The European Energy Performance of the Buildings Directive (EPBD)

Progress and New Directions

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RESNET Building Performance Conference
New Orleans, Feb. 16, 2009

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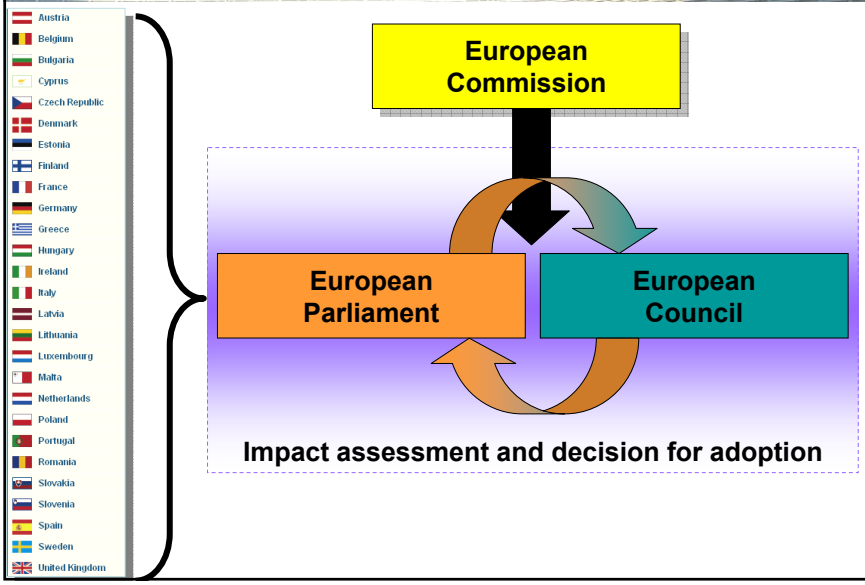
Structure of the presentation

- European Directives?
- The EPBD
  - The motivation
  - What are the requirements?
  - Where are we today?
  - What about the future?
- Cooperation with RESNET
- Conclusions

European Directives?

- A **Directive** is a legislative act of the European Union which requires Member States to achieve a particular result without dictating the means of achieving that result.
- It can be distinguished from European Union **Regulations** which are self-executing and do not require any implementing measures.
- Directives normally leave Member States with a certain amount of leeway as to the exact rules to be adopted.

Process for adopting a Directive



Process for adopting a Directive

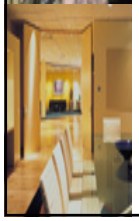
Important Directives in relation to energy use in buildings

- **CPD – Construction Product Directive**
  - Adopted in 1989
  - Focus on characterisation and free movement of building products
- **EPBD – Energy Performance of Buildings Directive**
  Adopted in 2002, published on January 4, 2003
- **ESD – Energy Services Directive**
  Adopted in 2006

Implementation if the EPBD

- EPBD is a prime example of the subsidiarity principle.
  The EPBD states the goals that must be reached, but it lets MS a wide range of freedom to implement them.
- With good reason:
  - Types of houses and HVAC practices vary widely across Europe,
  - Climates are very different, heating and cooling needs totally different from North to South.
  - Different cultures in regulatory approach
  - Different cultures in organisation of building market

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

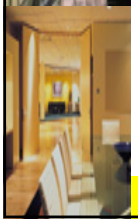
Environment
Energy production and use create 94% of CO_2 emissions

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 (estimate in 1998)

OBJECTIVE and required MEASURES



Objective of the EPBD

Promoting the improvement of energy performance of buildings within the EU through cost-effective measures, **with no compromise to comfort and Indoor air quality**.

The required measures by all Member States

- **Apply a Methodology for integrated building energy performance**
- **Minimum requirements for new buildings and for large existing buildings undergoing a major renovation**
- **Certification schemes for all buildings**
- **Inspection & assessment of boilers and air conditioning**

OBJECTIVES and required MEASURES

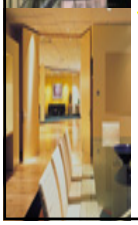
Austria
Belgium
Bulgaria
Cyprus
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Ireland
Italy
Latvia
Lithuania
Luxembourg
Malta
Netherlands
Poland
Portugal
Romania
Slovakia
Slovenia
Spain
Sweden
United Kingdom

If lack of inspectors

The required measures by all Member States

- Apply a Methodology for integrated building energy performance
- Minimum requirements for new buildings and for large existing buildings undergoing a major renovation
- Certification schemes for all buildings
- Inspection & assessment of boilers and air conditioning

Methodology for the integrated energy performance of buildings



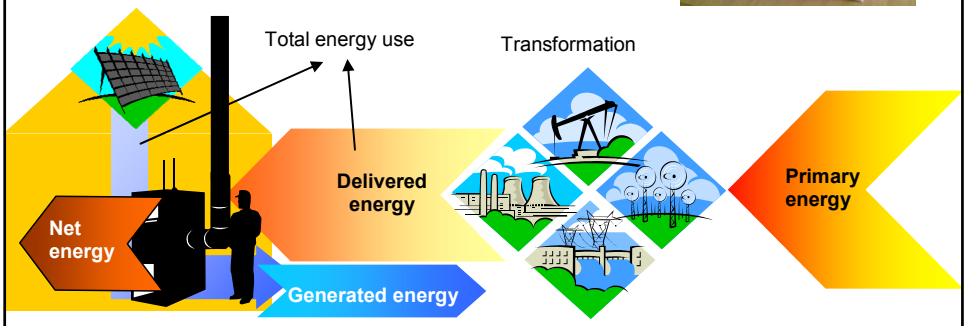
Annex : The methodology of calculation of energy performances of buildings shall include at least the following aspects:

- thermal characteristics of the building (walls, partitions, etc.). These characteristics should also include air-tightness;
- heating installation and insulation characteristics, including their
- air-conditioning
- ventilation
- lighting installation (mainly the non-residential sector);
- design and orientation of buildings, including outdoor climate;
- passive solar systems and solar protection;
- natural ventilation;
- indoor climatic conditions, including the designed indoor climate.

Lack of a common methodology for characterizing the energy performance of buildings represents a major difficulty for MS.

Mandate to CEN to deliver suitable standards and an Umbrella Report

Building & System Energy Demand

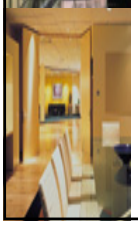


Impose minimum requirements

New buildings

Application of the minimum energy performance requirements to all residential and non-residential buildings.

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

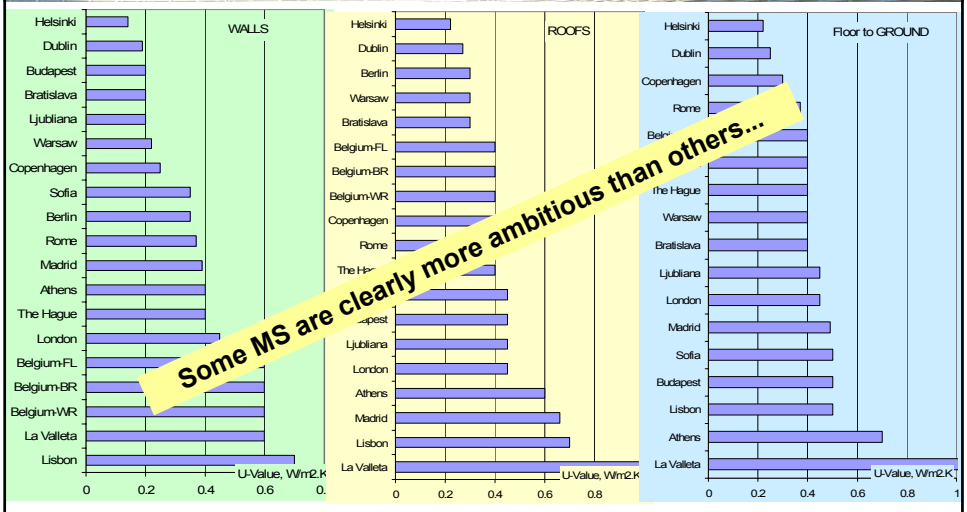


Existing buildings

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).

Art.4 – Minimum Requirements

- **Minimum U-values (indicative, often combined with global consumption targets)**

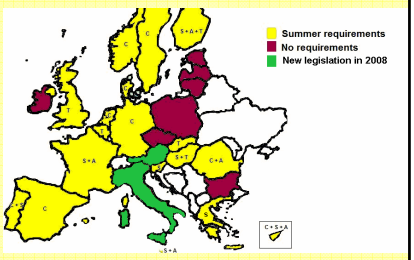


County improvements ranged from 1% to 50%...

with an overall 25% average increase in energy efficiency requirements.

Requirements for Summer cooling

- ***Most MS have chosen to implement summer requirements in their new building regulations,*** often for the first time.
- Four different types of requirements are adopted by MS, either one at a time or with combinations of more than one type:
  - Calculation (and limits) of ***cooling loads***
  - Calculation (and limits) of ***overheating***
  - Requirements for ***minimum shading*** of glazed areas
  - Limits on ***maximum glazed area***
- The first two types of requirement are the most commonly adopted by MS.
- It seems logical that every MS should be forced to adopt minimum requirements to reduce AC needs (within cost-effectiveness rule).

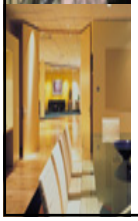


Inspection and assessment of heating & cooling installations

Heating systems

- Regular inspection : boilers 20 - 100 kW
- Every 2 or 4 years: boilers > 100 kW
- Boilers larger than 20 kW and older than 15 years: the entire heating installations should be inspected + advice

Inspections of boilers can be replaced by information campaigns.



Cooling systems

Regular inspection of air-conditioning systems with an output of more than 12 kW

ENERGY CERTIFICATES

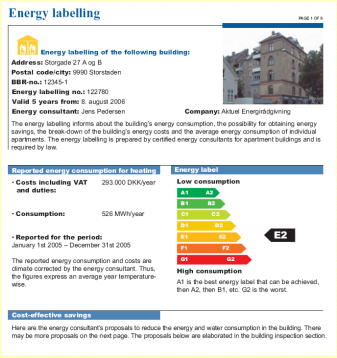
The New Rules for Certification of Buildings

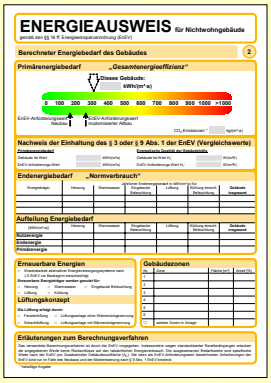
- When buildings are constructed, sold or rented out an energy performance certificate is to be made available to the buyer or tenant (but: by building, by apartment, measured or calculated rating,…? MS decision, free option in the EPBD)
- Public Buildings to set an example by being certified regularly and visibly (but: what is a public building? Rather vague definition in the EPBD)
- All large buildings visited regularly by the public to display energy certificate prominently (but: what is a building regularly visited by the public? Vague in EPBD)

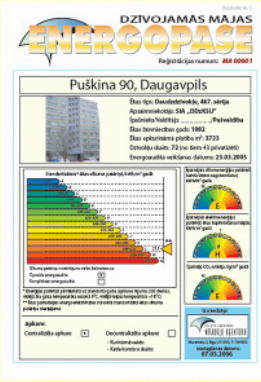
It is relatively easy to publish new building regulations. But starting a brand new certification scheme for millions of buildings, with so many options to decide, is a difficult undertaking and it involves a huge logistic problem.

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.







Types of Ratings in Certificates

- **Calculated Energy Rating – compares buildings on the basis of reference conditions – best suited for New Buildings and Residential buildings.**
- **Measured Energy Rating – describes the actual performance of a building – accounts for use pattern, occupant effects – can use metered energy (bills) – it should be used only for Existing Public buildings.**
- **Existing buildings pose the greatest problems, because of lack of accurate information about its envelope and systems details… The new revised EN-ISO 13790 describes the survey and calculation methodologies.**
- **Direct comparisons of building performance** among different MS **will be quite difficult due to the adoption of different sets of simplifications** at national level.

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 were rather drastic…

Certification of Buildings

- **When we talk about Certification, we should really be talking about many different problems.**
- **The needs and work are totally diverse for different typologies:**
  - **New Buildings vs Existing Buildings**
  - **Single-family buildings vs Apartments vs Non-Residential buildings**
  - **Regular Certification vs Certification by Sale, by Rental or at the end of Construction.**
- **MS had thus to develop not one but several suitable schemes well adopted for each case.**

It is obvious that there are major delays in the implementation of certification in many MS

Timing for starting to Issue Certificates for Residential Buildings

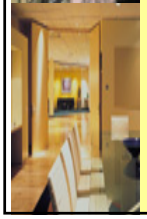
By:	2006	2007	2008	2009	Later
New	5	8	6	3	5
	19%	48%	70%	81%	
Exist.	5	3	4	8	7
	19%	30%	44%	74%	

Certification of existing buildings is a clear problem. Many countries will start after 2009. Only 5 countries have fully operational cchemes as of Jan 1 2009.

A few MS have not yet even required existing buildings to have a certificate for sale or renting.

Public buildings are not being used as examples.

National Energy Plans



Energy End-Use Efficiency and Energy Services Directive

Directive 2006/32/EC

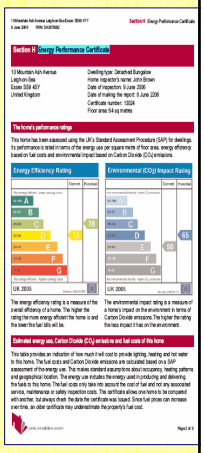
Most MS produced National Energy Plans (or drafts) in 2007/2008.

It requires 1%/year energy consumption savings until 2015 – a very difficult target to reach without a serious effort on buildings (40% of overall energy use in the EU), both new and existing…

But, like the EPBD implementation, the implementation of the National Energy Plans is delayed in most EU Member States… The EC just launched 20 procedures against Member States on Jan 28, 2009, to require them to speed up implementation.

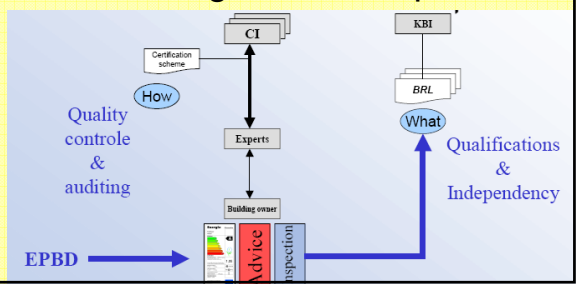
The implementation of the EPBD by MS

- For most MS, the transposition of the Buildings Directive involved, mainly:
  - ***Revising national building regulations***, some of them quite old already, with updated and more detailed calculation models, as well as more demanding, cost-effective, energy efficiency requirements;
  - ***Setting up certification schemes as well as schemes for inspections of boilers and air-conditioning systems***, with all its legal and logistical implications;
  - ***Training experts*** to carry out certification and inspections, including all the concerns for ensuring Quality control and monitoring of the results.

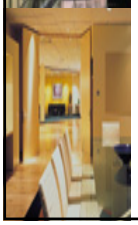

Section 1 Energy Performance Certificate

Independence of Experts and Inspectors

- In order to ***avoid*** any ***conflict of interest*** (real or perceived), MS should have a solid certification scheme with adequate Quality Assurance.
- The issue of “independence” of the qualified experts and inspectors is quite vague in the EPBD and may lead to ***very different solutions among MS***. Harmonisation of practices among MS will require a stronger EPBD.



The difficulties for Implementation



Which support by EC to Member States?

EC is supporting a whole range of SAVE projects

EC is providing forum for MS to informally discuss implementation issues → The Buildings Concer[illegible]ction

BUILDINGS CONCERTED AC[illegible] (2005-2007)

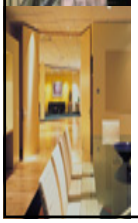
- 29 countries working t[illegible] on a voluntary basis.
- Getting inspiratio[illegible]deas from one another.
- Towards limit[illegible]e range of solutions to the common challeng[illegible]isposing the EPBD.

Over 100 participants (mainly from MS ministries) at these meetings

The Buildings Concerted Action

- **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.**

BUILDINGS CONCERTED ACTION: Overall objectives



Work focuses on 4 core themes:

- Certification
- Training
- Inspection of boilers and air-conditioning systems
- Use of new CEN standards

Tools for Information

Presentations

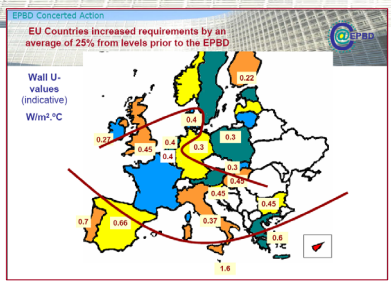
Exhibitions

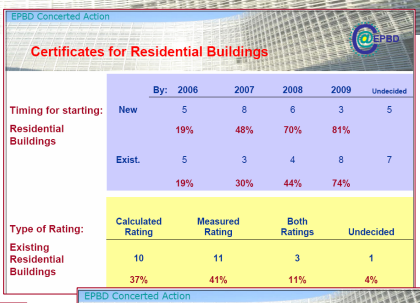
Posters

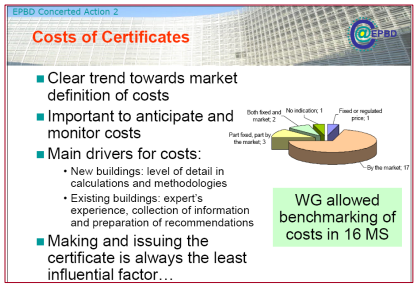
Active Participation

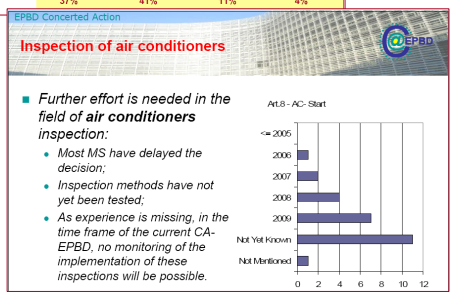
Informal Networking

Analysis and Summaries



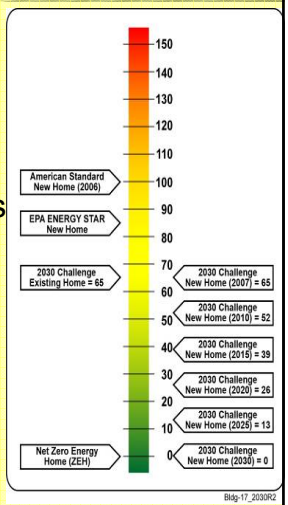






Interaction with Outside Groups

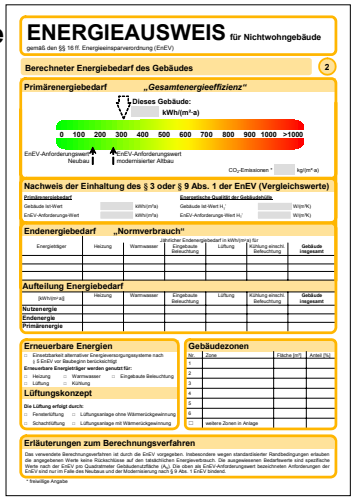
- Invited guests who can contribute with useful information:
  - CEN standards (CEN WG leaders, standards convenors, etc.)
  - International Organization representatives (e.g., IEA)
  - USA building certification network RESNET
  - IEE financed EPBD-project coordinators
- *i.e, share experiences with all others who share our common interests and objectives*

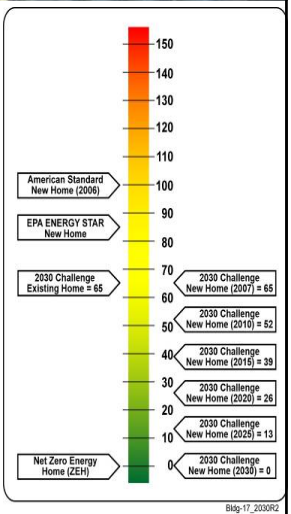


RESNET HERS Index

Common Standards EU-USA?

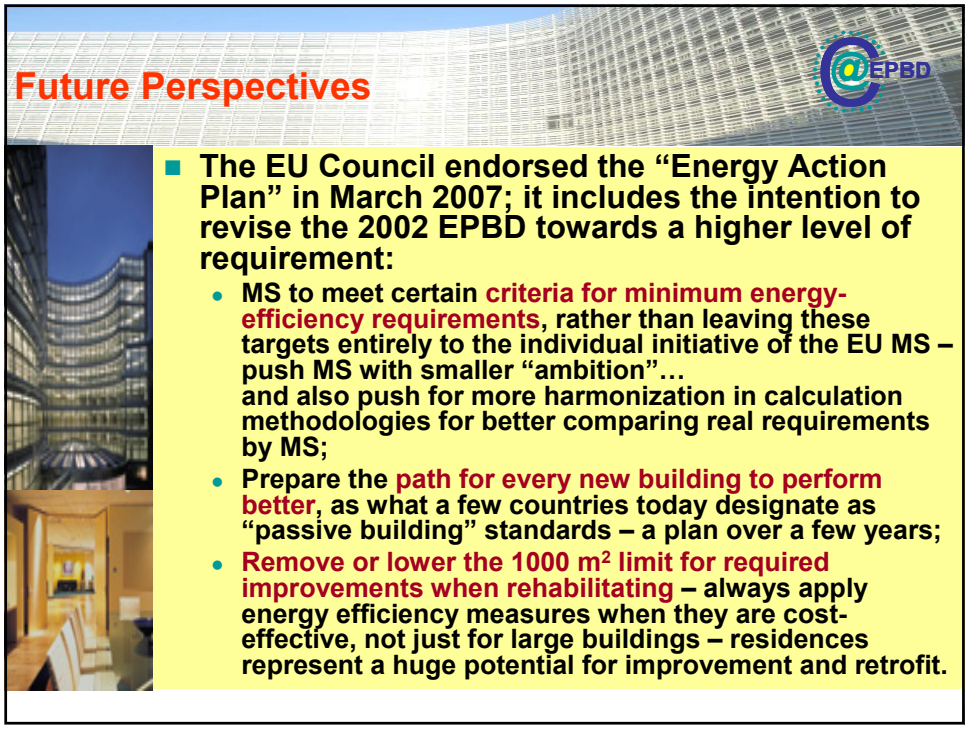
- **Building Physics is the same everywhere – a ISO standard is being drafted.**
- **Common standards can be flexible enough to allow any national preferences, as it was the rule within the whole of the EU.**
- **But everybody could have a common basis for comparison.**
- **RESNET and the EU share common interests and goals.**





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

The "Buildings Platform" is the official EC information channel for EPBD issues



- **The EU Council endorsed the "Energy Action Plan" in March 2007; it includes the intention to revise the 2002 EPBD towards a higher level of requirement:**
  - **MS to meet certain criteria for minimum energy-efficiency requirements, rather than leaving these targets entirely to the individual initiative of the EU MS – push MS with smaller "ambition"…**
    and also push for more harmonization in calculation methodologies for better comparing real requirements by MS;
  - **Prepare the path for every new building to perform better, as what a few countries today designate as "passive building" standards – a plan over a few years;**
  - **Remove or lower the 1000 m² limit for required improvements when rehabilitating – always apply energy efficiency measures when they are cost-effective, not just for large buildings – residences represent a huge potential for improvement and retrofit.**

Changes in Requirements in the proposed EPBD Recasting

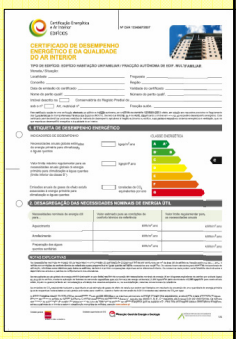
- **Mandatory cost-effectiveness criteria for MS to set national targets for minimum energy efficiency requirements in all MS, as well as national calendars for moving requirements towards "passive standard" new buildings within a decade or less (within ESD national energy Action Plans) – An European tool for setting up cost-effective targets to be prepared by the EC and "offered" to MS.**
- **Lowering the threshold of applicability of energy requirements in major renovations below 1000 m² – The EU Commission proposes to simply apply this requirement to every building undergoing a major renovation (>25% of the area of the façade or cost of the comparable new building).**
- **Lowering the requirement to display a certificate in public buildings from 1000 m² to 250 m².**
- **Imposing mandatory monitoring of results at MS level and common periodic reporting formats on advances from the implementation to the European Commission.**

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.**

Changes in Certification Schemes in the proposed EPBD Recasting

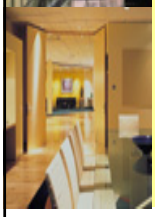
- ***Certificates must have added value to consumers*** **– the recommendations should lead to real energy and cost savings – Rules for existing buildings must be made stronger.**
- **MS must make use of the information in the certificates to *stimulate energy savings* in buildings.**
- **This requires:**
  - **Quality certificates – quality requirements for qualified experts should be made stronger, and mandatory random quality control procedures in place;**
  - **Incentives for carrying out the recommendations (or requirements for rehabilitation when there is cost-effectiveness).**
- **Requirements on Public buildings should be strengthened (clearer definition, faster implementation and rehabilitation requirements).**



Changes in Inspections Schemes in the proposed EPBD Recasting

- Many MS have organised an ***inspection system*** following one of the two main approaches based on available experience:
  - ***as a proof of regular maintenance and random on site check;***
  - ***as regular inspection*** performed by, e.g., chimney-sweepers, normally in charge of safety checks.
- ***Other MS have implemented or intend to organize information, promotion and advice campaigns*** to accelerate the replacement of old boilers or to improve servicing.
- **Periodic inspections schemes will be required to become more effective, but allowing full flexibility to MS – the goal is to combine energy efficiency inspections with regular maintenance or safety inspections, to reduce costs.**
- **Inspections extended to all HVAC systems, to remove existing ambiguities about the meaning of "heating and cooling installations" (e.g., is ventilation also included?).**

Further requirements in the Proposed EPBD recast



- No Public Funds can be used for buildings that do not fully obey official requirements;
- Member States required to prepare a national plan to move towards cost-effective low emission buildings within a short period, “e.g., a decade”;
- Certificates required to include a CO_2 indicator;
- Every Public Building to have a Certificate by the end of 2010.

Conclusions

- Building Energy Efficiency is a major concern.
- New buildings must be built as efficient as possible.
- Existing buildings must be improved, as they are responsible for most of the real energy consumption.
- Building Certification can identify the best candidates for cost-effective retrofit - Cost-effective measures are always good business.
- The EU is requiring this step for every new building and major renovation, mandatory rather than volunteer basis – a huge scale!
- Find solutions to provide financial support to improvements.
- It is important to share experiences and converge on methodologies with every actor, within the EU and outside of the EU – everybody has something to gain, like every MS in the EU benefited from the CA to find practical solutions that are cheap, are not seen as burdens to citizens, do not cause delays, don´t involve much paperwork, etc.
- Changing the EPBD now shall simply correct problems and barriers that were identified, namely those that were preventing reasonable minimum requirements in all MS and effective certification and inspections schemes, as well as promoting cost-effective energy retrofit of the largest possible number of existing buildings, both public and private.