Opinion of the European Economic and Social Committee on Energy efficiency of buildings — The contribution of end users (exploratory opinion)

(2008/C 162/13)

On 16 May 2007 the Commission decided to consult the European Economic and Social Committee, under Article 262 of the Treaty establishing the European Community, on

Energy efficiency of buildings and the contribution of end users

The Section for Transport, Energy, Infrastructure and the Information Society, which was responsible for preparing the Committee's work on the subject, adopted its opinion on 23 January 2008. The rapporteur was Mr Pezzini.

At its 442nd plenary session, held on 13 and 14 February 2008 (meeting of 14 February 2008), the European Economic and Social Committee adopted the following opinion by 195 votes in favour with 1 abstention.

1. **Conclusions**

1.1 The Committee recognises that energy efficiency is a fundamental factor when it comes to taking care of the climate and achieving the targets set by the EU in Kyoto and the new ceilings set by the European Council in March 2007 in the field of reducing emissions. It therefore recommends stepping up efforts aimed at consumers.

1.2 The Committee is convinced that there is great potential in the building sector for saving energy, particularly from heating, air conditioning, motive power and lighting as well as through insulation techniques, in building design and use.

1.3 When defining measures to increase energy efficiency, account should also be taken of the benefits of the widespread use of cost-effective technological innovations, enabling end users to take more informed decisions regarding their individual energy consumption.

1.4 The Committee believes that innovative methods must be developed so as to address the issues of information and financing for end users more directly: it is essential that owners and tenants do not see these new Community measures as a new tax levied on such a primary asset as the home.

1.5 The Committee believes that new cultural stimuli and incentives will need to be devised, both to offset the higher costs and to raise interest in:

— project research,

— revised building methods,

— the use of better materials in the building process, and

— new structural methods.

1.6 In the Committee's view, the work of the CEN (the European Committee for Standardisation) should be stepped up, in line with the Commission's brief on the matter, which provides for the definition of harmonised standards for measuring the energy consumption of existing buildings and new builds, as well as for certification and inspection procedures.

1.7 The Committee would reiterate the importance of avoiding setting unsustainable restrictions on Member States, in the face of international competition, and ensuring that owners who rent out or occupy a property are not forced to shoulder costs that they cannot afford.

1.8 The obligations and costs arising from the certification process should in the Committee's opinion be accompanied by publicity campaigns, so as to guarantee fair access to improved energy efficiency, in particular for residential buildings, built or managed in the context of social policy, and blocks of flats, particularly in the new Member States where most blocks of flats are standard-type buildings; for such buildings, standard certificates can be used.

1.9 The Committee would stress the importance of developing Community initiatives to harmonise the activities of Member States in terms of energy efficiency, so as to make real progress towards greater European coherence, while taking local conditions into account.

1.10 The Committee recommends a number of measures that could encourage end users to be more mindful of energy efficiency in general and more specifically in buildings:

— free advice on energy and public financing of feasibility studies;

— tax credits and/or subsidies for carrying out 'energy audits';

— tax relief for the consumption of fuel for heating, electricity and motive power and economic incentives and deductions/reimbursements for the purchase of energy efficient and environmentally-sound technologies or for the installation of better heat insulation in existing buildings;

— low-interest loans for the purchase of energy efficient equipment and installations (e.g. condensing boilers, individual thermostats, etc.) and for work involving ESCOs ([1]);

([1]) ESCO = Energy Service Company.

— tax relief or deductions for investments in R&D activities, or in pilot projects, with a view to promoting the dissemination of new technologies, in the field of building-sector energy efficiency, making the most of the opportunities provided by the 2007-2013 Seventh Framework Programme for Research and Technological Development (FP7), the Competitiveness and Innovation Framework Programme (CIP), the LIFE+ programme and the Structural and Cohesion Funds;

— EIB loans, above all for the sustainable renovation of large, ageing public or public service buildings and social housing;

— assistance to families on low incomes and pensioners for improving the energy efficiency of housing, and long-term, low-interest loans aimed at improving the energy efficiency of buildings;

— fixed-price standard packages for regular maintenance services for boilers and centralised air-conditioning installations, to be provided by qualified staff;

— a Community website linked to national sites, easy for end users to access;

— the preparation of European teaching materials, in all Community languages, focussed on the various professional groups concerned, regarding the issue of a European 'housing licence' ([2]);

— the incorporation of key education-related themes in relevant Community programmes — the EU's education programme; FP7-RTD; Marie Curie; EIB, Universities;

— the provision of information and training materials for schools at all levels, for professional and union associations, and for consumers and their organisations.

1.11 From the point of view of the final consumer, the Committee feels that consideration must be given to the obstacles hindering the promotion and implementation of energy efficiency in buildings in Europe: barriers of a technical, economic, financial, legal, administrative, bureaucratic, institutional, management-related and socio-behavioural nature and barriers linked to inconsistencies of approach (imbalances between heating/air-conditioning, no consideration of the local climate).

2. **Introduction**

2.1 The Presidency Conclusions of the Brussels European Council (8/9 March 2007) stress 'the need to increase energy efficiency in the EU so as to achieve the objective of saving 20 % of the EU's energy consumption compared to projections for 2020 […] "and identify" energy-efficient and energy-saving behaviour of energy consumers, energy technology and innovations and the **energy savings from buildings**' as priority areas.

2.1.1 Energy efficiency of buildings is an issue which falls within the scope of the Community initiatives on climate change (commitments under the Kyoto Protocol) and security of supply, particularly in the context of the green papers on security of energy supply and energy efficiency, on which the EESC has commented on several occasions ([3]).

2.1.2 Energy consumption in buildings-related services accounts for around 40 % ([4]) of the EU's energy consumption.

2.1.3 For heating alone, the average consumption of dwellings in many regions of Europe is 180 kWh/m^2/year. This shows that many European nations' buildings are particularly poor performers when it comes to energy efficiency.

2.1.4 Many factors contribute to this. On the one hand, few consumers are aware of the ever-increasing difficulties of obtaining energy at affordable prices; on the other, architects, building firms and the countless small entrepreneurs who work in the building sector ([5]) tend to pay little attention to energy efficiency and environmentally sound construction when building and to prioritise aesthetic aspects and follow passing fashions such as floor quality, luxury washing appliances, attractiveness the vitrification of external facades, type of material and size of window frames.

2.1.4.1 Moreover, many administrative bodies, particularly municipal engineering departments and public health offices, fail to pay enough attention to the issue when it comes to recording energy consumption of buildings as part of checks ensuring that they provide safe accommodation or are insufficiently informed.

2.1.4.2 Nevertheless, contrary to common belief, there is great scope for increasing energy efficiency, in existing as well as new buildings, particularly in multi-occupancy accommodation in cities ([6]).

2.1.5 As regards renovation of existing infrastructure, the contracts that can be concluded with Energy Service Companies (ESCOs) have an important role to play: under these contracts,

([2]) To certify awareness of the need to use resources efficiently. See similar proposal for a European computer licence.

([3]) Opinion on the Green Paper — Towards a European strategy for the security of energy supply, rapporteur Ms Sirkeinen, OJ C 221 of 7.8.2001, p.45; exploratory opinion on a strategy for an optimal energy mix, rapporteur Ms Sirkeinen, OJ C 318 of 23.12.2006, p. 185; exploratory opinion on Energy Efficiency, rapporteur Mr Buffetaut, OJ nr C 88/53 of 11.4.2006; opinion on energy end-use efficiency and energy services, rapporteur Ms Sirkeinen, OJ C 120 of 20.5.2005, p. 115; opinion on an Action Plan for Energy Efficiency, rapporteur Mr Iozia, OJ nr C 10/22 of 15.1.2008.

([4]) 32 % in transport, 28 % in industry — Source: European Commission, DG ENTR.

([5]) The building sector's GDP accounts for over 5 % of the EU's total GDP.

([6]) If the average energy consumption of buildings in European regions fell to 80KWh/m2/year, i.e. into Class D, much of the energy used in the building sector could be saved. This is clearly in line with the spirit of Directive 2002/91/EC.

the companies are entrusted with the improvements to be made to existing buildings, to make — sometimes substantial — savings on energy costs. The company is paid with the money saved from the reduced consumption ([7]).

2.1.6 Additionally, numerous measures could be taken in small-scale renovations such as external shutters on windows, the installation of smart meters, which allow consumers to monitor their consumption in real time on an ongoing basis, or gas-fired water heating plant (top boxes) that can reduce costs and harmful gas emissions by 40 %. Air ventilation micro-systems have also proved to be remarkably efficient in flats, while paying attention to the type of material used, for example, for a transparent vertical panel (windows) can reduce heat loss from a flat by at least 20 % ([8]). The use of water-saving renovation techniques also cuts down on energy consumption. In connection with the energy bills, energy suppliers shall inform the consumers clearly and free of charge about the consumption of the corresponding period of the year before, for the consumes to be able to put their present consumption into perspective.

2.1.7 The EESC firmly believes that initiatives in this sector can bring huge savings, thus helping to achieve goals related to climate change and security of energy supply. Given that there is relatively little scope for action in the short- or medium-term in the area of energy supply conditions, it is necessary to influence end users, i.e.:

— increase energy end-use efficiency;

— contain demand for energy;

— promote renewable energy production ([9]);

— provide for better energy management, on the basis of self-control.

2.1.8 There are a variety of factors which prevent saving and better use of energy resources:

— cultural considerations;

— difficulty of handling the change;

— lack of know-how;

— inadequate fiscal policy;

— not enough enterprise partnerships;

— lack of information.

([7]) There are currently three types of contract: the first-out performance contract, the shared savings contract and the guaranteed savings contract.

([8]) This is achieved by using a low-emission window made up of two glass panels with a layer of noble gas between them (krypton, xenon, argon).

([9]) The contribution of renewable sources: solar radiation intercepted by the Earth: **177 000 TW;** solar radiation at ground level: **117 000 TW;** Global primary energy consumption: **12 TW** (Source: University of Bergamo, Engineering department).

2.1.9 The potential for energy saving in the building sector is huge, especially when it comes to energy consumption for heating, motive power and lights in the use-phase of the building. This is shown by what are known as passive buildings ([10]), which harness huge saving opportunities, spurring the Community's competitiveness and innovation by keeping the focus increasingly on development and use of new, more energy efficient technologies.

2.1.10 The energy policy's strategic objectives seek to:

— reduce pollutant and climate-change emissions, with due regard for the particular characteristics of the environment and the region;

— promote competitive growth in the property sector, industry and new energy technologies;

— focus on welfare and public health protection as related to energy policy.

2.1.11 When defining measures to increase energy efficiency, account should also be taken of the benefits of widespread use of cost-effective technological innovations. End users can take more informed decisions regarding their individual energy consumption if they are given appropriate information, such as details of measures laid down to increase energy efficiency, comparisons of end users' profiles, and specific, practical techniques relating to energy-powered appliances ([11]).

2.1.12 All kinds of information on energy efficiency, especially the related costs, should be widely disseminated in the appropriate forms to interested parties. The information should also cover financial and legal aspects and should be presented in information and advertising campaigns which provide a clear picture of best practices, at all levels.

2.1.13 Measures limited solely to technical aspects are necessary, but not sufficient, to reduce energy consumption in the building sector. The complex interaction between the constantly-developing technology and its many and varied users also needs to be addressed.

2.1.14 As part of the previous Intelligent Energy — Europe Programme (2003–2006), the initiative of an EPBD Buildings Platform was developed ([12]). This provides services facilitating the implementation of Directive 2002/91/EC on the energy performance of buildings, which entered fully into force at the beginning of 2006. The directive includes the following requirements, which apply to the Member States:

— method of calculation of the integrated energy performance of buildings and related energy performance requirements;

([10]) 'Passive' buildings are buildings which consume less than 15 KWh/m^2/year.

([11]) End users should already be provided with some of this useful information under Article 3(6) of Directive 2003/54/EC.

([12]) EPBD = European Energy Performance of Buildings Directive.

— minimum joint EU requirements on the energy performance of new buildings;

— minimum requirements on the energy performance of large existing buildings that are subject to major renovation;

— energy certification of buildings, which is mandatory for new buildings, buildings subject to major renovation and all flats subject to change of occupancy ([13]);

— regular inspection of boilers and of air-conditioning systems in buildings, and assessment of heating installations in which the boilers are more than 15 years old.

2.1.15 From a technical point of view it is essential that the public and consumers realise the need for an integrated approach which takes various factors into account, including:

— the quality of heat insulation;

— the type of heating and air-conditioning installations;

— the use of renewable sources;

— the orientation of the building;

— the prevention of damp problems and the formation of mildew.

2.1.15.1 There are essentially two basic indicators:

— **the specific energy demand of the building envelope**: this estimates the performance of the envelope, which minimises heat loss in winter and limits over-heating in summer;

— **the entire specific primary energy demand:** in addition, this estimates the performance of the set of installations which convert primary energy into accommodation comfort and into various services.

2.1.16 To achieve the goal of keeping down energy consumption and pollutant and climate-change gas emissions, policies are also needed which:

1. flank heat insulation measures (passive energy-saving measures) with substantial improvements in installation technology (active energy-saving measures);

2. extend the range and scale of energy-saving measures;

3. integrate renewable sources into high-efficiency 'hybrid' systems;

4. target innovative systems: **solar cooling, micro CHP, trigeneration, heat pumps and hybrid plant** ([14]).

([13]) In the event of purchase, sale, renting out or inheritance.

([14]) **Average energy concentration**: solar panels:~ 0,2 kW/m²; wind turbine: ~ 1-2 kW/m², hydraulic engine: ~ 5 000 kW/m²; heat engine: ~ 10,000 kW/m² (Source: University of Bergamo, Engineering department).

2.1.17 Community innovation and research programmes play a decisive role in developing the energy efficiency of buildings, as regards the technological goal of developing 'zero energy' intelligent buildings, i.e. 'positive energy' buildings which produce more energy than they consume, using the most common alternative forms of energy such as solar, wind and geothermal energy.

2.1.18 At Community level, in addition to the above-mentioned Competitiveness and Innovation Framework Programme (CIP), a decisive role in supporting the development of clean energy technologies is played by the Seventh Framework Programme for RTD, which provides for a special thematic priority under the 'Cooperation' specific programme.

2.1.19 European technical standardisation has an essential role to play in the energy efficiency of buildings sector. The CEN — European Committee for Standardisation — has been instructed by the Commission to draw up the technical regulations necessary for the implementation of the above-mentioned Energy Performance of Buildings Directive ([15]), as follows:

— harmonised standards on measuring energy consumption for existing buildings;

— harmonised standards for new buildings;

— uniform standards for certification;

— joint standards for inspection procedures.

2.1.20 Almost 30 (CEN) European standards have been drawn up ([16]). The Member States have already confirmed their intention to implement them on a voluntary basis. Should it be observed that voluntary conformity with the standards is not being achieved, appropriate legislation should be introduced to make them binding.

2.1.21 In any case, it is the Commission's responsibility to provide Member States with the instruments necessary to develop an integrated, uniform methodology for calculating the energy performance of buildings. Once the Member States have established minimum energy-efficiency requirements, these must

([15]) Cf. footnote 16 for the UN-CEN/CENELEC reference standards drawn up thus far. WWW.CEN.EU/CENORM/BUSINESSDOMAINS/SECTORS/UTILITIESAND ENERGY/NEWS.ASP.

([16]) EN ISO 6946 Building components and building elements; EN 10339 Air-conditioning systems for thermal comfort in buildings; EN 10347 Building heating and cooling; EN 10348 Building heating; EN 10349 Building heating and cooling; EN 13465 Ventilation for buildings; EN 13779 Ventilation for non-residential buildings; EN 13789 Thermal performance of buildings; EN ISO 13790 Thermal performance of buildings; EN ISO 10077-1 Thermal performance of windows, doors and shutters; EN ISO 10077-2 Thermal performance of windows, doors and shutters; EN ISO 13370 Thermal performance of buildings; EN ISO 10211-1 Thermal bridges in building construction; EN ISO 10211-2 Thermal bridges in building construction; EN ISO 14683 Thermal bridges in building construction; EN ISO 13788 Hygrothermal performance of building components and building elements; EN ISO 15927-1 Hygrothermal performance of buildings; EN ISO 13786 Thermal performance of building components; EN 10351 Building materials; EN 10355 Walls and floors; EN 410 Glass in building. Determination of luminous and solar characteristics of glazing; EN 673 Glass in building. Determination of thermal transmittance (U value); EN ISO 7345. Thermal insulation – Physical quantities and definitions.

be reflected in 'energy performance certificates', which are essentially marks conferred on buildings, similar to those conferred on household appliances. However, the certificates for buildings are more elaborate and complex and are accompanied by recommendations on how to improve performance.

2.1.22 Research projects have clearly demonstrated that, along with a building's technical installations, the attention which its users give to energy saving — be they residents or users of workplaces during the daytime — is a decisive factor in energy consumption.

2.1.22.1 For instance, it is worthwhile promoting a culture of dressing more appropriately in high temperatures, e.g. not wearing jackets and ties in the summer ([17]), as well as appropriate winter attire, to enable the temperature in apartments and offices to be kept at approximately 20 or 21 °C ([18]).

2.1.23 Even the orientation of a house affects the quantity of heat needed to make it comfortable for its inhabitants. The per-capita energy consumption for heating identical terraced houses can vary by a factor of 2,5 (and by a factor of 3 for detached houses) while electricity consumption can vary by a factor of 4 or 5.

2.1.23.1 In view of the above and other considerations, the existing legislation should be fleshed out with some precepts for energy efficiency, not only for buildings but also for neighbourhoods.

2.1.24 Increasingly, even at school age ([19]), people should be made more aware of the significant amount of primary energy required by their homes for:

— providing heating in the winter;

— keeping them cool in the summer;

— heating water;

— running lifts;

— providing lighting;

— running domestic appliances;

and that with a little care and readiness much of this energy can be saved ([20]).

([17]) See decision by the Japanese prime minister.

([18]) The temperature in Brussels' Renewable Energy House does not exceed 21 °C in wintertime.

([19]) Joules, the unit for measuring energy, and watts (joules per second), the unit for measuring electrical power, should be included in school curricula alongside the notions of metres, litres and kilograms ....

([20]) The cheapest sort of energy is **the sort that has been saved!**

2.1.25 End users often have to take important decisions regarding investments, for instance when renovating houses or deciding to make significant changes to houses still being planned or built. Decisions to invest in new technologies that allow significant energy savings can have major repercussions on the energy performance of buildings. Examples include:

— materials that offer better insulation;

— frames (doors and windows) with improved transmittance ([21]);

— solar protection mechanisms, such as simple shutters for instance;

— the choice or adjustment of the heating system ([22]);

— the installation of additional systems such as photovoltaic technology, solar heating, or horizontal or vertical geothermal heating systems ([23]);

— the prevention of damp problems and the formation of mildew.

2.1.26 It is clear that to change the frame of reference generally used to date, new cultural stimuli and incentives will have to be found to compensate for the higher costs and to increase interest in:

— planning-stage research;

— revised building methods;

— the use of quality materials in the building process;

— new structural designs, to enable solar heating equipment to be fitted ([24]);

— the optimum positioning of solar panels;

— prior surveys for the use of vertical or horizontal geothermal technology.

([21]) The transmittance value is set increasingly to equal and exceed the aesthetic value of housing fixtures.

([22]) Condensing boilers have efficiency of 120 % compared to traditional boilers, which have efficiency of 80 %.

([23]) Vertical geothermal technology is based on the principle that the temperature of the ground is higher deeper down. Therefore a quantity of water sent down a pipe at a certain depth comes up at a higher temperature and requires less heat to reach the temperature necessary to heat a building. Horizontal geothermal technology exploits the constant temperature of the earth at a depth of 4 or 5 metres and therefore provides water at a higher temperature than the ambient temperature, in a coil placed at that depth. This means that the thermal delta is lower. The amount of heat needed to bring a quantity of water from 6 °C up to 30 °C is very different to that needed to bring it from 14 °C to 30 °C.

([24]) 'Solar cooling': solar energy can also be used to generate air conditioning devices, with considerable energy savings. The process is based on a heat absorbing cooling device. The use of **solar collectors** as generators of power to run cooling devices enables the panels to be used during the sunniest periods.

2.1.27 The following incentives deserve to be considered:

— an increase in the buildable area;

— a reduction in some of the taxes levied on construction and renovation projects;

— streamlined planning permission procedures;

— allowances for the greater thickness required by an opaque vertical structure (a wall), when furnished with layers of insulating material;

— the award of quality labels, on the basis of the level of saving achieved.

2.1.28 Any measures adopted with a view to securing significant energy savings should take into account the fact that the majority of Europeans live in existing buildings and that new buildings constitute only a small percentage.

2.1.29 One problem with rented accommodation is that it is generally *the owners that bear the cost* of energy efficiency-increasing measures (e.g. new door and window frames, high-efficiency boilers, clean energy generators), *whereas it is the users that benefit* from the resulting lower costs.

2.1.30 This problem could be avoided by backing the '**third-party financing**' method ([25]). This involves **encouraging** energy-saving initiatives in buildings, carried out by companies linked to lending bodies, **paying off** investments over a fixed number of years with the average savings made as a result of lower energy costs in the years following completion of the work.

2.1.31 One valid financing system used in the industrialised countries, which could be backed and extended, is demand side management (DSM). Energy producing or supplying companies invest in projects for the energy-related renovation of the buildings within their responsibility. The savings made after the work cover the expense.

2.1.32 Clearly, the system could be improved with the right legal framework, encouraging energy suppliers to invest in renovating the heating systems of buildings for which they supply energy.

2.1.33 The complex issue of saving energy in residential buildings is one facing most of the EU's new Member States. The burden of this cost and complexity must not be allowed to fall on the end users and the public. The Czech Republic, for instance, has managed to use some of the funds granted through cohesion policy for the renovation of residential buildings.

2.1.34 The main area requiring attention is the need to ensure that building renovation is carried out with concern for energy conservation. If the objectives of keeping energy consumption and pollutant gas emissions down are to be met, policies are needed to:

— flank heat insulation measures (passive energy-saving) with the necessary improvements to installation technology (active energy-saving);

— extend the range and scale of energy-saving initiatives, not least using policies that provide for financial and planning incentives;

— disseminate 'hybrid' systems, i.e. systems that combine traditional energy with alternative or clean energy inputs, so as to reduce the use of fossil fuels.

2.1.35 To be genuinely effective, a policy aimed at promoting energy savings in buildings must secure, alongside public involvement, the commitment of the various professional associations and entrepreneurs in the various sectors, namely:

— professionals;

— promoters of green and bioclimatic urban planning;

— project managers;

— energy managers;

— ESCOs;

— construction companies;

— real estate companies;

— building sector manufacturers;

— providers of service and maintenance.

3. **The current situation**

3.1 *The current situation within the EU*

3.1.1 Improving the energy efficiency of buildings has been the objective of many Community provisions, including: the 1989 Directive on construction products ([26]) and the construction-related elements of the 1993 SAVE Directive ([27]), a 1993 directive on the energy certification of buildings ([28]), the 2002 Directive on the energy efficiency of buildings (EPBD) ([29]), Directive 2005/32/EC of 2005 establishing a framework for the

([25]) This is the subject of an EU recommendation in Article 4 of Directive EEC No. 93/76 (OJ L 237/28 of 22.09.1993). In this instance it is a technical–financial device applied in the form of a contract, for the overall provision of auditing, financing, installation, operation and maintenance by an external company commonly known as an ESCO (Energy Service Company) and required to pay for the investment in new devices, by mortgaging part of the financial value of the expected energy saving for a number of years. See appendix.

([26]) Directive 89/106/EEC.
([27]) Directive 93/76/EEC.
([28]) Directive 93/76/EEC (repealed by Directive 2006/32/EC).
([29]) Directive 2002/91/EC.

setting of ecodesign requirements for energy-using products ([30]), and the 2006 Directive on energy end-use efficiency and energy services ([31]). Meanwhile there have been many other legislative measures relating to products, such as the directive on boilers ([32]), the office equipment decision ([33]), the directive on household appliances and the labelling of energy consumption ([34]), the directive on the energy efficiency of refrigerators ([35]), and the directive on ballasts for fluorescent lighting ([36]). The 2002 EPBD Directive deals specifically with improving the energy efficiency of new and existing residential and non-residential buildings.

3.1.2 The deadline for transposing this directive was 4 January 2006, but various Member States have requested and been granted an extension ([37]), while others, are subject to infringement procedures by the Commission for failed or incorrect transposition ([38]). Nevertheless, all the Member States should have established criteria for energy certification by the end of 2007.

3.2 *The current situation in relation to types of housing and climate*

3.2.1 In order to address fully the issue of end users' contribution to the energy efficiency of buildings, one has to consider the specific characteristics of the vast areas of the EU concerned, with regard in particular to:

— the various types of building stock,

— the various climate contexts.

3.2.2 **Types of building stock.** In the new Member States and the five East German Länder, the building stock has potential for considerable energy savings, compared with building stock in the other 15 Member States.

3.2.2.1 The building stock in these areas is for the most part the legacy of post-war town planning, and is based on the use of prefabricated components making up large multi-storey multi-occupancy blocks. These were built using rapid mass production and homogeneous, standard, centralised technologies. They also went without any maintenance or restructuring for long periods ([39]).

3.2.2.2 In Romania, for instance, 4 819 104 residential buildings were counted in 2002. There were 83 799 housing blocks containing 2 984 577 apartments. They account for approximately 60 % of existing flats. Furthermore, 53 % of residential buildings are over 40 years old; 37 % are over 20 years old and only 10 % are under 10 years old.

3.2.2.3 In over 95 % of the big apartment blocks, common to all the countries of the former Soviet bloc, energy for heating, ventilation and water heating is supplied by centralised systems. Studies carried out in 2005 on this type of building calculated potential energy savings of 38-40 %.

3.2.2.4 These major energy losses can be put down in part to the end users, the poor quality of materials, insufficient heat insulation, old high-consumption technologies, obsolete heating installations, high-consumption lighting, inefficient firing installations, poor quality pumps, etc. Another reason is inefficient energy management, with considerable losses ([40]) paid for in the long run by the consumer. **Energy efficiency is the most accessible, the least polluting and the cheapest** of all the available options.

3.2.3 Climate zones

3.2.3.1 In the main climate zones of northern and southern Europe, average consumption in the residential sector is equal to 4 343 kWh/year ([41]). This energy is used principally for heating, which consumes 21,3 % of demand for electricity, despite being concentrated mainly in northern and central Europe. Next in line is the share of electric energy used by fridges and freezers (14,5 %) and by lighting (10,8 %).

3.2.3.2 In southern Europe (Italy, Spain, Portugal, Slovenia, Malta, Greece, Cyprus, and the south of France), one of the main factors in increased electricity consumption is the rapid spread of low power consumption, low yield residential air conditioning units ([42]) (< 12 kW output cooling power) and their widespread use in summertime.

([30]) Directive 2005/32/EC.
([31]) Directive 2006/32/EC.
([32]) Directive 92/42/EEC.
([33]) Decision 2006/1005/EC.
([34]) Directive 92/75/EEC.
([35]) Directive 96/57/EC.
([36]) Directive 2000/55/EC.
([37]) See, Italy, among others …
([38]) See reasoned opinion sent to France and Latvia, 16.10.2007.
([39]) Overview on energy consumption and saving potentials — Carsten Petersdorff, ECOFYS GMBH, Eupenerstrasse 59, 50933 Cologne, Germany. May 2006.
([40]) When it comes to the energy content of the fuel used, the overall energy losses are equal to 35 % for the best performing systems and 77 % for those least efficient.
([41]) Total consumption of electricity divided by the number of households.
([42]) In March 2002, the European Commission adopted Directive 2002/31/EC) aimed at the introduction of more energy efficient installations; it was supposed to enter fully into force by June 2003, but the deadline was then postponed until summer 2004. It set the energy efficiency indicators for small Class A air conditioners at 3.2. However, there are already models on the market with higher energy efficiency levels, ranging from 4 to 5.5 for the better models. This means that the generalised spread of Class A is no longer an ambitious objective. It also means that the scope for savings is still wide, as there are still a large number of Class D and E models on the European market with efficiency indicators of approximately 2.5.

3.2.3.3 Residential consumption of electricity for air conditioners, to which Directive 2002/31/EC applies, has been estimated at around 7-10 TWh per year for the 25-Member State EU ([43]). It should also be noted that in Europe, new multimedia equipment, such as personal computers, printers, scanners, modems and mobile phone chargers plugged in continuously account for 20 % of household energy consumption.

3.3 *A few international comparisons*

3.3.1 Energy consumption in **Japan,** accounts for approximately 6 % of world consumption. Measures were taken some time ago to reduce this level of consumption and the resulting CO_2 emissions, particularly in the transport and construction sectors, the residential sector accounting for 15 % of overall consumption.

3.3.2 In the residential sector, primary energy savings, reduced CO_2 emissions and energy cost savings achieved by means of building energy efficiency measures have been estimated, respectively at approximately 28 %, 34 %, and 41 % ([44]). Japan's residential building energy efficiency standards ([45]) were revised in 1999 and include both yield standards and prescriptive standards, the objective being to achieve full application of these standards for more than 50 % of new buildings.

3.3.3 The Japanese method of assessing jointly buildings and the household electrical appliances used has the following features:

a) an assessment of the energy efficiency of buildings and of household electrical appliances;

b) an assessment of the energy efficiency of the entire house, using total energy consumption, specifying consumption for air conditioning, water heating, lighting and ventilation, **at the time of construction;**

c) an assessment of efficiency regarding air conditioning, water heating, lighting and ventilation appliances **during actual use;**

d) detailed measurements of efficiency when new homes are actually lived in, with a view to reaching savings targets by 2010.

([43]) See footnote 37.

([44]) Energy efficiency standard as measured by Japan's 'CASBEE' rating. Source: From Red Lights to Green Lights: Town Planning Incentives for Green Building presentation to the 'Talking and walking sustainability international conference', February 2007 Auckland. Author: Mr Matthew D. Paetz, Planning Manager, BA, BPlan (Hons), MNZPI. Co-Author: Mr Knut Pinto-Delas, Urban Designer, Masters of Urban Design (EIVP, Paris).

([45]) Japan: Law Concerning Rational Use of Energy, Law No 49 of 22 June, 1979).

3.3.4 **In the USA,** already in 1987 ([46]), in line with the chapters on residential building in the International Energy Conservation Code (IECC ([47])), minimum efficiency standards were established for 12 types of household electrical appliance. These form the basis for a number of state energy codes.

3.3.5 Building energy efficiency monitoring is the responsibility of individual states and in many cases individual counties, particularly since the adoption of the Energy Policy Act of 2005, (EPACT), which uses accelerated tax deductions to encourage the owners of commercial buildings to apply energy efficiency systems to reduce dependence on fossil fuels.

3.3.6 The Model Energy Code (MEC) ([48]), developed on the basis of the IECC in the 1980s and regularly updated including as recently as 2006, is backed up by the US Department of Energy's Building Energy Codes Program, and aims to promote ever better building energy codes and assist the federal states in adopting and applying those codes, which are reviewed regularly in order to:

— redefine climate zones,

— simplify prescriptive requirements,

— remove obsolete, superfluous or contradictory definitions.

3.3.7 In 2007, the Energy Efficient Buildings Act was introduced to Congress with a view to:

— establishing a pilot program to award grants to businesses and organisations for new construction or major renovations of energy efficient buildings that will result in innovative energy efficiency technologies;

— giving due consideration to buildings that are likely to serve low income populations;

([46]) USA: the National Energy Policy and Conservation Act (NEPCA) 1987.

([47]) USA: Residential Energy Code Compliance — IECC 2006 on the residential requirements of the 2006 International Energy Conservation Code., http://www.energycodes.gov/.

([48]) In the USA, 63 % of states have adopted the MEC for residential buildings and 84 % have adopted the ASHRAE/IES 90.1-2001 standard for commercial buildings, a technical standard developed by the American Society of Heating, Refrigerating and Air-Conditioning Engineers — ASHRAE and the Illuminating Engineering Society of North America — IES/IESNA. CFR. HTTP://WWW.ASHRAE.ORG/ E http://www.greenhouse.gov.au/buildings/publications/pubs/international_survey.pdf.

— providing a clear definition of an 'energy efficient building' as one that after construction or renovation uses heating, ventilation, and air conditioning systems that perform at no less than Energy Star standards; or if Energy Star standards are not applicable, uses Federal Energy Management Program recommended heating, ventilating, and air conditioning products.

3.3.8 According to the Federal Department of Energy, DOE, the design of new more comfortable and efficient buildings could reduce cooling and heating costs by 50 %, while measures aimed at applying the energy efficiency codes in buildings will create new job opportunities in construction, renovation and plant engineering.

4. **General comments**

4.1 The Committee has spoken out on a number of occasions on the need to make significant and sustainable energy savings by developing low-consumption techniques, products and services, and on the need to change people's behaviour so as to reduce energy consumption while nevertheless maintaining the same quality of life.

4.2 The Committee recognises that energy efficiency makes a major contribution to safeguarding the climate and to respecting the commitments made by the EU at Kyoto as regards emission reductions, and it recommends continuing and stepping up efforts made at consumer level.

4.3 The Committee would argue that to encourage energy savings in buildings there must be a detailed examination of the obstacles that have prevented full implementation of the EPBD directive, and that a transition period of approximately 10 years should be allowed before making certification for all existing buildings covered by the directive compulsory.

4.4 In its 2001 opinion on the draft EPBD directive, the Committee stressed its support for the Commission initiative and its desire to develop a common methodology for assessing and monitoring the energy performance of buildings. However, it pointed out that care should be taken to: **'avoid creating intolerable constraints for Member States in terms of international competition' and to 'avoid imposing charges on property owners — whether renting out or living in their property — that are disproportionate to their means, as this could have the effect of neutralising the objectives of the directive, and encouraging people to reject a united Europe'** ([49]).

4.5 The EESC believes any extension to the EPBD directive should include a building-system lifecycle analysis, to illustrate the impact on the carbon cycle. This would give consumers and the regulatory authorities a clearer idea of the consequences regarding the carbon emissions of the products planned for use in the building system.

4.5.1 Any extension of Community legislation in this area should in any case be subject to an appropriate impact evaluation, given its likely impact on the market and the costs falling on the final consumers, be they owners or tenants.

4.5.2 Care should also be taken to ensure that the desired measures for improving heat insulation allow for sufficient circulation of air and humidity, prevent damp and do not cause damage to the building, for instance by causing mildew to form.

4.6 As the Committee has already pointed out ([50]), 'Relevant actions to enhance energy efficiency vary widely because of different local circumstances and actions so far. The effects of these actions on the internal market seem limited. Against this background it is important, in line with the subsidiarity principle, that additional actions at EU level give genuine added value'.

4.7 The certification process should be accompanied by publicity campaigns, so as to guarantee fair access to improved energy efficiency, in particular for residential buildings that are built or managed in the context of social housing policy.

4.8 The regular maintenance, by qualified staff, of boilers, air-conditioning installations and other alternative energy installations will help to ensure they are at the right settings, in accordance with product specifications, and thus providing optimum performance.

4.9 On the basis of the positive experience of a number of Member States, and following the results in past years of the implementation of major Community policies, the Committee would recommend a number of measures that could help to promote energy efficiency in general and more specifically in buildings:

— free energy advice;

— tax credits and/or subsidies for carrying out 'energy audits';

— tax relief on the consumption of fuels for heating, electricity and motive power;

— tax relief for the purchase of energy efficient and environmentally-sound technologies;

([49]) Opinion of the Economic and Social Committee on the 'Proposal for a Directive of the European Parliament and of the Council on the energy performance of buildings' in OJ C 36/20 of 8.2.2002.

([50]) Opinion regarding energy end-use efficiency and energy services, rapporteur: Ms Sirkeinen; O.J. nr C 120 of 20.5.2005, p. 115.

— low-interest loans for the purchase of energy efficient equipment and installations (e.g. condensing boilers, individual thermostats, etc.);

— preferential loans for ESCO initiatives;

— tax relief or deductions for investments in R&D activities, or in pilot projects, with a view to promoting the dissemination of new technologies focused on energy efficiency in buildings;

— assistance to families on low incomes and pensioners for improving the energy efficiency of housing;

— long-term, low-interest loans aimed at improving the energy efficiency of buildings.

4.10 The Committee believes that innovative methods must be developed so as to address the issues of information and financing for end users more directly: **it is essential that owners and tenants do not see these new Community measures as a new tax levied on such a primary asset as the home**.

4.11 Meeting the Kyoto Protocol objectives and saving energy must not appear to be a simple transfer of greater costs from the energy producing industries to the end users and European citizens.

4.12 In order to limit the burden on individual owners, the Committee would argue that, wherever possible, certification should be conducted for entire buildings using sample apartments to secure certification that would be valid for all the apartments in the building.

4.13 A website, promoted by the Commission and linked to national websites, might be a useful way of overcoming the legal, institutional, management-related and technical barriers that prevent user-friendly access for end users.

4.14 The Committee considers it to be important that it should set a good example on energy efficiency in the management of its own buildings. It has noted the excellent example of its near neighbour in Brussels — the 'Renewable Energy House' — which shows that significant improvements in an existing building can be achieved in a cost-efficient way. Some improvements have already been made in the Committee's buildings, and in working towards EMAS certification. The Committee is now calling for a further report from its administration to review progress so far, and identify what further improvements could be made.

Brussels, 14 February 2008.

The President

of the European Economic and Social Committee

Dimitris DIMITRIADIS