

<b><i>Title of the measure:</i></b>	EU11      Energy Performance of Buildings (Directive 2002/91/EC)
-------------------------------------	---

### ***General description***

The basic objective underlying this Directive is to promote the improvement of the energy performance of buildings within the EU, ensuring in so far as possible that only such measures as are the most cost-effective are undertaken. The Directive lays down a framework that should lead to increased co-ordination between Member States of legislation in this field. The practical application of the framework, however, will remain primarily the responsibility of the individual Member States.

The Directive covers four main elements:

- A) Establishment of a general framework of a common methodology for calculating the integrated energy performance of buildings.
- B) Application of minimum standards on the energy performance to new buildings and to certain existing buildings when they are renovated.
- C) Certification schemes for new and existing buildings on the basis of the above standards and public display of energy performance certificates and recommended indoor temperatures and other relevant climatic factors in public buildings and buildings frequented by the public.
- D) Specific inspection and assessment of boilers and heating/cooling installations, the latter for boilers older than 15 years.

### ***A common methodology for integrated energy performance standards***

There is a strong tendency towards an integrated approach in building standards and codes that are being developed in and outside the EU (e.g. in the U.S., Australia, Canada and New Zealand). Such an approach can integrate, in addition to the quality of insulation of the building, heating installations, cooling installations, energy for ventilation, lighting installations, position and orientation of the building, heat recovery, active solar gains and other renewable energy sources. With today's highly insulated new buildings and the trend towards low energy houses, these additional factors play an increasingly large role and should therefore be included in regulatory provisions. Such an integrated approach will give more flexibility to designers to meet energy reduction standards in the most cost-effective way. An integrated approach for the energy performance of buildings has to varying degrees already been applied in D, F, UK, I and NL and some other Member States intend to do the same. In some cases it is mandatory. A common approach on this basis would contribute to a more level playing field as regards the efforts made by Member States to achieve energy savings in the buildings sector.

### ***Application of these standards to new buildings and to certain existing buildings when they are being renovated***

New residential buildings and dwellings as well as new buildings in the tertiary sector should meet the minimum energy performance standards based on an integrated methodology. Furthermore these standards should also be applied to larger (i.e., greater than 1000 m<sup>2</sup>) existing buildings, when the buildings undergo larger renovations as long as the implementation of energy related measures are technically and economically feasible.

### ***Certification schemes for new and existing buildings on the basis of the above methodology***

One of the main reasons for market imperfections as regards investment in energy efficiency on the rental market is the fact that the owner and renter of a building, dwelling or office have different interests. As the renter normally pays the energy bill, the incentive for the owner to invest in energy efficiency is weak. The best way to make these investments more attractive is to provide clear and reliable information to prospective renters. Clear information will influence the rent that can be asked and therefore will be an incentive for owners to make investments in the energy efficiency of buildings and houses. Therefore, to facilitate the transfer of this information on the energy performance of buildings and apartments, energy

certificates for new and existing buildings and dwellings should be available when these are constructed, sold or rented out. This certification, which should not be more than 10 years old, should be based on the same integrated approach as used for the minimum standards for new buildings and should include accompanying advice on how to improve the energy performance of the building.

### ***Specific inspection and assessment of heating/cooling installations***

Heating installations are recognized to be a key issue as regards energy efficiency. Boilers with an effective rated output of 20 kW to 100 kW fired by non-Renewable fuel should be inspected regular to improve their operation. For boilers with rated output more than 100 kW, inspection shall be carried out at minimum every two years. However for gas boilers, the inspection interval can be four years.

### ***Impact evaluation (methods and results)***

#### Methods

The method used in the main evaluation study is an ex-ante scenario analysis up to 2005 and 2010 (see MURE case study 2)

#### Results

Aspects of energy in buildings used for heating, hot water, cooling and lighting purposes are addressed in the Directive on energy performance of buildings. It should be noted that this document covers the building envelope, including windows, and installed equipment such as heating, air-conditioning and ventilation. It does not cover measures for non-installed equipment such as domestic appliances (including cooking ), which together are responsible for 18% of the total energy consumption in the residential sector. In the tertiary sector, lighting, which accounts for 14% of the sector's energy consumption, is for the most part installed equipment and therefore included. Non-installed equipment is estimated to account for around 20% of the tertiary sector's consumption, due partially to the large share of office equipment. For non-installed equipment, specific policies such as labelling, mandatory minimum efficiency requirements, voluntary agreements, etc. have been implemented or are envisaged in the Action Plan for Energy Efficiency (see references).

The total final energy consumption in the EU in 1997 was about 930 Mtoe. 40.7 % of total energy demand is used in the residential and tertiary sectors, most of it for building-related energy services. Space heating is by far the largest energy end-use of households in Member States (57%), followed by water heating (25 %). Electrical appliances and lighting make up 11% of the sector's total energy consumption. For the tertiary sector the importance of space heating is somewhat lower (52 % of total consumption of the sector), while energy consumption for lighting and office equipment and "other" (which is mainly office equipment) are 14% and 16%, respectively.

As regards energy in buildings that is used for heating, hot water, air-conditioning or lighting purposes, a savings potential of around 22% of present consumption is estimated to exist and can be realised by the year 2010 (MURE Database, see references). As stated in the European Climate Change Progress Report, this figure has been based on the assumption of a normal rate of retrofitting and rehabilitation for existing buildings, a net increase in the building stock of around 1.5%/year, and a successively increasing share in the use of best available technologies in buildings. In this context, savings potential is generally defined in terms of investments in energy-efficient technology having a pay-back period of eight years or less, allowing a high rate of return compared to alternative investments, including investments in energy production.

In its Green Paper "Towards a European Strategy for Energy Supply" the Commission re-states the indicative target from the Council Resolution of 7 December 1998: to improve energy intensity of final consumption by a further 1 percentage point per year over that which would have been otherwise attained. For the building sector, meeting this indicative target would result in avoided energy consumption of over 55 Mtoe, equivalent to avoided CO<sub>2</sub> emissions of around 100 Mt/year or around 20 % of the EU Kyoto commitment. Meeting this target would also realise two-thirds of the available savings potential in the sector, while making allowance for price fluctuations and possible "rebound effects". However, for this to be achieved effective action is required.

Studies using the PRIMES model and Ecofys bottom-up approach indicate that the cost-effective potential for emission reduction could be between 130 Mt/year and 160 Mt/year, respectively.

According to SEC(2008) 2864, rough calculations for the assessment of impacts of the current directive show that if the directive is fully and properly implemented, the energy savings from the EPBD directive can be as much 96 Mtoe in 2020, this being 6.5% of EU's final energy demand. In terms of primary energy savings, the value is estimated as much as 130 Mtoe.

EC assessment SEC(2008) 0780 indicates substantial positive impacts which are possible if the directive is revised which would make use of a large part of existing potential in the building sector and would also exploit the full potential of the current Energy Performance of Buildings Directive (EPBD). The minimum total impact of the revised EPBD is;

- 60 – 80 Mtoe/year energy savings in 2020, i.e. reduction of 5-6% of the EU final energy consumption in 2020;
- 160 to 210 Mt/year CO<sub>2</sub> savings in 2020, i.e. 4-5% from EU total CO<sub>2</sub> emissions in 2020
- 280,000 to 450000 potential new job will be created

<b>Ex-post evaluation</b>	1995	2000		
direct CO <sub>2</sub> (kt)				
Energy (TJ) (Fuels/Electricity)				
<b>Ex-ante evaluation</b>	1995	2000	2010	2020
direct CO <sub>2</sub> (kt)			151.4 Mt	
Energy (TJ) (Fuels/Electricity)			3465 PJ	

### Historical data

The Directive was recasted and repealed in 2010 by the EU Directive 2010/32/EU which was enacted on 8 July 2010. The deadline for transposal in Member states was 9 July 2012.

### References

- 2002/91/EU [http://europa.eu/legislation\\_summaries/other/127042\\_en.htm](http://europa.eu/legislation_summaries/other/127042_en.htm)
- 2010/31/EU [http://europa.eu/legislation\\_summaries/internal\\_market/single\\_market\\_for\\_goods/construction/en0021\\_en.htm](http://europa.eu/legislation_summaries/internal_market/single_market_for_goods/construction/en0021_en.htm)
- Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings, Official Journal L 001 , 04/01/2003 P. 0065 - 0071.
- "Action Plan to improve Energy Efficiency in the European Community" COM(2000)247 final.
- "Mesures d'Utilisation Rationnelle de l'Energie (MURE)" Database, European Commission ([www.mure2.com](http://www.mure2.com) and [www.isis-it.com/mure](http://www.isis-it.com/mure))
- ECCP Progress Report (2000), <http://europa.eu.int/comm/environment/climat/eccp/htm>
- Council Resolution of 7 December 1998 on energy efficiency in the European Community (98/C 394/01)
- 2002/91/EC <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:001:0065:0071:EN:PDF>
- Impact Assesement 2002/91/EC <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SEC:2008:2864:FIN:EN:PDF>
- SEC(2008) 0780 – Proposal for a Directive on energy performance of buildings (recast) <http://www.ipex.eu/IPEXL-WEB/dossier/files/download/082dbcc530b1bf490130bbc7e3dc5d94.do>