

**DIRECTIVE 2002/91/EC OF THE EUROPEAN PARLIAMENT AND OF
THE COUNCIL
of 16 December 2002
on the energy performance of buildings ^[1]**

Forward.

On the OJ of the European Communities L 66, 04.01.2003, the expected Directive 2002/91/CE on the energy performance of buildings was at last published.

We had hoped for a better document that took into account the know-how, the experience and the available standards. Instead we note in some parts a certain explanatory disorder, that shows an inadequate knowledge of the state of the art. It is nevertheless a provision that will produce important results by the application of its innovative concepts.

The quality of the effects will however depend on its application. In fact, the Directive leaves wide power of action to Member States. There are many possibilities to make up for the parts that are lacking in effectiveness. The scope is that the Directive will not become a charge for the users, but instead an occasion and a means to achieve, without actual costs, a wide improvement in existing buildings and in future construction field. The improvements will consist of better indoor comfort, and big reduction in energy use and in polluting emissions. In the same time this will support work and the savings will produce financial resources to sustain productive activities.

By the following comments and marks, interested categories provide their contribution to meet the above targets.

[] Comments were arranged in Italy by:*

- Ing. Franco Barosso e Ing. Adriano Gerbotto - for "Consiglio Nazionale degli Ingegneri".*
- Per. Ind. Giampiero Colli – Secretary of "ASSOTERMICA".*
- Ing. Laurent Socal – Chief of Italian delegation at CEN TC 228.*
- Ing. Roberto Socal - President of ANTA (Associazione Nazionale Termotecnici e Aerotecnici).*
- Per. Ind. Franco Soma e Per. Ind. Elio Verdinelli - for "Commissione Nazionale Impianti Tecnologici" of "Consiglio Nazionale dei Periti Industriali".*
- Per. Ind. Michele Vigne – Responsible of technical working group of CONFEDILIZIA.*

(NOTE: In the following text some particularly significant words or phrases have been highlighted.)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 175(1) thereof,

Having regard to the proposal from the Commission ⁽¹⁾,

Having regard to the opinion of the Economic and Social Committee ⁽²⁾,

Having regard to the opinion of the Committee of the Regions ⁽³⁾,

Acting in accordance with the procedure laid down in Article 251 of the Treaty ⁽⁴⁾,

[1] This comment refers to Italian version only.

Whereas:

- (1) Article 6 of the Treaty requires environmental protection requirements to be integrated into the definition and implementation of Community policies and actions.
- (2) The natural resources, to the prudent and rational utilisation of which Article 174 of the Treaty refers, include oil products, natural gas and solid fuels, which are essential sources of energy but also the leading sources of carbon dioxide emissions [2].

[2] *The cut in fuel consumption implies not only a reduction in carbon dioxide emissions, but also the reduction of other types of pollution not less damaging to the environment like CO, Nox, etc, for two reasons:*

1. *a cut directly proportional to the reduction in fuel consumption;*
2. *a further cut due to the use of new combustion technologies in systems renovation.*

- (3) Increased energy efficiency constitutes an important part of the package of policies and measures needed to comply with the Kyoto Protocol and should appear in any policy package to meet further commitments.
- (4) Demand management of energy is an important tool enabling the Community to influence the global energy market and hence the security of energy supply in the medium and long term.
- (5) In its Conclusions of 30 May 2000 and of 5 December 2000 the Council endorsed the Commission's Action Plan on Energy Efficiency and requested specific measures in the building sector.
- (6) The residential and tertiary sector, the major part of which is buildings, accounts for more than 40 % of final energy consumption in the Community and is expanding, a trend which is bound to increase its energy consumption and hence also its carbon dioxide emissions.
- (7) Council Directive 93/76/EEC of 13 September 1993 to limit carbon dioxide emissions by improving energy efficiency (SAVE)(5), which requires Member States to develop, implement and report on programmes in the field of energy efficiency in the building sector, is now starting to show some important benefits. However, a complementary legal instrument is needed to lay down more concrete actions with a view to achieving the great unrealised potential for energy savings and reducing the large differences between Member States' results in this sector [3].

[3] *This reflection appears important particularly in Italy, which must remove an evident barrier.*

Art. 30 of the law n. 10/91, concerning the energy certification of buildings, "acknowledged" some indications of the Directive 93/76/CE of 13 September 1993, two years in advance, and prescribed immediate regulations (within 180 days).

But the committed authority declared his disagreement to the Parliament and "refused" to do his duty (how declared in public by the responsible of the relevant office of the Industry Ministry).

Now, the law 15 March 1997 n 59 and the relevant execution regulations, which transferred to the Regions the authority on the energy certification of buildings, seem to have removed that barrier.

However it would be important that the State exercise (possibly well, not how it did till now) its "coordination function" it is committed to by art. 8 of the above law.

- (8) Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction

products (6) requires construction works and their heating, cooling and ventilation installations to be designed and built in such a way that the amount of energy required in use will be low, having regard to the climatic conditions of the location and the occupants [4].

[4] *This principle was established in Italian law 10/91. Unfortunately very bad regulations and standards followed: the energy performance requirements were too low and the unreliable complicated calculations have diminished the results.*

(9) The measures further to improve the energy performance of buildings should take into account climatic and local conditions as well as indoor climate environment and cost-effectiveness. They should not contravene other essential requirements concerning buildings such as accessibility, prudence and the intended use of the building [5] [6].

[5] *These are important remarks that deserve attention for a correct application. As it was clearly stated by the Italian law n. 10/91, the Directive also takes into great consideration indoor comfort and hygiene. By that way any limitation in use of comfort systems is excluded.*

[6] *Referring to measures to improve energy performance of buildings, the Directive set another important principle: cost effectiveness. This requires an economic analysis that takes into account not only the cut in energy consumption but also the energy content of materials and components and their durability.*

This analysis would avoid errors such as the transformation of centralised heating systems in gas supplied unfamiliar heating systems, using instead independent control of indoor temperature and the billing to users of heating costs.

(10) The energy performance of buildings should be calculated on the basis of a methodology, which may be differentiated at regional level, that includes, in addition to thermal insulation other factors that play an increasingly important role such as heating and air-conditioning installations, application of renewable energy sources and design of the building. A common approach to this process, carried out by qualified and/or accredited experts, whose independence is to be guaranteed on the basis of objective criteria, will contribute to a level playing field as regards efforts made in Member States to energy saving in the buildings sector and will introduce transparency for prospective owners or users with regard to the energy performance in the Community property market [7].

[7] *The wording is fairly confusing and reveals an inadequate knowledge of the principles on which the last standardisation works for the calculation of the energy performance of buildings are based on.*

There are some important points we need to make clear for a univocal understanding of the above text.

a) *The energy performance of buildings should be calculated using a methodology based on a common framework: we think it should be the one that was issued (or will be issued) by C.E.N.*

b) *The methodology may be differentiated at a regional level: a reasonable interpretation is that the calculation of the maximum energy consumption requirements may be set at a regional level, taking into account local outdoor climate and targets.*

c) *The calculation method used to verify the energy performance requirements, as a measuring instrument, should be nevertheless the same if we want to create a homogeneous context.*

Different verification methods may be only used for a transitory period of time by countries like Italy, Denmark, Germany and maybe others, which have already got calculation methods of

the energy demand for space heating in building. These methods would be however based on the principle on which CEN work is based.

Energy demand calculations require specific knowledge. So, qualification or accreditation of experts must be based on a verification of the knowledge acquired by a specific course.

- (11) The Commission intends further to develop standards such as EN 832 and prEN 13790, also including consideration of air conditioning systems and lighting [8].

[8] This intent of the Commission confirms the interpretation given at a previous point. To be better understood it may be useful to remember the present situation of standardisation in the field.

- a) European standard "EN 832 – Thermal performance of buildings – Calculation of energy use for heating – Residential buildings" was issued some years ago and is available in Europe.
- b) "prEN 13790 – Thermal performance of buildings – Calculation of energy use for space heating", is now waiting for the result of the formal vote and will be available in a short time (this standard will live together with EN 832 and is suitable for any kind of buildings).
- c) prEN 14335-1 – Heating systems in buildings – Method for calculation of system energy requirements and system efficiencies – Part 1 – Framework", has already passed public enquiry. The other parts:
 - prEN 14335-21 – Calculation of efficiencies and primary energy use – Part 2-1 – Subsystem of emission and control;
 - prEN 14335-22 – Calculation of efficiencies and primary energy use – Part 2-2 – Subsystem of heat generation by combustion;
 - prEN 14335-2X – Calculation of efficiencies and primary energy use – Part 2X – Subsystem of heat generation by heat pump;
 - prEN 14335-23 – Calculation of efficiencies and primary energy use – Part 2-3 – Distribution subsystem;would be ready for public enquiry for springtime 2004, possibly before.
- d) The Italian standard UNI 10348 "Space heating of buildings – efficiencies of heating systems" was issued some years ago and is available even if it is being reviewed for improving. This Italian standard, which has been used by WG4 TC 228 as a basis for elaboration of prEN 14335, uses the calculation of the four efficiencies of heating systems and the calculation of the annual use of primary energy (fuel and electric energy).
- e) There are additional standards that would be useful for the application of the Directive, concerning: procedures for gathering input data for calculation, procedures for energy diagnosis and optimisation, methods for financial analysis of energy saving measures. In Italy, a draft of these procedures is available. They were proposed by professionals in the field, that have already used them. The above documents are now under discussion to become a national standard.

Italy would probably be able to apply the Directive in a standard way (to a limited extent concerning energy use for space heating and water heating) in a short time, not more than one year. Europe will probably need more time to produce common standards.

Standardisation concerning energy use in air conditioning will require additional time. It is difficult to make an accurate forecast.

We inform that CEN TC 89 and CEN TC 228 produced all available matter on a voluntary basis in more than ten years of activity.

European Community can certainly reduce the times by simply placing under mandate the standards that are needed for the application of the Directive, as it did for standards concerning products. The pressure on this matter is in conflict with the production of standards on a voluntary basis.

- (12) Buildings will have an impact on long-term energy consumption and new buildings should therefore meet minimum energy performance requirements tailored to the local

climate [4]. Best practice should in this respect be geared to the optimum use of factors relevant to enhancing energy performance. As the application of alternative energy supply systems is generally not explored to its full potential, the technical, environmental and economic feasibility of **alternative energy supply systems** should be considered; this can be carried out once, by the Member State, through a study which produces a list of energy conservation measures, for average local market conditions, **meeting cost-effectiveness criteria**. Before construction starts, specific studies may be requested if the measure, or measures, are deemed feasible [9].

[9] *The application of alternative energy supply systems requires accurate technical and economic analysis taking into account note [6] to check real cost-effectiveness.*

- (13) **Major renovations** of existing buildings above a certain size should be regarded as an opportunity to take cost-effective measures to enhance energy performance. Major renovations are cases such as those where the total cost of the renovation related to the building shell and/or energy installations such as heating, hot water supply, air-conditioning, ventilation and lighting is higher than 25 % of the value of the building, excluding the value of the land upon which the building is situated, or those where more than 25 % of the building shell undergoes renovation [10].
- (14) However, the improvement of the overall energy performance of an existing building does not necessarily mean a total renovation of the building but could be confined to those **parts that are most relevant for the energy performance of the building and are cost-effective** [10].

[10] *The reflections in point (14) are very important in order to define “major renovation”. Due to that, there is no need to set minimum requirements for existing buildings. In fact, whenever a renovation, even partial, of a building or of related systems is done, the owner may implement only the energy saving measures that are cost-effective. The cost-effectiveness criteria should also lead the well-informed owner in undertaking energy saving measures of his building or system on a voluntary basis even if renovation was not foreseen.*

- (15) Renovation requirements for existing buildings should not be incompatible with the **intended function, quality or character** of the building [5]. It should be possible to recover additional costs involved in such renovation within a reasonable period of time in relation to the expected technical lifetime of the investment by accrued energy savings [6].
- (16) The certification process may be supported by programmes to facilitate equal access to improved energy performance; based upon agreements between organisations of stakeholders and a body appointed by the Member States; carried out by **energy service companies** which agree to commit themselves to undertake the identified investments [11]. The schemes adopted should be supervised and followed up by Member States, which should also facilitate the use of incentive systems. To the extent possible, the certificate should describe the actual energy-performance situation of the building and may be revised accordingly. **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**. The dissemination to the public of this information on energy performance should be enhanced by clearly displaying these energy certificates. Moreover, the displaying of officially recommended indoor temperatures, together with the actual measured temperature, should

discourage the misuse of heating, air-conditioning and ventilation systems. This should contribute to avoiding unnecessary use of energy and to safeguarding comfortable indoor climatic conditions (thermal comfort) in relation to the outside temperature.

[11] *“Energy Service” is taken into account in Italy at point p) of art. 1 of DPR 412/93, but it would require some more regulations.*

(17) Member States may also employ other means/measures, not provided for in this Directive, to encourage enhanced energy performance. Member States should encourage good energy management, taking into account the intensity of use of buildings.

(18) Recent years have seen a rise in the number of **air-conditioning systems** in southern European countries. This creates considerable problems at peak load times, increasing the cost of electricity and disrupting the energy balance in those countries. **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 indoor climatic conditions and the microclimate around buildings [12].

[12] *We may take into consideration the priority set by the Commission. However it is important to state that a correct and effective intervention in the air conditioning field requires standards similar to the ones applicable in the heating field, based on the diagnosis and economic analysis of the measures. Without them we will generate sure costs but can't verify returns. Time can be reduced only by putting under mandate the necessary CEN standards (see also the last part of note [8]).*

(19) Regular maintenance of boilers and of air conditioning systems by qualified personnel contributes to maintaining their correct adjustment in accordance with the product specification and in that way will ensure optimal performance from an environmental, safety and energy point of view. An independent assessment of the total heating installation is appropriate whenever replacement could be considered on the basis of cost effectiveness [13].

[13] *Regular maintenance of systems is certainly due, but absolutely insufficient, particularly if it is limited to the conservation of combustion efficiency.
If the system is basically wrong or oversized it will continue to waste energy even after an accurate maintenance.
Only renovation, decided on the basis of energy diagnosis and economic analysis of the measures is able to produce a real cost-effective cut in energy consumption.*

(20) The billing, to occupants of buildings, of the costs of heating, air-conditioning and hot water, calculated in proportion to actual consumption, could contribute towards energy saving in residential sector. Occupants should be enabled to regulate their own consumption of heat and hot water, in so far as such measures are cost effective.

(21) In accordance with the principles of subsidiarity and proportionality as set out in Article 5 of the Treaty, general principles providing for a system of energy performance requirements 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. 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 [14].

[14] *Is useful to reaffirm the importance of standardised calculation methods: we cannot measure the same unit (consumption) using different parameters, if we want free circulation of ideas, products and services. (see also note [7]).*

(22) Provision should be made for the possibility of rapidly adapting the methodology of calculation and of Member States regularly reviewing minimum requirements in the field of energy performance of buildings with regard to technical progress, inter alia, as concerns the insulation properties (or quality) of the construction material, and to future developments in standardisation [15].

[15] *The above considerations confirm the reflections in note [14].*

(23) The measures necessary for the implementation of this Directive should be adopted in accordance with Council Decision 1999/468/EC of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the Commission ⁽⁷⁾,

HAVE ADOPTED THIS DIRECTIVE:

Article 1

Objective

The objective of this Directive is to promote the **improvement of the energy performance** of buildings within the Community, taking into account outdoor climatic and local conditions, as well as **indoor climate requirements and cost-effectiveness**.

This Directive lays down requirements as regards:

- a) the general framework for a methodology of calculation of the integrated energy performance of buildings [7] and [8];
- b) the application of minimum requirements on the energy performance of new buildings;
- c) the application of minimum requirements on the energy performance of large existing buildings that are subject to major renovation [10];
- d) energy certification of buildings; and
- e) regular inspection of boilers and of air-conditioning systems in buildings and in addition an assessment of the heating installation in which the boilers are more than 15 years old [16].

[16] *Regular inspection and the assessment should be related to the excessive specific consumption, not to age of the heat generator.
In case of excessive specific consumption an energy diagnosis of both building and system would be more useful to find and eliminate the reasons for high energy use.*

Article 2

Definitions

For the purpose of this Directive, the following definitions shall apply:

1. “building”: a roofed construction having walls, for which energy is used to condition the indoor climate; a building may refer to the building as a whole or parts thereof that have been designed or altered to be used separately;
2. “energy performance of a building”: the amount of energy actually consumed or estimated to meet the different needs associated with a standardised use of the building, which may include, inter alia, heating, hot water heating, cooling, ventilation and lighting. This amount shall be reflected in one or more numeric indicators which have been calculated, taking into account insulation, technical and installation characteristics, design and positioning in relation to climatic aspects, solar exposure and influence of neighbouring structures, own-energy generation and other factors, including indoor climate, that influence the energy demand [17];

[17] “Energy performance” is in fact represented by the specific energy use expressed separately for space heating and for water heating, in $\text{kJ/m}^3\cdot\text{DD}$, for standardised use conditions. This amount automatically takes into account all the influences listed above. Further numeric indicators may be the average transmittance of the envelope, the efficiencies of the subsystems and other information about the typology of the systems.

3. energy performance certificate of a building: a certificate recognised by the Member State or a legal person designated by it, which includes the energy performance of a building calculated according to a methodology based on the general framework set out in the Annex [17];
4. CHP (combined heat and power): the simultaneous conversion of primary fuels into mechanical or electrical and thermal energy, meeting certain quality criteria of energy efficiency;
5. air conditioning system: a combination of all components required to provide a form of air treatment in which temperature is controlled or can be lowered, possibly in combination with the control of ventilation, humidity and air cleanliness;
6. boiler: the combined boiler body and burner-unit designed to transmit to water the heat released from combustion [18];

[18] Standards use the wording “heat generator”.

7. effective rated output (expressed in kW): the maximum calorific output specified and guaranteed by the manufacturer as being deliverable during continuous operation while complying with the useful efficiency indicated by the manufacturer;
8. heat pump: a device or installation that extracts heat at low temperature from air, water or earth and supplies the heat to the building.

Article 3

Adoption of a methodology

Member States shall apply a methodology, at national or regional level, of calculation of the energy performance of buildings on the basis of the general framework set out in the Annex. Parts 1 and 2 of this framework shall be adapted to technical progress in accordance with the procedure referred to in Article 14(2), taking into account standards or norms applied in Member State legislation.

This methodology shall be set at national or regional level [7], [8] e [14].

The energy performance of a building shall be expressed in a transparent manner and may include a CO2 emission indicator.

Article 4

Setting of energy performance requirements

1. Member States shall take the necessary measures to ensure that minimum energy performance requirements for buildings are set, based on the methodology referred to in Article 3. When setting requirements, Member States may differentiate between new and existing buildings [10] and different categories of buildings. These requirements 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 the age of the building. These requirements shall be reviewed at regular intervals which should not be longer than 5 years and, if necessary, updated in order to reflect technical progress in the building sector [19].

[19] *Building sector obviously includes system sector.*

2. The energy performance requirements shall be applied in accordance with Articles 5 and 6.

3. Member States may decide not to set or apply the requirements referred to in paragraph 1 for 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, 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 2 years or less, industrial sites, workshops and non-residential agricultural buildings with low energy demand and non-residential agricultural buildings which are in use by a sector covered by a national sectoral agreement on energy performance,

?? residential buildings which are intended to be used less than 4 months of the year [20],

[20] Holiday buildings are often used both by residents and occasional users. Depending on the construction technologies adopted, heating costs of each user may vary substantially in case of occupation or non-occupation of adjacent flats.

For these buildings, energy performance should be expressed for both conditions: neighbours present and neighbours absent to let the buyer or the tenant know the range of possible variation of heating costs. This class of new buildings should not be excluded from setting specific minimum requirements (except if the building is not occupied in cold season).

?? stand-alone buildings with a total useful floor area of less than 50 m².

Article 5

New buildings

Member States shall take the necessary measures to ensure that new buildings meet the minimum energy performance requirements referred to in Article 4.

For new buildings with a total useful floor area over 1000 m², Member States shall ensure that the technical, environmental and economic feasibility of alternative systems such as:

?? decentralised energy supply systems based on renewable energy,

?? CHP,

?? district or block heating or cooling, if available,

?? heat pumps, under certain conditions,

is considered and is taken into account before construction starts [9].

Article 6

Existing buildings

Member States shall take the necessary measures to ensure that when buildings with a total useful floor area over 1000 m² undergo major renovation, their energy performance is upgraded in order to meet minimum requirements in so far as this is technically, functionally and economically feasible. Member States shall derive these minimum energy performance requirements on the basis of the energy performance requirements set for buildings in accordance with Article 4. The requirements may be set either for the renovated building as a whole or for the renovated systems or components when these are part of a renovation to be carried out within a limited time period, with the abovementioned objective of improving the overall energy performance of the building [10].

Article 7

Energy performance certificate

1. Member States shall ensure that, when buildings are constructed, sold or rented out, an energy performance certificate is made available to the owner or by the owner to the

prospective buyer or tenant, as the case might be. The validity of the certificate shall not exceed 10 years.

Certification for apartments or units designed for separate use in blocks may be based:

?? on a common certification of the whole building for blocks with a common heating system,

or

?? on the assessment of another **representative apartment** in the same block [21].

[21] *In case of central heating system it is easy to obtain the certification of a single apartment from the one of the whole building on the basis of the related share of heating power. In case of independent systems or self-governing systems, there is no representative apartment, because every apartment is characterized by its own energy performances, due to its specific position in the building, its exposition to the sun and the characteristics of its heating system.*

Member States may exclude the categories referred to in Article 4(3) from the application of this paragraph [20].

2. The energy performance certificate for buildings shall include **reference values such as current legal standards and benchmarks** in order to make it possible for consumers to compare and assess the energy performance of the building [22]. The certificate **shall be accompanied by recommendations for the cost-effective improvement of the energy performance** [23].

The objective of the certificates shall be limited to the provision of information and any effects of these certificates in terms of legal proceedings or otherwise shall be decided in accordance with national rules.

[22] *For Italy these data may be the following:*

- a) *the energy performance of the building;*
- b) *the maximum specific standardised energy use set by DPR 412/93 to be revised (will represent the requirement set by the law);*
- c) *the best energy performance, achievable by the adoption of the best technologies available (reference value).*

[23] *The above data imply the energy diagnosis, the simulation and the economic analysis of the possible energy saving measures. The process is certainly convenient, but only for buildings with a high energy use. In any case, this is an important process that requires finishing of standards that are in elaboration at present in Italy and in Europe. It requires also formation and training of specific technicians, but it will generate an important renewal process in buildings and relevant systems.*

To guarantee the correct and tidy development of the process is important to implement gradually, taking into account the available resources. In other words is important to avoid forcing companies in the field from oversizing themselves only for a few years.

For these reasons, a preliminary classification of buildings on the basis of their energy use for heating will be essential. Every user of heating systems (or apartment house manager) should attest to:

- *the gross volume of the heated space (some directions for the user are required);*
- *the net surface area (some directions for the user are required);*
- *the annual energy use for space heating (in litres of diesel oil, m³ of natural gas, etc);*

- the annual energy use for water heating (in litres of diesel oil, m³ of natural gas, etc)(for independent systems this may be included in energy use for heating);
- the annual electric energy use supplied to heating system, in kWh (only for centralised heating systems).

The above data will enable to obtain specific energy use for heating and hot water production, in kJ/m³.DD and to make a list (based on the energy use for space heating only; this parameter is in fact more indicative and discriminating)

Owners of buildings with an energy consumption of primary energy of 100 kJ/m³.DD or more, for example, should be very soon obliged to perform diagnosis and energy certification, in case of sale or renting of the building.

For buildings included in fields of consumption however high (100-80, 80-70, 70-60, 60-50) further deadlines should be set, taking into account that cost effectiveness will tend to diminish for low energy consumption (except if there will be economic incentives).

Under certain limits the energy diagnosis should be considered optional because it has little use. Perhaps it will be of interest of the seller to show the good quality of his building.

3. Member States shall take measures to ensure that for buildings with a total useful floor area over 1000 m² occupied by public authorities and by institutions providing public services to a large number of persons and therefore frequently visited by these persons an energy certificate, not older than 10 years, is placed in a prominent place clearly visible to the public.

The range of recommended and current indoor temperatures and, when appropriate, other relevant climatic factors may also be clearly displayed.

Article 8

Inspection of boilers

With regard to reducing energy consumption and limiting carbon dioxide emissions, Member States shall either:

- a) 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 inspection may also be applied to boilers using other fuels.

Boilers of an effective rated output of more than 100 kW shall be inspected at least every 2 years. For gas boilers, this period may be extended to 4 years.

For heating installations with boilers of an effective rated output of more than 20 kW which are older than 15 years, Member States shall lay down the necessary measures to establish a one-off inspection of the whole heating installation. On the basis of this inspection, which shall include an assessment of the boiler efficiency and the boiler sizing compared to the heating requirements of the building, the experts shall provide advice to the users on the replacement of the boilers, other modifications to the heating system and on alternative solutions;

or

- b) take steps to ensure the provision of advice to the users on the replacement of boilers, other modifications to the heating system and on alternative solutions which may include inspections to assess the efficiency and appropriate size of the boiler. The overall impact of

this approach should be broadly equivalent to that arising from the provisions set out in (a). Member States that choose this option shall submit a report on the equivalence of their approach to the Commission every two years [24] [13].

[24] *Classification of buildings on the basis of their specific energy use (see note [23]) will show its usefulness in this case also.*

The inspection of boilers in buildings characterized by a low consumption does not make sense because it will represent a useless waste of resources.

Instead, in buildings with high consumption, inspection of boilers is not enough. Only energy diagnosis represents the appropriate consulting instrument suitable to show a group of consistent energy saving measures to be energy effective and cost effective.

Article 9

Inspection of air-conditioning systems

With regard to reducing energy consumption and limiting carbon dioxide emissions, Member States shall lay down the necessary measures to establish a regular inspection of air-conditioning systems of an effective rated output of more than 12 kW.

This inspection shall include an assessment of the air-conditioning efficiency and the sizing compared to the cooling requirements of the building. Appropriate advice shall be provided to the users on possible improvement or replacement of the air-conditioning system and on alternative solutions [12] and [8].

Article 10

Independent experts

Member States shall ensure that the 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 by qualified and/or accredited experts, whether operating as sole traders or employed by public or private-enterprise bodies [25].

[25] *Training, qualification and accreditation of experts should be committed to representative bodies of competent categories (in Italy, engineers and “periti industriali”), with the contribution of ENEA.*

Article 11

Review

The Commission, assisted by the Committee established by Article 14, shall evaluate this Directive in the light of experience gained during its application, and, if necessary, make proposals with respect to, inter alia:

- a) possible complementary measures referring to the renovations in buildings with a total useful floor area less than 1000 m²;
- b) general incentives for further energy efficiency measures in buildings.

Article 12

Information

Member States may take the necessary measures to inform the users of buildings as to the different methods and practices that serve to enhance energy performance. Upon Member States' request, the Commission shall assist Member States in staging the information campaigns concerned, which may be dealt with in Community programmes.

Article 13

Adaptation of the framework

Parts 1 and 2 of the Annex shall be reviewed at regular intervals, which shall not be shorter than 2 years.

Any amendments necessary in order to adapt Parts 1 and 2 of the Annex to technical progress shall be adopted in accordance with the procedure referred to in Article 14(2).

Article 14

Committee

1. The Commission shall be assisted by a Committee.
2. Where reference is made to this paragraph, Articles 5 and 7 of Decision 1999/468/EC shall apply, having regard to the provisions of Article 8 thereof.
The period laid down in Article 5(6) of Decision 1999/468/EC shall be set at three months.
3. The Committee shall adopt its rules of procedure.

Article 15

Transposition

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive at the latest on 4 January 2006. They shall forthwith inform the Commission thereof.

When Member States adopt these measures, they shall contain a reference to this Directive or shall be accompanied by such reference on the occasion of their official publication. Member States shall determine how such reference is to be made.

2. Member States may, because of lack of qualified and/or accredited experts, have an additional period of three years to apply fully the provisions of Articles 7, 8 and 9. When making use of this option, Member States shall notify the Commission, providing the appropriate justification together with a time schedule with respect to the further implementation of this Directive.

Article 16

Entry into force

This Directive shall enter into force on the day of its publication in the *Official Journal of the European Communities*.

Article 17

Addressees

This Directive is addressed to the Member States.

Done at Brussels, 16 December 2002.

For the European Parliament

The President

P. COX

For the Council

The President

M. FISHER BOEL

⁽¹⁾ OJ C 213 E, 31.7.2001, p. 266 and OJ C 203 E, 27.8.2002, p. 69.

⁽²⁾ OJ C 36, 8.2.2002, p. 20.

⁽³⁾ OJ C 107, 3.5.2002, p. 76.

⁽⁴⁾ Opinion of the European Parliament of 6 February 2002 (not yet published in the Official Journal), Council Common Position of 7 June 2002 (OJ C 197, 20.8.2002, p. 6) and Decision of the European Parliament of 10 October 2002 (not yet published in the Official Journal).

⁽⁵⁾ OJ L 237, 22.9.1993, p. 28.

⁽⁶⁾ OJ L 40, 11.2.1989, p. 12. Directive as amended by Directive 93/68/EEC (OJ L 220, 30.8.1993, p. 1).

⁽⁷⁾ OJ L 184, 17.7.1999, p. 23.

ANNEX

General Framework for the calculation of energy performance of buildings (Article 3)

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.

[26]

[26] In Italy, standards cover highlighted topics. For lacking ones see notes [8] and [12].
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.