

European Actions to Improve Energy Efficiency of Buildings

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SUMMARY

As presented by the Energy Green Paper “A European Strategy for a sustainable, competitive and Secure Energy” (1), Europe has entered a new energy era. Global demand is increasing within a framework of high and unstable prices. Emissions of greenhouse gases are rising and it is clear that the European Union and the rest of the world have not reacted quickly enough to increase the use of low-carbon energy technologies or to improve energy efficiency. EU greenhouse gas emissions will exceed the 1990 level by 2% in 2010 and 5% in 2030 according to PRIMES model. EU dependence on imported energy will increase from the current 50% to 65% by 2030.

In this domain, the building sector plays a key role. Consuming more than 41% of the final energy use and producing close to one third of the total emissions of greenhouse gas, the building sector plays a key role in any energy or environmental policy in Europe.

The basic elements of a sustainable policy in this sector clearly needs to:

- Reduce the overall energy demand of buildings,
- Increase the energy efficiency of the building sector,
- Increase of combined heat and power generation,
- Improved efficiency of energy using products,
- Increase the use of renewable energy, and
- National Energy Efficiency Action Plans (IEEAs).

The present paper will detail the status of the Energy Performance of Building Directive launched in 2002 and its panel of accompanying measures as well as various other actions taken in Europe in order to enhance these policies.

1. INTRODUCTION

Historically, energy policy has always played a huge role in the construction of Europe; in 1952, with the Coal and Steel Treaty and 1957 with the Euratom treaty, the founding Member States saw the need for a common approach to energy.

Today, energy market and geopolitical considerations have changed significantly. But the need for action in the energy domain is stronger than ever. Energy is essential for Europe to function. But the days of cheap energy for Europe seem to be over. The challenge of climate changes, increasing import dependence and higher energy prices are faced by all EU members. Moreover, the interdependence of EU Member States in energy as in many other areas is increasing; a power failure in one country has immediate effects in others.

Europe as well as developed country in general, needs to act now, to deliver sustainable, secure, and competitive energy. In doing so, Europe returns to its roots.

In the building sector, this need of a coherent approach is mandatory to succeed. This is the main reason why EC has launched a certain number of measures in order to improve the overall energy efficiency of the building sector, to reduce the use of primary energy in this sector and increase the use of renewable energies.

After a brief presentation of the weight of building sector in Europe, this paper will describe the more important element of European Energy policy in this particular sector.

2. ENERGY SHARE AND SUSTAINABILITY IN EUROPE

In Europe, energy accounts for 80% of all greenhouse gas (GHG) emission; it is a root of climate change and of many pollutions. In this domain, the weight of the building sector is high,

As indicated on figure 1, the final energy use of the building sector, if we integrate the transformation losses of energy is about 41% of the total energy use in Europe.

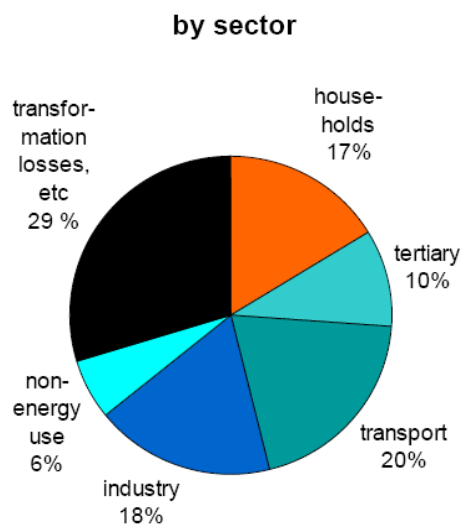
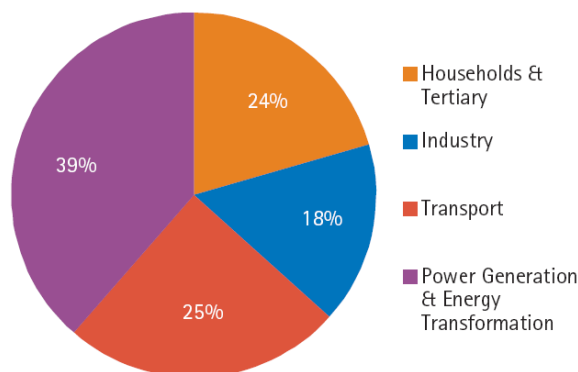


Figure 1: Overall raw energy demand (EU25-2005)

As indicated on figure 2, 24% of CO₂ emissions are directly linked to the building sector.



*Source: Eurostat

Figure 2: Distribution of CO₂ emissions (2002)

The European Union is a region of over 460 millions inhabitants, Europeans occupy and use a wide array of

building types with an equally wide range of thermal qualities and each year the building stock increases significantly. The Member States have all publicly stated their priority to energy efficiency, and building sector represents the largest share of energy demand.

From all indicators, there is a high cost effective potential for energy savings in buildings. The Council resolution of 7 December 1998 on energy efficiency stated that meeting the indicative target of a 1% improvement in energy intensity above the current trend would result in avoiding 55Mtoe in buildings. This represents about 20% of the Kyoto Protocol target. Most recent analysis is provided in the original proposal prepared by EC before launching the recent Directive on the Energy Performance of Buildings. The global potential of energy savings in the building sector was estimated about 22% of present consumption that can be realized by 2010.

3. POLICY DEVELOPMENT RELATED TO BUILDINGS ENERGY EFFICIENCY

The role of EU in terms of energy efficiency policies and programs has evolved since the first oil crisis, in part because EU as evolved politically and institutionally. Going back to the 1970s, there were a number of directives (for example on appliance labeling) that were poorly implemented by Member States. There was a major change in 1989 with the creation of the THERMIE program. THERMIE's goal was to promote energy technologies and it has become to be part of Community Research program. The original SAVE program which is till today the Community's program for energy efficiency, was approved only in 1991. Energy efficiency policies and programs at the Community level have significantly evolved over recent years. In 1998, a Communication on Energy Efficiency (3) set out the broad prospective of a European energy efficiency strategy. An Action Plan followed the Communication in 2000. The action plan stated that if energy intensity of final consumption can be improved by an additional 1% per year above the baseline expectations, then two thirds of the available cost-effective saving potential would be achieved by 2010. If achieved, this would contribute to 40% of the EC commitment to meeting Kyoto protocol target. The 2000 European Climate Change Program identified the most environmentally and cost effective measures to help EU meets Kyoto Protocol, obligations giving considerable emphasis on energy. Most recently the Energy Intelligent Europe (EIE) program was approved in 2003. The EIE has SAVE as a sub program in it. The EU is also involved in technology development through the successive Framework Program (6th and now 7th) which cover all EU funded research. Energy efficiency is funded through one of the priority areas of sustainable development, global change and ecosystems. During the last two years, this strategic plan for energy efficiency and sustainability has been reinforced and new Green Paper on Energy Efficiency (5) has been issued as well as two strategic papers: one on Strategic Energy Technology Plan (6), the other on "an Energy Policy for Europe (7). It is important to review these main actions and to see their implication for buildings.

Five energy directives

- **The co-generation** goal is a real challenge for Europe. In Finland the share of co-generated electricity is much higher than average in Europe. More than 40% of building stock is heated by district heating. Most of this is from co-generation. However, the other type of technical solutions may be in the future even better in respect of energy efficiency. These are discussed in other reports.
- **Energy performance of buildings directive** sets a framework for the national legislation and regulations for the energy efficiency of buildings. It point out the important areas where member countries should focus in their activities. The implementation of the directive has been much slower than anticipated due to national requirements of legislation and lack of technical guidelines. The commission is rewriting the directive (recasting is the term used by commission). More stringent requirements can be expected.

- **End use energy efficiency directive** sets the requirement for member countries to reduce energy use and CO₂ emissions. The goal is to reduce 1% per each year during nine years. The effect of these measures are reported to commissions. The reports are based on calculations of combined effect of the implemented measures.
- **Energy using products directive** sets the eco-design criteria for the energy using products. The design guidelines are at the first stage for the products that are sold more than 200 000 units per year. After 2-3 period for studies, first drafts for the design requirements were published in the beginning of 2008. These products include fans, pumps used in heating systems, boilers and water heaters.
- The purpose of **Renewable energies directive** is to increase the use of renewable energies up to 20 % in Europe, and biofuels up to 10%. In Finland the use of renewable energy sources is already more than 20%, but the proposed target for renewable energies is 38% that is a real challenge. Mostly the use of renewable energies is in pulp and paper industry where the increase is very difficult, as the plants are shut off
- **Other directives related to the energy efficiency of buildings:**
 - . Directive for the taxation of energy products and electricity
 - . Directive on energy efficiency requirements for boilers, refrigerators and ballasts for fluorescent lighting
 - . Directives for labelling of electric ovens, air-conditioners and refrigerators and other appliances
 - . Regulation of Energy Star labelling for office equipment

4. THE ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE: (EPBD)

For significant energy efficiency improvements in the building sector, the focus has been on the Directive on Energy Performance of Buildings. It covers the major end-uses of energy in buildings: space heating and cooling, water heating in residential buildings, space heating and cooling, lighting and water heating in other buildings as well. As shown on the two diagrams from the original proposal of the directive (2) it represents 89% of total energy use in residential buildings and 79% for other buildings.

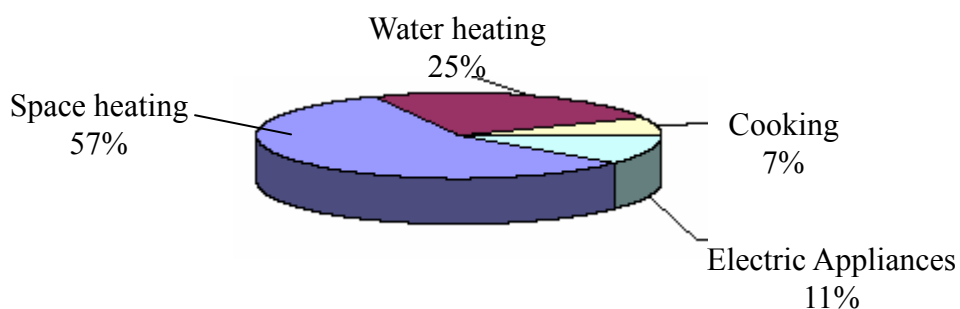


Figure 3: Energy share in EU residential buildings (2001)

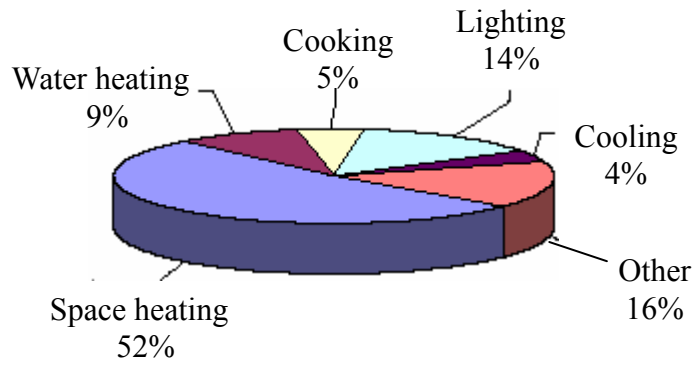


Figure 4: Energy share in EU tertiary buildings (2001)

This directive is focusing on 5 main items:

- Common methodology,
- Setting of minimum energy performance requirements,
- The energy performance certificate,
- Inspection of boilers and air conditioning systems,
- Requirements for experts and inspectors.

Adoption of a common methodology:

This theme deals with **article 3** of the directive on the Adoption of a methodology. The EPBD provides the general framework for the calculation procedures. "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. The energy performance of a building shall be expressed in a transparent manner and may include a CO₂ emission indicator."

In order to facilitate application of article 3, a mandate has been given to the CEN committee to develop appropriate calculation procedures to support member states for the national implementation of a calculation methodology of energy performance.

Setting of minimum energy performance requirements

This topic deals with the procedures for setting up energy performance requirements in the Member States, which are covered in **articles 4, 5 & 6** of the directive. As Member States may differentiate their requirements between new and existing buildings and different building categories, the issues of this theme span a wide range of items such as: strategies on national minimum EP requirements, which building categories are considered in the different Member States, how do the requirements take into account the general indoor climate conditions, what building types are exempted from energy requirements, is the 1000 m² borderline applied in all Member States, what kind of requirements are there for major renovations, are these requirements based on benchmarks, is the rating based on measured or calculated data, how are compliance checks organized, what kind of legal sanctions are there,...

Article 4: Setting of minimum energy performance requirements

"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 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 five years and, if necessary, updated in order to reflect technical progress in the building sector.

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 1 000 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.

Article 6: Existing buildings

"Member States shall take the necessary measures to ensure that when buildings with a total useful floor area over 1 000 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."

The Energy performance certificate is stated in **article 7** of the directive as follow:

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,
- on the assessment of another representative apartment in the same block.

Member States may exclude the categories referred to in Article 4 from the application of this paragraph.

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. The certificate shall be accompanied by recommendations for the cost-effective improvement of the energy performance. 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.

Member States shall take measures to ensure that for buildings with a total useful floor area over 1 000 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.

Inspection of boilers and air conditioning systems

This theme deals with **articles 8 & 9** of the directive. These articles relate to:

- the inspection of hot water boilers used for heating of buildings
- the inspection of air conditioning systems used to control air temperature inside buildings, possibly in combination with the control of building ventilation, air humidity and air cleanliness.

In its "considerations", the EPBD states that "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".

It also asserts that "an independent assessment of the total heating installation is appropriate whenever replacement could be considered on the basis of cost-effectiveness".

Requirements for Experts and Inspectors

This theme deals with **article 10** of the directive on Independent Experts. It comprises issues such as specifications and training requirements for experts and inspectors including indications on the resources needed at national level (how many experts and inspectors and level of expertise), quality assurance for experts, inspectors and certificates, criteria for accreditation, code of practice, insurance and liability...

5. ACCOMPAGNIING MEASURES

EPBD Concerted Action: (www.epbd-ca.org)

The Concerted Action working plan has been organized around a series of 8 meetings (from January 2005 to June 2007), bringing together the participants of 25 countries (23 Member States + Bulgaria and Norway - missing: Czech Republic, Luxemburg, Malta). The CA-participants are the representatives of national governmental ministries or governmental affiliated institutions that are in charge of preparing the technical, legal and administrative framework for transposing the EPBD in their own country. Within the global objective of sharing information and experiences between countries, EPBD CA has the following specific goals :

- To discuss and to prepare a structure for the energy **certification** of buildings in order to maximize similarities and reduce the range of different options selected by the MS;
- To discuss and prepare a coherent basis for the methodologies for **inspection** of heating boilers and air-conditioning equipment;
- To discuss and prepare ways to implement adequate schemes for accrediting of energy audit and inspection **experts** in Member States;
- To discuss criteria for the implementation of common **methodologies** for calculating of the energy performance of buildings.

EPBD Building Platform: (www.buildingsplatform.eu)

The **EPBD Buildings Platform** is a European Commission initiative in the framework of the Intelligent Energy - Europe (2003-2006) program, which provides information services for practitioners and consultants, experts in energy agencies, interest groups and national policy makers in the European Member States for helping the implementation of the **EPBD**.

Intelligent Energy Europe:

There are many untapped opportunities to save energy and encourage the use of renewable energy sources in Europe, but market conditions do not always help. The **Intelligent Energy - Europe programme** is the EU's tool for funding action to improve these conditions and move us towards a more energy intelligent Europe. The second Intelligent Energy – Europe programme started in early 2007 as part of a broader EU programme called **Competitiveness and Innovation**. Concerning the building domain two main programmes have to be considered : SAVE (energy efficiency and rational use of resources) and ALTENER(new and renewable resources); More than 50 projects have been financed since 2004 in accompanying measure of EPBD implementation (http://ec.europa.eu/energy/intelligent/index_en.html)

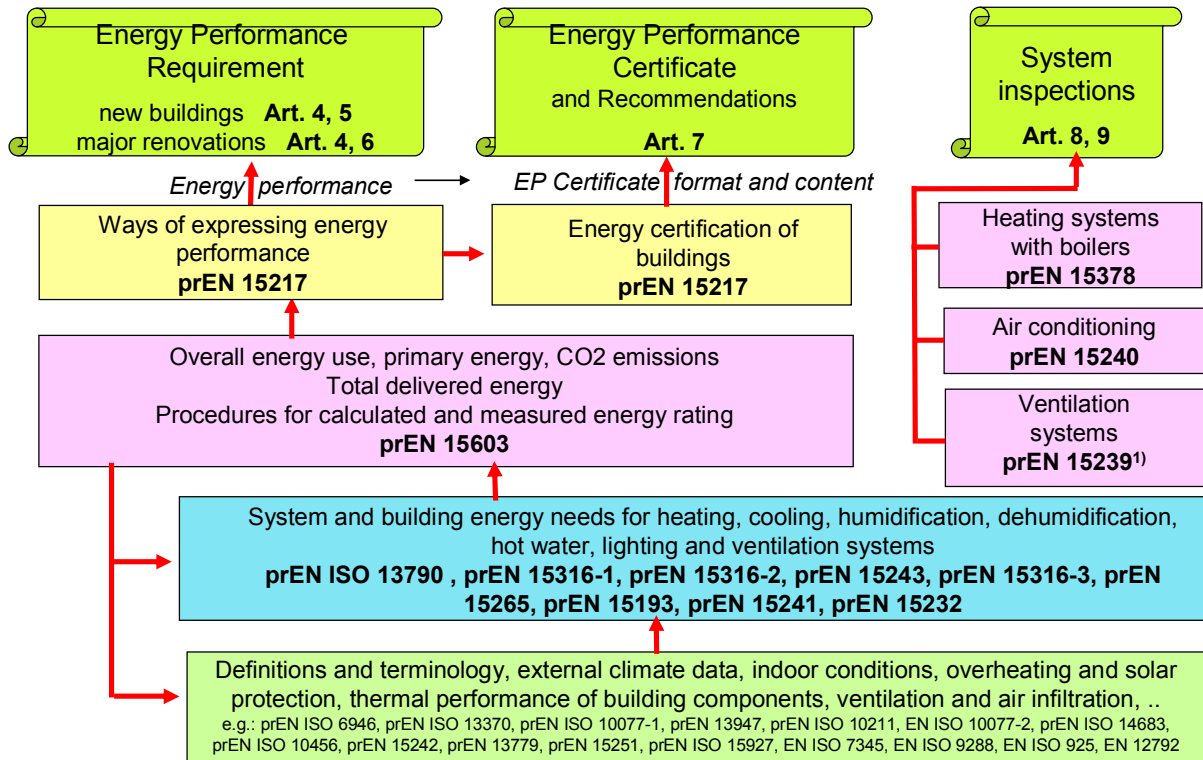
Standardisation on European level

CEN, the European standard organization has leaded a huge work in developing standards for different aspects as:

- energy performance,
- heating and cooling,
- lighting,
- thermal insulation,
- ventilation.

Furthermore, EU gave a specific mandate to CEN, CENELEC and ETSI for the production of standards for calculating the integrated energy performance of buildings and estimating the environmental impact, in accordance with the terms set forth in EPBD.

Methodology for calculating energy performance (Article 3 and Annex)



1): Not explicitly mentioned in the Directive

Figure 7: An overview of the relations between the EPBD standards: the "Umbrella Document" (EN 15615).

In 2008, most of the draft standards have been in final voting, and all drafts in voting have been accepted as a European standard.

6. NATIONAL INITIATIVES

As stated, EPBD gives only a frame but the main initiative belongs to each Member State to adapt this frame to its particular climatic, economical, cultural or technical conditions. Thus the Member States who committed in fact when establishing the directive have a key role in its implementation. All Member States were not equally prepared and facing the huge legislative work to be done, most of them have recently asked for an extension of the implementation period initially defined until 2009. In 2007-2008, certificates will pop up for **new buildings**, **public buildings**, and, to a lesser extent, **existing buildings**. Because of this diversity of approaches, the complete EPBD shall not be fully in force in the whole of Europe before 2009.

However it is interesting to see how the Member States are now really involved in this energy policy. Most of them are, in parallel with the implementation of the EPBD, reviewing their own policy and are defining new initiatives in order to promote the integration of renewable energies in building, to develop specific certification for sustainable buildings, to label low energy buildings or even positive energy buildings. In the very few last years, low energy buildings or green buildings have bloomed everywhere in Europe.

Most of countries have also set a number of measures of financial incentives to support the financial cost for

improving the energy efficiency of buildings. These measures cover a large scale of

- **tax allowances and exemptions** (Belgium, France, Slovenia, Czech Republic,...),
- **grants** (Austria, Belgium, Finland, France, Germany, Hungary, UK, Sweden,...)
- **or loan support** (Austria, Germany, the Netherlands, Lithuania, Spain, Slovak Republic,...).

7. EXPERIENCE REGARDING THE IMPLEMENTATION OF EPBD

The implementation of EPBD is followed with Concerted action project. The first stage was finished in the mid 2007 and the second stage started in end to 2007. In addition the implementation is followed in several projects funded by the Intelligent Energy Europe Programme, such as ASIEPI (www.asiepi.eu). DG TREN (Directorate General – Transport and energy) organised also in the end of January a one day seminar focusing on the next steps to be taken to develop EPBD-2002. Practical arrangements of the seminar were done by Sustainable Energy – programme (www.sustenergy.org) and EPBD Buildings platform (www.buildingsplatform.eu). The seminar was open to all. Some observations regarding the implementation of EPBD were presented and summarised in the seminar. These included but were not limited to the following:

- Cost effectiveness of preparing the energy certificates should be improved
- Computerized tools are needed for energy inspections
- Standardized guidelines are needed for experts who do the boiler, A/C and other inspections
- The effect and quality of energy certificates should be assessed in the future
- The effects of EPBD-2002 should be monitored
- There is a need to compare the mandatory and voluntary methods to improve boiler efficiency
- A/C inspections are not cost effective – need to move towards to reduction of cooling loads, and other methods to reduce high summer temperatures, like improved solar shading, low energy cooling technologies etc.
- Calculation methods (the number of factors to be included in calculation) described in the annex of EPBD-2002 are too complex. There is a need to develop simpler methods especially for small residential buildings
- Regulations should be flexible, and formulated so that they do not prevent new innovative solutions
- Public awareness in energy and environmental issues should be improved
- More practical standards are needed - especially CEN-standards dealing with inspections should be revised

8. NEXT STEPS WITH EPBD

In November 2008, a first draft of the EPBD recast has been proposed reinforcing the introduction of renewable energy in buildings, extending the new regulations to renovated part, stressing the member states to set minimum requirements and to develop plans for increasing the number of buildings with very low or zero CO₂ emission, reinforcing the leading role of public buildings and extending the energy certificate for giving advice to the user in improving the energy efficiency of its building.

9. SOME OTHER ENERGY RELATED EUROPEAN DIRECTIVES

Directive on energy end-use efficiency and energy services

The directive on energy end-use efficiency and energy services was accepted in April 2006. It defines very clearly the targets for energy conservation. Member States shall adopt and aim to achieve an overall national

indicative energy savings target of 9 % for the ninth year of application of this Directive, to be reached by way of energy services and other energy efficiency improvement measures. Member States shall take cost-effective, practicable and reasonable measures designed to contribute towards achieving this target.

Each Member State shall establish an intermediate national indicative energy savings target for the third year of application of the Directive, and provide an overview of its strategy for the achievement of the intermediate and overall targets. This intermediate target shall be realistic and consistent with the overall national indicative energy savings target. For the follow up of the implementation of the directive the Member States have to submit Energy Efficiency Action Plans (EEAP).

- a first EEAP not later than 30 June 2007;
- a second EEAP not later than 30 June 2011;
- a third EEAP not later than 30 June 2014.

All EEAPs shall describe the energy efficiency improvement measures planned to reach the targets set out as well as to comply with the provisions on the exemplary role of the public sector and provision of information and advice to final customers. The second and third EEAPs shall:

- include a thorough analysis and evaluation of the preceding EEAP;
- include the final results with regard to the fulfilment of the energy savings targets
- include plans for — and information on the anticipated effects of — additional measures which address any existing or expected shortfall vis-à-vis the target;
- use and gradually increase the use of harmonised efficiency indicators and benchmarks, both for the evaluation of past measures and estimated effects of planned future measures;
- be based on available data, supplemented with estimates.

The Commission shall publish a cost/benefit impact assessment examining the linkages between EU standards, regulations, policies and measures on end use energy efficiency.

Directive on establishing a framework for the setting of ecodesign requirements for energy-using products

Over all energy use and environmental impact of buildings is affected by building and its operation but also by the equipment and appliances used in the buildings. In 2005 an important directive establishing a framework for the setting of ecodesign requirements for energy-using products was approved. The introduction of Directive states some important goals of the directive:

“Energy-using products (EuPs) account for a large proportion of the consumption of natural resources and energy in the Community. They also have a number of other important environmental impacts. For the vast majority of product categories available on the Community market, very different degrees of environmental impact can be noted though they provide similar functional performances. In the interest of sustainable development, continuous improvement in the overall environmental impact of those products should be encouraged, notably by identifying the major sources of negative environmental impacts and avoiding transfer of pollution, when this improvement does not entail excessive costs. The ecodesign of products is a crucial factor in the Community state on Integrated Product Policy. As a preventive approach, designed to optimize the environmental performance of products, while maintaining their functional qualities, it provides genuine new opportunities for manufacturers, for consumers and for society as a whole”.

The commission has defined 14 products groups that are investigated at the first stage for new design guidelines. These include:

- **boilers and water heaters (gas/oil/electric)**
- **air conditioning appliances, electric motors, pumps, fans...**
- personal computers, imaging equipment, televisions
- battery chargers and external power supplies
- office and public street lighting
- commercial refrigeration and freezers

- standby and off-mode losses of EuPs
- **solid fuel combustion installations**
- domestic and industrial lighting
- vacuum cleaners and set-top boxes

Several studies have been done to collect background information for future guidelines. Consultation with stakeholders is in the process. More detailed regulations on EU-level are being prepared.

Directive on the promotion of cogeneration based on a useful heat demand in the internal energy market

The use of combined heat and power (CHP) presents a substantial potential for increased energy efficiency and reduced environmental impacts. It is considered to be a priority area for many Member States. The efficient use of fuel, in simultaneous production of heat and power can offer energy savings and avoided CO₂ emissions compared with separate production of heat and power and the development in the use of fuels used in CHP applications show a trend towards cleaner fuels. Nearly 40% of the electricity produced from cogeneration is produced for public supply purposes, often in connection with district heating networks. 60% are generated by auto-producers, normally for industrial processes.

The Communities strategy outlined in the Commission's cogeneration strategy of 1997 sets an overall indicative target of doubling the share of electricity production from cogeneration to 18% by 2010. This was endorsed by the Member States in the form of a Council Resolution in December 1997. The indicative target was taken up in the Communication on CHP (COM(97)514 final) providing for an analysis of the barriers and strategies for its realization. Projections show that meeting this target is expected to lead to avoided CO₂ emissions of over 65 Mt CO₂/year by 2010.

In terms of installed capacity, the share of electricity produced by cogeneration processes has raised to 10% in the EU in 2001. Large differences however are to be noted amongst the Member States with variations of the shares between 2% and 60% of the electricity production.

Hence, a new Community legislative measure concentrates on providing a framework for the promotion of this efficient technique in order to overcome still existing barriers, to advance its penetration in the liberalized energy markets and to help mobilizing un-used potentials. The Directive defines high efficiency cogeneration as cogeneration providing at least 10% energy savings compared to separate production. As the indicative target value from the 1997 strategy is out-dated, the Directive does not include targets. Instead the Directive urges Member States to carry out analyses of their potential for high efficiency cogeneration.

Directive on the promotion of the use of energy from renewable sources

The European Renewable Energy Roadmap demonstrated that a 20% target for the overall share of energy from renewable sources and a 10% target for renewable energy in transport would be appropriate and achievable objectives, and that a framework that includes mandatory targets should provide the business community with the long term stability it needs to make rational investment decisions in the renewable energy sector.

The commission published a draft directive on the promotion of the use of energy from renewable sources in January 2008. Three sectors are concerned in renewable energy: electricity, heating and cooling and transport. The overall approach is for Member States to retain discretion as to the mix of these sectors in reaching their national target. However, it is proposed that each Member State shall achieve at least a 10% share of renewable energy (primarily biofuels) in the transport sector by 2020. The proposed directive sets the principles how the use of renewable is defined, for example, so that it does not overlap with energy conservation measures. It also defines which part of the energy from the heat pump heating system can be considered as renewable.

10. CONCLUSIONS

This paper has shown how Europe is developing a very strong effort in order to reduce the overall energy demand of buildings, increase the energy efficiency of the building sector, increase the use of renewable energy and reduce drastically the GHG emission.

We are still in the implementation phase of this policy and very strict evaluation of its impact is already prepared in order to propose a revision of EPBD planned for 2009 following the Energy Plan which is targeting a further 20% reduction of energy use for 2020.

With all its diversity in climates, building types, cultures and traditions, Europe could play a key role in demonstrating to the world that a very strong concerted policy combined with local and national initiatives can lead to a real improvement of the energy efficiency on the one hand but also to a real sustainable society on the other hand. REHVA is strongly involve in this policy and will be a key actor in accompanying measures and dissemination of information to his members and partners.

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