



# The Energy Performance of Buildings Directive

## A summary of its objectives and contents



Directive 2002/91/EC of the European Parliament and Council, on the energy performance of buildings, came into force on 4 January 2003. It will greatly affect awareness of energy use in buildings, and is intended to lead to substantial increases in investments in energy efficiency measures within these buildings. Legislation must be in place by 4 January 2006, and will affect all buildings, both domestic and non-domestic. The major responsibility for practical measures to meet the requirements will fall on building services engineers. This briefing explains the main provisions of the Directive.

### *Why was the directive introduced?*

The 160 million buildings in the EU use over 40% of Europe's energy and create over 40% of its carbon dioxide emissions, and that proportion is increasing. Under the Kyoto protocol, Europe is committed to reducing emissions and the Directive is intended to contribute to achieving this.

### *How is this energy used?*

Heating fuel is the most important component (57% of domestic consumption, 52% of non-residential building consumption). Water heating accounts for 25% of domestic consumption and 9% of non-residential use. Lighting accounts for up to 25% of emissions due to commercial buildings.

### *How much of this energy can be saved?*

According to the European energy commissioner, a cost-effective savings potential of around 22% of present consumption in buildings can be realised by 2010.

### *How much can this directive reduce the threat of climate change?*

According to the European climate change programme, the directive could deliver up to 45 million tonnes of carbon dioxide reduction by 2010. In order to meet the agreed Kyoto targets, the European Union must implement reductions of 330 million tonnes between 1990 and 2010.

### *How will the directive work?*

It facilitates requirements to measure energy use in buildings by:

- ◆ introducing agreed measurements of relative energy performance
- ◆ regular inspections and re-evaluations
- ◆ requiring higher standards for upgrading larger buildings
- ◆ improving standards for new buildings.

This briefing was written by Andrew Warren, Director of the Association for the Conservation of Energy, which seeks to encourage a positive national awareness of the need for, and benefits of, energy conservation; to help establish sensible and consistent national policies and programmes, and to increase investment in all appropriate energy saving measures.

## Sponsored by:



Association  
for the  
Conservation  
of Energy

## Article 1: Objective

The objective is to improve the energy performance of buildings by requiring:

- ◆ a methodology to calculate integrated energy performance of buildings
- ◆ minimum energy requirements for new buildings
- ◆ minimum energy requirements for large existing buildings being renovated
- ◆ energy certification of buildings
- ◆ regular inspection of boilers and of air conditioning systems.

## Article 2: Definitions

Defines: a 'building', the 'energy performance of a building', the 'energy performance certification of a building', 'CHP', 'air conditioning system', 'boiler', 'effective rate output expressed in kW' and 'heat pump'.

## Article 3: Adoption of a methodology

This requires every government to apply a methodology which calculates the energy performance of buildings. These calculations must be based on a general framework incorporating the following items:

- 1 The methodology of calculation of energy performances of buildings shall include at least the following aspects:
  - (a) thermal characteristics of the building (shell and internal partitions, etc.); these characteristics may also include air-tightness
  - (b) heating installation and hot water supply, including their insulation characteristics
  - (c) air-conditioning installation
  - (d) ventilation
  - (e) built-in lighting installation (mainly the non-residential sector)
  - (f) position and orientation of buildings, including outdoor climate
  - (g) passive solar systems and solar protection
  - (h) natural ventilation
  - (i) indoor climatic conditions, including the designed indoor climate.
- 2 The positive influence of the following aspects shall, where relevant in this calculation, be taken into account:
  - (a) active solar systems and other heating and electricity systems based on renewable energy sources
  - (b) electricity produced by CHP
  - (c) district or block heating and cooling systems;
  - (d) natural lighting.
- 3 For the purpose of this calculation buildings should be adequately classified into categories such as:
  - (a) single-family houses of different types;
  - (b) apartment blocks;
  - (c) offices;
  - (d) education buildings;
  - (e) hospitals;
  - (f) hotels and restaurants;
  - (g) sports facilities;

- (h) wholesale and retail trade services buildings;
- (i) other types of energy-consuming buildings.

This methodology can be set either at national or regional level, and must be regularly updated and easy to understand. It may include an indicator of the CO<sub>2</sub> emissions from the building.

## Article 4: Setting of energy performance requirements

The minimum energy performance requirements must be based on the calculation methodology. These shall take account of general indoor climate conditions, in order to avoid possible negative effects such as inadequate ventilation, as well as local conditions and the designated function and age of the building. When setting requirements, governments may differentiate between new and existing buildings, and different categories of buildings. These requirements must be reviewed at least every five years, and updated to reflect technical progress.

Member States can decide to omit the following categories of buildings:

- ◆ buildings and monuments officially protected as part of a designated environment or because of their special architectural or historic merit, but only where compliance with the requirements would unacceptably alter their character or appearance
- ◆ buildings used as places of worship and for religious activities
- ◆ temporary buildings with a planned time of use of two years or less
- ◆ industrial processes
- ◆ workshops and non-residential agricultural buildings with low energy demand
- ◆ non-residential agricultural buildings if covered by a sectoral agreement on energy performance
- ◆ residential buildings intended to be used less than four months a year
- ◆ stand-alone buildings with a total useful floor area of less than 50 m<sup>2</sup>.

## Article 5: New buildings

All new buildings must meet the minimum energy performance requirements. For those with a useful floor area over 1000 m<sup>2</sup> governments must ensure that, before construction starts, formal consideration is given to the following alternative systems for heating:

- ◆ CHP
- ◆ district or block heating or cooling
- ◆ heat pumps
- ◆ decentralised energy supply systems based upon renewable energy.

Such assessments should consider technical, environmental and economic feasibility.

## Article 6: Existing buildings

Governments must ensure that, whenever a building with a total useful floor area of over 1000 m<sup>2</sup> undergoes major renovation, its energy performance is upgraded to meet

minimum requirements based upon Article 4. These should be technically, functionally and economically feasible.

The requirements may be set either for the renovated building as a whole, or alternatively for the renovated system or components, but only when these are part of a renovation to be carried out within a limited time period.

## Article 7: Energy performance certificates

Whenever a building is constructed, sold or rented out, a certificate detailing its energy performance must be made available. This can either be to the owner or, by the owner, to the prospective buyer or tenant. No certificate may be older than 10 years.

For apartments or for units designed for separate use in blocks, it is possible for certificates to be based on either a common certification of the whole building where a block has a common heating system, or upon the assessment of another representative apartment within the same block.

In order to facilitate comparisons between buildings, the energy performance certificate must include reference values such as current legal standards and benchmarks. It also must include recommendations for the cost effective investments which can be undertaken in the building, and which will improve its energy performance.

The objective of the certificates shall be limited to the provision of information. Any effects of these certificates in terms of legal proceedings will be subject to national legislation.

### *Publicising the certificates*

All buildings, either occupied by a public authority, or regularly visited by a large number of people, must display in a prominent place clearly visible to the public its current energy certificate. In addition a range of recommended and current indoor temperatures and, when appropriate, other relevant climatic factors may also be clearly displayed. This applies only to buildings with a total useful floor area over 1000 m<sup>2</sup>.

## Article 8: Inspection of boilers

In order to reduce energy consumption, governments have two options. The first option is to lay down the necessary measures to establish a regular inspection of boilers fired by non-renewable liquid or solid fuel of an effective rated output of 20 to 100 kW. Such inspections can also be extended to boilers using other fuels. Boilers over 100 kW must be inspected every two years, although in the case of gas boilers, this can be delayed for up to four years.

For boilers larger than 20 kW and over 15 years old, there must be a one-off inspection of the entire heating installation. This must include an assessment of the boiler efficiency and size compared to the heating requirements

of the building. Advice must be provided to the users on the replacement of the boilers, other modifications to the heating system and on alternative solutions.

The second option — most likely to be pursued in the UK — is for governments to ensure that there is adequate provision of advice to users on the replacement of the boilers, other modifications to the heating system and on alternative solutions, which may include assessment of the efficiency and appropriate size of the boiler. No regular time scale is required for such advice. However, if governments do choose this means of complying, they have to produce a report every two years showing how this achieves as much as implementing this Article under the first option given.

## Article 9: Inspection of air conditioning systems

In order to reduce energy consumption, governments must establish regular inspections of all air conditioning systems with an effective rated output of more than 12 kW. Such an inspection must include an assessment of the efficiency and sizing of the air conditioning, compared to the cooling requirements of the building. Appropriate advice must be provided to users on possible improvements or replacements, and on alternative solutions.

## Article 10: Independent experts

Governments must ensure that certification of buildings, the drafting of the accompanying recommendations and the inspection of boilers and air conditioning systems are carried out in an independent manner. This must be by qualified and/or accredited experts. These can operate as sole traders or be employed by public or private bodies.

## Article 11: Review of progress

The Commission has to evaluate how effectively the directive is being implemented. It may make proposals with respect to:

- ◆ expanding Article 6 to cover renovation in buildings below 1000 m<sup>2</sup> useful floor area
- ◆ general incentives for further energy efficiency measures in buildings.

In carrying out these reviews, it will be assisted by the committee established under Article 14.

## Article 12: Information

If Member States ask for help, the Commission must assist them in staging information campaigns regarding the best means of improving energy efficiency in buildings. This can be by using Community programmes. But it is up to governments whether they choose to undertake information programmes to inform building users as to what the best way is to save energy in buildings.

## Article 13: Adaptation of the framework

Parts 1 and 2 of the general framework for the calculation of energy performance of buildings, as listed in Article 3, must be reviewed at regular intervals, and at maximum every two years. Any amendments necessary can be approved by the committee established under Article 14.

## Article 14: Committee

The Commission has created a special committee to oversee implementation. It is made up of representatives of each EU government, both administrative and specialist, together with certain independent observers.

## Article 15: Transposition into national law

Every government must bring the laws, regulations and administrative provisions necessary to comply with this directive into force by 4 January 2006 at the latest.

However, if Member States believe that there are insufficient qualified or accredited experts anywhere within the European Union to implement fully the provisions of Article 7, 8 and 9, they may delay these Articles for up to three further years. If they wish to cause this delay, governments must justify this to the Commission together with a schedule detailing when they do plan to fully implement the directive.

## Preamble

As with all EU directives, the 23-paragraph preamble is part of the formal text. This outlines the reason why the European Parliament and the European Council of Ministers have adopted the directive. Amongst the reasons given is the need to augment, with a complementary legal instrument, an earlier directive (93/76/EEC) which required Member States to develop, implement and report on programmes to promote energy efficiency in the building sector

Developing a common approach to energy certification will 'contribute to a level playing field as regards efforts made in Member States to [achieve] energy savings in the buildings sector'. It will also 'introduce transparency for prospective owners or users with regard to energy performance in the Community property market'.

This is an acknowledgement that, particularly so far as non-residential buildings are concerned, there is an increasing need for prospective occupants to be able to make valid comparative assessments of the likely running costs of different buildings in different countries. Making such information available will assist in completing the Single European Market.

Major renovations of larger existing buildings 'should be regarded as an opportunity to take cost-effective measures to enhance energy performance'. The definition

of 'major renovations' given is when their total cost is 'higher than 25% of the value of the building, excluding the value of the land upon which the building is situated'; or alternatively 'those where more than 25% of the building shell undergoes renovation'.

The certification process may be carried out 'by energy service companies which agree to commit themselves to undertake the identified investments'. The directive then goes on to say that the 'schemes adopted should be supervised and followed up by Member States, which should also facilitate the use of incentive systems'.

It states that 'public authority buildings, and buildings frequently visited by the public, should set an example by taking environmental and energy considerations into account, and therefore should be subject to energy certification on a regular basis.'

Concern is expressed about the rise in air conditioning. 'Priority should be given to strategies which enhance the thermal performance of buildings during the summer period. To this end there should be further development of passive cooling techniques, primarily those that improve climatic conditions and the micro-climate around buildings.'

Personalised billing, calculated in proportion to actual consumption, is encouraged. 'Occupants should be enabled to regulate their own consumption of heat and hot water.'

It is agreed that the 'general principles providing for a system of energy performance and its objectives should be established at Community level'. But 'the detailed implementation should be left to Member States, thus allowing each Member State to choose the regime which corresponds best to its particular situation'.

In summary, 'this directive confines itself to the minimum required in order to achieve those objectives and does not go beyond what is necessary for that purpose'.

## Current status

The Directive has to be implemented into UK law by January 2006. It is clear that this will require a range of measures, which are likely to include further amendments to the Building Regulations. However, there will also need to be a robust certification scheme agreed, and arrangements for it to become operative in all public buildings, as well as private buildings visited by the public.

The implementation timetable is tight, and CIBSE will be actively engaged in the development of the relevant measures to achieve it.

## Where can I find out more?

The text of the Directive may be downloaded from the following website:

[http://europa.eu.int/eur-lex/en/lif/reg/en\\_register\\_121020.html](http://europa.eu.int/eur-lex/en/lif/reg/en_register_121020.html)