Environment.</p> <p>A framework and methodology is being put in place to set minimum requirements on, air-conditioning used in public buildings and it is in general more stringent than the EPBD and is expected to be signed and applied by summer 2008 (prior to the full implementation of the EPBD).</p>	The energy auditors' certification procedure is still under discussion, but it is likely that certified organizations will undertake preparatory training courses
Hungary	<p>The calculation procedures are defined in the annex of Ministerial Decree TNM 7/2006 which has been in force since 1 September 2006.</p> <p>A software tool was developed on a commercial basis in 2005, with added modules for a widely used HVAC program and building physics calculations – to date 800 exemplars have been sold.</p>	<p>The rating system and the numeric values of the requirements have been in force since September 2006.</p> <p>The new requirements are mandatory for building permits requested after 1 September 2006. Building permit must be issued for new buildings as well as for major renovation. The 1000 m2 rule has been recently applied.</p>	<p>Although the method of the certification became the subject of discussion, the rating system and the numeric values of the requirements have been in force since September 2006.</p> <p>All new buildings require certification as part of the building permit.</p> <p>In the case of major renovation of any building larger than 1000 m2 the same requirements as those for new buildings must be applied. The definition of major renovation is based on the value of the building (excluding the building site): if the costs of the renovation of the building envelope and/or the mechanical systems exceed 25% of the building's value, the requirements should be fulfilled.</p> <p>The definition of public buildings is still under discussion (as of March 2008)</p>	The regulation is still under discussion, due to formal problems, e.g. whether a regulation may include equations, etc. It is expected that the regulation will be issued in 2008.	Although about 1500 practicing engineers and architects joined the training courses run by universities and other bodies, and the Chamber of Engineers was prepared for the exams in 2006, to date no licences have been issued, due to the lack of the relevant regulation on the certification. When the certification method is formalised, the procedures should be restarted.

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Ireland	<p>The national calculation methodology for new residential buildings, entitled Dwellings Energy Assessment Procedure (DEAP), is a simplified asset based monthly calculation which conforms to EN ISO 13790. The output of DEAP is in the form of annual primary energy and CO₂ emissions arising from the provision of space heating and ventilation, water heating, associated pumps and fans, and lighting, calculated on the basis of a standardised notional pattern of occupancy.</p> <p>The national calculation methodology framework for non-residential buildings, entitled "NEAP", is an adapted version of the UK "National Calculation Method".</p>	<p>For new buildings, the amended 'Part L' building regulations came into force for building permits requested after 1 July 2006.</p> <p>The type and level of requirements depend on the function of the type of building (residential, office buildings, schools...) and cover:</p> <ul style="list-style-type: none"> >Limitation of heat loss through the building fabric >Limitation of CO₂ emissions >Controls for space heating and hot water supply systems >Insulation of hot water storage vessels, pipes and ducts <p>For dwellings the new improved requirements came into force for planning applications submitted after 1 July 2008.</p> <p>From 1991, the Government of Ireland adopted minimum requirements for new building components when building renovation is done and for extensions to existing buildings. These requirements were strengthened from 1 July 2006.</p>	<p>Certification of new residential buildings became mandatory from 1 January 2007. New non-residential buildings became mandatory from 1 July 2008.</p> <p>Existing buildings offered for sale or rent will require certificate from 1 January 2009</p> <p>Display of BER in public service buildings over 1000m² also required from 1 January 2009</p>	<p>Boilers An information and promotional campaign for boilers (Article 8(b)) is currently being implemented.</p> <p>A/C The inspection and assessment of air-conditioning systems is covered by Statutory Instrument No. 346 of 2006. These regulations were adopted in June 2006 and apply from January 2008. The procedures for inspection of air conditioning systems are being finalised.</p>	<p>Residential sector BER assessments are carried out by registered BER assessors who have: a Level 6 construction related qualification or equivalent received a Level 6 award in BER from a training provider that is registered with a recognized national accreditation body signed the BER Assessor Code of Conduct correctly completed the appropriate assessor registration forms</p> <p>over 1600 persons who have completed accredited training courses, over 600 have registered to date as BER assessors.</p> <p>SEI developed a National BER Register in 2007.</p>
Italy	<p>The basis for the calculation methodology is the 'Energy Performance Building Regulation' (EPBR). It is based on the CEN standards and applies to both new and existing buildings.</p> <p>All commercial software tools which will be made available on the market, must comply with the CTI reference tool, keeping the difference in energy performance result to less than 5%, and the validation has to be approved by CTI or UNI.</p>	<p>On 29 December 2006, the Government revised the minimum requirements for all new buildings. The Energy Performance (EP) requirements are implemented in three stages, corresponding to buildings, whose permit requests are required respectively after 1st January 2006, 1st January 2008 and 1st January 2010.</p> <p>A proof of compliance must be made after completion of the building. Legal responsibility rests with the director of works.</p>	<p>The certification of new buildings started 30 days after the publication of the new Decree (1st February 2007).</p> <p>The certification will gradually become mandatory for all buildings, when the property is transferred, in three stages: July 2007 for buildings above 1000 m² useful surface; July 2008 for buildings below 1000 m² (excluding single flats), and July 2009 for all apartments.</p> <p>A certificate is also required in order to access any incentives for improving energy performance.</p> <p>For public buildings over 1,000m² a certificate is also required when an energy service contract is signed.</p>	<p>Boilers Inspection of boilers was introduced in Italy through Law in 1991 and were modified in 2006 giving more responsibility to the regions and allowing for a longer maximum interval (up to 4 years) for the maintenance and control of small gas boilers.</p> <p>A/C The procedures for inspection of air conditioning systems are still under discussion, as the E.C. has granted the request for a three-year delay.</p>	<p>The Ministry Decree 30-05-2008 authorizes the following criteria for the accreditation of building energy performance assessors:</p> <ol style="list-style-type: none"> 1. Professionals, registered at the official association, demonstrating suitable design or energy auditing experience. 2. Any person having a technical-scientific background, attending a specific training course, with final examination. 3. The background qualification diplomas have to be recognised by the regions and autonomous provinces. 4. The training courses have to be organised or authorised by the regions and autonomous provinces.

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Latvia	<p>Building energy efficiency calculation methodology is in place as draft version. It is based on CEN standards and prEN standard projects. Methodology covers heating, hot water, AC, ventilation, built-in lighting systems. For residential and non-residential buildings energy efficiency calculation procedures do not differ. Draft calculation methodology calculation is based on simulation process. A special calculation software tool will be prepared after adoption of Building energy efficiency calculation methodology.</p>	<p>According to Law on Building Energy Efficiency article 8 minimum energy efficiency requirements refer to: >new buildings; >major reconstruction where the total floor area exceeds 1000 sq.m. and where the total cost of major reconstruction exceed 25% of building cadastral value or where major reconstruction construction works cover 25% of building total volume.</p> <p>Additional requirements covered in the law approved in March 2008 are still under discussion.</p>	<p>All necessary legislative documents required to start building energy certification will not be adopted until June 2008. - according to the adopted Building Energy Efficiency Law the energy certification process of buildings must start on 1st January 2009.</p>	<p>According to law, boiler and AC inspection have to be made at the same time as the building energy certification. The Construction, Energy and Housing State Agency is responsible for the implementation of promotional measures for boiler and AC inspection.</p>	<p>Requirements for auditors are now in the draft version phase. Energy auditors have to achieve compliance requirements: >Theoretical knowledge based on university education programme or on further education programme. >Demonstrate their practical work experience if practical work experience if theoretical knowledge is based on further education programme. >Pass a special energy auditor exam in which candidate must prove their theoretical and practical knowledge of usage of building energy efficiency calculation methodology.</p>
Lithuania	<p>The Lithuanian calculation procedure (article 3) is defined in Building Technical Regulation STR 2.01.09:2005 „Energy Performance of Buildings; Certification of Energy Performance of Buildings“, adopted on 20 December, 2005 by the Minister of Environment.</p> <p>The calculation procedure is based on methods described in the standards EN 15217:2005 „Energy performance of buildings. Methods for expressing energy performance and for energy certification of buildings“, and EN 15203:2005 „Energy performance of buildings. Assessment of energy use and definition of ratings“.</p>	<p>The new energy performance requirements for new buildings in relation to the EPBD (article 5) are described in the Building Technical Regulation. These requirements came into force on 4 January, 2006 The energy performance class may not be: >Lower than C for new buildings >Lower than D for existing buildings with a floor area exceeding 1000m² after major renovation.</p>	<p>Certification requirements for new buildings came into force on 1st January 2007 and until may 2008 594 certificates for new buildings had been issued.</p> <p>Certification requirements for existing buildings and refurbished existing buildings will come into force as of 1 January 2009.</p>	<p>Boilers According to Order No. 4-73 of 28 February 2006, inspection of boilers fired by non-renewable liquid or solid fuel of an effective rated output of more than 100kW capacity started in 2007.</p> <p>Inspection of boilers fired by non-renewable liquid or solid fuel of an effective rated output of more than 20-100kW capacity are due to start in2008 and will need to be carried out every 2 years.</p> <p>A/C Inspections of a/c systems of an effective rated output of more than 12kW are due to start in 2008.</p>	<p>The Experts Training Program started on November, 2006. Up to the present time there is a group of 191 qualified experts. Two institutions were appointed as experts training organisations: the Architecture and Building Institute of the Kaunas Technological University (KTU ASI) and the Quality Management Centre of Vilnius Gedimino Technical University (VGTU).</p> <p>An expert for certification of energy performance of buildings must conform to the requirements of the rules, pass the training courses and the examination and obtain the certificate of qualification. It is foreseen that the Experts Training Program will be revised every 5 years.</p>

Member State	Adoption of Methodology	Setting of Energy Performance Requirements	Certification of Energy Performance of Buildings	Boiler and A/C Inspections	Training of Independent Experts
Luxemburg	<p>The new regulation implements a methodology to calculate the energy performance of new residential buildings and of existing residential buildings if they are subject to major modifications or extensions.</p> <p>The regulation on energy performance in residential buildings and came into force on 1st January 2008.</p>	<p>The requirements for new buildings came into force on the 1st January 2008 and achieve an improvement of about 30% - 50% in comparison to the former standards.</p> <p>Requirements include: >Maximal U-values of building elements >Building air tightness >Shading measures >Insulation of hot water pipes >Qualitative requirements for ventilation systems</p> <p>The requirements for existing buildings undergoing modification or extensions are the same as for new buildings.</p>	<p>The energy performance certificate is required for the following: - >new buildings >extension and modification of existing buildings >renovation or replacement of the technical installations which influences the energy consumption demands >change of ownership or tenancy</p> <p>Four years after the issuing of a certificate for a new or existing residential building, the building owner must ensure that the certificate is accomplished by an energy consumption indicator for heating and/or domestic hot water.</p> <p>Certificates must be displayed in all public buildings over 1,000m²</p>	<p>Boilers Regular 4 year inspections of gas-powered boilers are covered by the 'Grand-Ducal Regulation' of 14 August 2000.</p> <p>Oil-powered boilers are covered by the amended 'Grand-Ducal Regulation' of 12 December 1987.</p> <p>The inspection of installations older than 15 years will be integrated into the regulations of 1987 and 2000 respectively.</p> <p>A/C Inspection is currently covered by the amended 'Grand-Ducal Regulation' of April 2004 but does not yet fulfil all EPBD requirements. A revision is under discussion.</p>	<p>Qualified experts are persons permitted to issue certificates and calculations. They must be recognized architects or engineers and a member of the "Ordre des architectes et ingénieurs-conseils" according to the "loi du 13 décembre 1989 portant organisation des professions d'architecte et d'ingénieur-conseil".</p> <p>At this time about 700 experts are authorized to issue the required documents.</p>
Malta	<p>Two existing Software packages namely EPA-NR and iSBEM have been evaluated and a decision as to which of these two packages will be chosen will be taken by end of July 2008 at the latest. After this stage the selected software will be verified and modified using local data sets and a customised front end for Maltese assessors. A separate assessment for the energy performance assessment of dwellings that takes into consideration both heating and cooling according to the relevant CEN standards is expected to have been developed by September 2008. [no update since March 2008 available]</p>	<p>A 46-page technical guidance Document 'Conservation of Fuel, Energy and Natural Resources' (available on www.mri.gov.mt) was issued as part of the regulations and is the instrument that sets the parameters for compliance. The requirements include:</p> <ul style="list-style-type: none"> • Thermal values of the building fabric, limitation of areas of glazing both in connection with loss of heat or coolness as well as with solar heat gain • Controls and insulation of heating and cooling systems • Controls of artificial lighting systems • Conservation and re-use of rainwater <p>It covers new and existing buildings for which building permit applications are received after 2 January 2007. Proof of compliance has to be provided after completion of the building.</p>	<p>The draft legislation envisages that: All newly constructed dwellings for which planning permission is applied for on or after 2nd January 2009 will fall under the definition of "new buildings" and will require an EPC. All other newly constructed buildings and buildings with a total useful floor area of over 1000 m² that undergo major alterations, and for which planning permission is applied for on or after 1st June 2009 will fall under the definition of "new buildings" and will require an EPC.</p> <p>In the case of rent or sale of dwellings the EPC will become mandatory as from the 2nd January 2009, whilst for all other buildings it will become mandatory as from 1st June 2009 and will have to be included in the contract for sale or rent documentation.</p>	<p>Malta is working on finalising methodologies based on CEN standards and these are supposed to be ready by the end of August 2008. The legislation concerning boilers and A/C systems should come into force on 2nd January 2009.</p>	<p>In terms of training, a programme is being formulated for holding training programmes for assessors and certifiers in mid September 2008.</p> <p>It is envisaged that architects and, civil engineers and Engineers will be required to attend an induction course on the chosen software/s and afterwards be registered with the MRA upon successful completion of the course in order to be registered as an EPC assessor.</p>

Member State	Adoption of Methodology	Setting of Energy Performance Requirements	Certification of Energy Performance of Buildings	Boiler and A/C Inspections	Training of Independent Experts
Netherlands	<p>The methodology for new buildings already complies with the current Energy Performance Standard (EPN)..</p> <p>The calculation method for existing buildings is based on EPA (Energy Performance Advice). For existing buildings the Energy Performance Advice (EPA) methodology is being simplified and enhanced. The quality assurance system and the calculation procedures for this have been ready since December 2006. The quality assurance system is built on a national quality standard for energy consultants and qualified auditors.</p>	<p>The Dutch building law sets requirements for the energy efficiency of new buildings and major renovations of existing buildings. In the current national building regulations, proof that the requirements are met must be given before the completion of the building. Verification of this legal provision is the responsibility of the Local Authority where the building is located. The main requirement is to comply with a given maximum value for the Energy Performance Coefficient (EPC). At this moment the value of the EPC in the Netherlands is 0,8 for residential buildings for non-residential buildings the value differs per category.</p>	<p>The issuing of the Energy Performance Certificate is established in the 'Decree Energy performance of Buildings' (BEG). The decree was published on December 5th 2006.</p> <p>Also, the Certification for buildings with a total useful floor area over 1000 m2 occupied by public authorities (Article 7.3), is allowed for in the decree. However, the Netherlands has decided not to set or apply this requirement for the categories of buildings that are named in Article 4.3.</p> <p>In the Netherlands the certificate is called 'Energylabel' and is mandatory for all flats or houses rented or sold as of January 2008.</p> <p>Certification of public buildings will be mandatory by January 2009</p> <p>The certificates are valid for 10 years.</p>	<p>Boilers The system that the Netherlands has implemented will lead, with regard to the inspection issues as described in the directive, to the intended result on the basis of both a voluntary scheme and legislation.</p> <p>A/C Inspection of air conditioning systems is fully implemented.</p>	<p>Energy performance inspectors are experts and need a valid NL-EPBD-Certificate as described in BRL 9500.</p> <p>Companies, not individuals are accredited by certifying bodies.</p> <p>Experts will need to have a higher (Building related) technical education and will need to follow an additional course in order to become an energy performance inspector.</p>
Poland	<p>A general description of the calculation method is given in legislation [Current status unclear, as no status update has been issued since 2006]</p>	<p>Every building will be assessed according to a reference building for which technical requirements are set. Requirements based on u-values of components.</p> <p>For new buildings, proof of compliance needs to be provided before the permit for use is issued.</p>	<p>From 1st of January 2008 all new buildings should have an energy certificate. From 1st of January 2009 all existing buildings that are sold, rented or modernised should have an energy certificate.</p>	<p>Inspection of boilers and AC are planned to be mandatory from 1st January 2009.</p>	<p>Boiler and A/C system inspections will be carried out by specialist engineers who have followed a course at a technical university and have passed special exams.</p> <p>For the certification, candidates need to have a relevant higher education and pass an additional exam. Certain specialised professions like architects are exempt from following these courses and may access the market directly.</p>

Member State	Adoption of Methodology	Setting of Energy Performance Requirements	Certification of Energy Performance of Buildings	Boiler and A/C Inspections	Training of Independent Experts
Portugal	<p>The calculation procedures are defined in the Building regulations for residential buildings and in the HVAC regulations for non-residential buildings.</p> <p>A software tool, produced by INETI for the Energy Certification System (SCE) for both residential and small non-residential buildings, became available in September 2006. For residential buildings, however, the calculations can be performed by hand, on a spreadsheet, or using any other commercial software package that became available in the meantime, offering enhanced interfaces and databases of materials, construction details, etc.</p>	<p>The <i>National System for Energy and Indoor Air Quality Certification of Buildings (SCE)</i> came into force on 1 July 2007. This milestone started a new phase in the current legislation on energy efficiency of buildings in Portugal since it was published in 4 April 2006. The new requirements are mandatory for building permits requested after 3 July 2006</p>	<p>Certification required for all new buildings with a floor area greater than 1,000m² by 1 July 2007</p> <p>Any renovations requiring a building permit after 1 July 2008 must also have a certificate</p> <p>Full implementation of all aspects of certification as laid out in the Article will come into force by January 2009</p>	<p>Inspections of boilers and air-conditioners are covered by the HVAC regulations adopted by the Government on 4 April 2006 and shall become mandatory from 1 January 2009. The procedures for inspection of boilers and air conditioning systems are still under discussion</p>	<p>Qualified experts are the only persons permitted to issue Certificates and carry out inspections. They must be recognised architects or engineers with at least five years' experience, on the basis of peer-analysis of their CVs carried out by elected boards by their professional associations. In addition, qualified experts must attend recognized courses and pass a demanding national examination that evaluates their knowledge about the technical requirements of the building regulations and the details of the certification system itself.</p> <p>Recognised courses are already offered by more than 40 universities or accredited training institutions, and more than 700 candidates are undergoing training as of January 2008. The goal is to have 2000 qualified experts by 2009.</p>
Romania	<p>"Methodology of calculation of the energy performance of buildings - Mc 001/1,2,3 – 2006" taking into account CEN standards available up till then. Also alternative calculation methods for heating and cooling processes, based on Romanian research activity, have been included in part of aforementioned Methodology. The new Methodology is a modified version of the previous one which was compiled in 2000. The previous energy certificate has also been modified.</p>	<p>For all new buildings and also renovations and extensions to existing buildings, there are minimum requirements for building permits requested after 1 January 1998 in line with regulation C107/1-7.</p> <p>Proof of compliance must be made upon completion of the building.</p>	<p>Certification has become mandatory for new buildings requiring a permit since January 2007.</p> <p>Residential buildings must have a certificate when rented or sold as of 1 January 2010.</p> <p>Public buildings over 1,000m² were also required to have a certificate on display from 1 January 2007</p> <p>Up to the end of January 2008, more than 800 Energy Certificates were registered on a web based central registration system</p>	<p>Boilers: Inspections have been mandatory since 1 January 2007</p> <p>A/C Inspections became mandatory in the course of 2008.</p>	<p>To issue energy performance certificates or carry out inspections, completion of a specialized graduate course and passing of a Ministry denominated commission exam is required.</p>

Member State	Adoption of Methodology	Setting of Energy Performance Requirements	Certification of Energy Performance of Buildings	Boiler and A/C Inspections	Training of Independent Experts
Slovakia	<p>The calculation procedure is strictly based on the EN standards. The calculation can be performed by hand or using commercial software. Although there is only software for parts of the calculations. The majority of the calculations are worked out using a spreadsheet.</p>	<p>The ministry of construction and regional development adopted minimum requirements for all new and existing buildings.</p> <p>The type and level of requirements depend on the building. There are no set requirements for average insulation levels – Only requirements for heat use.</p> <p>The requirements have come into force for building permits requested after 1 January 2008.</p>	<p>The system of energy certification of buildings came into force from 1st of January 2008.</p> <p>The energy certification is mandatory for new and major building renovations, for sold and rented buildings (not apartments or parts of buildings), for residential and non-residential buildings. Certification is also required for public buildings.</p> <p>The limitation on 1000 m² total floor area is not a condition.</p> <p>The Municipality checks if the certificate is legally required.</p>	<p>Inspections of boilers and air-conditioning systems in Slovakia are covered by the Act No. 17/2007 Coll. It was adopted by the National Council of the Slovak Republic on 16th December 2006. The regular inspections became mandatory on 1st January 2008.</p> <p>Regular intervals of inspections are dependant on the thermal output of heating system, type of fuel and type of building (residential/non-residential) or depending on the cooling output of the inspected AC-system.</p>	<p>The requirements for energy experts are set forth in the Slovak Act No. 555/2005.</p> <p>Energy certificates may only be issued by officially licensed experts.</p> <p>To be qualified and to obtain a licence, a university degree in the relevant area of certification is required, as well as three years of experience in the field.</p> <p>'Energy Auditor' training courses are organised and professionally supervised by the SIEA.</p>
Slovenia	<p>Methodology of calculation of integrated energy performance of buildings is under development and it will be integral part of <i>Regulation on efficient use of energy in buildings</i>. CEN standards for support of implementation of EPBD will be applied as much as possible. Due to the considerable variety in local climate, additional effort will be put into the preparation of climatic data.</p> <p>It is planned that these regulations will be promulgated in January 2007. [Most recent status update August 2006]</p>	<p>Definition of minimum requirements will be a part of <i>Regulation on efficient use of energy in buildings</i>. The minimum requirements will be expressed in terms of annual heat demand for space heating and cooling (useful energy) and in terms of annual energy demand for buildings operation (final energy).</p> <p>It is planned that requirements for heat demand will be approximately 30% stricter than those of 2002.</p>	<p>Rules for energy certification will be based on <i>Energy Act</i>. It is planned that issuing certificates for new buildings and public buildings will start in the beginning of 2008 and for other buildings at the beginning of 2009.</p>	<p>Regular inspection of boilers is already in place in Slovenia in the framework of the <i>Environmental Protection Act</i>. The additional tasks and protocols for regular inspection of boilers requested under EPBD is planned to be promulgated at the end of 2007.</p> <p>It is considered option b) will be applied by a provision of advice and financial incentives for replacement of boilers. Regular inspection of air conditioning systems is planned to be established at the beginning of 2008.</p>	<p>The certificates are issued by chartered engineers, after an additional training, exam and approval by the state.</p>

Member State	Adoption of Methodology	Setting of Energy Performance Requirements	Certification of Energy Performance of Buildings	Boiler and A/C Inspections	Training of Independent Experts
Spain	<p>EPBD is a national regulation and does not use CEN standards. It covers both new and existing buildings. The assessment method is based on asset rating.</p> <p>More information regarding the technical specification of the calculation procedure can be found in Annex 1 of Royal Decree 47/2007.</p>	<p>The Building Code (CTE) has set minimum energy requirements for new buildings. The requirements come into force for building permits requested after 17th September of 2006.</p> <p>The type and level of performance cover:</p> <ul style="list-style-type: none"> >Maximum U-values for different building elements; >Solar factor for windows, roof lights, etc; >Minimum Efficiency performance for thermal installations; >Minimum Efficiency performance for lighting installations; >Minimum natural lightning contribution; >Minimum solar contribution to Domestic Hot Water; >Minimum photovoltaic contribution to electric power. 	<p>Certification of all new buildings became mandatory from 31 October 2007</p> <p>For existing buildings a 'Basic Procedure' is expected to be ready and mandatory from 2009</p>	<p>Inspection of boilers is already covered by the Regulation on thermal installations on Buildings (RITE)</p> <p>The inspection of A/C systems is also covered by RITE. They take place every 1 and 2 years depending on the capacity of the system. Inspections of the whole facility installations is performed every 6 years.</p>	<p>Inspections of thermal installations have been carried out by experts for years because of safety regulations. For the SPBD, an additional training of 2-3 days is required. Mainly architects and engineers are involved in the certification process. The specific requirements depends on the respective regional authorities.</p>
Sweden	<p>Operational rating (measured rating) is used for all types of buildings. If no measured values are available, calculations may be used.</p> <p>There is no general calculation method and software tool for energy calculations.</p> <p>One software tool option is 'ENORM'.</p>	<p>The type and level of requirements are different for residential and non-residential buildings.</p> <p>A maximum energy consumption per m² of tempered floor is given (for heating, cooling and domestic hot water demand) along with other advice about comfort and indoor environment.</p> <p>There are two climate zones.</p> <p>Proof of compliance must be made within 24 months after completion of the building.</p> <p>Control of this regulation is the responsibility of the municipality where the building is located.</p>	<p>Sweden will not have an 'Energy performance certificate' but an 'energy declaration'. All declarations must be sent to the 'national board of housing, building and planning' where they are lodged in a register.</p> <p>Declarations will become mandatory for new buildings as of 1 January 2009.</p> <p>For public buildings and multi-family houses, a declaration will become mandatory as of 31 December 2008.</p> <p>Other buildings, when rented or sold must have a declaration as of 1 January 2009.</p> <p>By the end of June 2008 more than 8100 Energy Certificates have been registered</p>	<p>Boiler inspections are in place. The testing of boilers will depend of the specific regulations regarding the type of boiler in place.</p> <p>The procedures for inspection of A/C systems will start as of 1 January 2009. The size of the systems, the cooling need of the building and cost-effective measures will estimate the efficiency of the system and help the owner to improve the efficiency.</p>	<p>Experts will need to have a degree from a basic technical education. They need at least five years experience, of which at least 2 years need to have been spent in an area directly linked to energy and auditing and certification. They also need to pass an additional theoretical exam.</p> <p>The Certification of the Experts is valid for 5 years, and it is subject to renewal pending proof of continued training and lack of malpractice.</p> <p>So far there are four bodies accredited to certify energy experts and about 527 experts certified. By June 2008 there about 205 offices were registered as Independent experts.</p>

Member State	Adoption of Methodology	Setting of Energy Performance Requirements	Certification of Energy Performance of Buildings	Boiler and A/C Inspections	Training of Independent Experts
UK	<p>The procedures for a national calculation methodology for building energy performance applying throughout the UK have been established.</p> <p>Additionally in Scotland improvement factors and low and zero carbon technology benchmark have been incorporated.</p> <p>Software tools have been developed by Government (SBEM and SAP); however other software packages, dynamic simulation models and SBEM interfaces can be used provided these are approved by Government.</p>	<p>England & Wales The requirements for new and existing buildings came into force in April 2006</p> <p>Scotland New energy standards came into force on 1 May 2007. The standards and guidance provided in these documents are intended to achieve an improvement of around 23-28% fewer emissions on the previous standards, design and construction methods which exceed these efficiency ratings and which make greater use of Low and Zero Carbon Technologies would be encouraged.</p> <p>Northern Ireland The requirements for new buildings came into effect in November 2006.</p>	<p>England and Wales The requirements regarding the certification of buildings will be implemented progressively between August 2007 and October 2008</p> <p>An 'Energy Performance Certificate' (EPC) is required when a building is constructed, sold or rented. It is valid for 10 years.</p> <p>A Display Energy Certificate is required for public buildings, and are valid for a year.</p> <p>Scotland Certification is required under the housing (Scotland) act 2006.</p> <p>Certification is being phased out as follows: >Sale of residential buildings as of 1 December 2008 >Sale of all other buildings as of 4 January 2009 >Rental as of 4 January 2009 >Public buildings – On display by 4 January 2009.</p> <p>EPCs will be produced and displayed in a prominent place in all public buildings greater than 1000m². Ratings are rated from 'Carbon Neutral' through to poor performance on an A-G scale.</p> <p>Northern Ireland Certification is being phased in as follows: >Existing residential buildings for sale as of 30 June 2008 >Newly constructed buildings as of 30 September 2008 >Existing non-residential buildings for sale =; all rental buildings; Display EPC's as of 30 Dec 2008.</p> <p>All certificates must be logged in a central, government approved, database.</p>	<p>Boilers: UK Government, in conjunction with the heating and hot water industry, are launching a new energy advice programme for heating and hot water systems, covering homes and businesses. The advice given is in the form of a simple checklist and recommendations that can be included in a service visit and now forms part of industry recommended good practice guidelines.</p> <p>A/C England and Wales First inspection of all existing A/C systems over 250kW must have occurred by 4 January 2009. First inspection of all remaining A/C systems over 12kW must have occurred by 4 January 2011.</p> <p>The inspection will include an assessment of efficiency, a review of their sizing and advice of their sizing and advice on improvements or replacements and alternative solutions.</p> <p>Scotland Inspections for all A/C systems over 12kW came into force on 1 May 2007. Delivery will be achieved through protocols (as with EPCs).</p> <p>Inspections are phased in and are veering the largest systems first.</p> <p>Northern Ireland New systems installed after 30 December 2008 must be inspected within 5 years of being put in service.</p>	<p>England, Wales and Northern Ireland Any energy assessor must be a member of a specialist accreditation scheme approved by the Government. Each accreditation scheme is responsible for ensuring that energy assessors are suitably qualified to conduct energy assessments and for ensuring the quality of the assessments and any certificates or reports produced (including their independence).</p> <p>An energy assessor needs to have both appropriate qualifications and accreditations.</p> <p>Scotland Any energy assessor must be a member of a specialist professional body selected by the Government. Each professional body is responsible for ensuring that energy assessors are suitably qualified to conduct energy assessments and for ensuring the quality of the assessments and any certificates or reports produced (including their independence).</p>

Sources: Member Status Reports, EPBD Buildings Platform <http://www.buildingsplatform.org/cms/>, RICS report "Towards an Energy Efficient Building Stock 2008", 12.09.2008, Interviews carried out December 2008/January 2009 by AEA.

ANNEX 2: BASIS OF DETAILED DISCUSSIONS WITH 10 NOMINATED MEMBER STATES

Introduction

Thank you for agreeing to spare some time today to discuss the implementation of the EPBD and issues affecting its revision.

We are interviewing a fairly small group of people and should like to have your approval to include a summary of our discussion in the final study report to the European Parliament. I'll send a draft of the summary to you for approval before its inclusion in the report. Are you happy to proceed on this basis, or would you prefer your contribution to remain anonymous?

Have you had an opportunity to read the summary of the Directive's implementation in your country and the summary of our understanding of the current proposals for updating the Directive, which was emailed to you?

Effects of Implementation

Do you have any comments to make about the summary? Do you think anything in the summary is incorrect?

Who manages implementation?

Please can you confirm who is responsible for the implementation of the EPBD in the following areas?

How have the following aspects been implemented?

Where relevant, please indicate where these vary for domestic, non-domestic public, public, non-domestic commercial sectors.

Who bears the costs of implementation?

- Architects & constructors (new build)
- Owners
- Occupiers
- Scheme administrators
- Others

How has implementation been affected by the local market conditions?

Examples are where characteristics of the building market are positively or adversely affecting energy efficiency or where characteristics of the markets are responsible for managing implementation e.g. skills shortages etc.

What have been the barriers to implementation?

How have difficulties been overcome?

What incentives have been provided specific to implementation of the EPBD?

What incentives have been provided that drive buildings energy efficiency in general?

What has been particularly successful in the implementation of the EPBD?

Please identify any best practice case studies within your country?

Scope of revision and recommendations for energy performance of buildings

Views on barriers and impacts

- What is likely to cause greatest difficulty and why?
- What is likely to have greatest impact on driving increased rates of implementation, higher levels of efficiency etc. and why?

Do you have any recommendations to strengthen effectiveness and avoid anticipated problems?

Linkages with Other Policies

- Which other policies and programmes influence energy efficiency in buildings?

ANNEX 3: INTERVIEW FINDINGS

The following section is based on the views expressed by each of the Member States throughout the study. It has not always been possible to check the validity of the statements.

1. BULGARIA

Overview

- Implementation is the responsibility of the Ministry of Regional Development.
- A national calculation method was adopted in March 2005 and is based on European Standards EN 832, EN13 370 and EN 13 798.
- Minimum energy performance requirements have been required on new and refurbished buildings since March 2005. They are enforced as part of building permits which are issued following an evaluation of a building's energy performance.
- Energy Performance Certificates have been required for new buildings since January 2005. For existing buildings, EPC assessments are carried out by the Energy Efficiency Agency. Tax cuts are given for buildings with an 'A' or 'B' rating.
- Boiler inspections have been mandatory since July 2005 and are carried out by the Inspectorate for State Technical Surveillance. Air-conditioning inspections have been required since July 2008, but the inspection procedure is still under discussion.
- Energy assessors must be accredited by the Energy Efficiency Agency, who set various professional criteria for accreditation. Examination material and evaluation process are coordinated by the Energy Efficiency Agency and approved by the Ministry of Economy and Energy.

Operational Level

The setting of legislation is the responsibility of Ministry of Economy and Energy, Ministry of Regional Development- Energy efficiency law. The provision of advice, guidance and training is carried out by the Energy Efficiency Agency.

The costs are borne by owners, with the exception of public buildings which are partly funded through the State budget.

It is not clear yet if characteristics of the building market are positively or adversely affecting energy efficiency or where characteristics of the markets are responsible for managing implementation i.e. skills shortages.

Barriers

The most important barriers are lack of finance, insufficient information for the beneficiaries and lack of Energy Service Companies (ESCO), especially for private owners. For the public buildings (state and municipal property) it is easier, as the expenditures are partially or in some cases even totally covered by state budget.

Incentives

The main incentive is the reduction of building tax and profit tax for corporations that has been made available⁴².

Best Practice/Successes

The EPBD has been successful in raising interest and awareness with the general public. The training and registration of energy auditors and certification companies has also been successful. No examples of best practice are yet available.

Scope of Revision

According to the Bulgarian authorities the current EPBD Directive contains some unclear text and contradictions, as a result similar text was transposed into Bulgarian legislation, and consequently there is confusion in putting the legislation into practice. No specific examples were given.

Bulgaria felt that the necessary minimum of requirements, incentives for the main stakeholders, and guaranteed minimum conditions for the contracting of energy services, in particular will be difficult to implement.

2. CZECH REPUBLIC

Overview

- Implementation is the responsibility of the Ministry of Industry and Trade.
- The national calculation method is based on relevant CEN standards.
- Minimum energy performance requirements are based on benchmarked performance against a reference building. Proof of compliance is required before a construction or renovation permit is issued. Requirements are the same for new and refurbished buildings.
- Energy Performance Certificates are required for new buildings, renovated buildings >1000m² and public buildings >1000m² from January 2009.
- Boiler inspections have been mandatory since January 2007. Air-conditioning inspections will be mandatory from January 2009.
- Energy assessors must have at least 6 years relevant experience and must pass a theory and oral examination (before a ministerial committee), or have at least 3 years experience and a university degree.

Operational Level

The Ministry of Industry and Trade is responsible for implementing the EPBD requirements. The State Energy Inspection is responsible for monitoring and compliance; they ensure the quality control of certificates. It also has the power to penalize non-observance of EPBD legislation by building owners.

In 2006 the Czech Parliament adopted the amendment of the Act on Energy Management, transposing the requirements of the Directive 2002/91/EC into the legislation of the Czech Republic.

⁴² No further information was available on the level on these benefits.

A National Calculation Tool (NKN) is a method used for calculating the energy demand and energy consumption of a building. The NKN is freely available and is not mandatory for implementation.

The owners bear all the cost of implementation. Purchasing an energy performance certificate will cost the property owner about 5% of the building's value; therefore fluctuating financial conditions could impede or encourage this aspect of implementation.

Barriers

The one barrier experienced by the Ministry during implementation was the lack of trained auditors; however since 2006 this problem has been overcome through an increase of education and training programmes. Overall, implementation has been quite successful; the Ministry did not face many barriers.

Incentives

The only subsidies provided by the Government are for purchasing EPCs and the Government provides subsidies for the reconstruction of panel buildings.

Best Practice/Successes

Information, though requested, was not received in time for inclusion in this report.

Scope of Revision

The Ministry of Industry and Trade agree with amendments to proposed legislation by the Commission; however they have some comments and recommendations.

- Article 6: The consideration of alternative energy sources is extended to ALL new buildings. → Instead of ALL should be 'Where appropriate'
- Article 7: Major renovation needs to be clearer
- Article 9: Member States must demonstrate that public buildings are taking the lead in this area → 'Where appropriate'
- Article 10: Display energy certificates are now required on public authority buildings over 250m² → the threshold should be taken away, and certificates should be displayed on all public authority buildings.

At the moment, the EPBD is the main policy which influences energy efficiency in buildings, and is described as 'good enough.'

3. DENMARK

Overview of implementation

- Implementation is the responsibility of the Danish Energy Authority and the Danish National Agency of Enterprise and Construction.
- The national calculation method is based on a software programme – Be06. This core programme must be used by all calculation software.
- Stricter minimum energy performance requirements were introduced in January 2006. Energy performance targets are set for all building types. For refurbished buildings, there is a requirement to carry out energy efficiency improvements on external walls, roofs, windows and heating systems.

- Energy Performance Certificates have been required on new buildings, those being sold and those being rented out since December 2005. For buildings >1000m², EPCs must be renewed every 5 years. Identified recommendations must have a payback period of < 5 years and must be implemented within 5 years. New buildings must achieve at least level B1. Day-to-day running of the EPC scheme is lead by the Council for Energy Labelling of Small Buildings (FEM⁴³) secretariat, who also registers all EPCs.
- Boiler inspections have been mandatory since September 2006. Air-conditioning inspections have been mandatory since January 2008.
- There are 3 types of energy inspectors: a) single-family residential building, b) multi-family residential/commercial/public buildings, and c) in-house commercial/public buildings. Inspectors must have at least 5 years relevant experience and must complete a special training course (with an annual 'reminder' training).

Operational Level

At an operational level FEM is responsible for running the energy labelling (including boiler and AC inspections) and consultant certification scheme. The Secretariat⁴⁴ is responsible for daily routines, reporting results and information provided to consultants. Operation of the labelling scheme is self-financing through fees levied for issuing buildings energy certificates by energy consultants. This fee is standardised for small buildings and capped, whereas for large buildings the market is free to find an appropriate price, reflecting the complexity of the work. FEM also assess for certification the general maintenance of domestic buildings and this is coupled to insurance premiums, though this is not part of the EPBD's requirements.

The energy consultants providing the certification services are registered by FEM, though Denmark is now switching towards certification of the company rather than the individual, transferring the responsibility to the employing company for ensure appropriate consultants are deployed.

More general supporting measures, such as public information campaigns are funded through the Danish Energy Agency. Funding has recently been provided to establish a knowledge centre of energy in buildings, which aims to transform academic knowledge into information suitable for practitioners to implement savings measures, including guidance on financial appraisal of projects to support building the business case for investments.

Harmonisation of the energy calculations across Denmark is achieved through compliance with the CEN standards. Prior to EPBD's implementation, Minimum Energy Performance standards for new and existing buildings were set by Danish Building Regulations and the mandatory buildings energy labelling scheme that was brought into force following the OPEC crisis in the late 70s. At the outset of EPBD implementation, the standards were tightened by ~ 30% and a planned change to use of gross energy demand (includes cooling and hot water demands, boiler losses etc.) rather than net heating demand was brought forward.

Be06 is the core software programme for calculating the energy demand of a building, which can be used to document that the building complies with the Danish Building Regulations and hence the EPBD. It is compliant with CEN standards, though developed to be appropriate for requirements in Denmark.

⁴³ Fællessekretariat for Eftersyns- og Mærkningsordningerne.

⁴⁴ <http://www.femsek.dk/>.

For example, there are 4 methods for calculating the net heating demand of buildings: yearly, monthly, hourly basis or as a simulation. In Denmark, calculations are made on a monthly basis.

Before selling an existing domestic property, an energy certificate must be obtained, however, there are no sanctions if a sale is made without the certificate, other than the purchaser can recoup the costs of certification from the seller. The Danish Energy Agency decided not to apply penalties because their strategy was to ensure EPBD would be driven through voluntary compliance driven by social and personal benefits, not avoidance of sanctions i.e. market pull. This is in part, due to recognition that monitoring for non-compliance and applying sanctions, such as fines, would be bureaucratic, burdensome and costly to government.

The cost of certification is paid by the building owner, though it is likely that this is added to the sale price and / or covered by selling agent's fees. In the case of new buildings, the cost of certification is applied at the time the building is occupied and paid by the building owner e.g. the Local Authority). Clearly, costs may be passed-on through the building's letting arrangements.

Within Europe, Denmark is one of the most active Member States for developing government policies and implementing energy efficiency.

In light of this history, implementation of the EPBD has been fairly straightforward, requiring relatively minor adjustments to existing Building Regulations and the pre-existent certification and labelling scheme.

Barriers

The main difficulty has been to implement EPBD in an cost efficient manner. For example, when a building has no room for improved efficiency measures, it could be considered that the costs of implementing EPBD has been to no avail (i.e. only a cost in that situation) and there are no techniques to focus activity on the less efficient buildings stock. In contrast, for buildings where many measures are identified, there may be little impetus to drive implementation on a reasonable time-scale, so again the Directive could be viewed as having limited impact. If measures are implemented at a later date, it is unclear what contribution the certification made to driving the change, as opposed to general improvements that would have occurred due to market developments. So the additionally of the EPBD is difficult to gauge.

There is no evidence to suggest that market penetration for implementation of EPBD varies by sector: domestic / private sector vs. government / public sector vs. industrial & commercial sectors.

Very little of the buildings stock in Denmark still has potential for increased energy efficiency through the application of simple, short-payback measures such as thermal insulation and double glazing. The main potential for improvement is with refurbishment of stock, where the 25% rule applies on the cost of the refurbishment or the % of the building envelop being upgraded. Improvements at the time of refurbishment are also controlled in Denmark through their building regulations, complementary to EPBD, that place individual requirements on refurbishments to roofs & attics, windows, and the outer shell of the building.

In Denmark, the 1000m² limit has never been applied, which demonstrates their advanced position in comparison with EPBD's standards. At the time of implementation all buildings were included, however at a later stage, the 25% rule was removed as an obligation for small single-dwelling buildings. This change was made in recognition that skilled craftsmen such as roofers would have no competencies to advise on and undertake improvements to heating systems (and vice versa).

Another difficulty for Denmark has been their decision to base energy certificates for existing buildings on calculations using actual consumption data. This presents problems for old building complexes such as hospitals that may comprise some one hundred buildings of widely varying types.

The impact of the global credit crisis and onset of recession is not yet seen as having an impact on Denmark's implementation of EPBD (or other buildings energy and environmental efficiency measures). The Danish economy is relatively robust.

In 2008 the Danish government decided to start work on a new energy action plan, with an emphasis on buildings. This may provide an opportunity to revise some of the implementing legislation, such as that controlling the need to base certification on actual consumption data calculations for large buildings complexes (see above). Formalisation of the plan is due in March 2009 (except for transport, which is due mid-2009).

Incentives

No specific incentives were identified during the interview. It should be noted that Denmark was experienced with building energy labelling due to the pre-existent mandatory scheme, so additional incentives were not required.

Further, until recently, the Danish government's policy was to preclude any changes to the taxation regime, so this could not be used to encourage EPBD's take-up. However, this is no longer the case and economic measures are under-discussion as part of the proposals for the new energy action plan (though not tied-in with EPBD's implementation). An example of these discussions, which is related to EPBD, is consideration of a buildings tax associated with the energy performance of building, where the energy certificate classification (A, B, C etc.), may be used to guide the tax advantages applied to better performing buildings. Adoption of this type of tax incentive would require a very good level of confidence with the measurement of the rating level and a regime of regular auditing to check standards.

The main effort to stimulate energy efficiency and increased use of renewable energy has been through support for R&D and support for a Knowledge Centre of Energy in Buildings aimed at facilitating take-up through guidance and advice, including support to make the business case for projects through effective financial appraisal.

The Danish government is increasingly responsive to calls to consider a wide range of policy instruments to encourage environmental, including energy, efficiency. Consequently, a range of measures is under debate as part of the energy action plan.

Best Practice/Successes

Good practice is embedded throughout Denmark's buildings supply chain through building regulations and construction practices.

Two low energy classes of buildings have been designated for new build in Denmark: Class II (75% of normal energy demand) and Class I (50% of normal energy requirements). The objective is that Class II should be the norm by 2010 and Class I by 2015. Local Authorities often set building development requirements such that Class I or Class II must be adhered to for the development to proceed / gain approval. This can result in investments in the design and construction of the building, rather than investing in connection to the local district heating or gas grid.

Scope of revision

Most of the measures recommended in the recasting of EPBD are already implemented in Denmark (e.g. removal of 1000m²) and Denmark is receptive and supportive of their take-up. The only exception is the application of the major renovations '25%' rule to single-family small buildings.

4. FRANCE

Overview

- The Ministry for Ecology, Energy, Sustainable Development et Territorial Development⁴⁵ and the Ministry for Housing⁴⁶ are responsible for the EPBD implementation.
- There are two different calculation methods, using different software: the 3CL method and the Th-C-E from the Thermal Regulation 2005 (RT2005). The 3CL (v15c) is a simplified method used for the Energy Performance Certificate (DPE⁴⁷) for existing households being sold or rented out. The Th-C-E is a complex method used to check the compliance of new buildings with the RT2005 (revised every 5 years), and used for their DPE as well.
- The RT2005 sets minimum energy performance requirements for new buildings. They apply to every building permit requested after September 1st 2006. Energy performance requirements for important refurbishments/renovations of buildings exceeding 1,000m² are included in the RT for Existing Buildings and have been mandatory since April 1st 2008. Furthermore, a feasibility study on different solutions for the building's energy supply – including renewable energies, is demanded for renovations and constructions of buildings exceeding 1,000m².
- Minimum energy performance requirements for new buildings were introduced in December 2007. Energy efficiency targets and a renewable energy study are required for buildings undergoing refurbishment (over >1000m²).
- Energy Performance Certificates (DPE) have been required for the sale of buildings since November 2006, for new buildings; for rentals since July 2007; and for public buildings >1000m² since January 2008. It is also mandatory for new buildings with permits requested after July 1st 2007.
- Measures to establish an inspection regime for boilers and air-conditioning systems is still under discussion. The implementation texts regarding the measures on boilers and air conditioning systems' inspections are being prepared.
- Energy experts must have appropriate knowledge and competence, but no particular degree or experience is required. Experts must pass an examination accredited by COFRAC (Comité Français d'Accréditation).

⁴⁵ Ministère de l'Ecologie, de l'Energie du Développement durable et de l'Aménagement du territoire, MEEDDAT in French.

⁴⁶ Ministère du Logement.

⁴⁷ Diagnostic de Performance Energetique.

Operational Level

The General Direction of Development, Housing and Nature (Direction Generale de l'Aménagement, du Logement et de la Nature, DGALN in French,) is in charge of the buildings' technical regulations, regarding energy, health & safety, noise, and ventilation.

The Parliament and the National Assembly voted the legislative dispositions allowing the Directive to be implemented by the French Law, and authorising the Government to take the corresponding decrees. The situation of the DPE is different. It has been put into place through successive regulatory measures, and each sector and type (i.e. rent/sale/public buildings/new buildings/existing buildings) is covered by a decree.

The enforcement of thermal regulations in new buildings is carried out by agents certified by the French Government. Those agents are in charge of controlling a certain percentage of operations.

The DPEs are not controlled by the State, but by the notaries⁴⁸ who have to make sure that they are included in the sale contract. Regarding rentals, there is no systematic control, for there is not always a professional intermediary (i.e. real estate agency) involved when signing the lease – which can be done directly by individuals.

The residential and non-residential sectors have different calculation methods and energy requirements, but they are both included in the same legal texts regarding thermal regulations.

The experts in charge of undertaking the DPE have to pass a mandatory test accredited by the COFRAC. The experts' accreditation is controlled by the verification of their DPE reports.

The evaluation methods used to produce the DPEs also differ based on the type of building. For non-residential existing buildings (including public ones), the DPE uses the actual energy consumption, i.e. the energy bills. For existing dwellings, the method varies (based on i.e. the dwelling type, heating system) and uses either energy bills or the 3CL method. For new buildings, the consumption is always estimated by calculating it.

There is no centralised registration system as such for DPEs and experts. However, a general list is going to be put together soon, based on the expert lists published by the certifying organisations.

Barriers

The market situation in France sees more demand than supply. Therefore, the lack of housing availability makes the DPE unlikely to be part of the selection criteria when residents are purchasing a property. An effort must be made to raise awareness on the DPEs and energy saving, especially for rentals.

The delay registered with enforcing the inspection of boilers and air conditioning systems has been caused by the difficulties in establishing a whole new methodology for those inspections (also experienced by other Member States), since such methodology did not exist before. The legislative texts are about to be finalised.

Incentives

The MEEDDAT works in collaboration with the Ademe – French Agency for the Environment and Energy - on the communication level. The Ademe is under the responsibility of the MEEDDAT.

⁴⁸ Legal expert in charge of the real estate sales acts in France.

With regard to the regulations for new and existing buildings, they have carried out communication campaigns to raise the professionals' awareness on energy issues for instance. They also create guidance packs on current regulations.

The DGALN is also in charge of the provision of the financial measures, in collaboration with the Ministry of Budget. Some measures have already been in place for 3 years, such as the tax credit for low energy equipment (individuals can claim this tax credit upon presentation of proofs and satisfaction of technical criteria).

The construction and purchase of low energy homes are also subsidised by the State.

Major refurbishments are going to be eligible for 0% interest rates loans, for all types of dwellings, when low energy work is carried out or when the whole dwelling reaches a certain energy efficiency threshold.

Other encouragement measures have been created alongside this regulatory framework by different organisations:

- The ANAH (National Agency for Housing) distributes subsidies for energy related work to be carried out during major refurbishments of energy inefficient dwellings;
- Labels have been created to certify the buildings exceeding the RT requirements;
- Regions have also launched their own programmes, subsidies and operations.

Best Practice/Successes

The RT for new buildings existed before the EPBD, and the 2005 version already included the Directive's requirements, which allowed for quick and efficient implementation.

With regard to the energy performance requirements, French regulations go further than the EPBD requirements. The Thermal Regulation "by element", covering existing buildings, has set minimal requirements since November 1st 2007, when some elements influencing the energy performance of a building are replaced (i.e. windows, boiler, etc.). The requirements are thus not based on the overall building performance, but are to be applied every time any work is carried out on a building. However, another consequence of this approach is that it makes it more difficult to measure and quantify the progress made in terms of energy efficiency.

The positive point of DPE consists of the discussions generated around it, making it well-known by the public and the professionals, although some progress should still be made regarding its quality.

The energy performance labels evoked earlier are considered good example of best practices and allow a public recognition of energy efficient buildings. They are delivered by private organisations having signed an agreement with the MEEDDAT.

Scope of the Revision

The public authorities are satisfied with the proposed amendments, but raise the following three issues:

- On the heating systems inspections: France is already late on boiler inspections, so any change to the inspection requirements that is to be implemented in the decreed short timescales is going to generate extra costs and important efforts.
- On the DPE/EPC's quality controls: controlling 0.5% of DPEs per year represents a very big volume and important investments will have to be made;

- The “cost-optimal levels” expression is not clear and its practical consequences and methods need to be more precisely defined.

The French feel that European Directives are efficient when it comes to creating measures or reforms, however there is a need to preserve Member States’ freedom of action at the national level, since situations differ from one country to another. The French feel that some autonomy is thus necessary to implement adequately the orientations taken at the European level.

France will also have to concentrate efforts on communication, professional training, as well as proceeding to the adequate financial investments

5. GERMANY

Overview

- Implementation is the responsibility of the Federal Ministry of Transport, Buildings and Urban Development, the Ministry of Economics and Technology and the Ministry for the Environment, Natural Conservation and Nuclear Safety.
- The national calculation method is based on 2 existing software programmes: DIN V 18599 for non-residential buildings, and DIN V 4108-6/ 4701-10 for residential buildings.
- Minimum energy performance requirements have been set for new and existing buildings. The 1000m² threshold does not apply in Germany. Requirements will be tightened by 30% in 2009 and a further 30% in 2012.
- Energy Performance Certificates are required within the following deadlines: residential buildings pre-1965 – July 2008; residential buildings post-1965/ all non-residential buildings – July 2009. 2 types of display energy certificates available for public buildings >1000m²: Type 1 is cheaper and available over the Internet, but from October 2009 is applicable only to recent or smaller buildings; Type 2 can be provided only by an accredited expert.
- Germany has opted for Option B in Article 8, so the German Energy Agency is due to launch an information campaign on heating system improvements. However, some boiler inspection and replacement is required. Air-conditioning inspections for systems >12kW will be required every 10 years. Inspections will be controlled by regional authorities.
- The German Länder have set accreditation requirements for energy assessors at various levels. There is no official register of experts or register of certificates.

Operational Level

The Ministry of Transport, Buildings and Urban Development, sharing common responsibility with the Ministry for Economics and Technology (in charge of the energy policy) is in charge of the elaboration of the Ordinances to implement the EPBD. It is also in charge of the technical aspects of the implementation. The Ministry of Environment is responsible for boiler inspections (a regulation that has already been in place for 30 years).

The two first quoted Ministries are allowed to produce ordinances on that topic through a Parliament Act. The 2007 Ordinance came later than scheduled (End of 2005) because of the anticipated general elections, but it was ready well before this date.

To allow the Ministries to elaborate the 2009 amendment of Energy Saving Ordinance (Energieeinsparverordnung - EnEV), the Parliament's First Chamber has adopted the Energy Saving Act in December 2008, and the Second Chamber (representing the Länder) is due to validate it by the end of January 2009 (NB the Länder Chamber is responsible for the law enforcement).

The amended Ordinance mainly intends to strengthen the requirements on new buildings as well as for the cases of refurbishment. But it is also going to bring about several changes. The most important one regards the law enforcement of the buildings' certification and of the mandatory update of old boilers.

The software currently used is based on existing software. However, in the future, the new methodology used in non-residential buildings will be also alternatively allowed for residential buildings. It will be allowed to use both methods, and the possible discrepancies between them should be of lesser influence because of the new system of requirements (reference building instead of fixed values). The new method tool is more accurate for low energy buildings and also takes into account into detail the heat gains from the heating installations (pipes, storage vessels, boilers in occupied spaces), which the old method only allows in general terms.

The process of issuing certificates is complex, as a lot of people are allowed to perform certifications. This was set out in such a format to avoid any "bottleneck-effects".

Before the EPBD implementation, there were different voluntary schemes. A transition clause within the ordinance includes the people who were acting as assessors in one of these schemes in order to continue issuing certificates even if they do not fulfil the new requirements for assessors. After the EPBD, rules were changed for those willing to become assessors. Engineers, or other professionals dealing with buildings, or people that studied building related topics, are allowed to be assessors.

Formally, there is a difference between new and existing buildings. New buildings are subject to the building codes, which is a constitutional responsibility of the Länder. They have already established their regional systems of experts, who are also in charge of certification, since this is closely connected to the process of granting a construction permit. This was already in place before the implementation, since 1995. Because the energy certification of existing buildings (in the cases of sale, rent or occupation by authorities providing public services) is not subject to building codes, the rules on experts are left for federal legislation. In § 21 of the Energy Saving Ordinance the Federal Government ensured that experts for the certification of new buildings are not excluded from certification of existing building of the same use, size and location. However, the Federal legislature includes significantly more persons than any local legal provision for new buildings.

The Chimney Sweeps⁴⁹ are going to be responsible for this enforcement, which should ensure better implementation of the EPBD.

Barriers

The biggest obstacle is considering the inclusion of lighting within the EPBD. In reality, it is virtually impossible to consider every light source of every building.

⁴⁹ As part of the government's ambitious package aiming at cutting the country's CO2 emissions by 40 percent relative to 1990 levels by 2020, the responsibility for enforcing some of the new measures will fall to the country's chimney sweepers.

The lighting installation often is not part of the building, but installed by the user. Considering the lighting is also difficult in the calculation of the operational rating, because the meters are in the possession of the tenant instead of the owner. On the other hand, there are less complicated requirements with sufficiently more impact on the efficiency than lighting, like putting into place more efficient boilers or ventilation systems.

Incentives

The prevailing principle is that if a measure is mandatory, then the authorities should not subsidize it, and the costs should rely on those responsible for carrying out the measures. Consequently, the building owners have to cover the cost of the energy certification and of any requirements. The German authorities have thus tried to keep the costs of certification as low as possible, and chosen to adopt a flexible approach allowing energy certificates to be produced based on different methods.

Currently two methods can be used, *one based on the energy demand*, which compares the building against a reference building, and *the other based on the consumption*, which compares the building with a Benchmark gained from existing ones of similar occupation (in case of non-residential buildings) or with a set of different benchmarks (from passive house to non-refurbished building, in case of residential buildings). The existence of these different methods raises issues. Both produce the same type of certificate, but result in differing figures. Therefore, Germany has chosen the continuous scale as indicator to provide the reader with a colour from “Green” to “Red”, which should be normally independent of the chosen type of rating.

Furthermore, there is discussion with regard to potential inaccuracies, as the Ordinance allows the involvement of the building owners in the process of data generation, but the expert has to review the contribution, to confirm that all figures are plausible. Despite this, it is possible to actually order a consumption-based certificate via internet for a very low price. The meter readings are in those cases provided by the owner himself⁵⁰.

In order to gain better knowledge about the market shares of the different kinds of certificates, about the driving forces of the market and about the extent of possible cheating, the government ordered a market study. A further study aiming on a closer evaluation of the whole certification system is planned for 2009.

The housing sector is partly operated by housing companies, partly by private owners. The housing situation varies a lot between regions. Some regions have enough housing stock, therefore the housing market is competitive, which allows the home buyers/tenants to base at least part of their choice on the dwelling's energy performance; in this case, the housing companies are encouraged to improve the houses' energy efficiency. In other regions with a less competitive market (e. g. Munich, Stuttgart or Frankfurt regions), even houses that have a poor energy performance find renters/buyers.

A lot of budget was spent on buildings' energy efficiency, with the set-up of the Energy Agency, provision of advice to professionals and the public, promotion and campaigns of the energy certificates etc. The main part of the financial help for energy efficiency comes from the KfW, the German bank for subsidies (largest bank specialised on funding within the EU). The KfW manages a lot of programmes funded by the federal governments to help the individuals finance the work carried out to improve their houses' energy efficiency.

⁵⁰ A TV-report showed how cheating is possible.

For that, the bank offers reduced interest rates, direct funding and lower payback loans (i.e. they do not need to pay the entirety of the loan back).

Best Practice

It seems that the discussions around the energy certification helped perhaps more than the certification itself (for the reasons evoked previously). They resulted in increased awareness and encouraged people to take action towards energy efficiency in buildings.

The requirements set also created a benchmark helping people to understand what they had to do and in which direction to go.

Nowadays it is possible to build passive buildings etc, but the main target for energy efficiency remains the existing building stock. The Energy Agency in Berlin has launched a campaign on converting existing houses into low energy houses. The campaign is funded by the federal government via the KfW and by private companies, and finances actions like green refurbishment of old buildings, in order to show potential energy savings to the public.

Scope of the Directive

The proposed amendments to the Directive are not expected to change too many things in Germany. The thresholds and measures in the proposed new articles 5 and 6 are already in place in the country. Germany was already well beyond the European requirements and in the area of regulations there was very little left to be done. A proof of this fact is that the market has already integrated those requirements. For instance, it is now impossible to install windows that would have a poor insulating capacity, or boilers with a poor energy efficiency, etc., because such products are no longer available on the market.

The building certification will be the probing test for the legislation in Germany. Currently there is no accreditation system for experts, and there are no requirements for the experts to register and undergo training. If registration were to become mandatory, Germany would probably have to change the whole system, which would lead to great costs.

Also, the energy certificates do not have to be registered anywhere; as such, at present there is no information regarding the number of certificates issued. It is considered that it would be very costly and time consuming to start keeping track of all of them and of all those previously carried out.

It is considered that there is no objectivity problem arising from the fact that there is no certification body or authority enforcing a code of conduct among the experts, as the production of the certificates is strictly regulated, therefore the influence of experts on the result of the assessment is very limited. For example, the expert has nearly no choice regarding conditions of use, calculation method, and of the building's boundaries used in the course of calculation of the demand.

Germany would like to see the Directive made simpler. European legislation is considered to create rules and controls, each time specifying new calculation methods and adding paragraphs to the legislation, which in turn becomes more and more complex and cannot always be proven. The Germans felt that adding complications doesn't help gain better energy efficiency; it increases costs - the example given on lighting (see above). There is a knowledge shortage in that area, given that the energy experts are not trained in this field.

The Germans also felt that another problem that needs to be dealt with is the accumulation of directives and regulations over time. In Germany, all the calculation models are based on previous European Directives. They consider that the new Directives change the rules each

time and without a proper schedule, adding costs and complications for the Member States, and a regulatory insecurity.

6. GREECE

Overview

- Implementation is the responsibility of the Ministry of Development and the Ministry of Environment.
- Software tools for the National Calculation Method are still under development. They will be based on CEN 832.
- Minimum energy performance requirements for new and refurbished buildings will come into force in January 2009.
- Energy Performance Certificates will be based on an 'A to G' label, with a subdivision into A+, A and A- to encourage increased effort in energy efficiency. EPCs will be mandatory for public buildings and other buildings being rented or sold from January 2009.
- A new inspection method for boilers is under development. Air-conditioning inspections were due to start in 2007.

Operational Level

Physical Planning and Planning Works have the main responsibility for setting legislation, and The Ministry of Development has the delivery role. The Ministry of Development will be responsible for energy auditors' certification and will keep an electronic register of energy auditors. The energy auditors' certification procedure is still under discussion, but it is likely that certified organizations will undertake preparatory training courses. The Ministry of Development, technically assisted by the Technical Chamber of Greece, will carry out the examination procedure.

Ministry for Development will also keep all energy performance certificates, energy audit reports for buildings and inspection reports for boilers and HVAC systems.

Ministry of Development (primarily) and Ministry for the Environment, Physical Planning and Planning Works (through Planning Authorities) will be responsible for monitoring compliance.

As yet the provision of advice, guidance and training is to be determined.

A single type of energy performance certificate is issued, taking into account climate data and usage of the building. The extended energy classification (including classes A+ and B+) is being considered.

Law 3661/2008 provides a separate category of boiler and HVAC inspectors in the energy auditors register. HVAC inspections are obligatory at least once every five years. There are three categories of independent experts: building auditors, boiler inspectors and HVAC inspectors.

The costs will be borne by owners.

No information was available about how implementation may/has been affected by local market conditions.

Barriers

The drafting of Building Energy Efficiency Regulation, and especially of the calculation methodology, has proved to be a long-lasting process due to different views of participating groups.

The lack of experience in building energy certification and auditing is also a concern.

Greece has a significant portion of low quality, ageing building stock, which makes energy performance implementation harder.

Incentives

The provision of incentives for implementing EPBD is pending legislation

However, the Operational Programme for Energy and Operational Programme for Competitiveness have provided financing for energy investments in buildings of the tertiary sector. The investment law also provides financing support for the tourism sector. In addition, a special programme for improving energy efficiency of local authorities' buildings will be applied shortly.

Best Practice/Successes

As the Directive is yet to be fully implemented this information is not yet available.

Scope of Revision

The EPBD has not been fully implemented in Greece since the general provisions of law 3661/2008 are not specified yet. It is expected that the required Presidential Decree and Ministerial Decisions will be issued in the following months.

7. LITHUANIA

Overview

- Implementation is the responsibility of the Ministry of Environment and the Ministry of Economy.
- The National Calculation Method was adopted in December 2005. It is based on EN 15217:2005 and EN 15203:2005.
- Minimum energy performance requirements for new and refurbished buildings came into force in January 2006. New buildings must achieve at least level C, and existing buildings >1000m² undergoing major refurbishment at least level D. An evaluation procedure will become mandatory for buildings at point of sale/ rent from January 2009.
- Energy Performance Certificates for new buildings have been required since January 2007. EPCs for existing and refurbished buildings will be required from January 2009.
- Inspection of boilers >100kW has been required since 2007 and should be repeated every 2 years. For boilers of 20-100kW, inspections started in 2008. Air-conditioning inspections started in 2008.
- The Certification Centre of Construction Products, under the Ministry of Environment, manages the accreditation of experts. An expert training programme was adopted in November 2006 and will be revised every 5 years. Experts must be engineers with at least 3 years construction experience and must have completed a training course and sample certificates.

Inspectors for boilers and air-conditioning systems must have a higher technical education, at least 3 years experience in ventilation and air-conditioning-related fields, a certificate in electrical safety and completion of a training course.

Operational Level

The National Calculation Method was adopted in December 2005. It is based on EN 15217:2005 and EN 15203:2005.

Owners bear the cost of implementation in both existing stock and new build. Items that relate to thermal insulation increases in the building regulations are covered by designers and architects as they must design to achieve a level C before the building will be approved.

Enforcement is carried out by an exam board who examine results of certificates. Designers and architects are assessed during the planning stage. It is possible for penalties to be issued for non-compliance.

Barriers

It is considered that new government officials⁵¹ have been a barrier to implementation. The Directive is open for interpretation in certain areas and this has caused confusion; a debate began amongst new Lithuanian government officials as to what elements are mandatory and what is 'recommended'. This has caused setbacks in the implementation.

Lack of budget to advice companies is a problem, while global economic problems are considered a challenge.

Incentives

A teaching programme has been adopted by the minister of environment to train people who have the basic requirements and are able to complete the training. The training programme has certified 240 people who are able to carry out the certificates.

Best Practice/Successes

No examples of best practice were identified within Lithuania. However, Lithuania was keen to point out that they have been successful at meeting deadlines for implementation of the EPBD. They also pointed out that the certificates had generated a high level of interest, and they are learning from other countries.

The country is particularly interested in solar passive houses.

Scope of Revision

A general European awareness programme from a media perspective would be helpful in carrying out the necessary messages. European level advertisement with support for awareness on an EU level would be helpful and alleviate misinterpretation of the Directive.

It would be helpful to create a knowledge sharing programme which allows countries to learn from each other. If difficulties are shared across the EU member states and posting information on status of implementation and addressing barriers is mandatory, then the level of implementation would increase across all states.

Using energy security as leverage would assist with implementation rates as this is an issue that many states are concerned about and people understand the issue of energy security.

⁵¹ The new government came into power September 2008.

8. ROMANIA

Overview

- Implementation is the responsibility of the Ministry of Regional Development and Dwellings. Local Public Authorities' (LPA) have responsibility for certificate production and authorising works.
- Minimum energy performance requirements have been required on new and refurbished buildings since January 1998.
- Energy Performance Certificates have been required for new buildings since January 2007 and will be required on all buildings being sold/ rented by January 2010.
- Boiler inspections have been mandatory since January 2007. Air-conditioning inspections were introduced during 2008. Regulations are in place but are not implemented on a regular basis.
- To issue energy performance certificates or carry out inspections, completion of a specialised university course and passing of a Ministry commission exam is required.

Operational Level

The legislation is set by the Ministry of Regional Development and Dwellings (MRDD).

MRDD and Local Public Authorities (LPAs) manage the implementation. LPAs are responsible to ask for the energy performance certificate (EPC) at the inception of the works for all new buildings and for public buildings. Public notaries (registrars) are responsible for the presence of EPCs in the set of buying/selling documents. For rental of buildings, the local financial administration asks for EPCs. National Programmes (i.e. for the refurbishment of blocks of flats, public buildings, hospitals etc.) are being implemented.

Currently there is no monitoring. This should be carried out by INCERC – the National Institute for Building Research – because they will be in charge of the database. Starting 1 January 2009, all certificates must be deposited at INCERC. INCERC should also monitor the impact, being the data repository. Currently, there is no verification by trials of the certification and audit projects. A Commission will be established⁵² - consisting of specialists that do not work in the MRDD – to monitor the EPBD implementation.

The Association of Energy Auditors for Buildings organises regular meetings, training courses for energy auditors and an annual conference. They also perform pilot demonstration projects.

So far, there is no differentiation between residential and non-residential buildings in terms of applied methodology and energy scales and marks. Only standards set for thermal resistances of building envelope elements are specified according to the building functional role (house, office, hospital, entertainment etc.), and such differences are reflected in the EPC in the reference building column.

The Government and LPAs meet 67% of costs for private residential multi-storied buildings annually nominated within national refurbishment programmes and 100% of costs for state-owned residential multi-storied buildings annually nominated within national rehabilitation programmes. The remainder of the cost is covered by owners.

Barriers

The largest barrier is considered to be the financial one (i.e. equipment costs, materials costs; the blocking of the building market due the financial crisis - lack of cash flow).

In addition there are not enough energy auditors on the market. This is compounded by the fact that there are exaggerated costs for implementation: construction companies take advantage and increase costs, especially in big cities.

There is also considered to be a lack of information for the implementing/enforcing authorities (LPAs, population).

At present there are no penalties in place – the Romanian law in force (Law 372/2005, that approximates the EPBD Directive in Romania) was to be modified and penalties were to be provided for; however, modification and updating of the law was postponed until the EPBD recast is published.

Incentives

No financial support or tax incentives have been put in place, however training and guidance is being provided.

Best Practice/Successes

Certification was carried out for buildings with surface less than 1000m². There is evidence of increased number of requests for energy certification and energy efficient refurbishment, as a result of dissemination and of the fact that any feasibility study related to buildings should have an energy audit as basic documentation (according to Government Ordinance 28/2008).

Scope of Review

It is considered that there should be some tariffs or guidance on costs for implementation works, but also for certification and auditing of buildings.

⁵² No indication of timeline given.

9. SPAIN

Overview

- Implementation is the responsibility of the Ministry of Housing (MV) and the Ministry of Industry, Trade and Tourism (MITYC).
- A National Calculation Method was adopted in 2007. It covers both new and existing buildings. It is not fully based on CEN standards. However, Spain worked closely with the European Commission on this and all relevant criteria were taken into consideration during the development of this bespoke method.
- El Código Técnico de la Edificación (The Technical Building Code, CTE) sets the minimum energy performance requirements for new and refurbished buildings. There is a minimum contribution of solar thermal and photovoltaic energy required for new buildings, based on type and size (minimum requirements ranges from 30% to 70%)
- Energy Performance Certificates for new buildings have been required since October 2007. EPCs for existing buildings will be required as soon as the draft Royal Decree be approved, which is expected to happen this year. At present a draft regulation on that has been submitted to Brussels.
- The National Basic Procedure for energy certification has two different ways of calculating the energy consumption and the associated CO₂ emissions which leads to a scale of seven letters A to G (from best to worse). A simplified method exists for residential buildings in different climatic areas which very easily lead to a D or E rating. The normal method uses a software tool named CALENER. There are two versions of this tool, one per housing and small tertiary buildings and another one for big non residential buildings. Location is a variable factor in the calculations and is based on the particular 'climatic severity areas' of which there are twelve.
- Boiler inspections, regulated by the Thermal Installation Regulation (RITE) approved in July 2007, are mandatory every 2, 4 or 5 years, depending on the size and type of unit. Inspection of the complete system is required every 15 years. Air-conditioning inspections take place every year or every 2 years, depending on system capacity. Inspection of the complete system is required every 6 years.
- Regulations require periodic servicing of thermal installations by suitable qualified inspectors. The need for additional training is now under review. Regional authorities set specific requirements.

Operational level

The enforcing regulation at national level is the responsibility of the Ministries of Housing (MV) and Industry, Tourism and Trade (MITYC) of central Government. In January 2007 a Royal Decree passed by the Council of Ministers transposed the Directive for New Buildings into the Spanish legislation.

At an operational level regional authorities regulate and are responsible for direct implementation, inspection and enforcement. The Spanish government is in the process of developing a complementary Royal Decree which will approve the procedure for existing buildings.

Property owners bear all the cost of implementation. Promoters are responsible for costs related to the delivery to building buyers of energy certificates. Architects are responsible for issuing the certificates at project design stage and once works are finished, but all these costs finally are paid by consumers.

Barriers

With the incorporation of the EPBD and other energy related requirements into Spanish legislation much of the building industry has to be re-educated, especially architects, engineers and auditors.

The Ministry of Housing, professional unions of architects, engineers and other entities have started offering intensive training programmes in order to prepare and educate professionals on this topic.

A particular area of study causing concern at the moment is the engineering required for upgrading the existing housing stock in order to meet minimum energy standards, especially dwellings constructed before the first energy regulations for buildings set in 1979.

Incentives

The new Housing Plan for 2009-2012 foresees subsidies for the promotion of high performance social housing and for energy retrofitting of existing ones. Promotions with high energy rating (A, B and C) will receive extra subsidies: A rating €3500, for B rating €2800, and C rating €2000, being the minimum rating D or E accordingly to the new Building Code energy requirements.

The Action Plan of the national Energy Saving Strategy 2008-2012 involves providing subsidies to improve energy efficiency in certain high importance buildings, for example schools, hospitals, hotels.

Best Practice/Successes

Implementation of the EPBD has allowed Spain to include more demanding energy requirements into national legislation, for example making solar thermal energy obligatory.

Increasing regulation has also helped raised awareness of energy usage; this is encouraged through ongoing campaigns. Public opinion on energy performance certificates is growing; there is a confidence in the system of third-party inspections.

Scope of Review

In general Spain agrees with the proposed amendments for the recast of the EPBD. The Directive in 2002 was a good starting point however there were a lot of grey areas which they hope the recast will clarify.

10. UK

Overview

- Implementation is the responsibility of the Department of Communities and Local Government, with some responsibilities for the devolved administrations.
- Two National Calculation Methods are used for EPCs: Standard Assessment Procedure (SAP) for domestic buildings and Simplified Building Energy Model (SBEM) for non-domestic buildings. An additional methodology is used for production of public building Display Energy Certificates, orCALC. SAP and SBEM are based on asset rating, whilst orCALC provides an operational rating.

- Minimum energy performance requirements for new and refurbished buildings are set in the Building Regulations Part L (England and Wales), Scottish Building Standards (Technical Handbook 6) and the Northern Ireland Building Standards (Part J). These were last revised in April 2006, May 2007 and November 2006 respectively. Further revisions of Part L are due in 2010 and 2013, leading to a zero carbon target for new build housing in 2016 (2019 for non-domestic buildings).
- Energy Performance Certificates for new buildings have been required since April 2008. EPCs for sales/ rental in non-domestic buildings have been required since October 2008. Display Energy Certificates for public buildings >1000m² have been required since October 2008. In Scotland, EPCs for all relevant buildings are required from January 2009. EPCs for the domestic sector were phased in during 2007 and 2008.
- The UK has chosen Option B for compliance and has launched an energy efficiency advice programme for heating and hot water systems for homes and businesses. First air-conditioning inspections for systems >250kW are required by January 2009; remaining eligible systems must have their first inspection by January 2011. Thereafter, inspections are at 5 year intervals.
- The UK government has set accreditation criteria for assessors and inspectors and appointed a range of accreditation organisations to oversee this. Most assessors/ inspectors must complete a relevant training course and examination.

Operational Level

Costs are shared across the industry:

- Owners bear the cost of implementation in both existing stock and new build as they must pay for the assessors to carry out the audit of the buildings and for the certificates, as well as any related costs.
- Assessors or employers bear costs when they undertake training, which are recovered through fees that cover relevant work.
- Architects and designers bear costs by implementing building regulations through relevant trainings, software purchases, or extra time required for including new regulations which will not allow buildings to pass through planning if items are not included (e.g. air permeability levels, U-values, etc).

Enforcement is carried out by the Office of Trading Standards and penalties are issued for non-compliance⁵³.

As awareness increases the market is being affected by potential purchasers who desire a more energy efficient building. The current economic climate has impacted the market overall, however, so it is difficult to determine the impact of the EPBD on the market at this time.

Barriers

Initial barriers included the training and provision of assessors and sharing knowledge across the industry. Government approved agencies or private companies were selected for carrying out the training and only these agencies are allowed to conduct training and certify assessors and relevant professionals.

⁵³ Enforcement has only been encouraged since January 2009.

Interpretation of the Directive and consultation within Government as to how the Directive should be implemented has caused slight delays and frustration amongst the industry whilst awaiting decisions on rolling out the Directive. The lack of clarity with the wording has led to numerous interpretations within the stakeholders involved. Even within the three distinct governing bodies of the UK (England & Wales, Ireland & Scotland) the interpretation has led to significant differences in delivery methodology and requirements. However, the deadlines have been met and the Directive is being implemented fully.

Incentives

No direct incentives exist to influence implementation. However, there are numerous other funding streams for energy efficiency best practice implementation, for both domestic and commercial properties, new build and refurbishment. One notable fiscal measurement is the provision of a tax subsidy for energy efficient technologies.

Best Practice

Examples of best practice include providing an EPBD helpline for industry professionals and owners in order to raise awareness and convey how the Directive will be implemented. Questions received by the helpline included deadlines and types of certificates required due to building type/function.

Since the implementation of DEC's it has been revealed that many public buildings are not performing as efficiently as they should, which is increasing awareness, as well as having a positive impact on enforcing changes to buildings to improve efficiency.

The process for capturing the certificate data is going to provide much clearer and detailed information about the quality of the building stock, which will be used to direct future Policy.

Specific architects and architectural firms are designing buildings that exceed building regulations within the UK, but this is not widespread. Additionally, Northern Ireland has been involved in smart metering projects and installing renewable energy technologies.

Scope of Revision

The UK representative felt that it was inappropriate to comment at this time with regards to this element, as they are currently reviewing some other documentation in relation to this, for the European Parliament.

The UK would like to encourage the European Commission to clarify the objectives of the Directive. It would also then be helpful to benchmark performance across Europe, and for the European Commission to report on the progress towards objectives.

ANNEX 4: DESCRIPTION OF MODIFICATIONS

Please note, the following descriptions are from the proposed Directive - whilst indented text contains AEA comments.

Art. 1. Subject matter

A reference is inserted to indicate new requirements on: (i) national plans for increasing the number of buildings of which both CO₂-emissions and primary energy consumption are low or equal to zero, and (ii) independent control systems for the energy performance certificates and the inspection reports.

Art. 2. Definitions

Clarifications to several terms are introduced and new definitions are added wherever necessary.

The Commission assessed that one of the factors that limit the full realisation of the energy saving potential intended by the EPBD is the wording of some of its provisions and definitions. Therefore several EPBD definitions were improved and new definitions were added in Article 2, such as: “building”, “technical building system”, “energy performance of a building”, “primary energy”, “building envelope”, “major renovation”, “European standard”, “energy performance certificate”, “cogeneration”, “cost-optimal level”, “air-conditioning system”, “boiler”, “effective rated output”, “heat pump”.

Art. 3. Adoption of a methodology

The text is adapted and the technical details it contained are moved to Annex I.

The methodology to be applied by Member States for the calculation of the energy performance of buildings shall be adopted at national or regional level.

Art. 4. Setting of minimum energy performance requirements

At present, the energy performance requirements are established by Member States. The text has been modified to ensure that the minimum energy performance requirements of buildings as set by Member States gradually align with cost-optimal levels.

Currently, the energy performance requirements and their levels of ambition vary widely across the Member States, even within similar climatic zones, and cost-optimal levels are not yet achieved European-wide by nationally fixed energy performance requirements. The Commission aims to achieve optimum performance requirements, which are feasible, cost effective and in balance with provoked energy savings, technical and environmental feasibility and sustainability.

While initially the EPBD provided for “setting energy performance requirements”, the recast proposes “setting of *minimum* energy performance requirements”. As such, Member States would be required to take the necessary measures to ensure that minimum energy performance requirements for buildings are set with a view to achieving cost-optimal levels calculated in accordance with the methodology introduced in Annex I of the recast.

The Commission proposes that, from 30 June 2014, Member States should not provide incentives for the construction or renovation of buildings or parts thereof which do not comply with the minimum energy performance requirements.

Also, it is proposed that, from 30 June 2017, where Member States review their minimum energy performance requirements, they should ensure that these requirements achieve cost-optimal levels.

Art. 5. Calculation of cost-optimal levels of minimum energy performance requirements

The above mentioned comparative methodology would consist of a calculation methodology developed by the Commission which would take cost-optimal criteria into account by variables (such as investment costs, operating and maintenance costs, incl. energy costs).

Currently, Member States individually fix energy performance requirements for buildings at different levels, based on different methodologies and covering different scale of influencing factors. The Commission thought of introducing a methodology (to be established by 31 December 2010) for benchmarking, i.e. for the comparison of existing national requirements with cost-optimal energy performance requirements.

The Member States would make use of this methodology as a benchmarking instrument and they would present the calculation and results of the benchmarking to the Commission by reports.

In doing so, Member States would not be asked to change their national methodologies to set their requirements, but would be asked to carry out a comparison calculation with the aforementioned new EPBD benchmarking methodology, in order to check whether their level of fixed requirements is at the cost-optimal level or not.

Through this provision the Commission aims to make transparent the ambition of energy performance requirements that Member States actually set, considered to be very difficult to rate at present. Therefore, the benchmarking instrument would be only a "translator" of the complex and widely varying energy performance requirements fixed at national levels to an EU-wide identical methodology for comparison purposes, and not for regulating the levels of requirements at EU level. This would indicate whether Member States are below the optimal levels which would mean that money from potential energy savings are lost every time regulations are applied or whether Member States are too ambitious in their requirements and pose an unjustified burden on their citizens.

The disadvantage of this option is its soft, rather voluntary nature, as Member States would not be forced to fix their energy performance requirements at the cost-optimal level, but just to benchmark them. However, the Commission believes that this requirement would create significant peer-pressure and would ultimately move all Member States towards cost-optimal energy efficiency requirements.

Art. 6. New buildings

The obligation to consider alternative systems for new buildings is extended to all buildings. This enlarges the EPBD's scope and supports the EU targets on renewables.

This proposal derived from the fact that buildings with less than 1000 m² are responsible for 73% of total CO₂ emissions caused by the building stock. Therefore the 1000 m² threshold is removed.

All new buildings would have to meet the minimum energy performance requirements to be set. Also, for the new buildings, regardless their total useful floor area, Member States would have to ensure that, before construction starts, the technical, environmental and economic feasibility of alternative systems (decentralized energy supply, cogeneration, district or block heating or cooling, heat pumps).

The analysis of alternative systems should be documented in a transparent manner in the application for the building permit or for the final approval of construction works of the building.

Art. 7. Existing buildings

The threshold of 1000 m² for meeting of the national/regional minimum energy performance requirements when the buildings undergo major renovation is deleted.

For all existing buildings, the Member States should take the necessary measures to ensure that, when buildings undergo major renovation, their energy performance is upgraded in order to meet minimum energy performance requirements.

In this respect, it is to be noted that the definition of “major renovation” is clarified, as it follows. **Major renovation** is defined as the renovation of a building where the total cost of the renovation is higher than 25% of the value of the building, or more than 25% of the surface of the building envelope undergoes renovation.

Art. 8. Technical building systems in existing buildings

Requirements are included for Member States to set up minimum energy performance requirements for the installation of new, or the replacement of existing, technical building systems, or their major retrofit. These should be consistent with the legislation applicable to the products which compose this system, and be based on a proper installation of the system’s components and their appropriate adjustment and sizing.

Art. 9. Buildings of which both carbon dioxide emissions and primary energy consumption are low or equal to zero

Member States are required to actively promote the higher market uptake of such buildings by producing national plans with clear definitions and targets for their uptake.

Currently, the definitions and calculations methodologies for the buildings that are designed in a way that significantly decreases their energy needs differ a lot between EU Member States. The European Parliament and some stakeholder organizations have called for the introduction of very low energy requirements (passive house standard) for new buildings in the revised EPBD. So far the uptake of these houses has been limited.

As such, the Commission proposed the introduction of a requirement for Member States to draw up national plans for increasing the number of buildings of which carbon dioxide emissions and primary energy consumption are low or equal to zero. The Member States would be required to set targets for the minimum percentage which those buildings in 2020 (with intermediate targets in 2015) shall constitute of the total number of buildings and represent in relation to the total useful floor area. Member States are required to set separate targets for new and refurbished residential buildings, new and refurbished non-residential buildings and buildings occupied by public authorities. For the latter, the targets should be set taking into account the leading role which public authorities should play.

The national plans are to be communicated to the Commission by 2011 and every three years.

Art. 10. Energy performance certificates

The role of the recommendations of the certificate is strengthened and clarified by emphasizing that they shall be an indispensable part of the certificate and by including provisions on the information they shall contain.

Contents of the certificates

The energy performance certificate should include reference values such as minimum energy performance requirements, as well as recommendations for the cost-effective improvement of the energy performance. The certificate should also contain information on the steps to be taken to implement the recommendations. The validity of the certificate should not exceed 10 years.

Art. 11. Issuing of energy performance certificates

The requirements related to the provision of the certificate are reformulated to ensure that the certificates are provided every time there is a property transaction and the prospective buyer or tenant is informed of the energy performance of the building (or its parts) at an early stage (i.e. in the sale/rent announcements).

A requirement that if the total useful area over 250 m² of a building is occupied by public authorities, a certificate should be issued by 31 December 2010, is introduced.

Issuing of certificates

When buildings are constructed, such a certificate should be handed over to the owner by an independent expert or by the vendor.

The numeric energy performance indicator of the certificate should be stated in all advertisements for sale/rent of the building which is for sale/rent.

The energy performance certificate should be shown to the buyer and handed over at the moment of conclusion of the sales contract/ lease at the latest.

Art. 12. Display of energy performance certificates

The scope of the obligation to display the certificate is extended: i.e. if the total useful area of a building occupied by a public authority or frequently visited by the public is over 250m², the certificate shall be displayed in a prominent place clearly visible to the public. For the latter, the requirement shall be imposed only if the certificate is already available.

Art. 13. Inspection of heating systems

Clarifications on the frequency of inspections are introduced in order to stress the importance of proportionality between inspection costs and anticipated energy savings (benefits) stimulated by the inspection. A requirement for an independent control system for the inspection reports, i.e. via random sampling checks of the quality, is introduced.

Heating systems

The initial term “boilers” in the EPBD is to be replaced with “heating systems”. There would be no upper limit for the effective rated output, as inspections would be required for effective rated outputs of more than 20 kW.

Member States might decide to take measures to ensure the provision of advice to the users on the replacement/ modification of heating systems.

Art. 14. Inspection of air-conditioning systems

Similar to Art. 13, clarification on the frequency of the inspections.

Air-conditioning systems

Member States would be required to lay down the measures to establish a regular inspection of such systems of an effective rated output of more than 12 kW, including an assessment of the efficiency and sizing of such systems. A clarification of frequency of inspections is proposed as well.

Art. 15. Reports on the inspection of heating and air-conditioning systems (new)

The requirement for an inspection report to be handed over to the owner or tenant of a building is introduced, in order to appropriately inform them about the inspection result and recommendations for cost-effective improvements.

Art. 16. Independent experts

A requirement is added that in the accreditation process the operative and technical skills of experts who carry out the certifications and inspections and their ability to carry out the service in an independent manner are taken into account.

The Commission has concluded that the current system limits competition (i.e. some Member States have restricted assessors to members of particular professional bodies).

Therefore the Commission proposed the addition of a requirement that the operative and technical skills of experts be taken into account in establishing independence. This aims at opening up the market and at enabling more assessors to be trained.

Art. 17. Independent control system

A requirement for an independent control system for the energy performance certificates and for the reports on the inspection of heating and air-conditioning systems, i.e. via random sampling checks of the quality, is introduced. The certificates and the inspection report shall be registered, if requested.

Art. 18. Review

Updated.

Art. 19. Information

Member States are required to provide information to building owners or tenants on energy performance certificates and the inspection of heating and air-conditioning systems.

The Commission has concluded that there is a lack of public awareness of the EPBD requirements and proposed that Member States should provide information to building owners/ tenants on energy performance certificates, heating system inspections and air-conditioning inspections.

Art. 20: Adaptation of Annex I to technical progress

Adapted.

Art. 21. Committee

Modified in line with the adaptations of the regulatory procedure with scrutiny.

Art. 22. Penalties

Member States are required to lay down and implement rules applicable in response to infringements of the national provisions adopted pursuant to the EPBD. The fine may depend on the energy consumption, or energy demand of the certified building/effective rated output of the inspected heating/air-conditioning system.

The text is similar to Article 20 (Penalties) of Directive 2005/32/EC.

Art. 23. Transposition

Transposition dates are adjusted so that Member States have sufficient time to transpose (31 December 2010) and fully implement (31 January 2012) the revised/new provisions. To reinforce the important role of the public sector to act as a leading example, the public authorities' deadline for the implementation of the provision is shorter (31 December 2010).

Art. 24. Repeal

Inserted so that there is a distinction between the provisions of the current EPBD and its recast.

Art. 25. Entry into force

Adapted.

Art. 26.

No changes.

Annex I

It is important that an estimation of the 'real' impact of the building's operation on the total energy consumption and on the environment is made and therefore a primary energy indicator and CO₂ emissions indicator shall be used.

The annual energy performance data shall be used for the assessment so that the importance of the different energy uses throughout the year is emphasised and the cooling demand is better incorporated. Reference to the European standards has been made to support the harmonization of the methodologies for calculating national/regional minimum energy performance requirements.

Annex II

Provides a description of independent control systems for energy performance certificates and inspection reports.

Annex III

Added as required in Article 23.

Annex IV

Correlation table.

ANNEX 5: LINKAGES TO OTHER POLICIES

Policy overview	Linkages with EPBD
Energy End-use Efficiency and Energy Services Directive (ESD) (2006/32/EC)	
<p>The ESD Directive sets targets for national energy savings, and requires Member States to prepare a series of Action Plans to show how these targets will be reached. There are also a number of specific requirements on the public sector and energy supply companies to promote the uptake of energy efficiency. The main elements are:</p> <ul style="list-style-type: none"> - Member States were given a target of achieving a 9% saving in energy over a nine year period beginning 2008. - The public sector is to play an exemplary role in saving energy and communicating with citizens. - An obligation on the energy companies to introduce schemes which will give incentives to their customers to install energy saving measures - Measurement and verification of energy saving. <p>The Directive allows MS to chose from a range of policy tools which will help them meet their energy saving targets; the EPBD is such as tool.</p>	<p>To achieve the indicated fixed energy savings target by 2016, Member States can opt for energy efficiency measures in the residential and tertiary sector by improving heating and cooling systems, insulation and lighting. The use of standards and norms aimed at improving the energy efficiency of buildings are also eligible measures (Article 4 and Annex III). The funds foreseen by the ESD can be used to finance energy audits and provide financing (i.e. loans, etc) for energy efficiency improvement measures. The funds are open to all providers of energy efficiency improvements measures (Article 11).</p> <p>ESD requires the Member States to ensure the availability of independent and high-quality energy auditing (Article 12); this will inform building owners of energy saving opportunities.</p>

Policy overview	Linkages with EPBD
Eco-design of Energy-using Products Directive (EUP) (2005/32/EC)	
<p>The framework Directive for the EUP provides a basis for establishing minimum eco-design requirements for energy using products. The aim of the Directive is to reduce the environmental impact of these products, contributing to sustainable development and ensuring the free movement of products in the EU. The Directive demands that:</p> <ul style="list-style-type: none"> - marking and declaration of conformity; a CE conformity marking should be fixed to the product - consumer information; consumers of EUP should be provided with information on the sustainable use of the product - implementing measures are placed on certain products which have a significant environmental impact. 	<p>A set of implementing measures establishing eco-design requirements are in preparation for a range of energy consuming products, which have a significant impact on the energy performance of buildings, such as boilers, water heaters, lighting.</p> <p>A main area of concern about the EUP Directive is its tendency to focus on product legislation rather than the final installed system of which the particular product is only a component part. An approach whereby the system is legislated could address the objectives of the Directive in a more effective manner; for example one could stipulate how much lighting should be provided in a particular building and the system employed should not use more than a certain amount of power, etc. However, it is difficult to legislate a whole system as it does not fit with some countries models (e.g. in the UK builders tend to purchase each product from a different manufacturer). The EUP can only go so far, it cannot dictate how a system is put together therefore the EPBD is needed to pick up on this by setting minimum energy performance requirements for new and existing buildings undergoing major renovation. Through regular inspections of air-conditioning systems and boilers (Article 8 & 9) efficiency can be measured and advice can be provided on improvements and/or alternative solutions.</p> <ul style="list-style-type: none"> - Most of the main energy using products which specifically relate to the EPBD, such as air-conditioning, heating, water pumping have all gone through the consultation forum, however none of them have yet had measures agreed. Boilers have to go through a second consultation due to disagreements on performance measurements and delivery.

Policy overview	Linkages with EPBD
Energy labelling Directive	
<p>The Directive requires that appliances be labelled to show their power consumption in such a manner that it is possible to compare the efficiency with other makes and models. The intention is that consumers will prefer more energy efficient appliances over those with a higher consumption, resulting in less efficient products eventually being withdrawn or decommissioned.</p>	<p>The recommendations for cost-effective improvements in energy performance suggested in the certificate can have an impact on what will be bought/done to a dwelling; i.e. It will encourage people (especially property owners) to purchase eco-labels products, which will help them improve a buildings energy performance. Increased awareness and change in behaviour is highlighted as a vital aspect in the Commission's Energy Efficiency Action Plan¹</p>
Directive on the Promotion of Cogeneration (2004/8/EC)	
<p>This Directive creates a framework for promoting the use and development of high efficiency cogeneration in order to increase energy efficiency and improve the security of supply.</p>	<p>The EPBD (Article 5) requires cogeneration for heating to be considered for new buildings over 1000m² before construction starts; there is no suggestion that this is to be mandatory requirement.</p>
Construction Products Directive (89/106/EEC)	
<p>The intention of the CPD is to replace existing national standards and technical approvals with a single set of European-wide technical specifications for construction products. Under the CPD, a product bearing the CE marking will be presumed to meet the requirements of these specifications; energy economy and heat retention is an essential requirement (Annex 1)</p>	<p>Developing specific standards for building products and components such as insulation and windows; pertaining to a declaration of conformity.</p>
Directive on the Promotion of the Use of Energy from Renewable Sources COM(2008)	
<p>The Directive establishes a common framework for the promotion of energy from renewable sources.</p> <p>Member States are required to adopt national targets for renewable sources that are consistent with reaching the Commission's target of 22 per cent of electricity from renewables by 2010.</p>	<p>With respect to their building regulations and codes Member States shall promote the use of renewable energy in heating and cooling systems and equipment, that achieve a significant reduction of fossil energy consumption and they shall use energy or eco-labels or other appropriate certificates or standards developed at national or European level, where these exist, as the basis for encouraging such systems and equipment.</p> <p>Buildings can be designed in a way that they do not consume more energy than they are able to produce, and even become net energy producers. However, at the moment the use of renewable energy is only dealt with in Article 5 of the EPBD, which only accounts for buildings exceeding 1000m² and it is also a non-mandatory requirement, making it low-level priority for implementation.</p>

Policy overview	Linkages with EPBD
EU Eco-label regulations	
<p>The Eco-label regulations are designed to encourage businesses to market products and services that are kinder to the environment and for European consumers, including public and private purchasers, to easily identify them.</p> <p>The labels are awarded on environmental criteria set by the European Union. These cover the whole life cycle of a product, from the extraction of raw materials, through manufacture, distribution, use and disposal of the product.</p> <p>There is discussion underway for producing an Eco-Label for buildings</p>	<p>The recommendations for cost-effective improvements in energy performance suggested in the certificate, can have an impact on what equipment or material is purchased and installed in a dwelling; i.e. It will incentive people (especially property owners) to purchase eco-labels products, by improving building energy performance and reducing operational costs.</p>
Regulation (EC) No 2422/2001 on a Community energy efficiency labelling programme for office equipment (2007)	
<p>This regulation requires EU institutions and Member States' governmental authorities, when purchasing office equipment, to use energy efficiency criteria no less demanding than those defined in the Energy Star programme.</p>	<p>The recommendations recognize that in nearly all Member States governmental authority infrastructure represents a significantly high proportion of the total. Strict adherence to all objectives of the Directive will greatly contribute to overall success.</p>
Energy Efficiency Action Plan, COM(2006)545	
<p>The Action Plan outlines a framework of policies and measures which provide the means to cut energy consumption by 20% by 2020. The progress achieved against the Action Plan will be assessed in the regular Strategic European Energy Reviews.</p>	<p>Making buildings more energy efficient is one of the Priority Actions in the policy. Other priority actions identified will also influence the energy performance of buildings.</p>
Sustainable Production and Consumption and Sustainable Industrial Policy Action Plan - COM(2008)	
<p>This policy sets a framework to improve the energy and environmental performances of products. It comprises of the following actions:</p> <ul style="list-style-type: none"> - extend the scope of the eco-design Directive - further develop the energy labelling Directive and eco-label regulations - a range of other action will be taken to achieve smarter consumption; 'greening' the supply chain 	<p>The proposals to extend the Eco-design Directive and the Energy Labelling Directive to cover more products and to promote green public procurement will impact on buildings. It is also expected to have positive economic impacts for example for the insulation and window industries that are likely to increase their sales considerably.</p>
Community guidelines on state aid for environmental protection (2008/c/82/01)	
<p>This policy introduces mechanisms for state aid which complements and supports the achievement of greater environmental protection.</p>	<p>Investment and/or operating aid enabling undertakings to achieve energy savings and reductions in greenhouse gas emissions will be considered compatible with the common market. It is also worth noting that support will also be given to renewable energy sources and cogeneration of heating and power, which can influence the performance of buildings.</p>

ANNEX 6: ENERGY SAVINGS TARGETS OF EU-MEMBER STATES UNTIL 2016

Member State	Target for 2016
Austria	22,333 GWh
Belgium	30,366 GWh
Bulgaria	7,291 GWh
Cyprus	2,152 GWh
Czech Republic	19,842 GWh
Denmark	2,083 GWh
Estonia	2,125 GWh
Finland	17,800 GWh
France	139,560 GWh
Germany	231,389 GWh
Greece	16,410 GWh
Hungary	11,611 GWh
Ireland	13,117 GWh
Italy	126,327 GWh
Latvia	3,483 GWh
Lithuania	4,652 GWh
Luxemburg	1,582 GWh
Malta	378 GWh
Netherlands	51,190 GWh
Poland	53,333 GWh
Portugal	20,840 GWh
Romania	32,564 GWh
Slovakia	10,338 GWh
Slovenia	4,261 GWh
Spain	196,349 GWh
Sweden	41,100 GWh
UK	136,500 GWh
Total	1,555,758 GWh

Source: Energy Efficiency Watch - Promoting Energy Efficiency in Europe: Insights, Experiences and Lessons learnt from the National Energy Efficiency Action Plan.