The European Directive on the Energy Performance of Buildings (EPBD)

RESNET Conference

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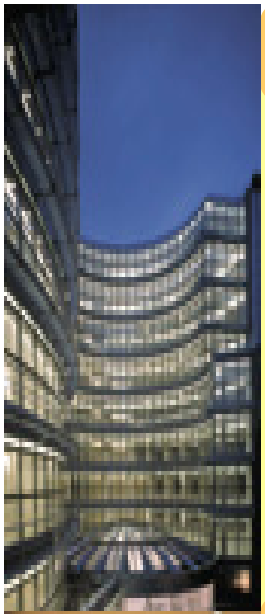
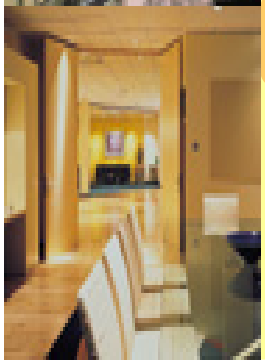
The Rationale for the EPBD





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

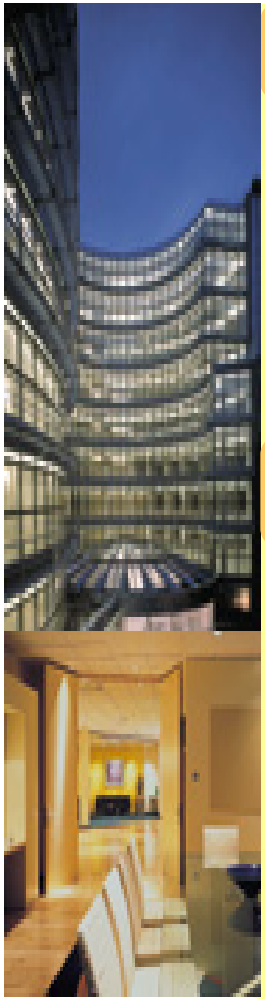
Impact of action on energy use in buildings

- 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

THE EPBD ALREADY HAS A LONG HISTORY…

- First proposed by the EU commission in early 2001
- It became a top priority for the Belgium EU presidency, discussed in detail by the council July-Nov. 2001
- Approved unanimously by the European Council in December 2001
- Approved by the European Parliament on 10 October 2002 and by the EU Commission on 16 December 2002
- Publication in the EU official journal as Directive 2002/91/EC on 4 January 2003
- Deadline for transposition by EU MS: 4 January 2006
- **Wishful thinking though**! Many of the 27 EU MS have fully transposed the EPBD as of today, although much preparatory work and significant progress has already taken place.

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

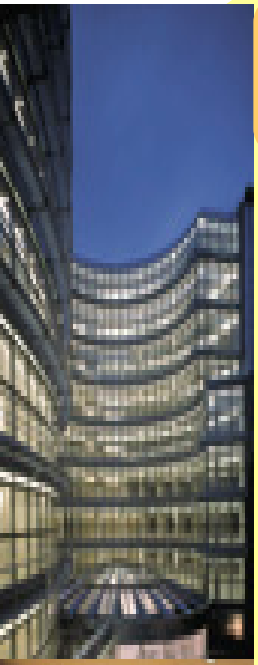
- Apply a Methodology for integrated building energy performance standards based on common minimum requirements
- Application of these standards on new and existing buildings
- Certification schemes for all buildings
- Inspection & assessment of boilers/heating and cooling installations

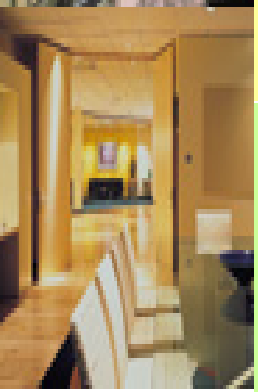
Background

- **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, construction techniques and HVAC practices vary widely across Europe, climates are very different, heating and cooling needs totally different from North to South.**




Methodology for the integrated energy performance of buildings





A common methodology for integrated minimum standards

- **integrate insulation, heating, cooling, ventilation, lighting and daylighting, renewable energy installations, passive solar heating and cooling systems, CHP, DH/C, position and orientation of the building**
- give **flexibility** to designers to meet energy reduction standards in the most cost-effective way
- can be expressed in **simple energy indicators**
- **are adopted by Member States** for different categories of buildings taking into account climatic differences

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

Mandate to CEN to deliver suitable standards and an Umbrella Report, out-lining the calculation procedure for assessing the energy performance of buildings.

The new set of European (EN) standards

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN ISO 13790

May 2005

ICS

Will supersede EN ISO 13790:2004

English version

Thermal performance of buildings - Calculation of energy use for space heating and cooling (ISO/DIS 13790:2005)

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 15217

March 2005

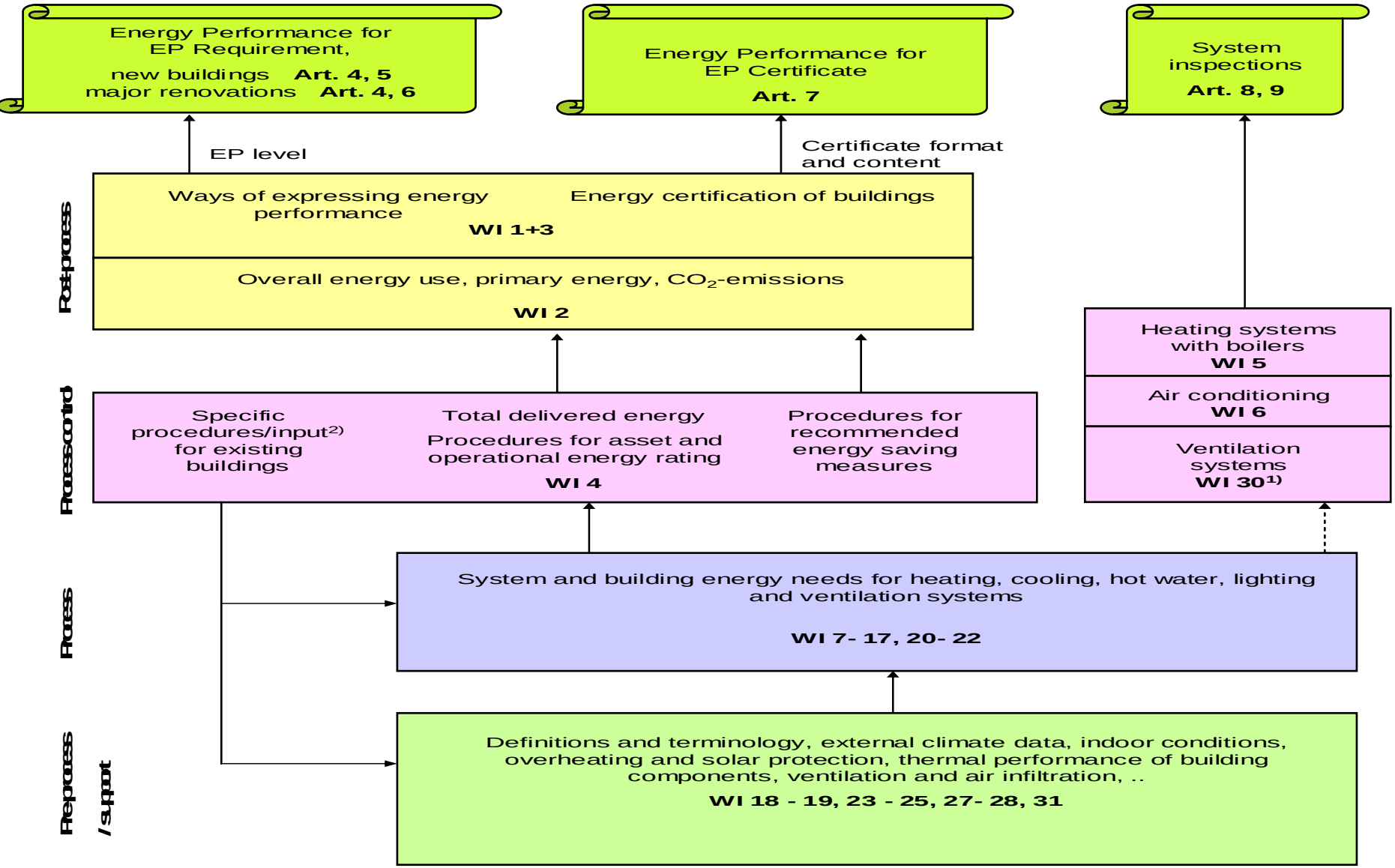
ICS

English version

Energy performance of buildings - Methods for expressing energy performance and for energy certification of buildings

version: 01-10-04

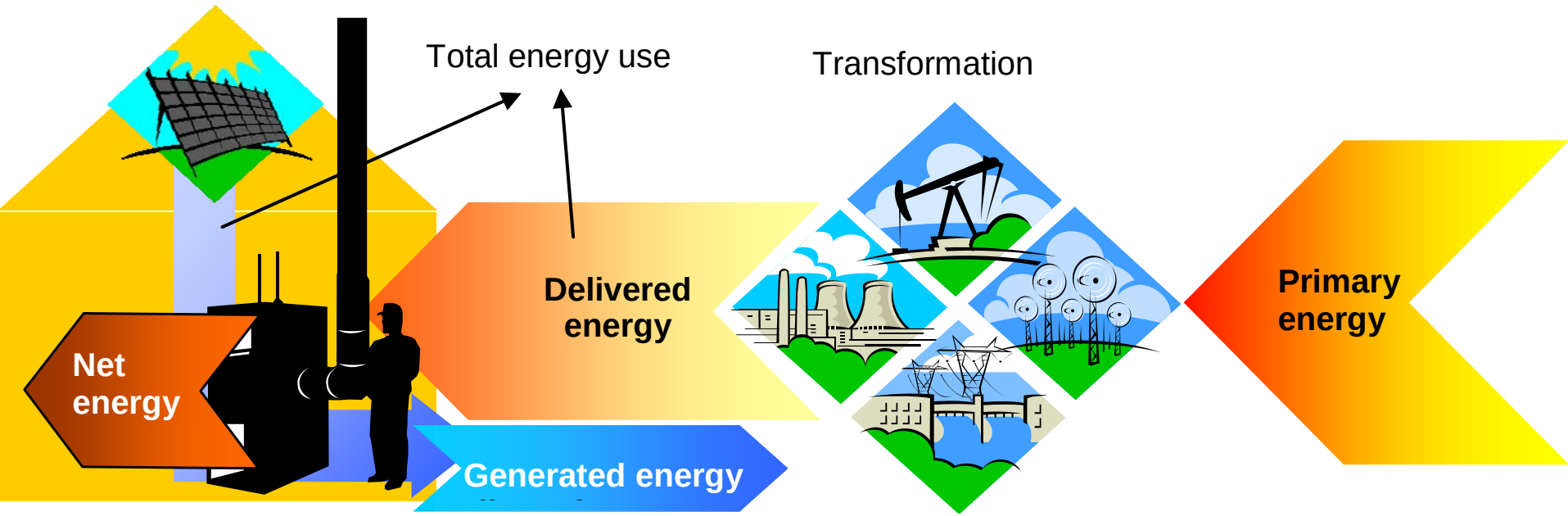
Methodology for calculating energy performance (Article 3)

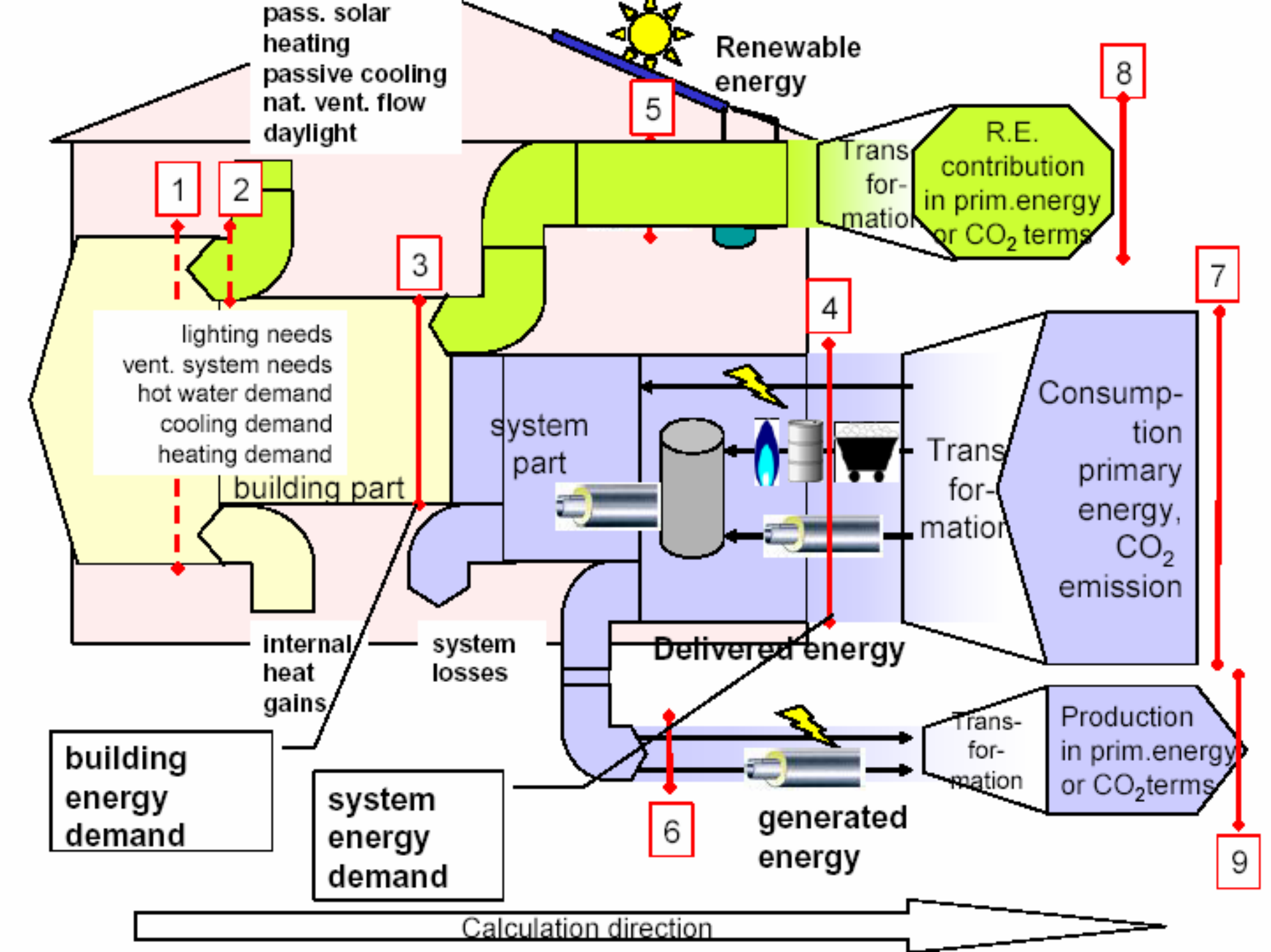


1): Note: not (explicitly) mentioned in the Directive

2): Unless already covered by WI 7-28

Building & System Energy Demand




pass. solar heating
passive cooling
nat. vent. flow
daylight
Renewable energy
5
8
Trans for-mation
R.E. contribution in prim.energy or CO_2 terms
1
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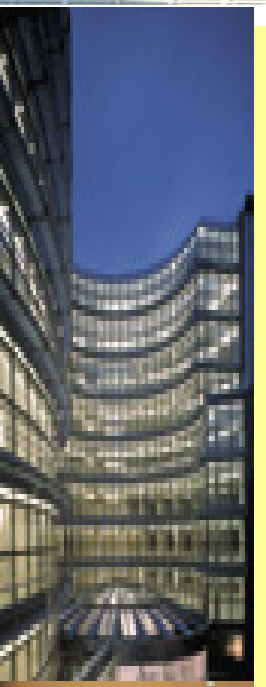
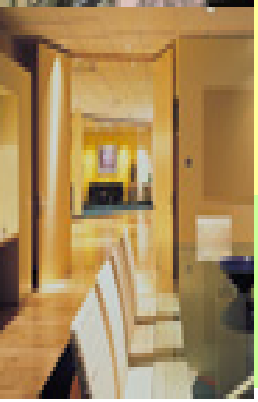
4
7
lighting needs
vent. system needs
hot water demand
cooling demand
heating demand
building part
system part
Trans for-mation
Consump-tion primary energy, CO_2 emission
internal heat gains
system losses
Delivered energy
building energy demand
system energy demand
6
generated energy
Trans-for-mation
Production in prim.energy or CO_2terms
9
Calculation direction

CEN Standards



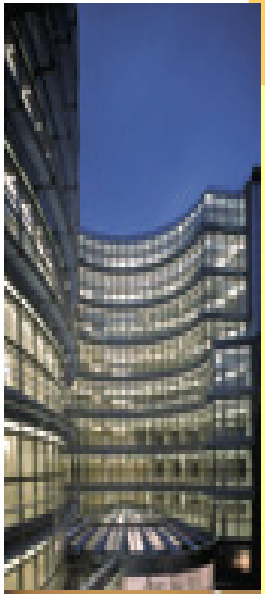


Key Dates for CEN standards

- End of 2004 – most prEN drafts ready
- 2005 - full consultation launched and comments received
- 2006 – revised versions of standards taking into account comments received from MS
- Voting the standards is currently under way (until April 2007)
- By May-June 2007 – Formal adoption of the new European standards ENs

For Transposition by 4 January 2006, MS were expected to make an effort to adopt the contents of the draft standards available in 2005 (major changes not expected).

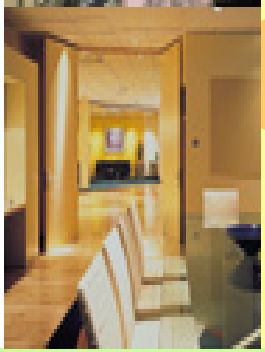
Minimum standards for all buildings



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).

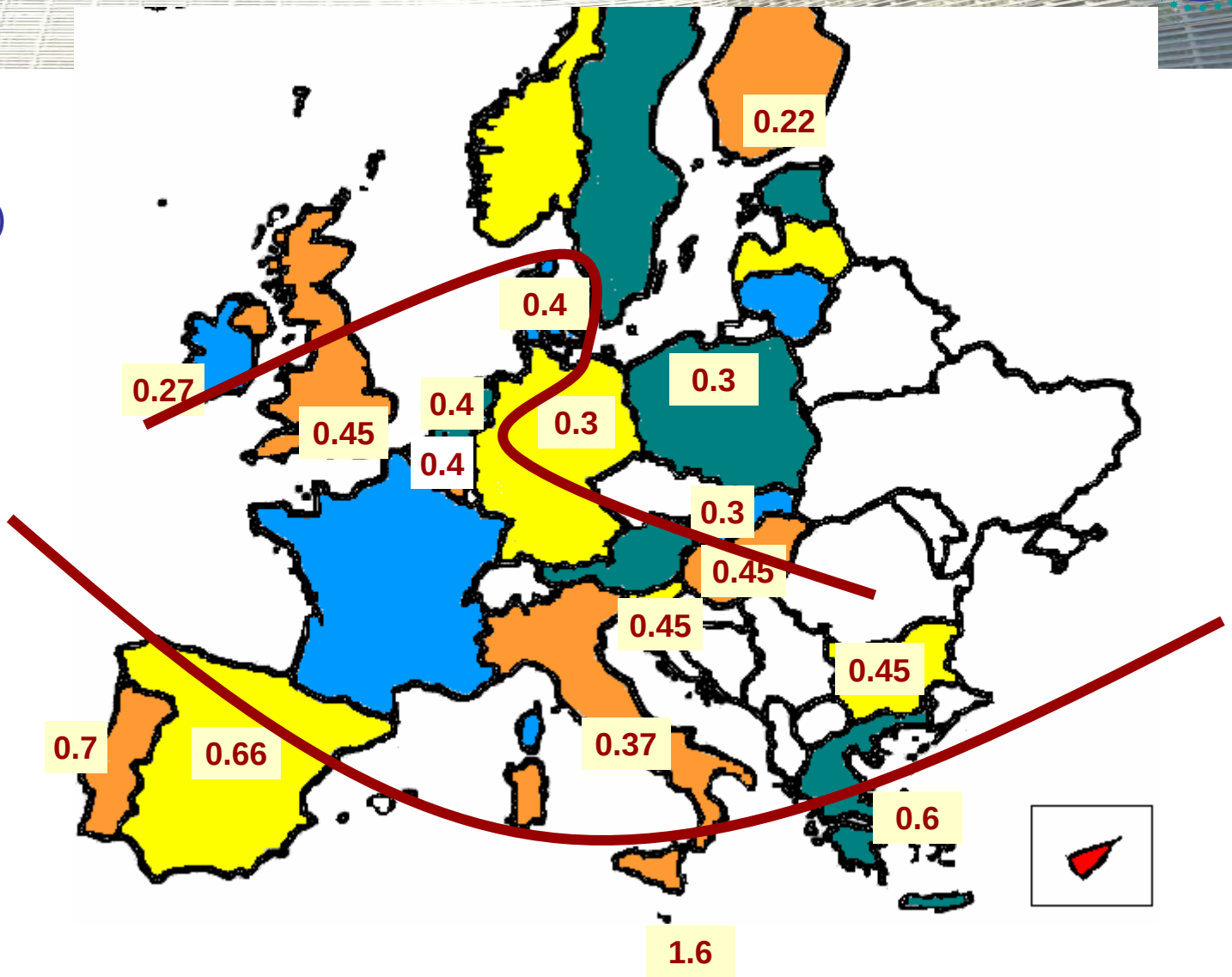
Most MS are adopting new, improved, more demanding building regulations.

Integration of Cooling requirements and other difficult issues still lagging.

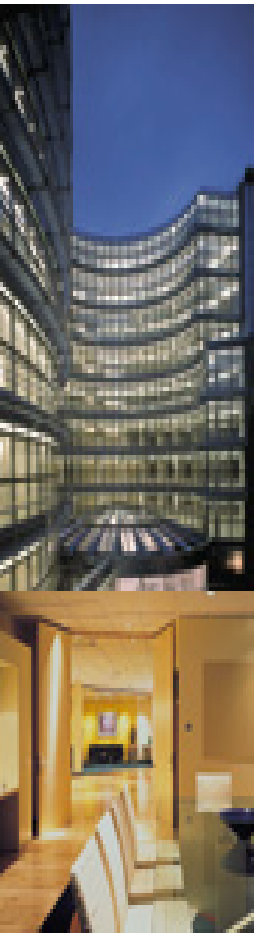
EU Countries increased requirements by an average of 25% from levels prior to the EPBD

Wall U-values
(indicative)

W/m².ºC

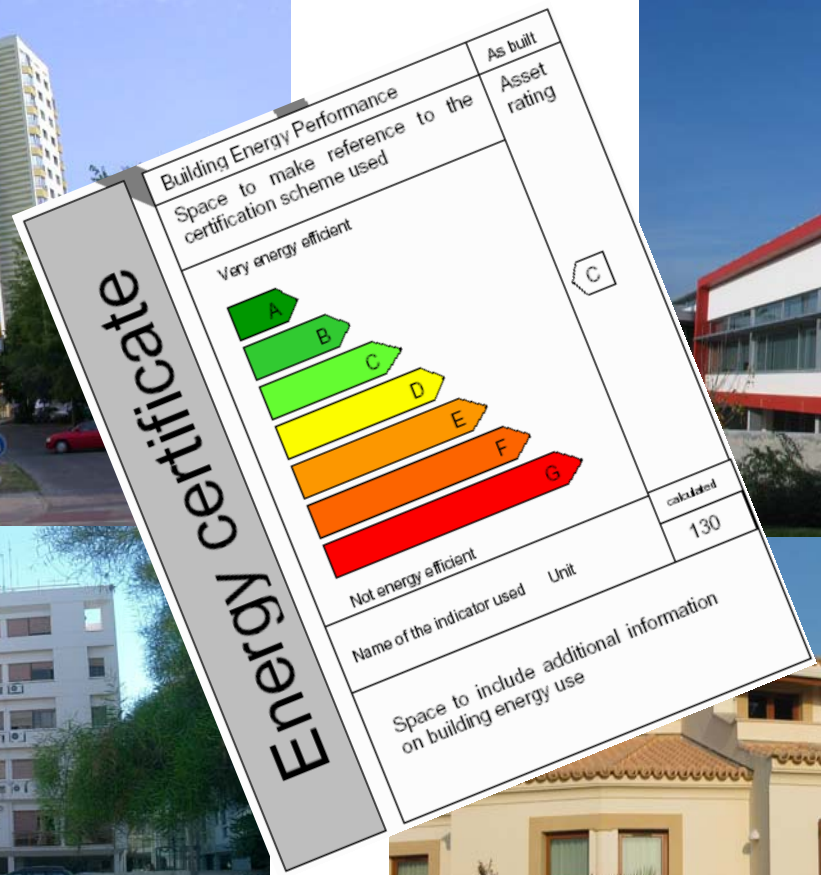


National Legislation required by the EPBD

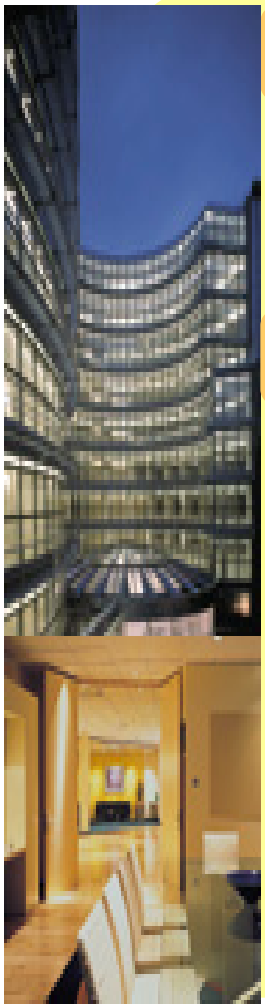


- **In most MS, implementation of the EPBD required:**
  - **Ammending building regulations, with new, more inclusive calculation methodologies, according to common set defined in the EPBD;**
  - **Publishing new Laws requiring Energy Certificate and setting up some form of national board to control 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?

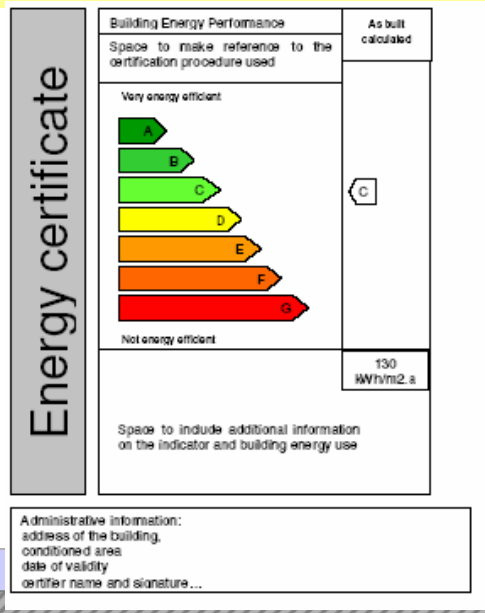
Energy performance **certificates** for new and existing buildings should be available **when they are constructed, sold or rented out**

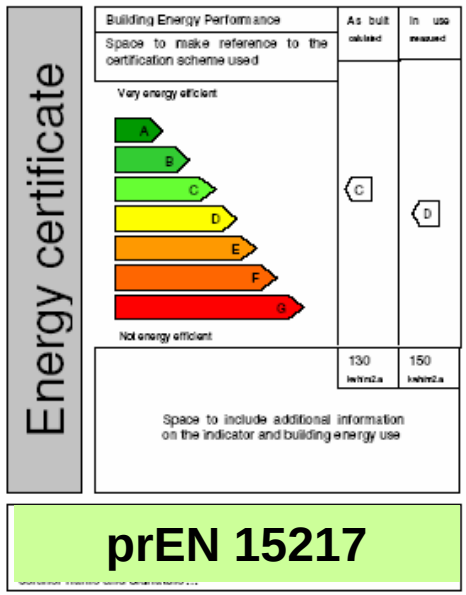
The certificates should:

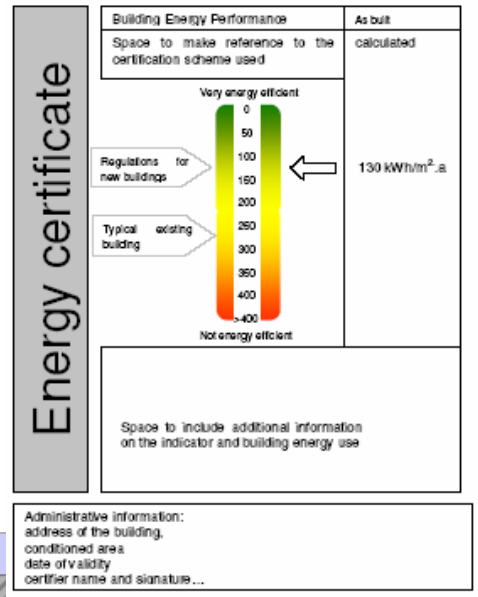
- **not be more than 10 years old**
- **be accompanied with advice on how to improve the energy performance**
- **be displayed in large public buildings and institutions (over 1000m^2).**

The Push towards Harmonization

- **Energy Certificate – format and content – huge potential for major differences.**
- **The EC wish to help convergence and similarity of approaches among MS – comparability for consumers.**
- **Industry pushing for similar approaches to allow for common specs for the same product in different national markets.**

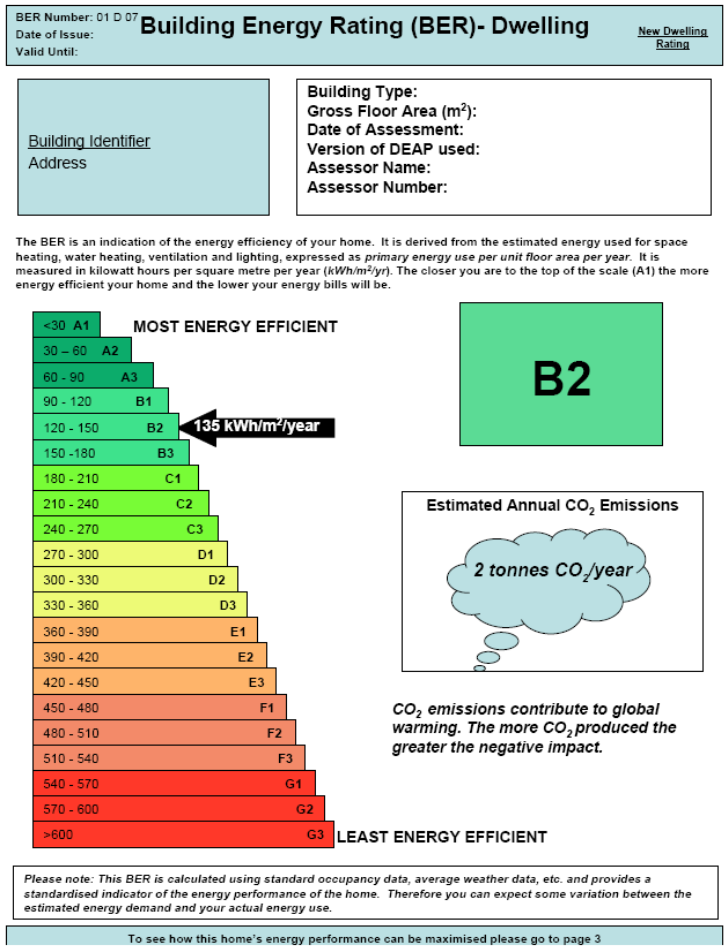






Model of the Certificate (Residential)

- How many steps?
- Where to put minimum level for new buildings? (prEN 15217: minimum is B)
- Possibility to improve the standard without changing the scales?
- Text?
- CO_2 values?
- More than one scale (calculated , measured,…)?
- Should you use A^+ and A^{++} ?
- Passive House standard?
- Or even B^-?



BER Number: 01 D 07
Date of Issue:
Valid Until:

Building Energy Rating (BER)- Dwelling

New Dwelling Rating

Building Identifier
Address

Building Type:
Gross Floor Area (m^2):
Date of Assessment:
Version of DEAP used:
Assessor Name:
Assessor Number:

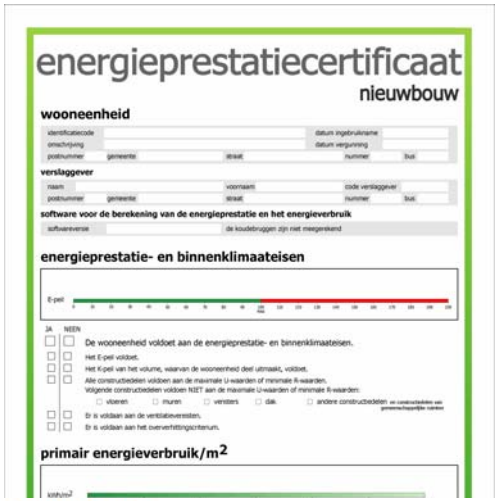
The BER is an indication of the energy efficiency of your home. It is derived from the estimated energy used for space heating, water heating, ventilation and lighting, expressed as *primary energy use per unit floor area per year*. It is measured in kilowatt hours per square metre per year (*kWh/m²/yr*). The closer you are to the top of the scale (A1) the more energy efficient your home and the lower your energy bills will be.

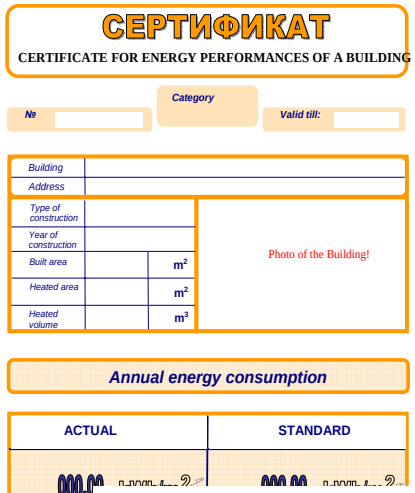
Please note: This BER is calculated using standard occupancy data, average weather data, etc. and provides a standardised indicator of the energy performance of the home. Therefore you can expect some variation between the estimated energy demand and your actual energy use.

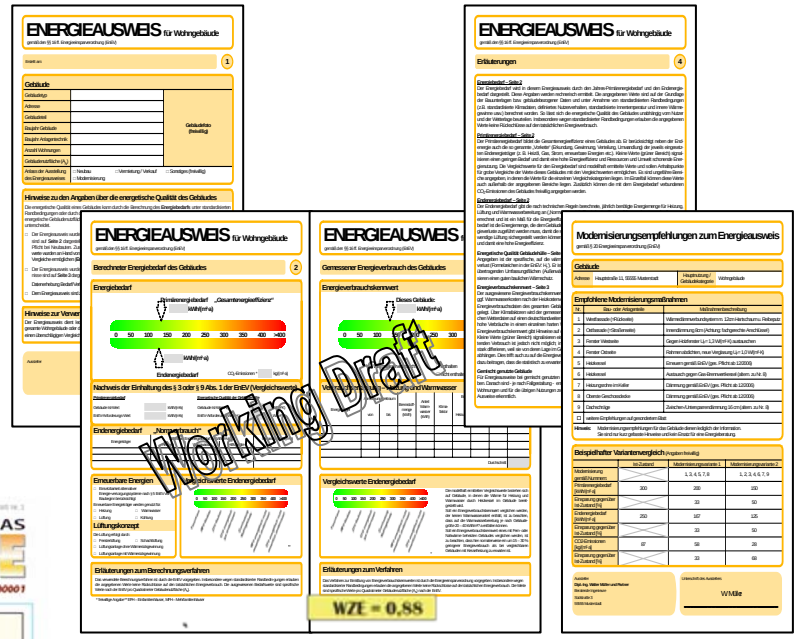
To see how this home's energy performance can be maximised please go to page 3

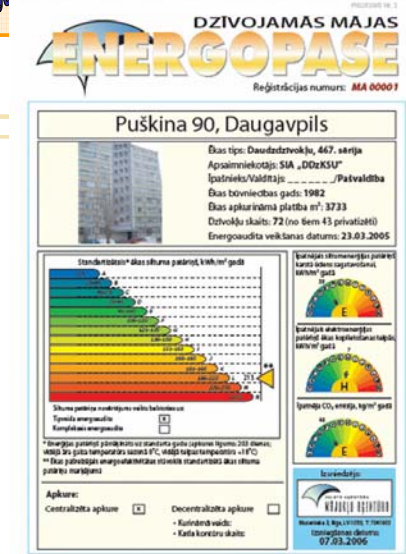
There are many variations in the form of the Certificates….

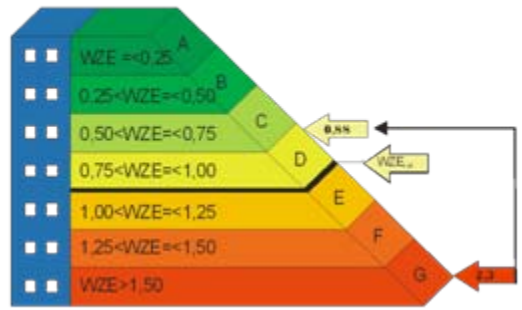
And yet many others…





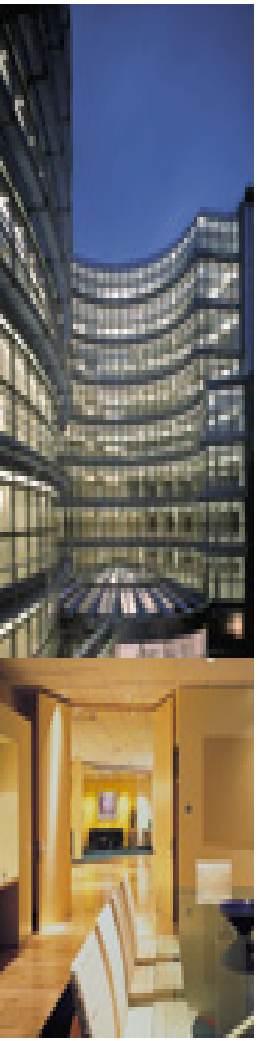






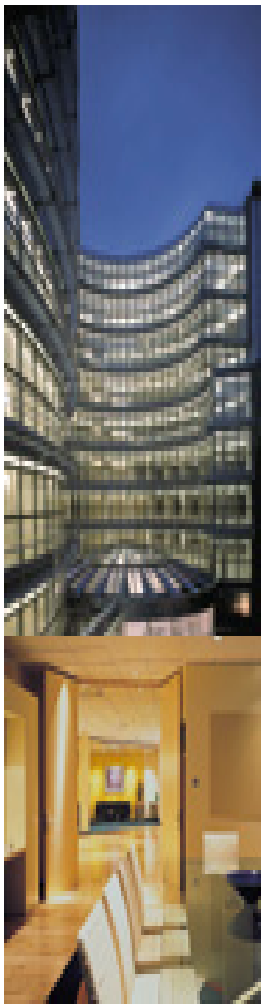
But, despite the differences, we can all "read" the same type of message in any of the certificates…

Types of Ratings in Certificates



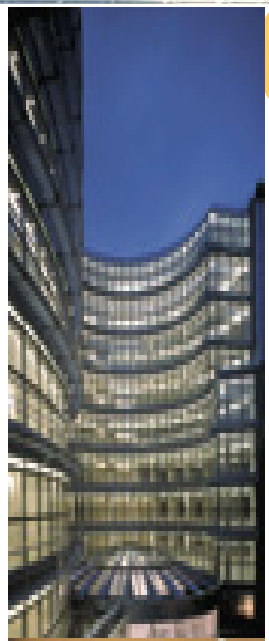
- **Calculated Energy Rating – compares buildings on the basis of reference conditions – mandatory for New Buildings and all Residential buildings.**
- **Measured Energy Rating – describes the actual performance of a building – accounts for use pattern, occupant effects – can use metered energy (bills) – can 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.**

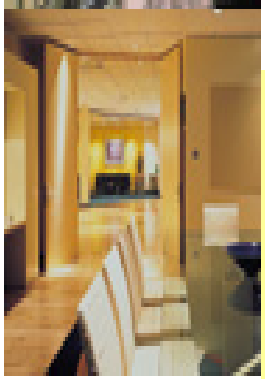
The New Rules for Certification of Buildings



- 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**

The difficulties for Implementation





Why?

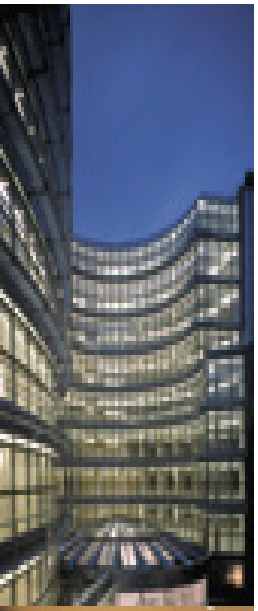
- It is relatively easy to publish new building regulations.
- But starting a brand new certification scheme for millions of existing buildings is difficult and it involves a huge logistical problem.

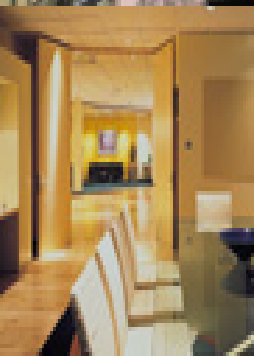
What have MS been doing?

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.

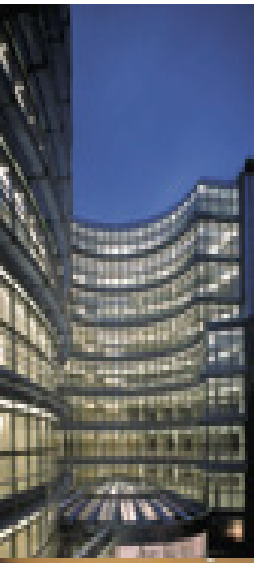
BUILDINGS CONCERTED ACTION - OVERALL OBJECTIVES

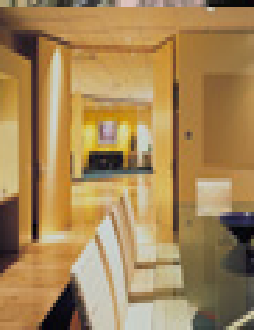




- To enhance and structure the sharing of information and experiences from national implementation.
- To promote good practice concepts in activities required of Member States for implementation of the EPB Directive.
- To create favourable conditions for an accelerated degree of convergence of National 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.

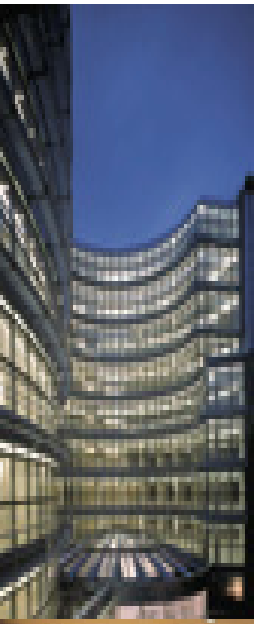
BUILDINGS CONCERTED ACTION - OVERALL OBJECTIVES

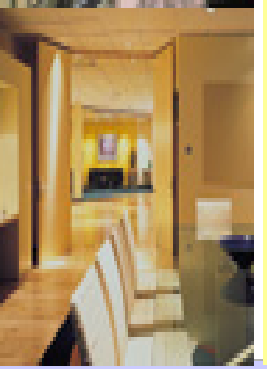




- **Work focuses on a series of specific, objective issues arranged in 4 core themes:**
  - **CERTIFICATION**
  - **INSPECTION OF BOILERS AND AIR-CONDITIONING SYSTEMS**
  - **CERTIFICATION OF EXPERTS AND INSPECTORS & QUALITY CONTROL SYSTEMS**
  - **USE OF THE NEW CEN STANDARDS**

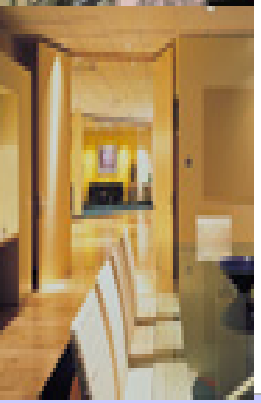
CERTIFICATION ISSUES





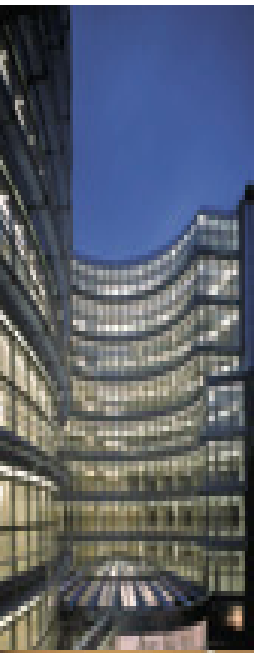
- **What is a Public Building?**
- **Organization of Certification schemes**
- **New vs Existing buildings - methodologies**
- **Public Buildings vs Rent or sale of apartments**
- **Certification per building or per apartment?**
- **Simplified methodologies for small buildings – default values**
- **How to use of metered data?**
- **Quality standards for software and calculation methods**
- **Quality insurance for inspections**
- **Identification of energy-saving recommendations and their real effectiveness**
- **How to take advantage of certificates for new buildings**
- **Costs of certification**
- **Asset rating or operational rating**

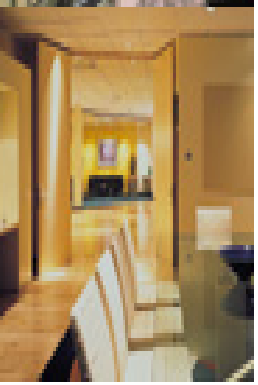
CA-EPBD Achievements on Certification



- **Certification of new buildings: most MS agreed that, ideally, it should be required at both project stage (it is easier to introduce changes and improvements) and after construction;**
- **Certification of existing buildings: it is far more complex and it requires extra planning time to be implemented – few MS are able to start now;**
- **Certification of existing buildings: absolute need for simplified methods, default values and interaction with national methodologies;**
- **Conclusions: Methodologies are well advanced for new buildings, still many issues unresolved for existing buildings.**

EXPERTS

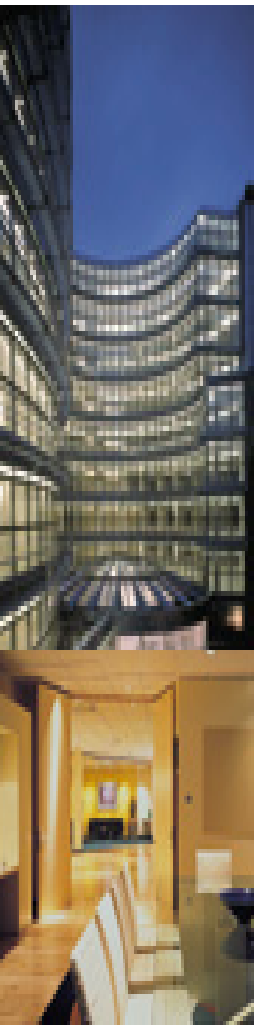




- How many experts are needed in each MS?
- Which criteria and qualifications for accreditation of experts and inspectors?
- Training inspectors
- Degree of Independance
- Code of Practice for Inspectors
- Quality assurance for experts and inspections
- National monitoring of inspections after 2006
- Insurance and Liability

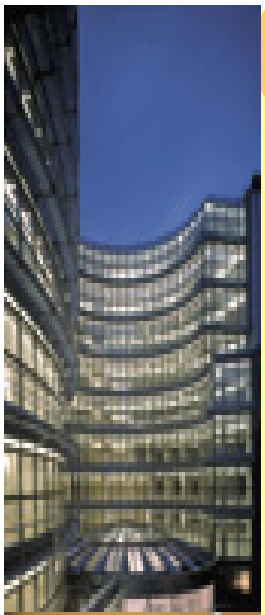
The lack of a sufficient number of accredited experts is accepted by the EPBD as sufficient reason for a postponement of the start of Certification activities for up to 3 years (up to 4 January 2009), and almost all MS are taking advantage of this opportunity to delay its implementation.

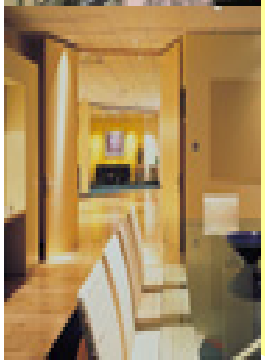
Quality Control



- Accredited experts recognized on the basis of an exam
- Issued certificates shall be registered in national databases
- In most countries, a random sample of the certificates shall be checked by independent experts to ensure their quality
- Accredited Experts issuing incorrect certificates to loose their accreditation
- National databases to be used for reporting impact of the EPBD at national and EU level

Inspection and assessment of heating & cooling installations





Heating systems

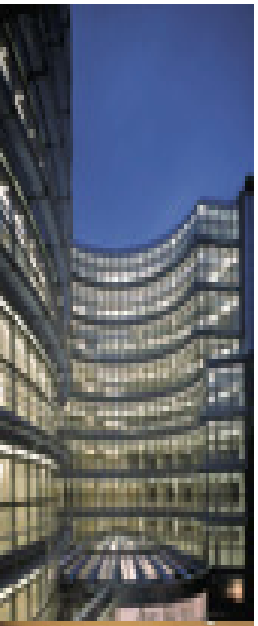
- Inspected regularly: boilers with an effective rated output between 20 kW and 100 kW
- Inspected every 2 years: boilers with an effective rated output over 100 kW
- Boilers larger than 20 kW and older than 15 years: the entire heating installations should be inspected. Advice should be given on alternative solutions which could reduce energy consumption

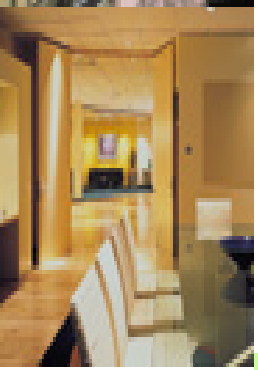
Cooling systems

Regular inspection of air-conditioning systems with an output of more than 12kW, including room systems used together.

Inspections of boilers can be replaced by information campaigns.

INSPECTION ISSUES





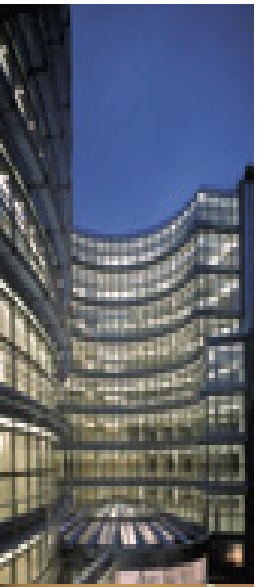
- Organization of inspection schemes
- Inspections or information campaigns?
- Cost effectiveness of the inspections
- Methodologies for Inspections
- How to use the new prEN standards for:
  - Regular inspection of boilers - large central systems
  - Regular inspection of air-conditioners - smaller individual units
  - Regular inspection of air-conditioners - larger central air-conditioners with heating, cooling and ventilation
- Are ventilation systems to be included in inspections?
- Combining inspections with regular maintenance procedures
- One-off inspection of heating systems at 15 years of age
- Costs of inspection
- Qualifications of inspectors

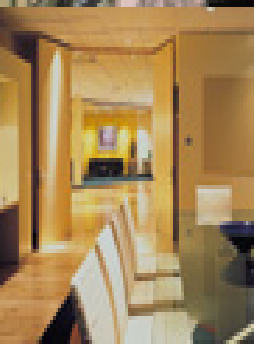
Inspections can also be delayed till 4 January 2006 for lack of sufficient trained inspectors.

12 kW per Building or per Equipment?

- **Many MS are still debating how to apply this requirement.**
- **The EPBD states that, from the inspection, advice should be produced about the correct sizing (or oversizing) of the equipment relative to the building – difficult to accomplish on a per unit basis.**
- **If inspections are “per unit”, small split units may be the best solution to avoid them…**

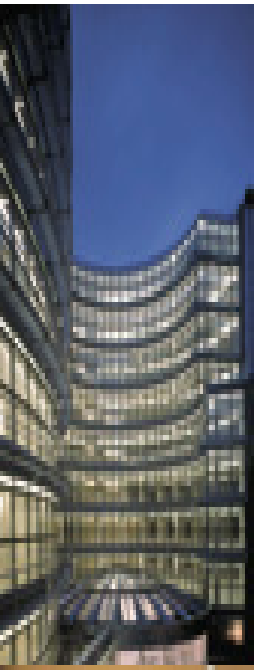
The Status of Transposition and the near future…

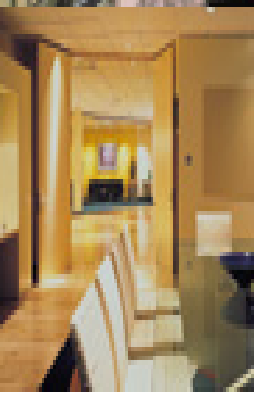




- As of January 2007, the European Commission has notified 15 MS that they must implement the EPBD faster
- Every country requested an extension (up to 3 years).
- We shall start to see certificates popping up for NEW buildings, PUBLIC buildings, and, to a lesser extent, EXISTING buildings over the period 2007-2008.
- The complete EPBD shall not be fully in force in the whole of Europe before 2009. No change really feasible before then. MS are dragging their feet…
- With the new Energy Services Directive (2005), MS have an incentive to start certification, inspections, advice and replacement of boilers / AC to reach a reduction of 1% / year in global energy consumption over the next 9 years…

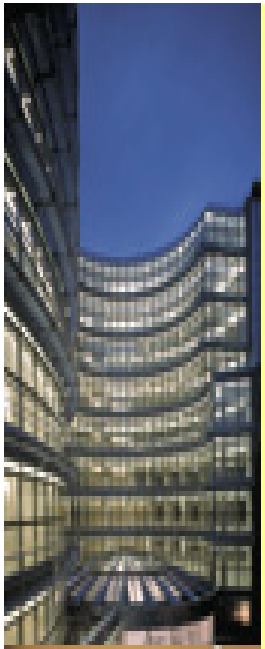
The major bottleneck

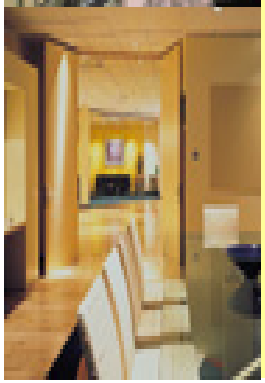




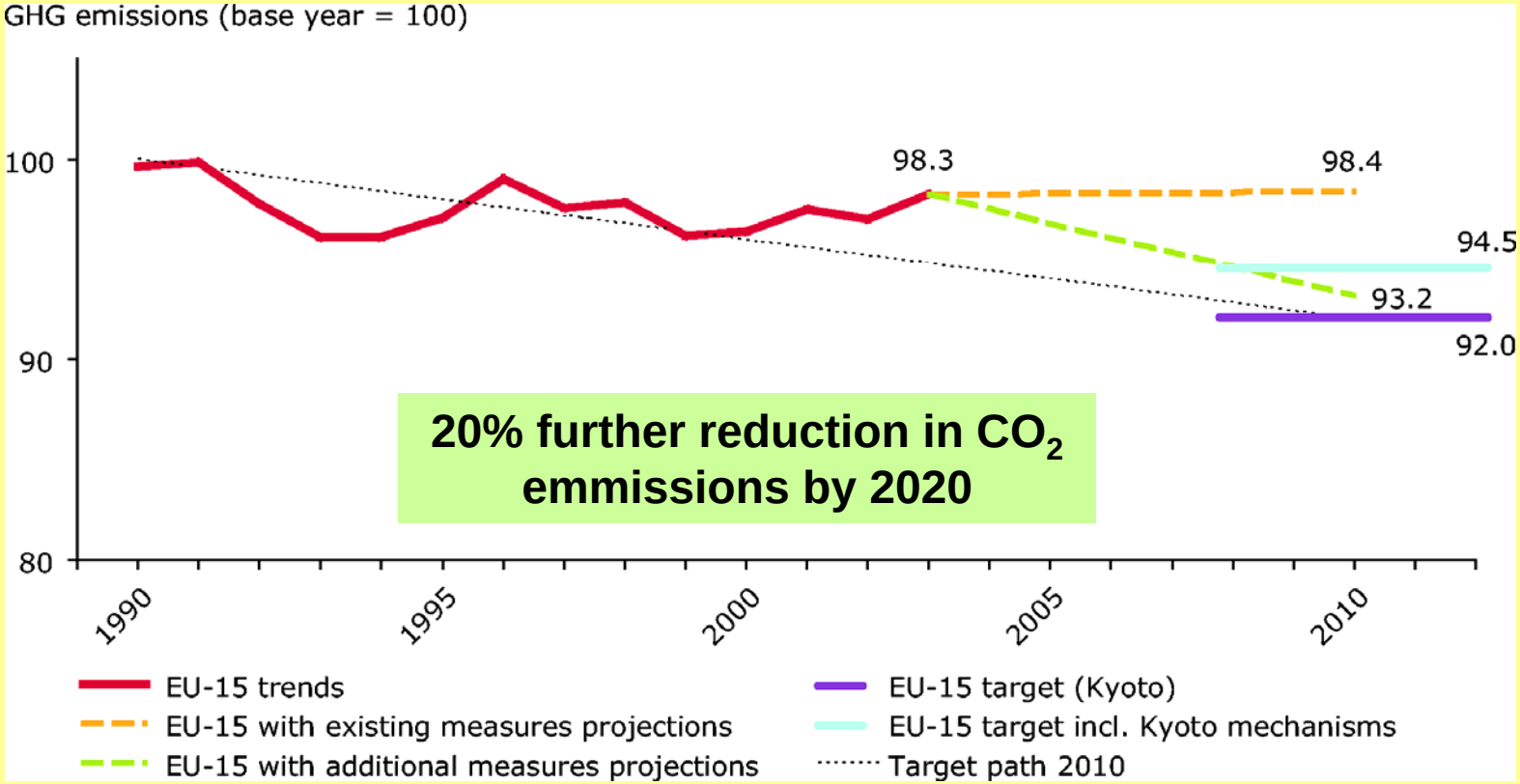
- **Certified experts!**
- **I.e., the lack of certified experts…**
- **Thousands needed across the EU, because ALL NEW buildings and major renovations must be certified, as well as ALL Public Buildings.**
- **All existing buildings must obtain a certificate for sale or renting after January 2009.**
- **Certification becomes REQUIRED rather than voluntary.**
- **It takes time to get them trained and certified with a minimum of credibility.**
- **This also allows most MS an excuse to request the 3-year extension.**
- **Many countries have not yet even decided the qualifications required for experts and inspectors.**

Follow-up policies – Strategic Energy Plan (Jan. 2007)



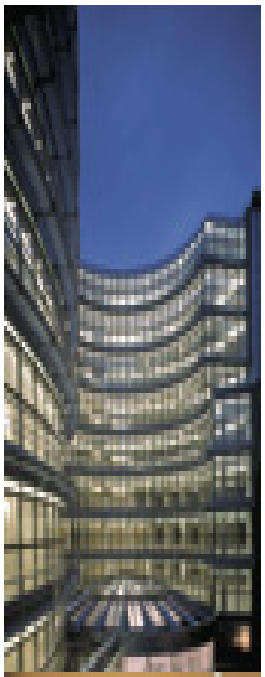


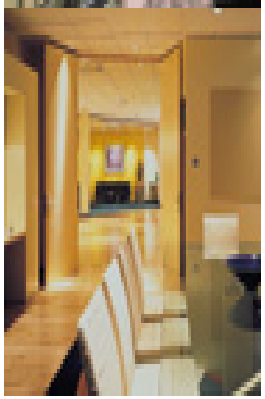
Greenhouse Gas Emissions – trends and targets within EU:



20% further reduction in CO_2 emmissions by 2020

INTEGRATING ENERGY & ENVIRONMENT





Energy Policy for Europe
(Strategic Energy Review)

Limiting Global Climate Change to 2°C

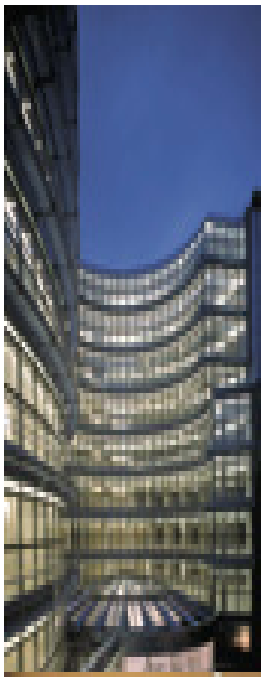
STRATEGIC OBJECTIVE

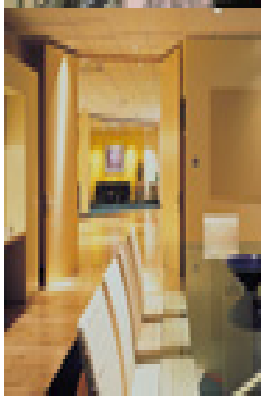
A unilateral EU independent **commitment of**

at least 20% GHG emission reduction by 2020, compared to 1990 levels

And a 30% reduction if broader participation

THE KEY DRIVERS 3x20% by 2020





20% by 2020
EFFICIENCY

By 2020 20% EU GHG

By 2020 20% RENEWABLES

BIO-FUELS

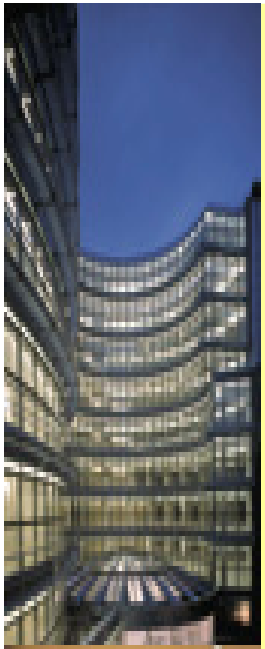
10 % 2020 binding

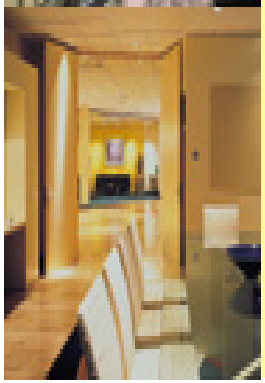
E-ELECTRICITY

HEATING & COOLING

NATIONAL TARGETS and ACTION PLANS

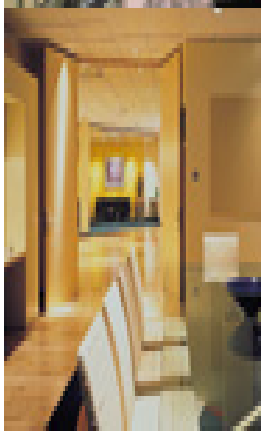
Concrete Measures of EC for 20%-2020 Energy Saving Goal



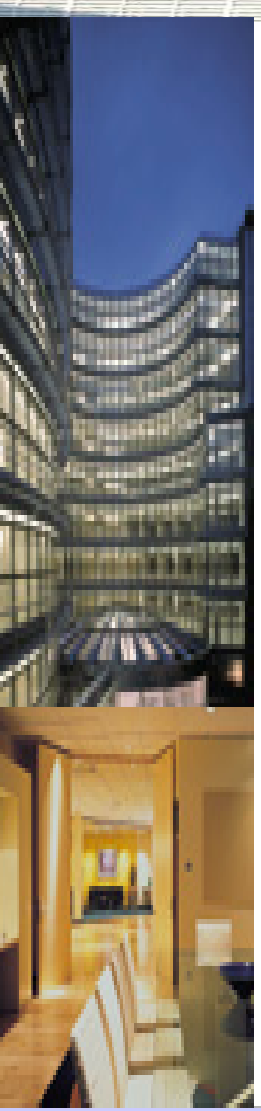


- Bringing forward a **Renewable Energy Road Map**
- New Community **Directive on heating and cooling** complementing the Community renewables framework
- Supporting **energy efficiency** improvement in buildings
- Supporting **financial instruments and mechanisms** to stimulate investment on energy efficiency improvement of buildings
- European Union Structural Funds: (new) Member States are called to use "**National Strategic Reference Framework 2007-2013**" for energy efficient refurbishment of buildings

The Green Paper on Energy Efficiency



Obstacles – The financial obstacles



- **Lack of information on costs and profitability**
- **Split-incentive**
- **Risk aversion**
  - **Address with: better and more (targeted) information**
  - **Global loans and right intermediaries**
  - **Role of Energy Service Companies (ESCO's)**

20 Webzines published by the end of 2006:

Register at

www.epbd-ca.org

EUROPEAN COMMISSION

Directorate-General for Energy and Transport

Your complete resource for information on Energy Performance of Buildings Directive

EPBD BUILDINGS PLATFORM

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:: EPBD: Energy Performance of Buildings Directive

Reducing the energy use of buildings without compromising the indoor environment and services is the key challenge for Europe. The implementation of the Energy Performance of Buildings Directive provides Europe with tools for this.

The **EPBD Buildings Platform** is an information service for helping the implementation of the Buildings' Directive, and in particular on **5 main themes** namely, certification, inspection of boilers and air-conditioning systems, requirements for experts and inspectors, calculation procedures and minimum energy performance requirements. This service is useful for practitioners and consultants, experts in energy agencies, interest groups and national policy makers in the 25 Member States plus Bulgaria and Romania.

Its objective is to support the full and continued implementation of the EPBD by:

- Setting up mechanisms for the transfer of i… stakeholders;
- Helping …

…questions database, …database).

…ols to support the Commission and the Member … in the follow-up and evaluation of the impact of the Directive.

The EPBD Buildings Platform has been launched by the European Commission in the frame of the Intelligent Energy - Europe, 2003-2006 programme.

Note to our visitors:
Navigate through our site but please visit us again soon. The site is still under development and various databases will be included in order to offer you more services in the weeks and months to come. If you want to be kept informed about new developments, don't forget to register.

> Latest News

:: Information paper on **implementation of EPBD in Denmark** - P09

:: Information paper on **minimum energy performance requirements** - P10

:: **Newsletter n°5** - October 2006

:: EPIC AIVC …Conference, Lyon …France) - 20-22 …ovember 2006 …ore]

[Country review]

P06

31-08-2006

EPBD BUILDINGS PLATFORM

Status of the EPBD Implementation in the Flemish Region (Belgium)

Wina Roelens
Flemish Energy Agency
Belgium

www.buildingsplatform.eu

Belgian Regions.

www.energiesparen.be/energieprestatie/alledownloads.php#software

[Country review]

P09

03-10-2006

EPBD BUILDINGS PLATFORM

Implementation of the EPBD in Denmark: Status August 2006

Søren Aggerholm
Danish Building Research Institute, SBi
Denmark

Denmark has implemented the EPBD since January 1st, 2006. Denmark has for many years had fairly strict energy requirements in the building regulations, obligatory labelling scheme for buildings and obligatory inspection scheme for boilers. Denmark has now tightened the energy requirements in the building regulations further and developed new labelling and inspection schemes.

1 > Legal context

In Denmark the implementation of the Energy Performance Building Directive, EPBD is the responsibility of the Danish Energy Authority (Articles 3, 5, 7, 8, 9 and 10) and of the Danish National Agency of Enterprise and Construction (articles 3, 4, 5 and 6).

[Country review]

P07

28-08-2006

EPBD BUILDINGS PLATFORM

Implementation of the EPBD in The Netherlands: Status and planning

Frans van Ekerschot
Coordinator EPBD,
Ministry of Housing,
Spatial Planning and the Environment

Marjolein Heinemans
SenterNovem

The Netherlands

The Netherlands is very experienced in low-energy-building. Due to the existing certification method, there are few problems issuing an EPBD Energy Certificate for new buildings. The Directive is more difficult to implement for the existing building stock (built before 199[7] which is the largest building stock in the Netherlands).

www.buildingsplatform.eu

1 > Legal context

The implementation of the Energy Performance of Buildings Directive in the Netherlands falls under the responsibility of the Ministry of Housing, Spatial Planning and the Environment.

On November 1st 2005 the Dutch government notified the European Commission on the status of the implementation of the EPBD in the Netherlands. The Netherlands fully understands the importance of the EPBD and strives for a full implementation of the Directive.

The Dutch government aims at complete implementation of the EPBD in the Netherlands, from January 1st 2007. The first step is the training and accreditation of assessors or inspectors who will then be qualified to issue the Energy Performance Certificate. Once the Netherlands has sufficient qualified inspectors, the Energy Performance Certificate will become mandatory for every transaction in the building sector.

2 > Status of the implementation

[Country review]

P08

11-09-2006

EPBD BUILDINGS PLATFORM

Implementation of the EPBD in Portugal: Status and planning

Eduardo Maldonado
University of Porto
Carlos Nascimento
ADENE
Portugal

www.buildingsplatform.eu

Portugal has adopted a series of measures to implement the directive into the national law: on 4 April 2006, the Government has adopted three Decrees that, together, constitute the transposition of the EPBD into national law.

1 > Legal context

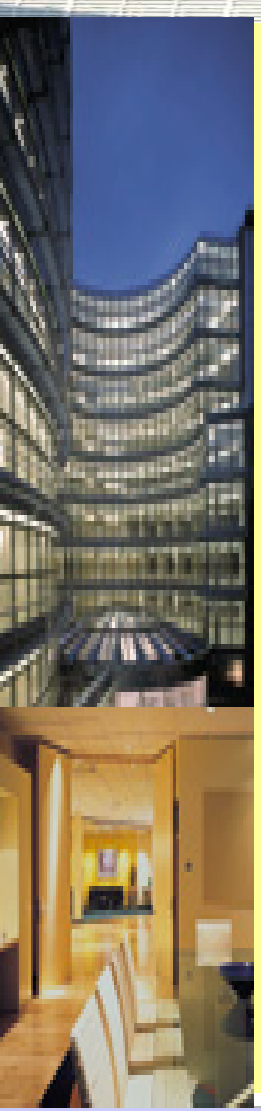
On 4 April 2006, the Official Journal published three Decrees regarding the transposition of the EPBD in national law:

- Decree 78/2006 - It creates and defines the operational rules for the System for Energy and Indoor Air Quality Certification of Buildings

CONCLUSIONS

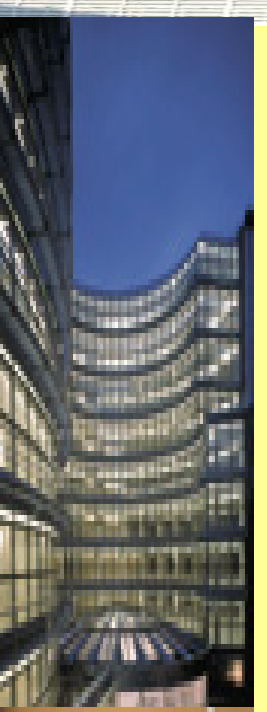
- There is a lot still happening in most MS to transpose the EPBD – major delays are taking place - Only a few MS have fully completed their plans
- The EU Commission is providing many supporting initiatives
- MS are cooperating with one another quite effectively at technical level
- New requirements for energy efficiency will be in place (more insulation, at reasonable levels, better solar protection in the South, …).
- New buildings will be more and more energy efficient than existing buildings for the same level of comfort.
- Certification of existing buildings will bring strong pressure for improvement (market forces - value, recommendations,…), both in Residential and in Public buildings.
- The EPBD will bring positive results, but measurable results will take time.
- The Commission, in its recently published Energy Action Plan (January 2007) aims to achieve a 20% further reduction in energy consumption by 2020, including a revision of the EPBD in 2009.

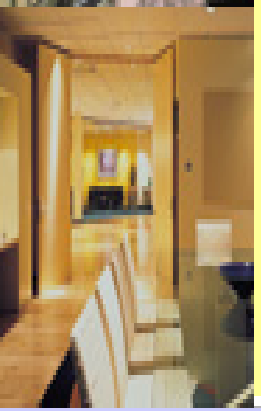
The Goals for ammending the EPBD in 2009



- **Mandatory targets for minimum energy efficiency requirements in all MS;**
- **Moving limits towards what today is "passive housing" (or A, A^{+}) standard (i.e., at least 50% better than today's minimum requirements);**
- **Lowering the threshold of applicability of energy requirements in major renovations below 1000 m^{2};**
- **Imposing mandatory monitoring of results at MS level and common reporting formats to the European Commission.**

WHY so much resistance to change?





- Many challenges remain.
- Energy costs are going up and up… CO_2 emissions are still there… Time is going by very quickly.
- Everybody seems to agree that we need to improve the energy performance of our buildings.
- Most MS took some steps to transpose the EPBD but there are few concrete results at the end of the foreseen 3 years – most MS are dragging their feet.
- The EC and the MS ministers have already agreed to take further measures to improve the energy efficiency of buildings beyond the EPBD requirements, yet, MS do not even move aggressively enough to implement the EPBD.
- **WHY AREN´T WE THEN SEEING FASTER PROGRESS?**
- Because Political leaders claim that measures to tighten building requirements are unpopular… and they drag their feet at national level, after grandstanding positive and forward positions in the EU council

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

It is always easier to promise than to deliver!

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