



Applying the EPBD to improve the Energy Performance Requirements to Existing Buildings – ENPER-EXIST

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AIVC conference on ventilation and energy efficiency in buildings in Brussels, 21-23 September 2005
for further information see: www.aivc.org

Common Ecobuildings symposium in Berlin, 22/23 November 2005
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Workplan of ENPER-EXIST work package 1: Tools Application

In the previous years standardization and regulations concerning the reduction of energy use has in most European countries been focused particularly on new buildings. Looking at the CEN standards which are developed in the past years, you see this same tendency.

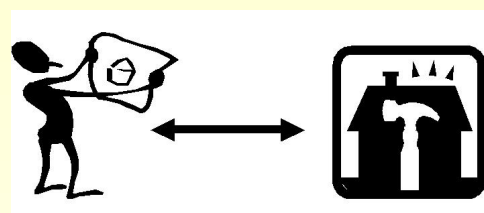
In various European countries energy saving in existing buildings is getting more and more attention, because of the huge energy potential. But still we see that the draft CEN standards, which have been developed last year to apply the EPBD, again heavily focus on new buildings and forget to take into account the effects which are specially important for existing buildings.

The aim of work package 1 of ENPER-EXIST is to identify the gaps between the EPBD CEN standards and practice for existing buildings. All the important EPBD CEN standards will be analyzed and examined on aspects as:

- Are there important influencing factors missing in the calculation procedure which are specially important for existing buildings? Aspects like aging and maintenance for instance are often not taken into account, but can significantly influence the energy performance of a building component.
- Are there influencing factors which are of less importance for existing buildings, but result in a relative large effort to gather the proper input data for this part of the calculation. Thermal bridges for instance become more and more important with increasing insulation thickness. A detailed method to calculate the effect of thermal bridges for buildings with few insulation is a bit overdone and the small effect on the energy use does not justify the extra effort, specially when there are more simple alternatives for instance by using default values.
- Another issue is that in contrast with new buildings, building components

and systems of existing buildings are often not well described and will not meet minimum requirements which often are a basic assumption in the calculation methods. An example of this are systems which do not comply with the boiler directive.

Some of the problems stated above could for instance be solved by the identification of classes of products and systems. These classes have to take into account on one hand the way input for the calculation is gathered and on the other hand the input which the CEN standards requires.



The analysis will result in numerous gaps and various points of attention. Experiences of Member States with calculation methods of the energy performance of existing buildings in their countries will be used to test, evaluate and if necessary extend or improve the CEN standards.

Finally this will result in recommendations for improvement of the EPBD CEN standards. This will be accomplished on one hand in the form of direct comments during the evaluation period of the draft CEN standards and on the other hand via the roadmap which is made in work package 4 of ENPER-EXIST. This roadmap will give alternative strategies to improve on a wide scale the energy efficiency of existing buildings and widen the scope of the EPBD in case of a future revision of the requirements of the directive.

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Planned Danish implementation of the EPBD requirements

New buildings in Denmark are considered to have a relatively high insulation standard. But 75 % of existing buildings were constructed before 1979 when the first significant tightening-up of requirements to energy performance was introduced. So when implementing the EPBD, Denmark will take the opportunity to tighten up the regulations governing both new and existing buildings as well as the rules for labelling schemes. The energy regulations and the rules for energy labelling will be linked in several ways. Before the official permit to use a new building is given, an energy audit has to be performed by a certified or approved energy consultant to check that the assumptions used when calculating the energy consumption are correct. Furthermore it will be mandatory for the public authorities to implement energy-saving measures with a pay-back time of less than five years as described in the energy certificate of the buildings.

Danish Building Regulations

The present Building Regulations from 1995 (BR-95) has resulted in a reduction of 25 % in the heating demand in new buildings compared with the previous Building Regulations (BR-82). New energy regulations (BR-2005) have been prepared i.a. facilitate the implementation of the EPBD. Here the requirements to new buildings have been tightened with 25-30 % compared with BR-95. Since 1995 it has been possible to choose between three different ways to prove compliance with the building regulations. With the new energy regulations the energy frame will always have to be calculated and will include energy for heating, hot water, cooling, ventilation and lighting. When the energy frame is estimated, electricity consumption is multiplied by 2.5 to compensate for the efficiency of the power production.

The building regulations governing domestic buildings stipulate that the total energy consumption shall not exceed

$$70 + \frac{2200}{A} \quad (\text{kWh/m}^2 \text{ year})$$

where A is the total heated area.

A building is classified as a low energy building class 1, if the total energy consumption is less than 50 % of the energy frame and as a low energy building class 2 if less than 35 % of the energy frame. The two low energy levels indicate the levels that are to become minimum requirements in the next revisions to be made in 2010 and 2015. Furthermore there is a fixed limit for the transmission losses for the thermal envelope excluding windows and doors.

There are also requirements when a building is renovated in a major way. The definition of a major renovation is taken from the Directive (25 % of the value of the building or more than 25 % of the building envelope).

The requirements to construction parts are seen in Table 1. Furthermore it is required that some individual, profitable measures have to fulfil the requirements, regardless of the size of the renovation. Individual measures are insulation of external walls when changing rain shield, insulation of attic and roof when changing roof, change of boilers and change of heat supply. To be a profitable measure, the saving (in DKK) multiplied by the lifetime (in year) divided by investment (in DKK) should be higher than 1.33. These measures will normally appear in the labelling scheme.

U-values [W/m ² K]	BR-82	BR-95	BR-2005 Renovation
Wall, heavy	0.35	0.30	0.20
Wall, light	0.30	0.20	0.20
Floor with and without heating	0.30	0.20	0.15/0.12
Roof	0.20	0.15	0.15
Windows (façade/roof)	2.9	1.8	1.5/1.8

Table 1: The energy requirements of the two latest Danish Building Regulations from 1982 (BR-82) and 1995 (BR-95) for large buildings and future requirements concerning renovation in BR-2005.

Energy Certificate

Since 1997 Denmark has had a labelling scheme for nearly all kinds of buildings. This scheme is now being revised to accommodate the requirements of the EPBD and adjust the design of the schemes to benefit from findings and experience gained during the past years.

From the beginning of 2006, an energy certificate will be issued when a building or an apartment is constructed, sold or rented. Denmark will have different labelling schemes for different users: single-family houses, blocks of flats and buildings with public service, trade and service. The new law on the future set-up of energy labelling schemes and inspection of heating and AC systems was unanimously approved in the Danish parliament on 16 June 2005. A new executive order for certification is now under development.

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Draft of PR EN 15217 standard submitted to public enquiry

The draft of the PR EN 15217 standard "Energy performance of buildings – methods for expressing energy performance and for energy certification of buildings" is submitted to the public enquiry until September 5th, 2005.

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Building Energy Foundation established in France

The Building Energy Foundation has been established since March 2005 by four major actors of the building and energy sectors: "Arcelor", "Electricité de France", "Gaz de France" and "Lafarge" on the initiative of ADEME (French Agency of the Environment and Energy Management) and CSTB (French Centre for Building Sciences). The main objective of the Foundation is to trigger research and to achieve major breakthrough in the technological field in order to satisfy the political decision of reducing greenhouse gas emissions by 4 by year 2050.

The program covers several areas such as the evolution of material use, combined functions of insulation, thermal inertia and ventilation or improved efficiency of heating and cooling system. It also takes into account the sociological aspects that will trigger the need and desire to search for energy efficiency during the whole life cycle of the building (from design to end-use). The research deals with both new and existing buildings. It should be noted that in France, the energy consumption of buildings represents 46 % of the overall consumption and accounts for 25 % of the total of greenhouse gas emissions. Besides the building stock takes over a 100 years to be renewed, hence the need to tackle the issue in existing buildings also.

The Board of directors consists of representatives of the four founding member, representatives of the Ministries (of internal affairs, of infrastructure and transport, of research and of the industry) and a few experts. The Scientific Committee suggests the areas onto which research should be focused in collaboration with the national action PREBAT (Research Programme on Energy in Buildings). The Foundation has a budget of 8 million €.

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European DISPLAY™ Campaign Information Day, 1st June 2005: a real success!

Mr Søren Møller, the Deputy Mayor of Odense, President of Energie-Cités and master of ceremonies for the day, got the proceedings underway with a warm wel-

come to approximately 80 participants representing a broad range of municipalities, associations and energy agencies from throughout Europe.

Ms Susanne Wegefelt of the Directorate-General for Environment and Mr Pedro Ballesteros of the Directorate-General for Energy and Transport, set the scene for the 'Information Day' with an update of the current situation regarding sustainable construction and energy performance of buildings and the challenge of implementing the new buildings directive. The Display™ team and representatives of the pilot cities then took over by providing a review of the Display™ project to date.

Representatives of the cities of Rimini (IT), Martigny (CH), Leicester (GB), Bristol (GB), Almada (PT) and Cork (IE) engaged the participants by highlighting the tremendous advantages the Display™ tool provides for municipalities and shared some interesting examples of how the Display™ project has led to a change in how their municipalities deal with energy issues.



Figure 1: Conversations at the Display™ Campaign Information Day.

Regarding the future of the Display™ Campaign, the next stage of the project titled "Working together towards Class A" was detailed by Energie-Cités. There was then a call by Utrecht, one of the pilot cities, to all the municipalities present, who are not yet part of the campaign, to join the Display™ Campaign.

The day ended with the handing over a certificate to the Region of Eindhoven as the 100th participant to join the Display™ Campaign and a gift to the 21 pilot cities. Further discussions and exchange of ideas and information took place during a cocktail afterwards hosted by the Mayor of Brussels Municipality, Mr Freddy Thielmans.

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