# The European Union Energy Performance of Buildings Directive (EPBD)

**RESNET Building Performance Conference**

**New Orleans, Feb. 16, 2009**

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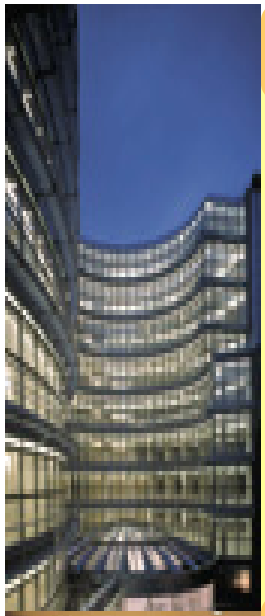
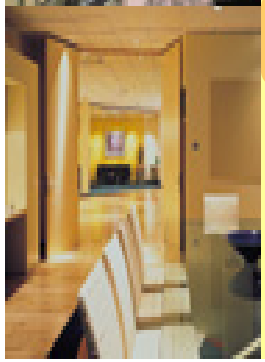
# The Rationale for the EPBD





## The EU needs to promote energy savings

Three main reasons.

**Security of supply**

External energy dependence 70% in 2030 if no measures taken

**Environment**

Energy production and use create 94% of $CO_2$ emissions

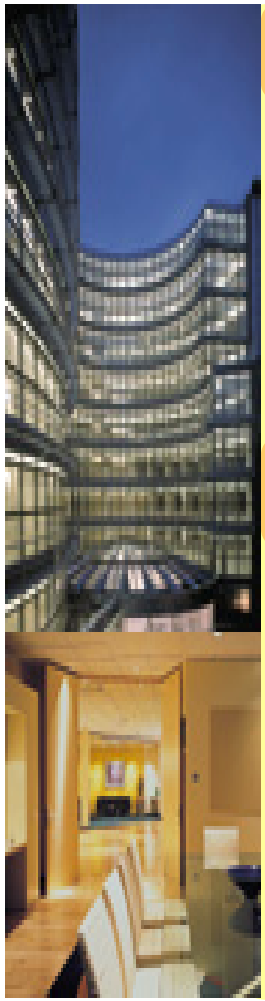
**Limited influence on supply**

The EU can promote savings in energy use

## Impact of action on energy use in buildings

- Largest end-user: 40% of energy is used in the residential/ tertiary sectors
- Large energy savings potential in the building sector with cost-effective measures: 22% by 2010

# OBJECTIVES



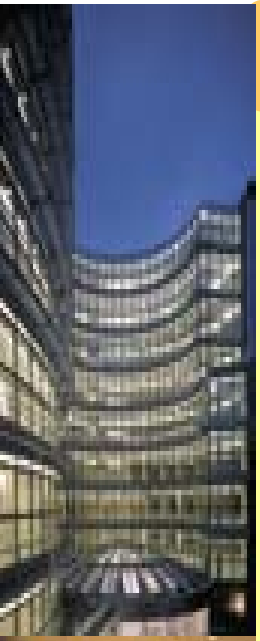
## Objectives

- Promoting the improvement of energy performance of buildings within the EU through cost-effective measures, with no compromise to comfort and Indoor air quality.
- Convergence of building standards towards those of Member States which already have ambitious levels.

## The measures

- Apply a Methodology for integrated building energy performance standards based on common minimum requirements
- Application of these standards on new and existing buildings
- Certification schemes for all buildings
- Inspection & assessment of boilers/heating and cooling installations

# Minimum standards for all buildings



## New buildings

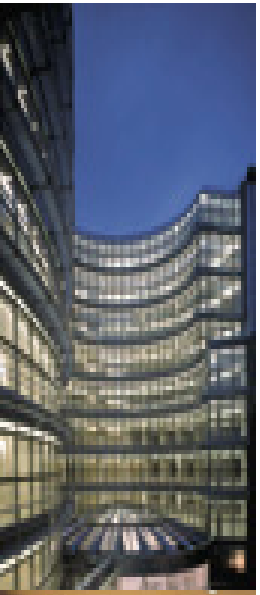
**Application of the minimum energy performance standards to all new residential and non-residential buildings.**
**Requirements should become more demanding than pre-EPBD national standards, and revised, at least, every 5 years.**

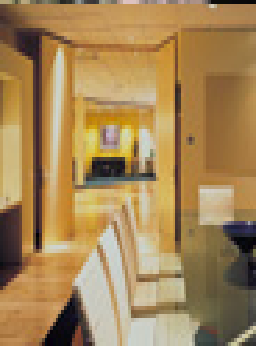
**Consider the feasibility of renewable energy, CHP, etc., for all new buildings over 1000 m².**

## Existing buildings

Application of the minimum energy performance standards to existing buildings larger than 1000 m² when they undergo a major renovation (i.e., cost over 25% of new).

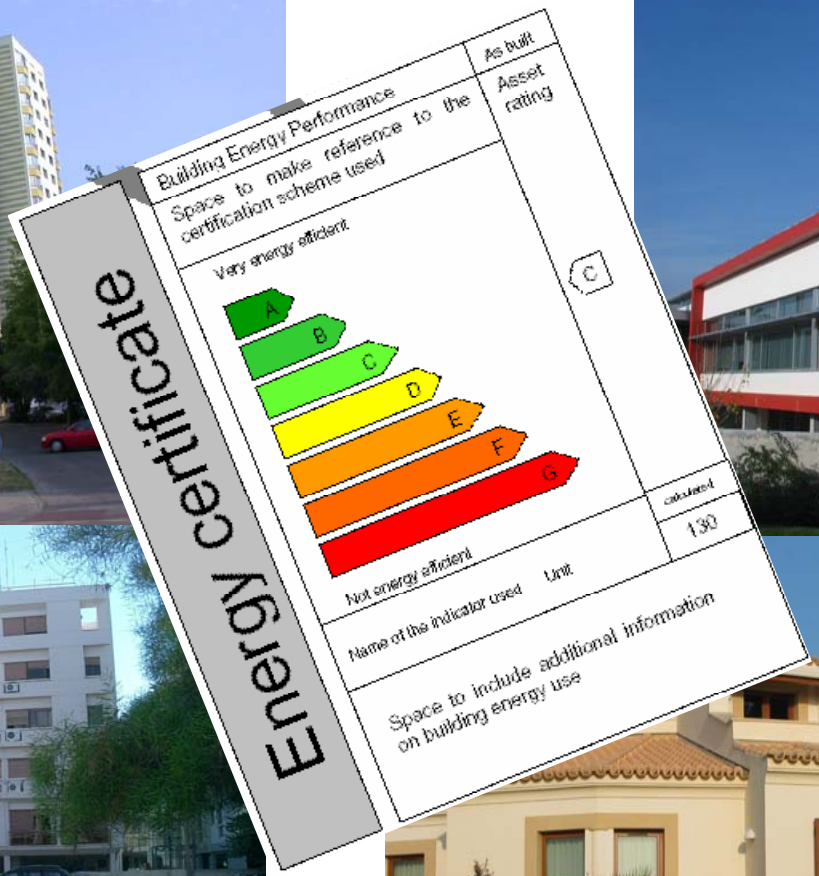
# National Legislation required by the EPBD



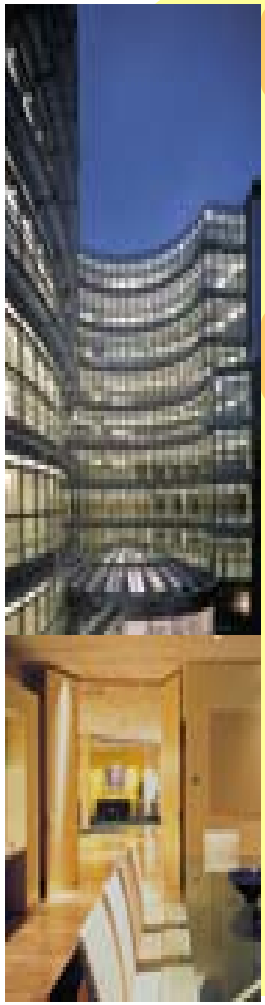


- **In most MS, implementation of the EPBD required:**
  - **Ammending building regulations, with new, more inclusive calculation methodologies, according to common set defined in the EPBD – Requirements increased by 25%, on average, over the whole EU, from pre-EPBD levels;**
  - **Publishing new Laws requiring mandatory Energy Certificates and setting up some form of national board to control the process;**
  - **Define the qualifications and rules to become an accredited expert to issue Certificates.**

# ENERGY CERTIFICATES




# Certification schemes for all buildings



## Why?

- To facilitate the transfer of clear and reliable information on the energy performance of buildings.
- To make energy efficiency more attractive.

## How?

Energy performance **certificates** for new and existing buildings should be available **when they are constructed, sold or rented out**

The certificates should:

- **not be more than 10 years old**
- **be accompanied with advice on how to improve the energy performance**
- **be displayed in large public buildings and institutions (over 1000m$^2$).**

# Certification of Buildings

- ***The forms of the certificates*** and the rules for advice on energy efficiency improvements ***have been designed in many different ways among MS***. However, they all seem fit for their desired purpose.

Energy labelling

PAGE 1 OF 9

Energy labelling of the following building:

**Address:** Storgade 27 A og B
**Postal code/city:** 9990 Storstaden
**BBR-no.:** 12345-1
**Energy labelling no.:** 122780
**Valid 5 years from:** 8. august 2006
**Energy consultant:** Jens Pedersen
**Company:** Aktuel Energirådgivning

The energy labelling informs about the building's energy consumption, the possibility for obtaining energy savings, the break-down of the building's energy costs and the average energy consumption of individual apartments. The energy labelling is prepared by certified energy consultants for apartment buildings and is required by law.

**Reported energy consumption for heating**

- **Costs including VAT and duties:** 293.000 DKK/year
- **Consumption:** 526 MWh/year
- **Reported for the period:** January 1st 2005 – December 31st 2005

The reported energy consumption and costs are climate corrected by the energy consultant. Thus, the figures express an average year temperature-wise.

**Energy label**

Low consumption

A1 A2
B1 B2
C1 C2
D1 D2
E1 E2
F1 F2
G1 G2

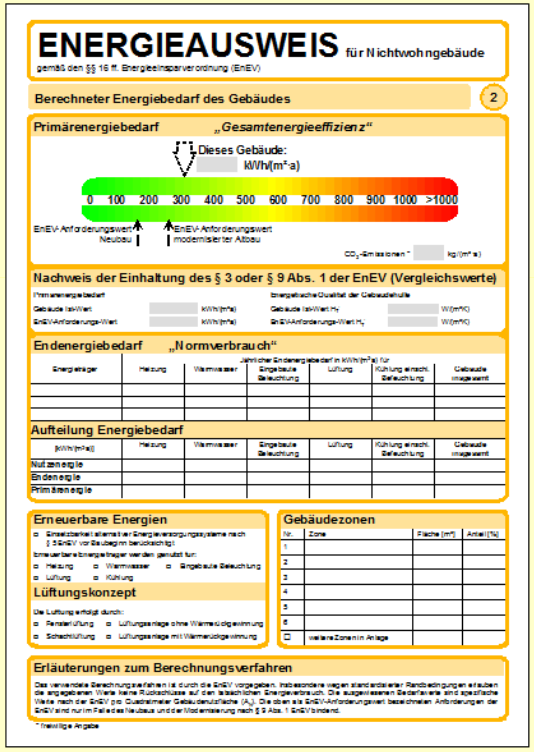
E2

High consumption

A1 is the best energy label that can be achieved, then A2, then B1, etc. G2 is the worst.

**Cost-effective savings**

Here are the energy consultant's proposals to reduce the energy and water consumption in the building. There may be more proposals on the next page. The proposals below are elaborated in the building inspection section.



**ENERGIEAUSWEIS** für Nichtwohngebäude

gemäß den §§ 16 ff. Energieeinsparverordnung (EnEV)

Berechneter Energiebedarf des Gebäudes 2

Primärenergiebedarf „Gesamtenergieeffizienz"

Dieses Gebäude: kWh/(m²·a)

0 100 200 300 400 500 600 700 800 900 1000 >1000

EnEV-Anforderungswert Neubau

EnEV-Anforderungswert modernisierter Altbau

$CO_2$-Emissionen * kg/(m²·a)

Nachweis der Einhaltung des § 3 oder § 9 Abs. 1 der EnEV (Vergleichswerte)

Primärenergiebedarf

Gebäude (ist)-Wert kWh/(m²a)

EnEV-Anforderungs-Wert kWh/(m²a)

Energetische Qualität der Gebäudehülle

Gebäude (ist)-Wert $H_T$ W/(m²K)

EnEV-Anforderungs-Wert $H_T$ W/(m²K)

Endenergiebedarf „Normverbrauch"

Jährlicher Endenergiebedarf in kWh/(m²a) für

| Energieträger | Heizung | Warmwasser | Eingebaute Beleuchtung | Lüftung | Kühlung einschl. Beleuchtung | Gebäude insgesamt |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |

Aufteilung Energiebedarf

| kWh/(m²a) | Heizung | Warmwasser | Eingebaute Beleuchtung | Lüftung | Kühlung einschl. Beleuchtung | Gebäude insgesamt |
|---|---|---|---|---|---|---|
| Nutzenergie | | | | | | |
| Endenergie | | | | | | |
| Primärenergie | | | | | | |

Erneuerbare Energien

- Einsetzbarkeit alternativer Energieversorgungssysteme nach § 5 EnEV vor Baubeginn berücksichtigt
- erneuerbare Energieträger werden genutzt für:
  - Heizung
  - Warmwasser
  - eingebaute Beleuchtung
  - Lüftung
  - Kühlung

Lüftungskonzept

Die Lüftung erfolgt durch:

- Fensterlüftung
- Lüftungsanlage ohne Wärmerückgewinnung
- Schachtlüftung
- Lüftungsanlage mit Wärmerückgewinnung

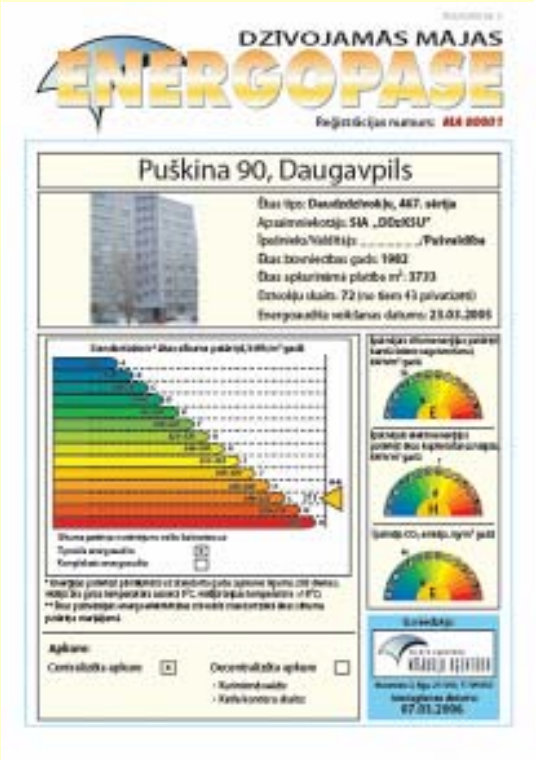
Gebäudezonen

| Nr. | Zone | Fläche (m²) | Anteil (%) |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| | weitere Zonen in Anlage | | |

Erläuterungen zum Berechnungsverfahren

Das verwendete Berechnungsverfahren ist durch die EnEV vorgegeben. Insbesondere wegen standardisierter Randbedingungen erlauben die angegebenen Werte keine Rückschlüsse auf den tatsächlichen Energieverbrauch. Die ausgewiesenen Bedarfswerte sind spezifische Werte nach der EnEV (zu Quadratmeter Gebäudenutzfläche $A_N$). Die oben als EnEV-Anforderungswert bezeichneten Anforderungen der EnEV sind nur im Falle des Neubaus und der Modernisierung nach § 9 Abs. 1 EnEV bindend.

* freiwillige Angabe



DZĪVOJAMAS MĀJAS

ENERGOPASE

Puškina 90, Daugavpils

Ēkas tips: Daudzdzīvokļu, 467. sērija

Apsaimniekotājs: SIA „DDzKSU"

Īpašnieks/Valdītājs: Pašvaldība

Ēkas būvniecības gads: 1982

Ēkas apkurināmā platība m²: 3733

Dzīvokļu skaits: 72 (no tiem 43 privatizēti)

Energoaudita veikšanas datums: 23.03.2006

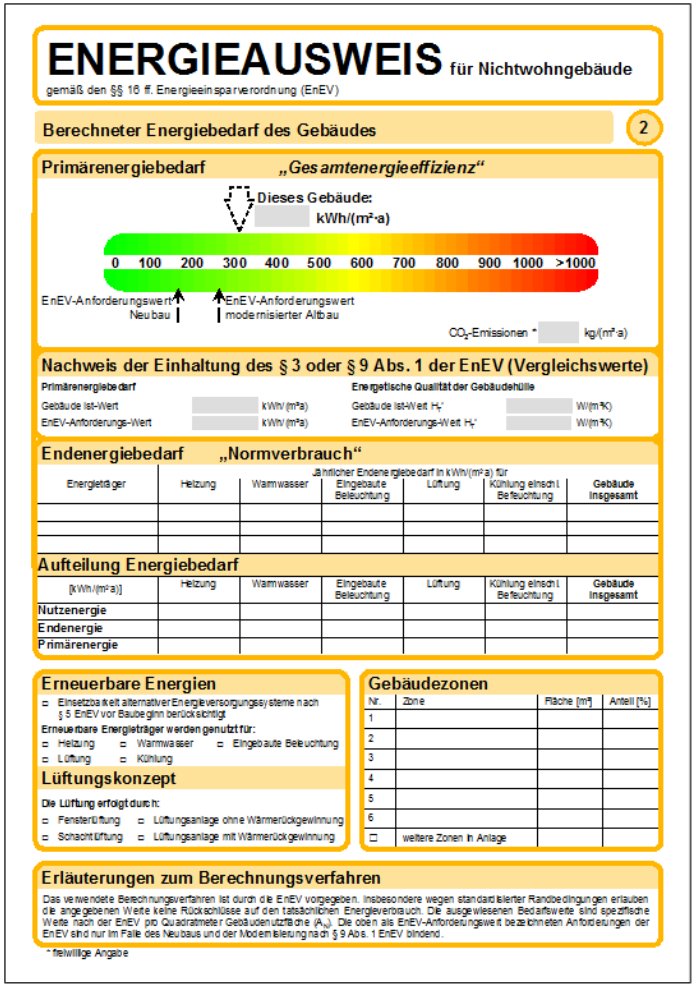
Apkure:

Centralizēta apkure

Decentralizēta apkure

- Kurināmais:
- Katlumāja:

# The RESNET scale could fit very well among the set…



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Nachweis der Einhaltung des § 3 oder § 9 Abs. 1 der EnEV (Vergleichswerte)

| Primärenergiebedarf | | Energetische Qualität der Gebäudehülle | |
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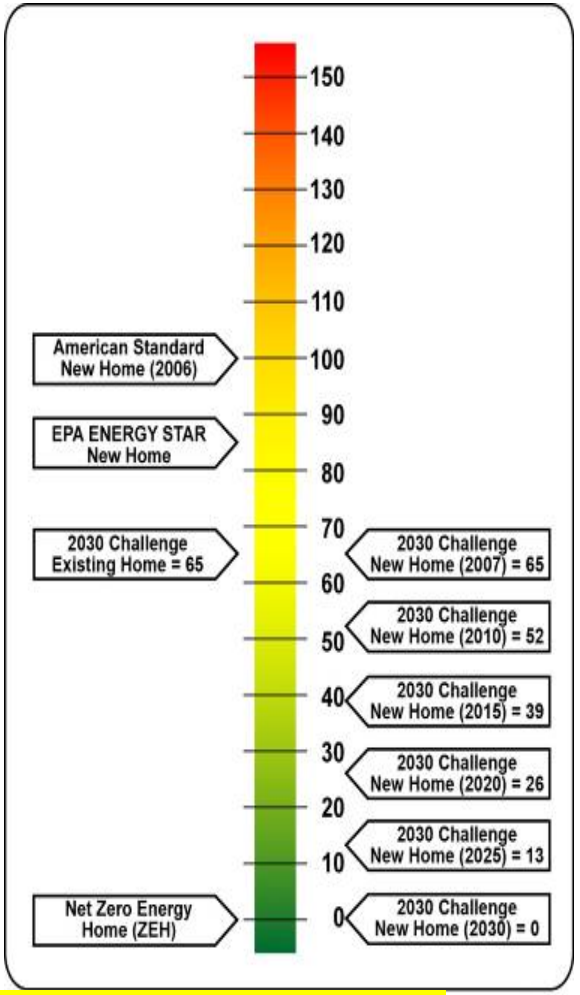


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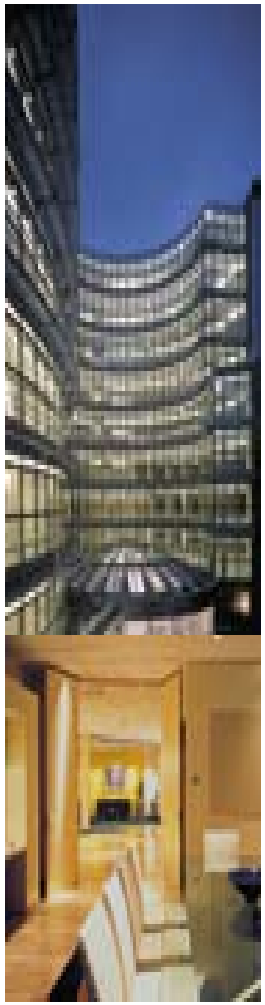
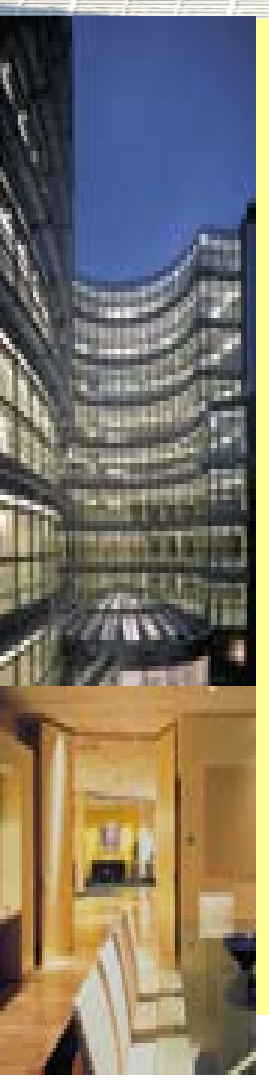
**Both sides of the Atlantic have much to gain from sharing experiences and knowledge.**

# The New Rules for Certification of Buildings



- When buildings are constructed, sold or rented out an **energy performance certificate** is to be **made available** to the prospective buyer or tenant
- **Public Buildings to set an example** by being certified regularly and visibly
- All large buildings visited regularly by the public to **display energy certificate prominently**

# Quality Control of the Certificates

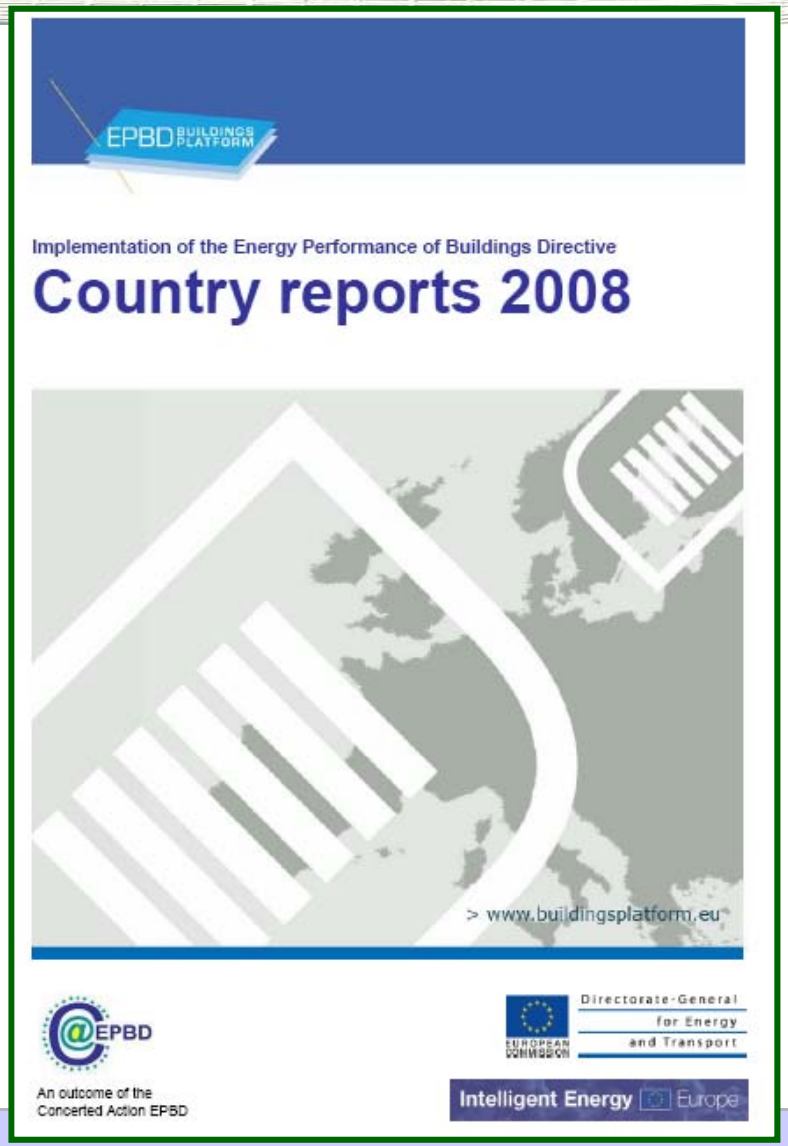


## In most Member States (not all):

- Qualified experts recognized on the basis of an exam;
- Issued certificates registered in national databases;
- A random sample of the certificates checked by independent experts to ensure their quality;
- qualified Experts issuing incorrect certificates risk paying fines and/or loosing their accreditation.

**The EU Commission wishes to make these principles as a rule for every Member State**

# Status of Implementation of the EPBD




**Just released**

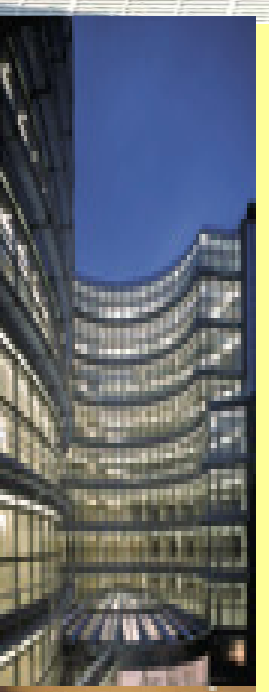
**Feb. 10, 2009**

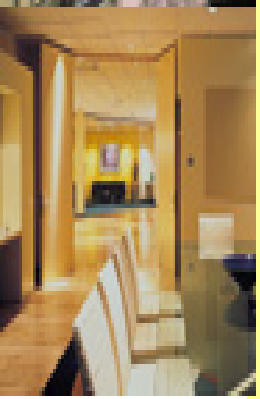
**Download from**

**www.buildingsplatform.eu**

**Or from the RESNET website**

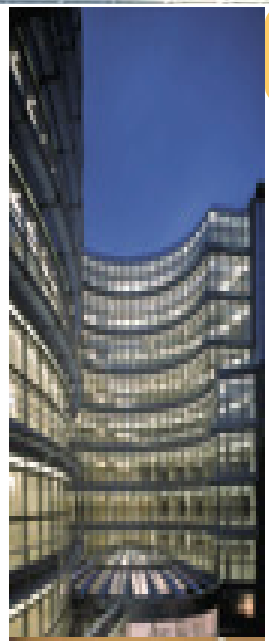
# Status of Implementation of the EPBD in 2009

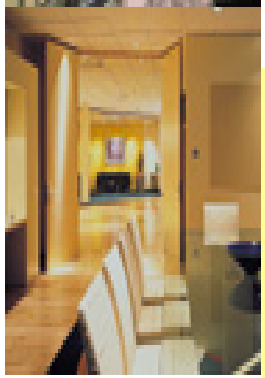




- Every new building receives a Certificate as a precondition to obtain a license (a few MS start this requirement later in 2009 or in 2010);
- Every existing building sold or rented must already have a Certificate in the majority of MS;
- Most Public buildings must display a Certificate by 2010 (a delay was necessary due to lack of sufficient qualified experts to issue the certificates to these usually complex buildings);
- Thousands of new jobs have been created in the EU (qualified experts...), providing cost-effective advice to building owners;
- Several million Certificates expected every year when all the MS have their systems fully operational.

# The difficulties for Implementation





## Why?

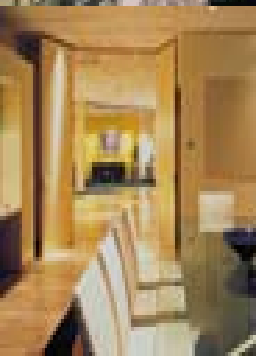
- It is relatively easy to publish new building regulations.
- But starting a brand new certification scheme for millions of existing buildings is difficult and it involves a huge logistical problem.

## What have MS been doing?

MS have been discussing among themselves the best options to implement credible and efficient certification systems in the BUILDINGS CONCERTED ACTION.

- 29 countries working together on a voluntary basis.
- Getting inspiration and ideas from one another.
- Towards limiting the range of solutions to the common challenge of transposing the EPBD.
- Developing a European philosophy for Energy Efficiency in Buildings.

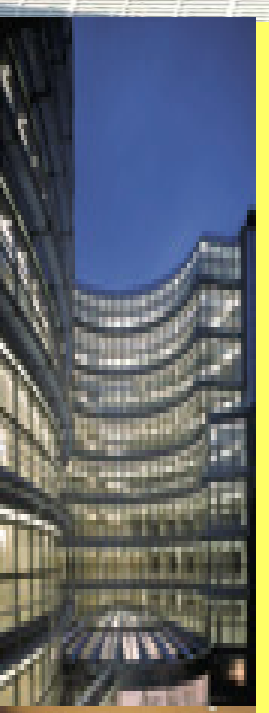
# BUILDINGS CONCERTED ACTION - OVERALL OBJECTIVES

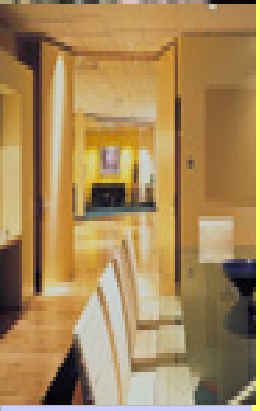


- To enhance and structure the sharing of information and experiences from national implementation.
- To promote good practice concepts in activities required of Member States for implementation of the EPB Directive.
- To create favourable conditions for an accelerated degree of convergence of National procedures in EPBD related matters.
- To complement the work of the Energy Demand Committee (Article 14 of the EPBD) and its ad-hoc group on CEN standards and Certification.

**The first ever such collaboration exercise between MS – now already being replicated for other topics.**

# There were other Obstacles too:





- Designers and builders reluctant to have their products analyzed (often with recommended improvements…) – pressure on them to improve;
- Failure to inform citizens about benefits of Certificates often created negative reactions;
- Building owners reluctant to pay for the cost of the Certificate, especially in the current “crisis”;
- Delays in admnistrative procedures – calls for a need to streamline;
- Initial Certificates not always first rate, with poor recomendations, and sometimes too costly – bad reputation in the media;
- Resistance to change the status-quo from some polititians and special interest groups.

# Certification of Buildings

- The main concern for every MS is:

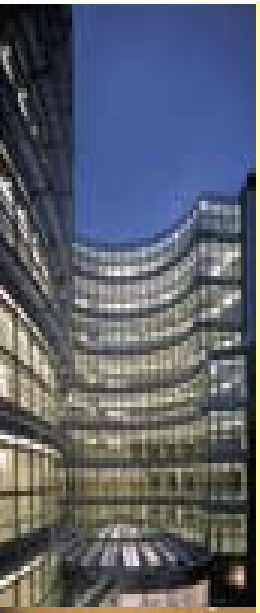
  ***keep the costs down***

  ***thus:***

***MS had to make a compromise between accuracy, quality, reproducibility and the costs and the time needed for issuing certificates.***

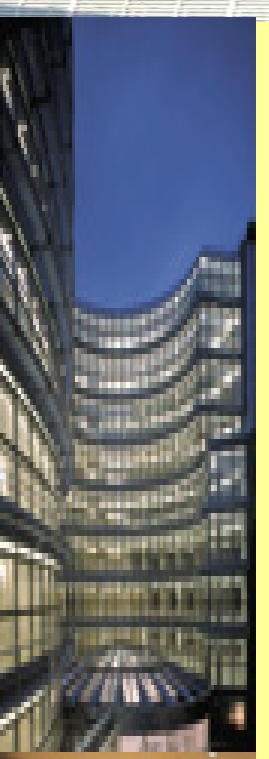
***Some of the compromises in some MS were rather drastic…***

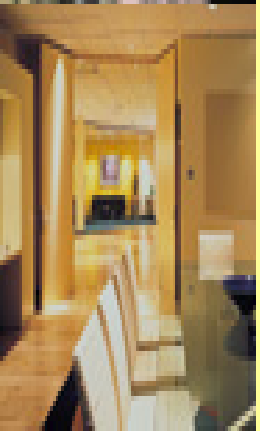
# The Future of the EPBD



- Not every MS completed implementation by Jan 1, 2009.
- Some MS implemented the EPBD with less than ambitious goals.
- The energy savings (and $CO_2$ emissions reductions) planned for 2009 have not yet been realized.
- The EU Commission wishes to tighten requirements on MS to achieve a rapid convergence with initial goals and the most ambitious MS.
- A proposal for a revision (recast…) of the EPBD was announced in Nov 2008, and it should be adopted by December 2009.

# The Goals for ammending the EPBD in 2009





- **Mandatory cost-effectiveness criteria for MS to set national targets for minimum energy efficiency requirements;**
- **Prepare the path for every new building with small emissions in every MS – a plan over a few years (e.g., a decade);**
- **Requiring energy rehabilitation to every major renovation (remove the >1000 $m^2$ limit) – bring the residential sector on-line, a "must" target;**
- **Mandatory quality checks of issued certificates and penalties for mistakes;**
- **Increase quality requirements for Certificates for existing buildings, with better recommendations;**
- **mandatory indication of the energy label in all publicity for buildings offered for sale or rent;**

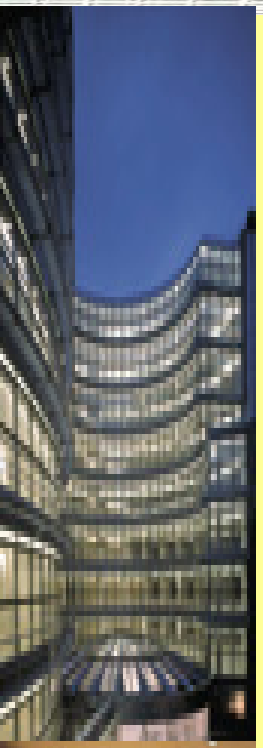
# Energy label to be featured prominetly in every advertsiement of houses for sale or rent

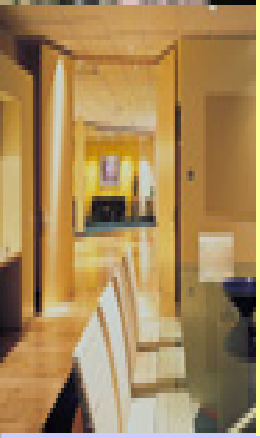
- **Extend mandatory indication of energy label in publicity for buildings offered for sale or rent, as already done for appliances, cars, air-conditioners, etc.**





# The Goals for ammending the EPBD in 2009 (cont.)





- No Public Funds can be used for buildings that do not fully obey official requirements;
- Every Public Building must have a Certificate on display by the end of 2010 (deadline still under discussion);
- Lowering the requirement to display a certificate in public buildings from 1000 $m^2$ to 250 $m^2$;
- MS must use certificates to stimulate energy savings in buildings, e.g., by offering financial or tax Incentives for carrying out the identified when cost-effective recommendations or for purchase of energy efficient buildings and appliances;
- Require effective inspections of boilers and air-conditioners to promote replacement with newer, more efficient units.
- Increase the rate of penetration of Renewables in buildings.

# Conclusions

- **Despite all the difficulties and skepticism, mandatory building certification is advancing in the EU;**
- **Moving from voluntary schemes to a universal obligation involves a huge effort and good planning, and it takes a lot of time just to put all the necessary infrastructure in place:**
  - **A Legal framework**
  - **A sufficient number of well-qualified experts**
  - **A suitable electronic platform for managing the whole system, with a capability to produce analyses on demand;**
- **Well targeted campaigns proved essential in those MS where the Certification system is more successful**

# Ending on the same note as in 2007, but with a twist…

## But we are already much further along than in 2007... Step by step, we will succeed!


**Although the foundations have been laid…much work is still to be done**

**There is plenty of potential for cooperation on both sides of the Atlantic Ocean towards promotion of Building Certification!**