



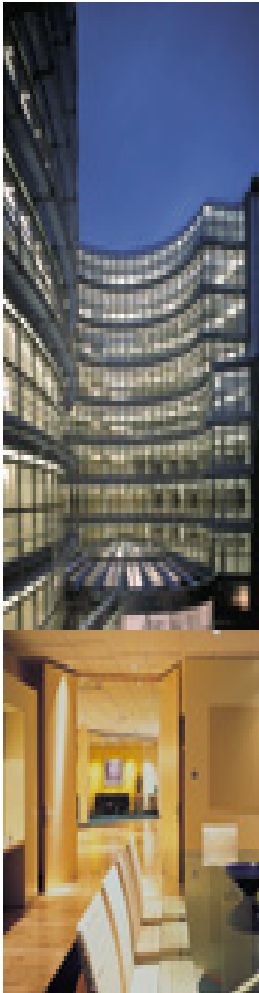
The Transposition of the Energy Performance of Buildings Directive in Europe

- RESNET Conference
- San Diego, CA, 19 February 2007

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Coordinator - Buildings Concerted Action



INTRODUCTION to the EPBD



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

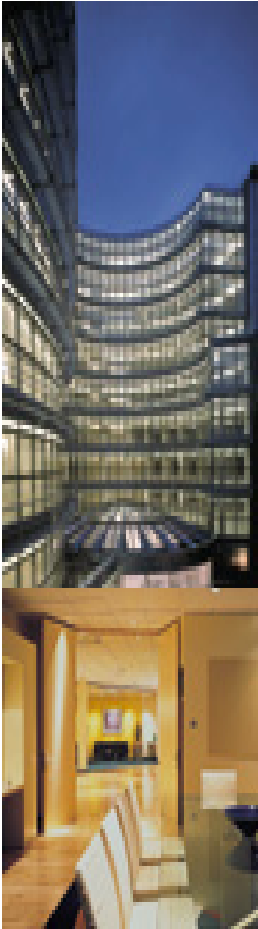
Background

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





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.

Methodology for the integrated energy performance of buildings

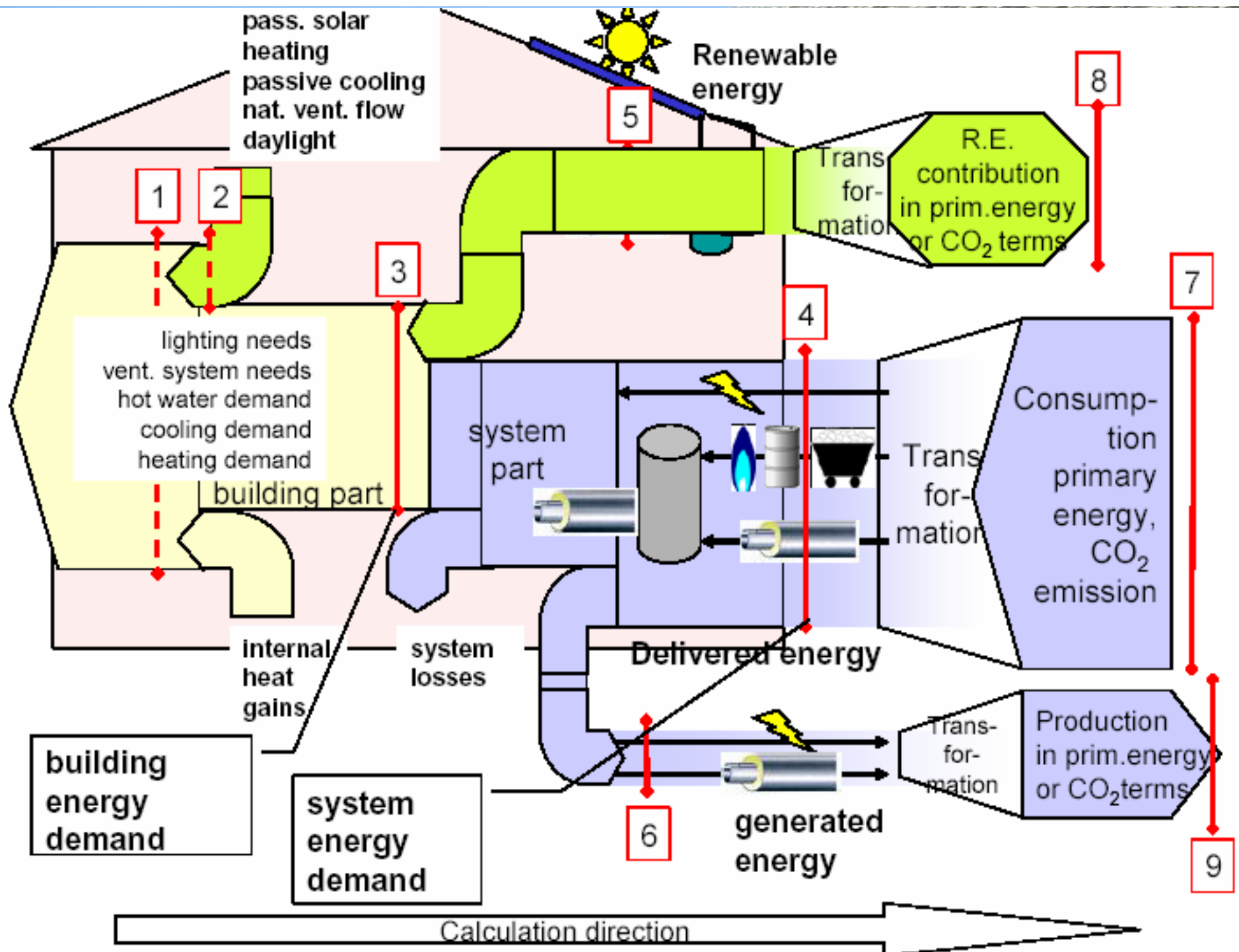


A common methodology for integrated minimum standards

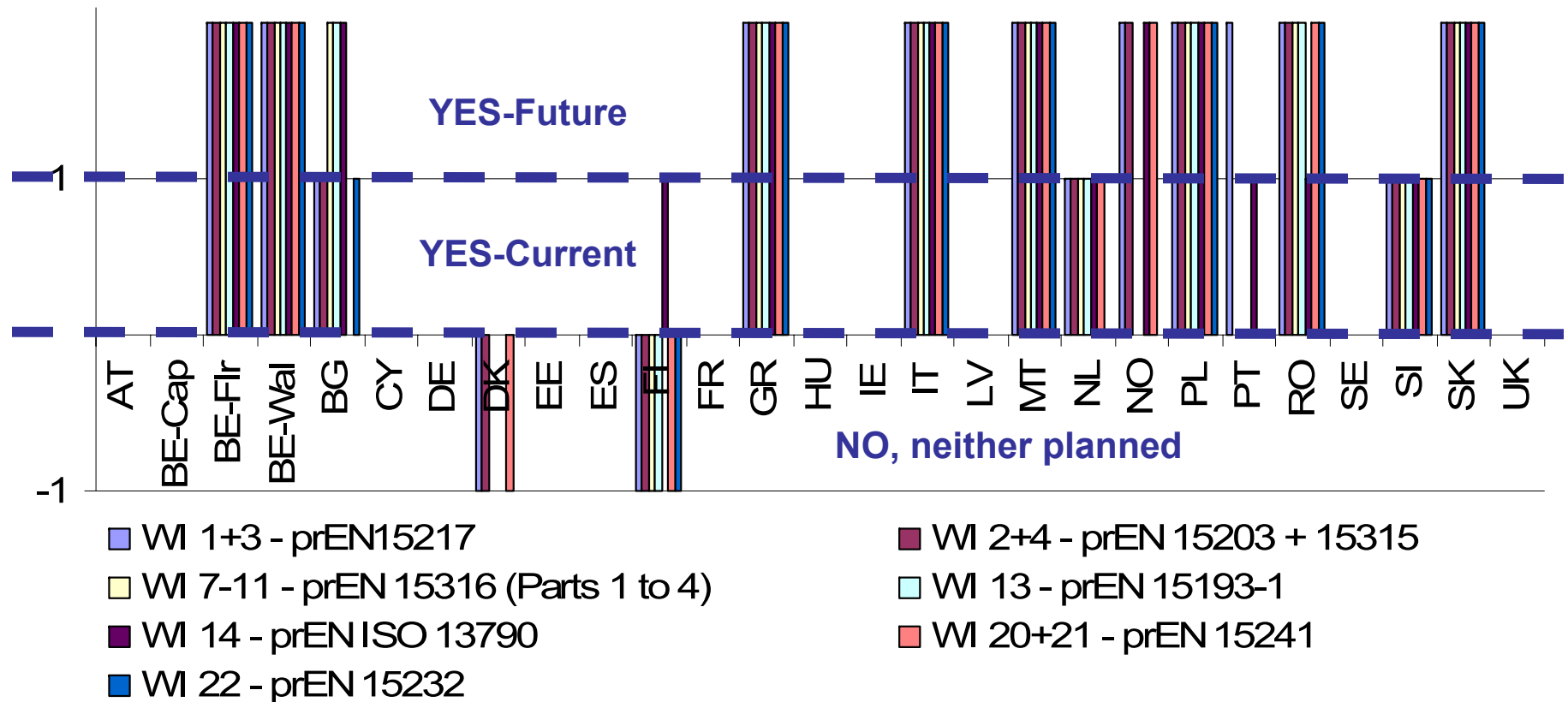
- integrate insulation, heating, cooling, ventilation, lighting and daylighting, renewable energy installations, passive solar heating and cooling systems, CHP, DH/C, position and orientation of the building
- give **flexibility** to designers to meet energy reduction standards in the most cost-effective 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, outlining the calculation procedure for assessing the energy performance of buildings. Available as advanced drafts in 2005, formal approval in April 2007.



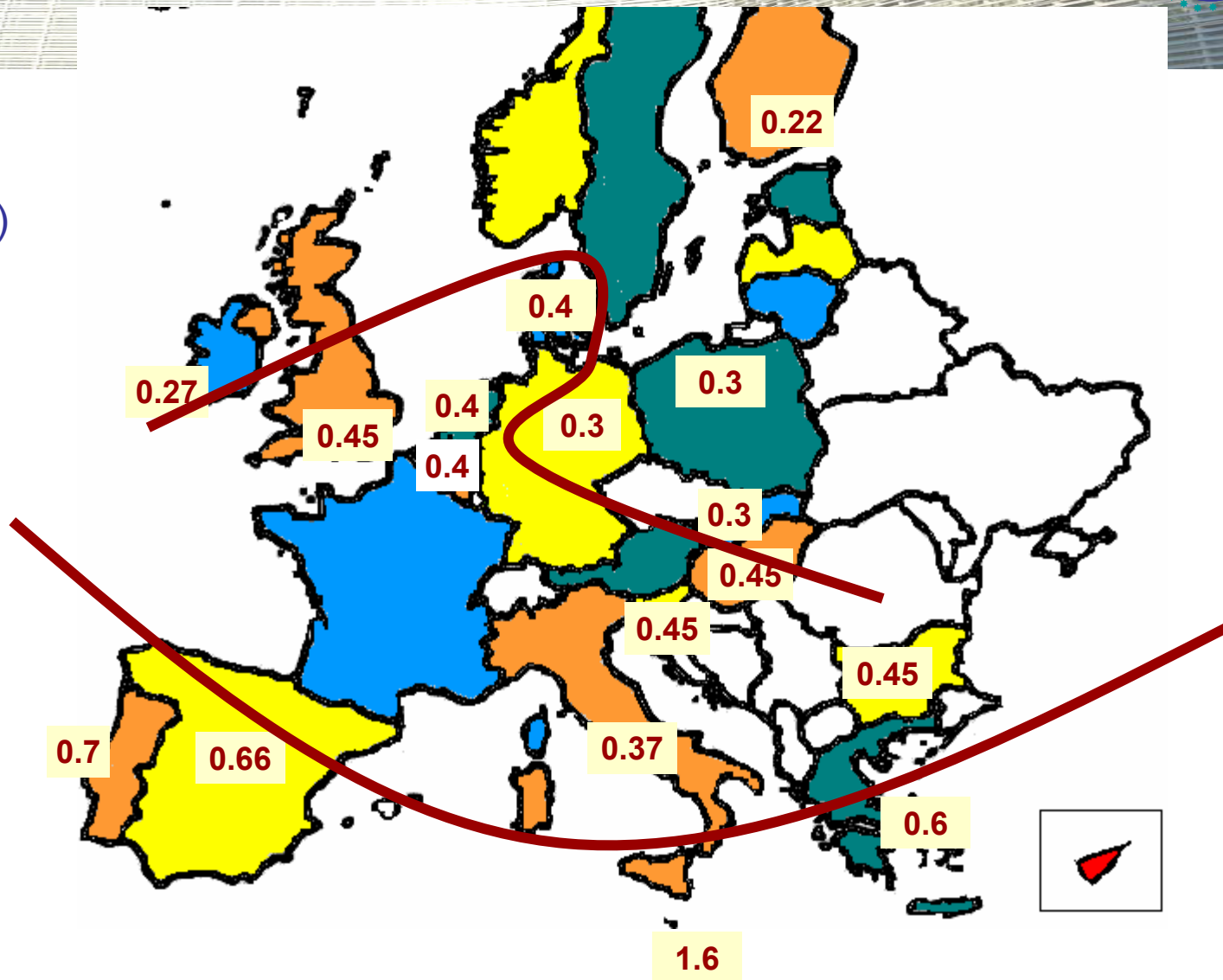
Adoption of CEN standards in Future Laws/Regulations (not required by the EPBD):



The most adopted Standard: **EN ISO 13790**

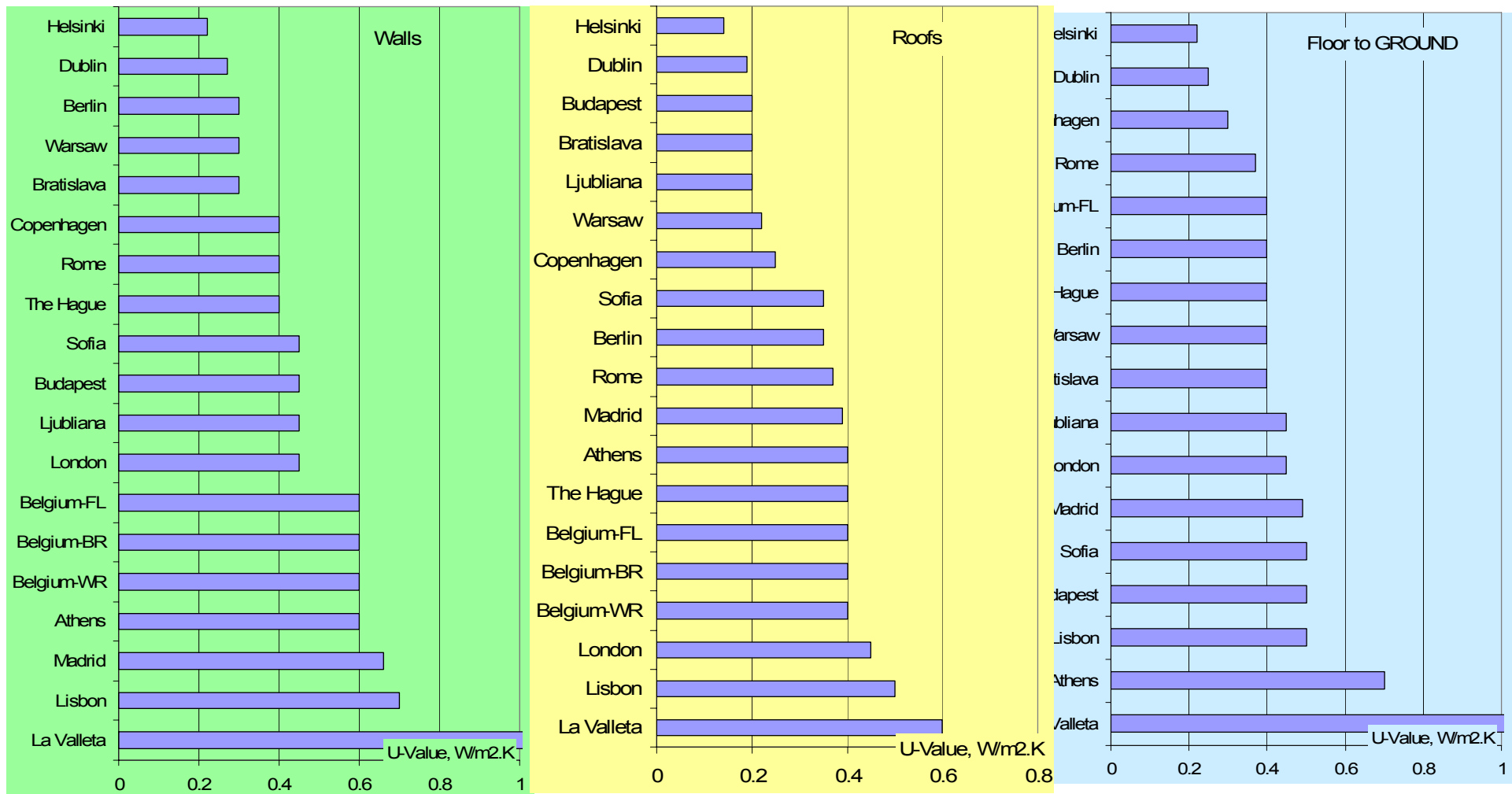
EU Countries increased requirements by an average of 25% from levels prior to the EPBD

**Wall U-values
(indicative)
 $\text{W/m}^2\cdot^\circ\text{C}$**



Art.4 – Minimum Requirements

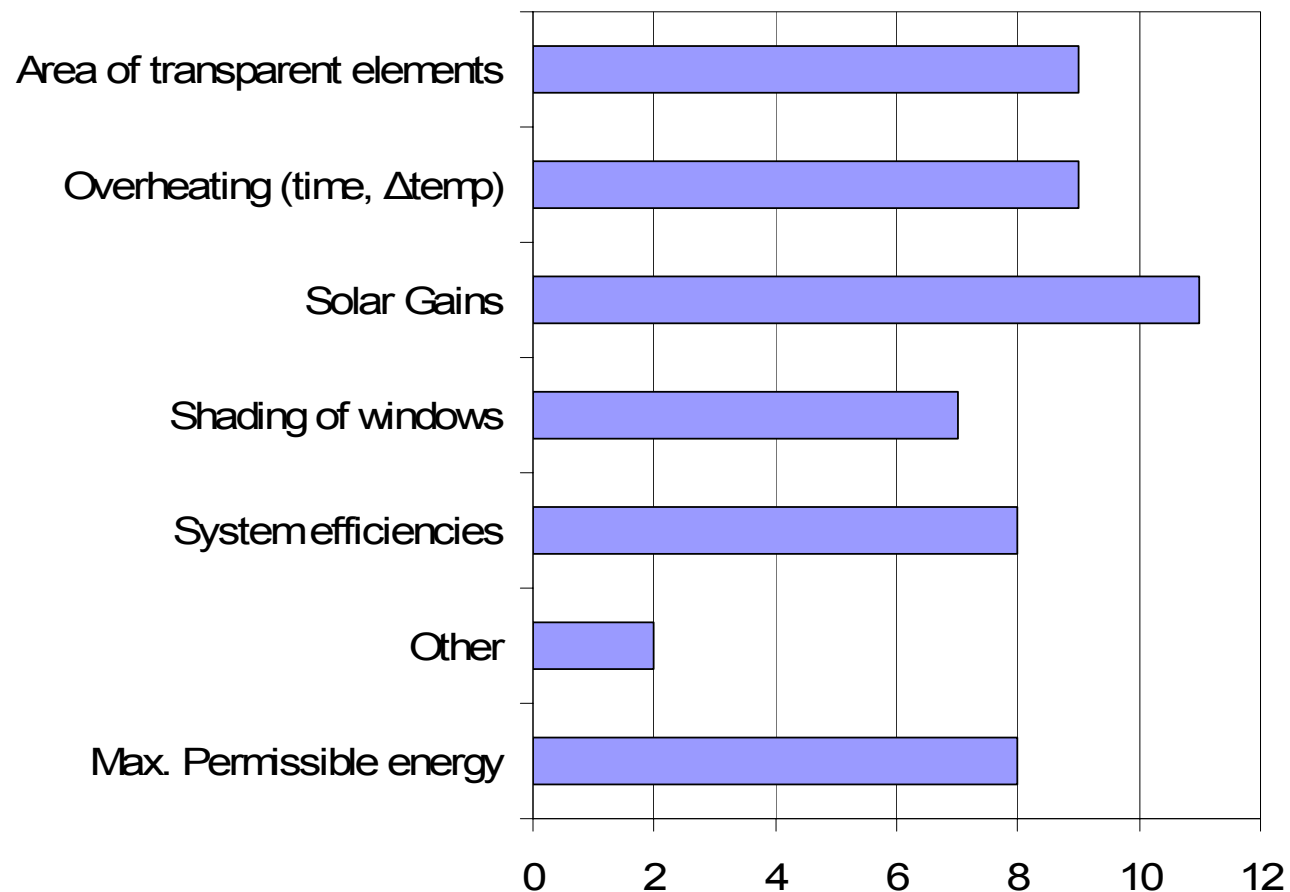
- Minimum U-values (indicative, usually combined with global energy targets)



Art.4 – Minimum Requirements

Summer: cooling requirements

Number of countries with requirements at



ENERGY CERTIFICATES

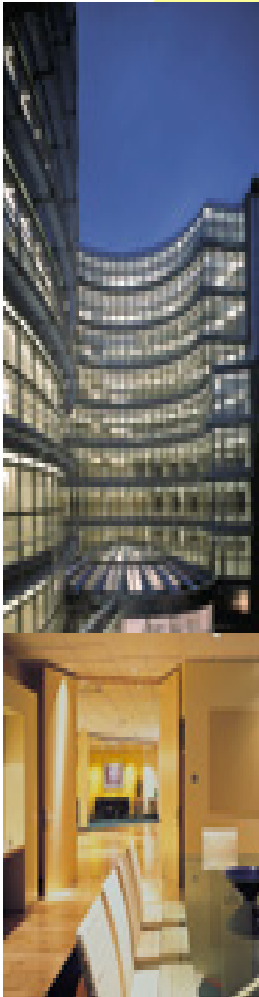


Energy certificate

Building Energy Performance		As built
Space to make reference to the certification scheme used		Asset rating
Very energy efficient		C
A		
B		
C		
D		
E		
F		
G		
Not energy efficient		
Name of the indicator used	Unit	calculated
Space to include additional information on building energy use		130



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 1000m²).



Certificates for Residential Buildings

Timing for starting:

**Residential
Buildings**

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

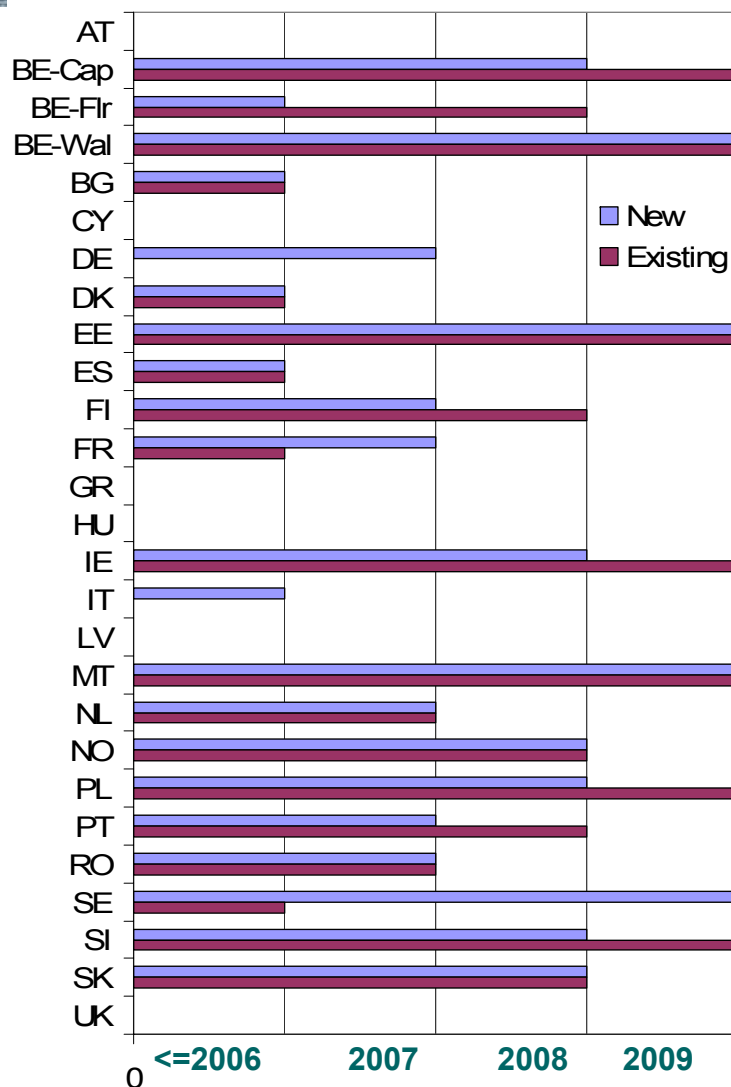
Type of Rating:

**Existing
Residential
Buildings**

	Calculated Rating	Measured Rating	Both Ratings	Undecided
	10	11	3	1
	37%	41%	11%	4%

Building Certificates: Non-Residential Buildings

Date of Implementation

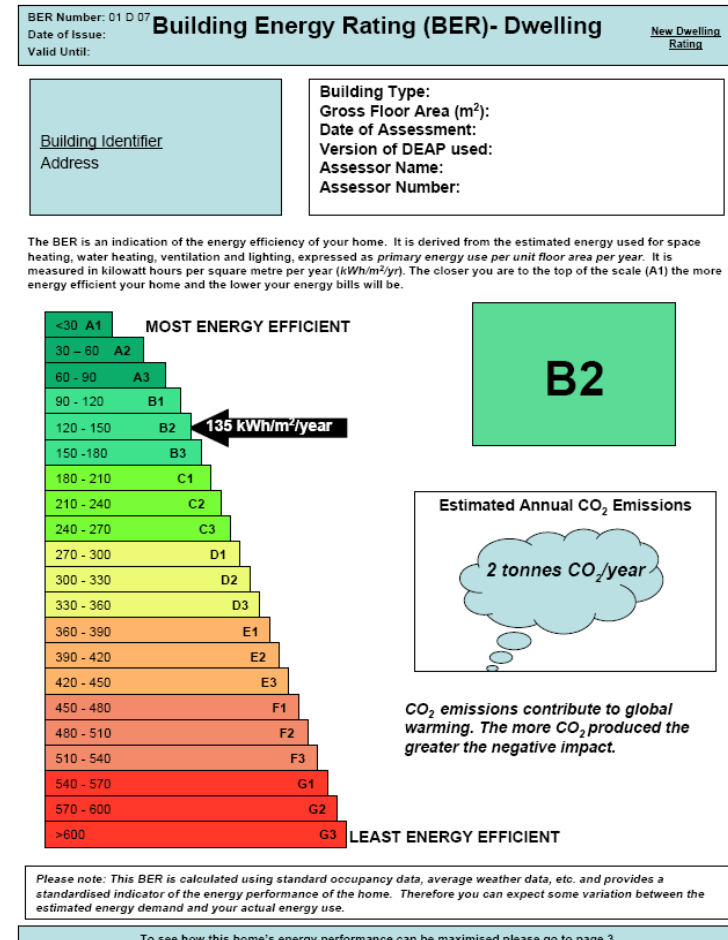


	<=2006	2007	2008	2009	?
New	5	6	6	4	5
	19%	42%	65%	81%	100%
Exist.	5	2	5	7	7
	19%	27%	46%	73%	100%

Model of the Certificate (Residential)



- How many steps?
- Where to put minimum level for new buildings (B or other)?
- Possibility to improve the standard without changing the scales?
- Confusion or information?
- Text?
- CO₂ values?
- More than one scale (calculated , measured,...)?
- Should you use A⁺ and A⁺⁺ ?
- Or even B⁻?



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

And yet many others...



energieprestatiecertificaat nieuwbouw

wooneenheid

Identificatiecode: _____ datum ingebruikname: _____
 omschrijving: _____ datum vergoeding: _____
 postnummer: _____ gemeente: _____ straat: _____ nummer: _____ bus: _____

verstagegever

naam: _____ code vestagegever: _____
 postnummer: _____ email: _____
 voornaam: _____ code vestagegever: _____
 postnummer: _____ email: _____

software voor de berekening van de energieprestatie en het energieverbruik

softwareversie: _____ de berekeningen zijn niet ingevoerd

energieprestatie- en binnenklimaatseisen

E-peil: _____

☐ JA ☐ NEEN

De wooneenheid voldoet aan de energieprestatie- en binnenklimaatseisen.

Het E-peil voldoet.

Het E-peil van het volume, waarvan de wooneenheid deel uitmaakt, voldoet.

Alle constructiedelen voldoen aan de maximale U-waarden of minimale R-waarden.

Volgende constructiedelen voldoen NIET aan de maximale U-waarden of minimale R-waarden:

☐ vloeren ☐ muren ☐ veranda's ☐ dak ☐ andere constructiedelen en constructiedelen van gemeenschappelijke delen

Er is voldaan aan de ventilatievoorschriften.

Er is voldaan aan het oververhittingscriterium.

primair energieverbruik/m²

kWh/m² _____

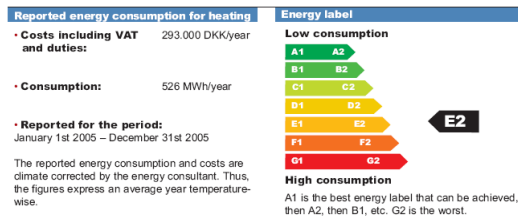
Energy labelling

Energy labelling of the following building:

Address: Storgade 27 A og B
 Postal code/city: 9990 Storsted
 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.



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.

СЕРТИФИКАТ

CERTIFICATE FOR ENERGY PERFORMANCES OF A BUILDING

Category

No: _____ Valid till: _____

Building

Address: _____

Type of construction

Year of construction: _____

Built area: _____ m²

Heated area: _____ m²

Heated volume: _____ m³

Photo of the Building!

Annual enerav consumption

DZIVOJAMĀS MĀJAS ENERGOPASE

Reģistrācijas numurs: MA 00001

Puškina 90, Daugavpils

Ēkas tips: Daudzdzīvokļu, 467. sērija
 Apsaimniekotājs: SIA „DDZKSU”
 Ipašnieks/Valdītājs: _____/Pašvaldība
 Ēkas būvniecības gads: 1982
 Ēkas apkures platība m²: 3733
 Dzīvokļu skaits: 72 (no tiem 43 privatizēti)
 Energoaudita veikšanas datums: 23.03.2005

Standartaēkas* ēkas siltuma patēriņš, kWh/m² gadā

Siltuma patēriņa norādījums valsts beļģenā uz: _____

Tipveida energoaudits: ☐

* Energoaudits patēriņš norādīts uz standarta gada apkures ilguma 303 dienām, vidējā gaisa temperatūra siltuma 17°C, ārējā gaisa temperatūra -17°C
 ** Ēkas patēriņš energoauditā ir norādīts standarta ēkas siltuma patēriņa mērvienībā

Apkure:

Centralizēta apkure ☒ Decentralizēta apkure ☐

Kurināmdzīvoklis: _____
 Kāda kontrole skaits: _____

Isināšanas datums: 07.03.2006

ENERGIEAUSWEIS für Wohngebäude

gemäß § 10f Energieeinsparverordnung (EnEV)

Erklärungen

Einzelwerte:

Der Energieausweis stellt die Energieeffizienz eines Gebäudes dar. Er berücksichtigt neben der Energieeffizienz auch die Qualität der Bauteile (Dachung, Fassade, Fensterelemente) und die Qualität der Bauteile (Dachung, Fassade, Fensterelemente) und die Qualität der Bauteile (Dachung, Fassade, Fensterelemente).

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ENERGIEAUSWEIS für Wohngebäude

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ENERGIEAUSWEIS für Wohngebäude

gemäß § 10f Energieeinsparverordnung (EnEV)

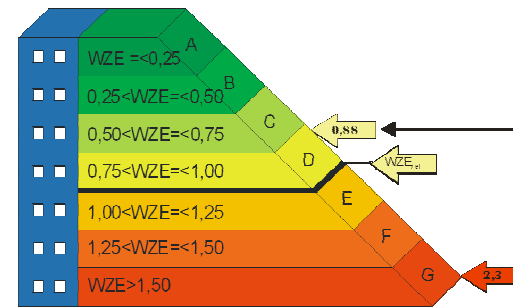
Erklärungen

Einzelwerte:

Der Energieausweis stellt die Energieeffizienz eines Gebäudes dar. Er berücksichtigt neben der Energieeffizienz auch die Qualität der Bauteile (Dachung, Fassade, Fensterelemente) und die Qualität der Bauteile (Dachung, Fassade, Fensterelemente).

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But, despite the differences, we can all “read” the same type of message in any of the certificates...

The Push towards Harmonization

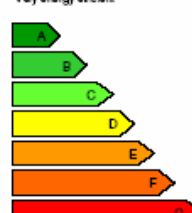
- All certificates fall under one of the options allowed by the applicable new EN standard.

Energy certificate

Building Energy Performance	
Space to make reference to the certification procedure used	As built calculated
Very energy efficient  Not energy efficient	C
Space to include additional information on the indicator and building energy use	130 kWh/m ² .a

Administrative information:
address of the building,
conditioned area,
date of validity
certifier name and signature...

Energy certificate

Building Energy Performance	
Space to make reference to the certification scheme used	As built calculated in use measured
Very energy efficient  Not energy efficient	C D
Space to include additional information on the indicator and building energy use	130 kWh/m ² .a 150 kWh/m ² .a

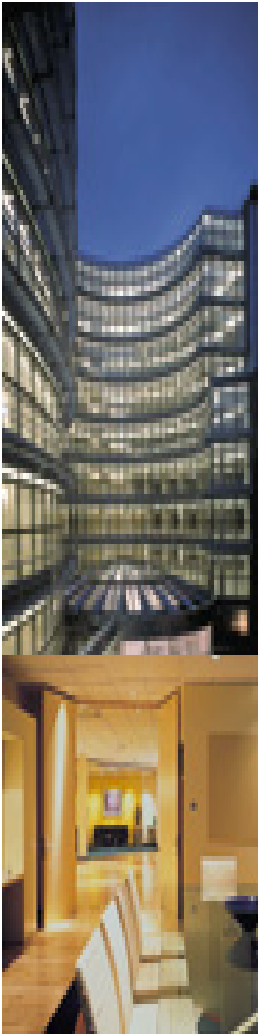
prEN 15217

Energy certificate

Building Energy Performance	
Space to make reference to the certification scheme used	As built calculated
Very energy efficient  Not energy efficient Regulations for new buildings Typical existing building	130 kWh/m ² .a
Space to include additional information on the indicator and building energy use	

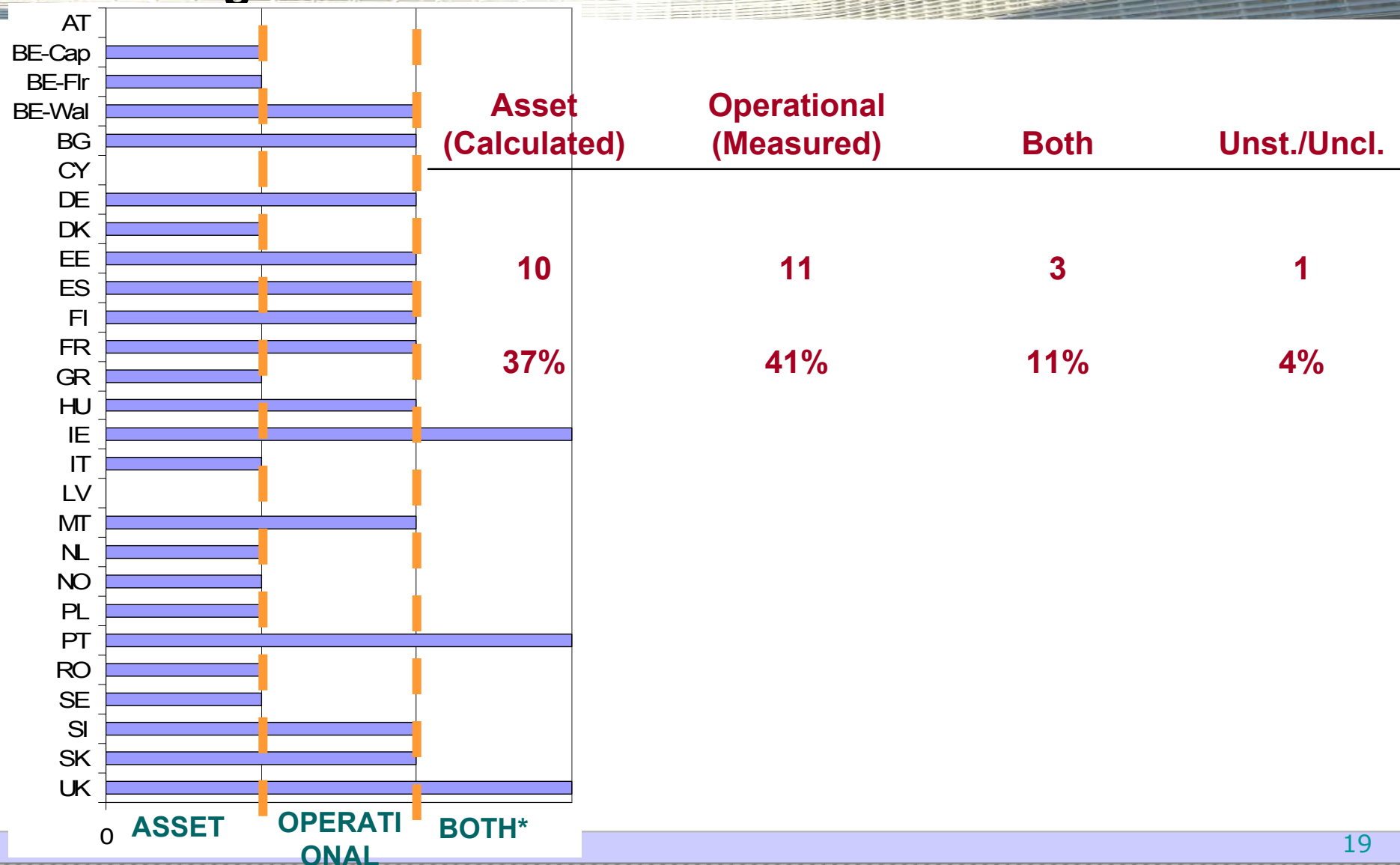
Administrative information:
address of the building,
conditioned area,
date of validity
certifier name and signature...

Types of Ratings in Certificates



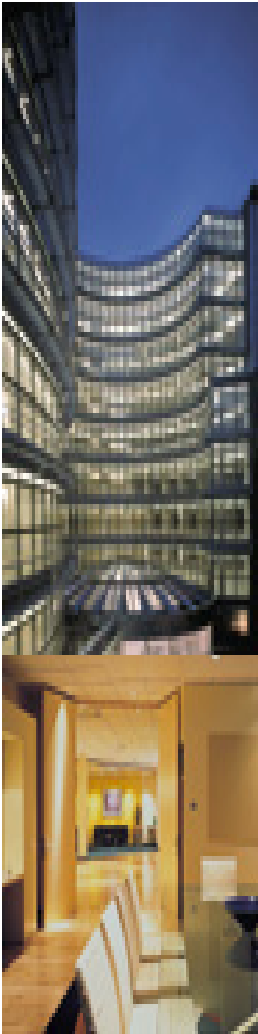
- **Calculated Energy Rating** – compares buildings on the basis of reference conditions – **mandatory for New Buildings and all Residential buildings.**
- **Measured Energy Rating** – describes the actual performance of a building – accounts for use pattern, occupant effects – can use metered energy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

Building Certificates: Non-Residential - Existing





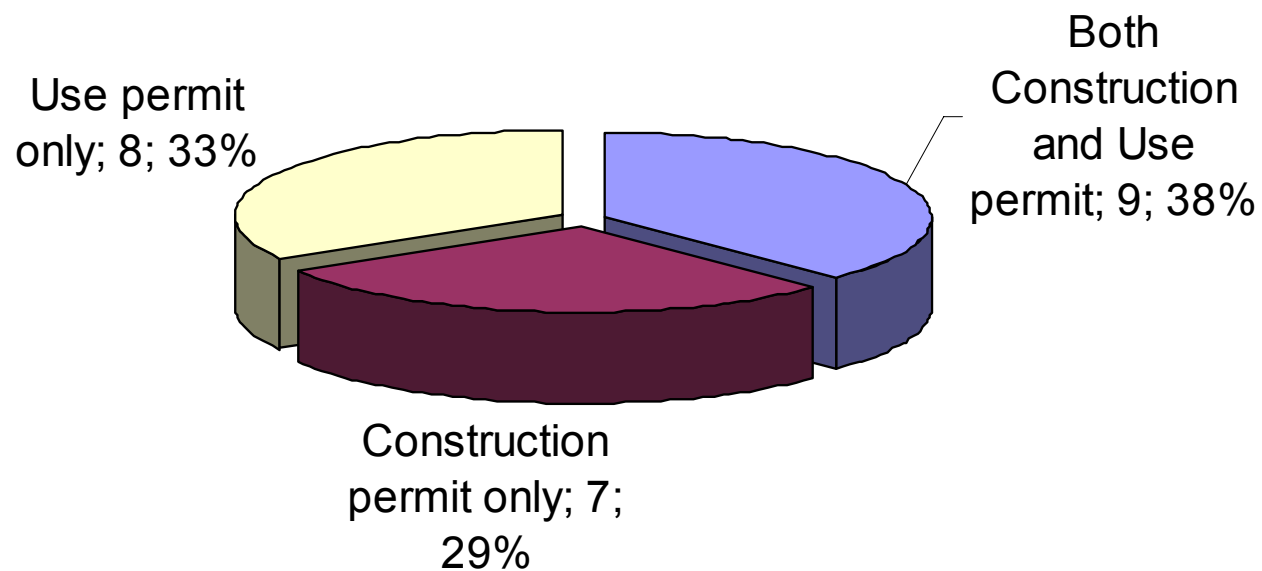
Certification procedures



- **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.

Accredited Experts must check project or building...

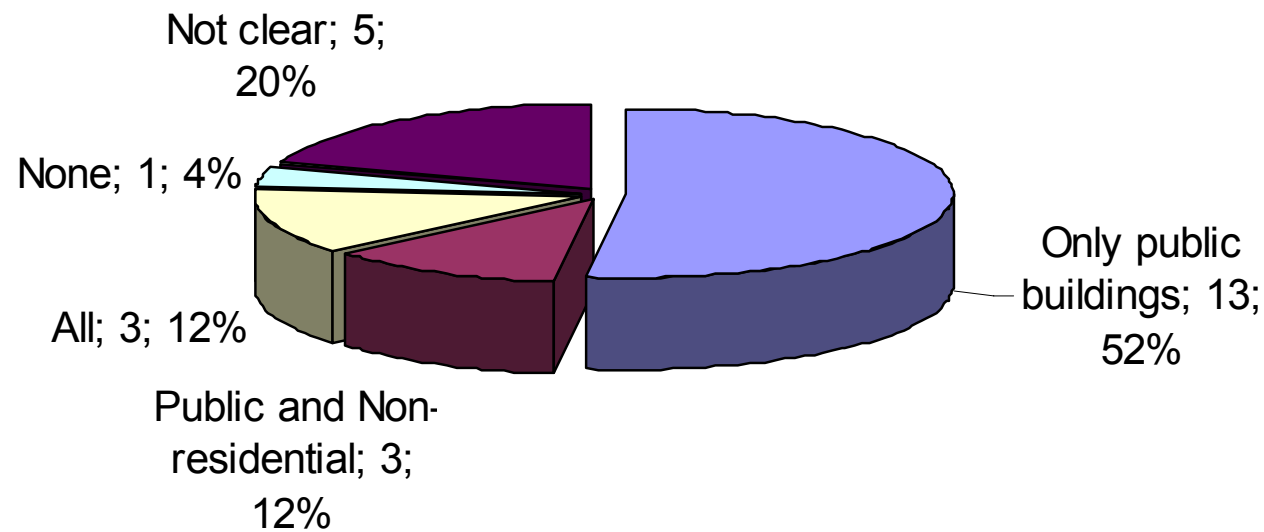
AE checks at...



- 71% have an assessment at the beginning of the use

Types of buildings where Displaying of Certificates is Mandatory

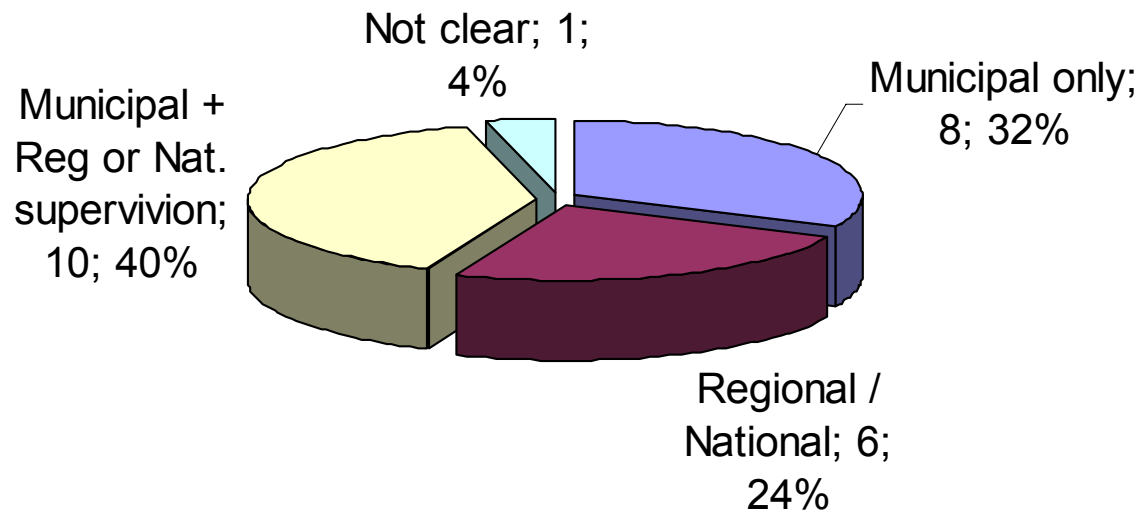
Displaying



- In most countries displaying is mandatory only at Public buildings.
- 3 include also to (at least large) Non-residential buildings.
- 1 MS explicitly says “none”
- 5 MS have not yet reached a decision

Who gets the certificate when a building construction or use permit is requested

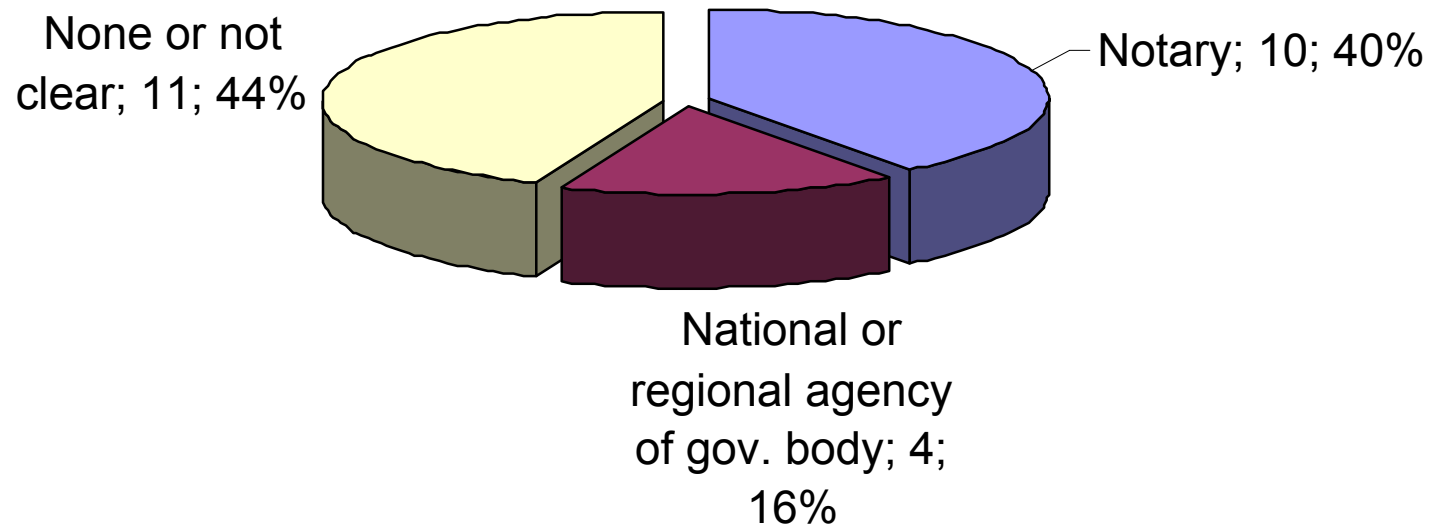
Certificate presented at...



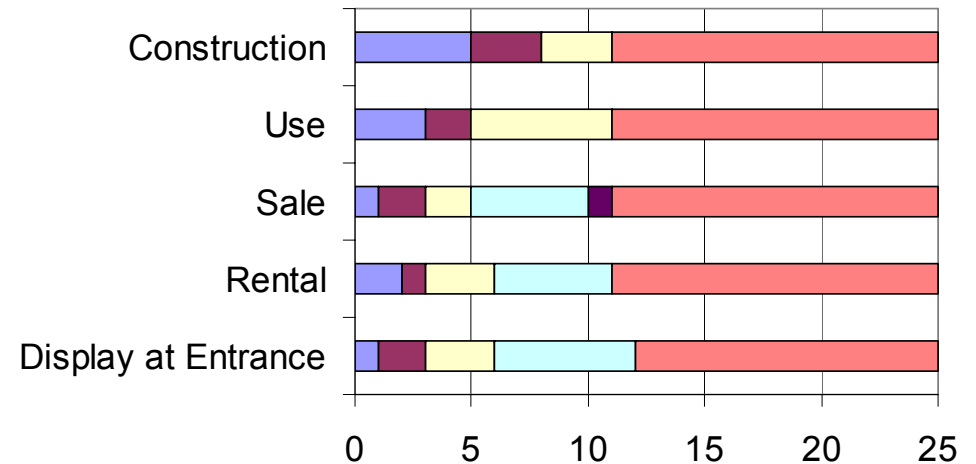
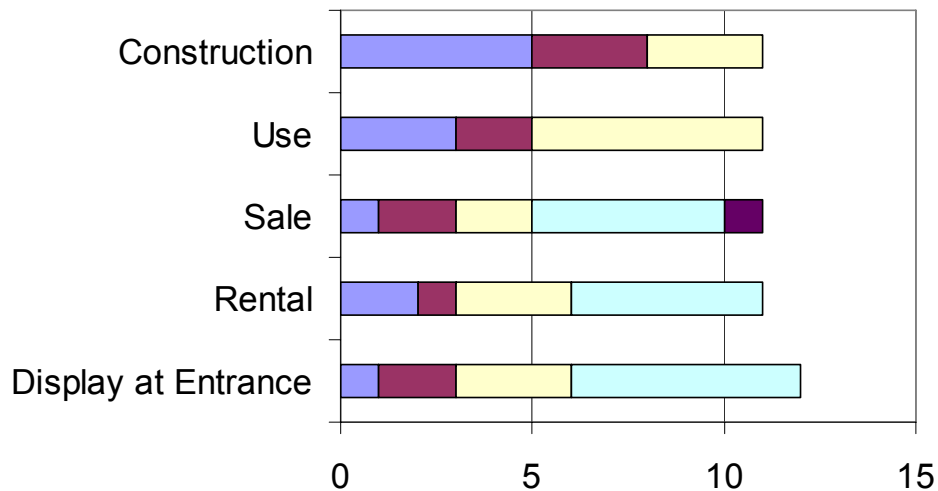
- In most countries the Certificate is needed at the Municipal level.
- In most countries there is also some “supervision” from the Regional or National levels.

Authority checking certificate at the moment of Sale

Authority checking certificate at the moment of Sale



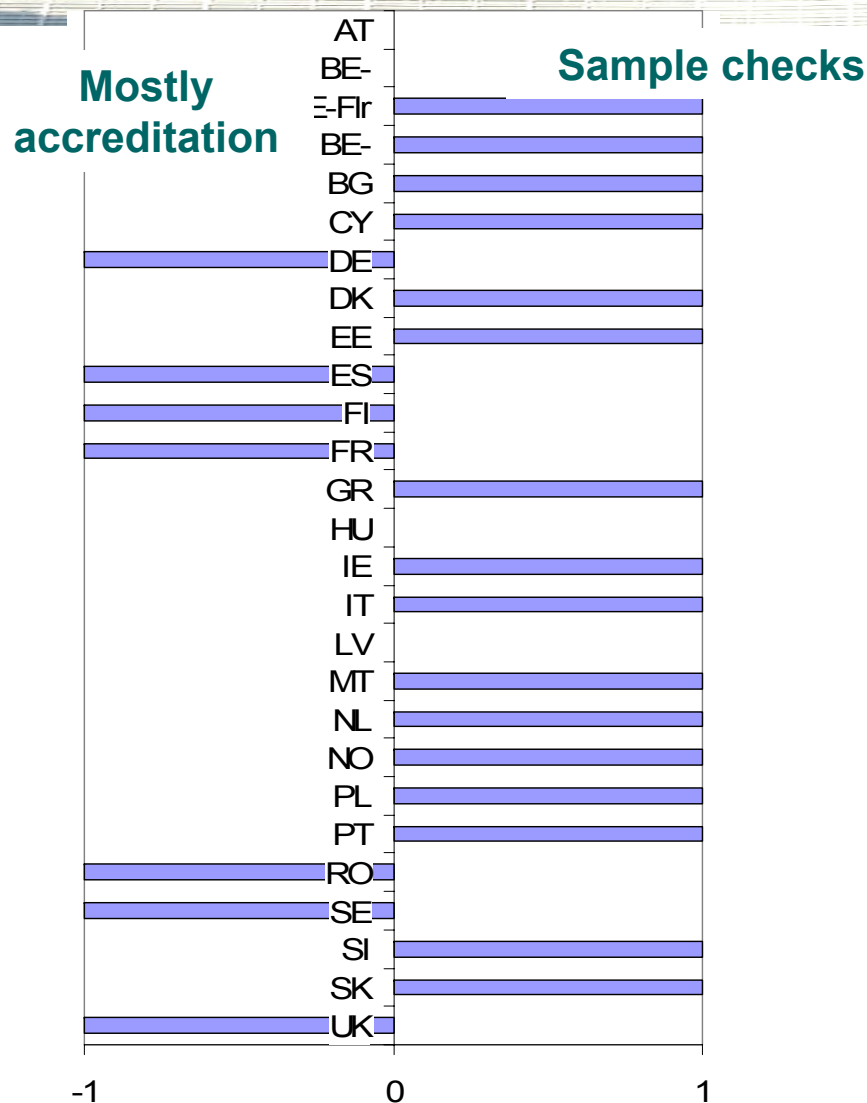
Dates for starting



■ <= 2006
 ■ 2007
 ■ 2008
 ■ 2009
 ■ >=2010
 ■ <= 2006
 ■ 2007
 ■ 2008
 ■ 2009
 ■ >=2010
 ■ Not clear

- Certification at the design phase starts first;
- Use at Sale, Rental and Displaying start later
- But for many (most) countries it is still not clear when the processes start.

Quality Assurance of Certification and Inspections



Sample checks

YES	NO	UND.
16	7	4

- Most countries control quality of certificates on a sample.
- Some countries decided that there will be a control, but have not yet decided how to perform it.

The Netherlands

System run by SenterNovem
(National Energy Agency)



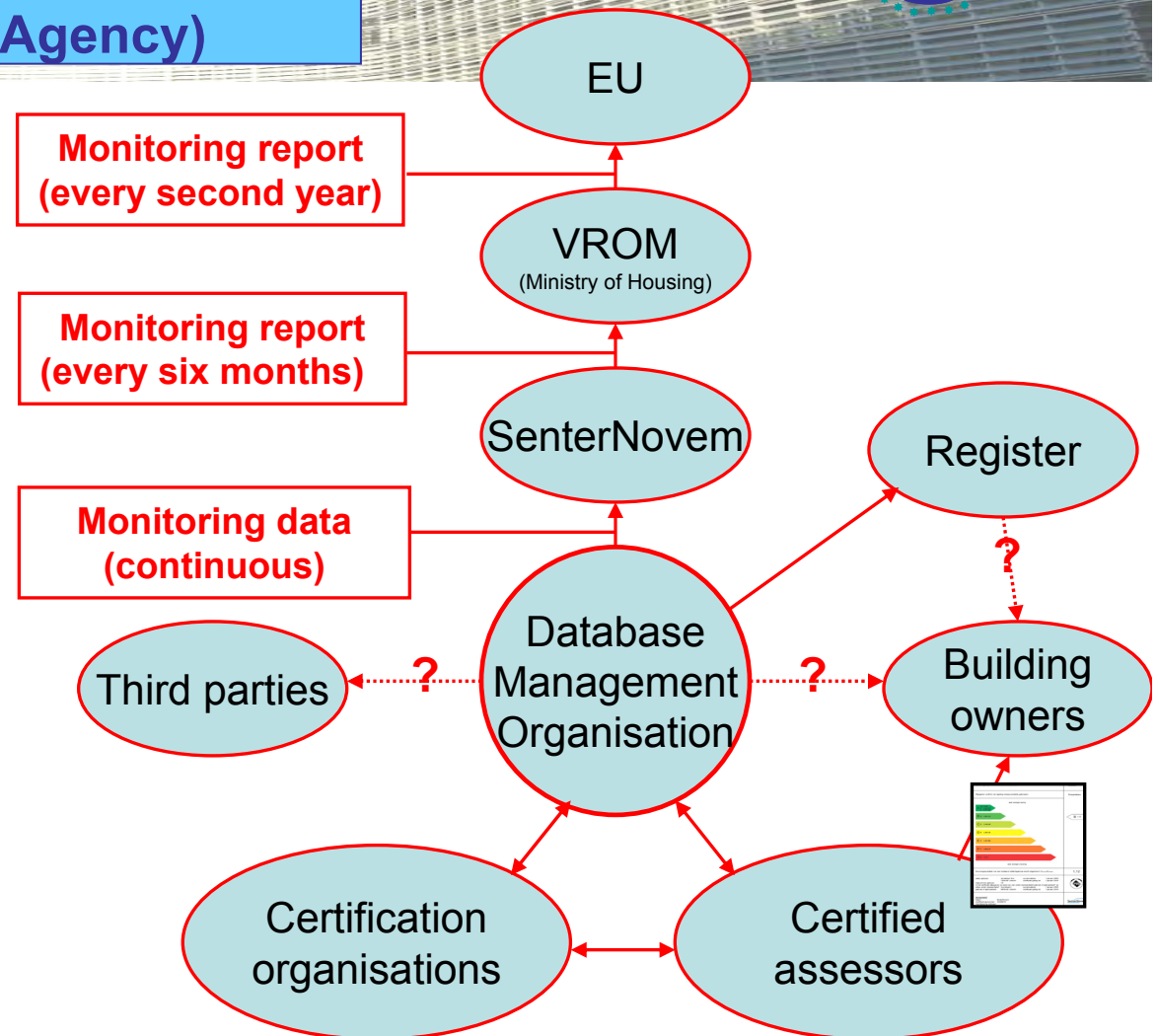
Software contains automatic upload routine (BRL 9501)

Database used by certification organisations for QA assessors

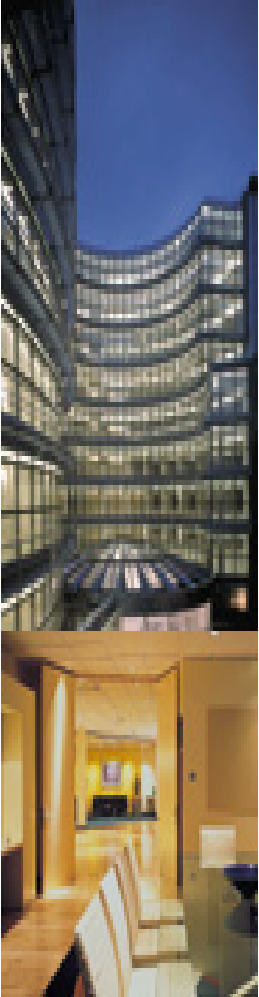
All data from calculations stored only part (appr. 50 parameters) used for reports

Centrao Register collects (limited) info;
-certificate yes/no
-address

Possibility for using database for third parties
-building owners
-municipalities
-...

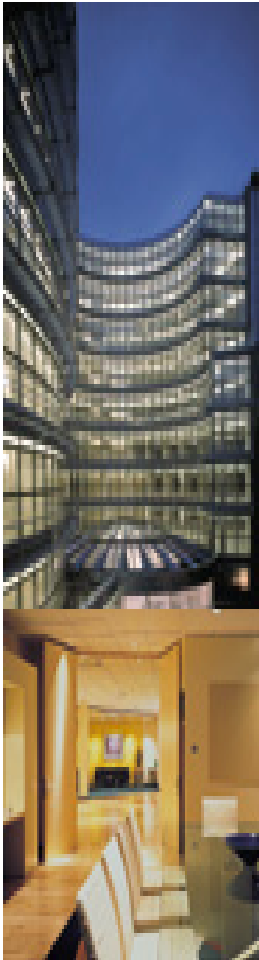


Required Qualifications for Accredited Experts (AE)



- There is quite a range from country to country;
- In most cases, Accredited Experts must either be an Architect or an Engineer;
- In most cases, but not everywhere, AE must take a special course and pass an exam;
- For simpler buildings (smaller residential), requirements may be less demanding.

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

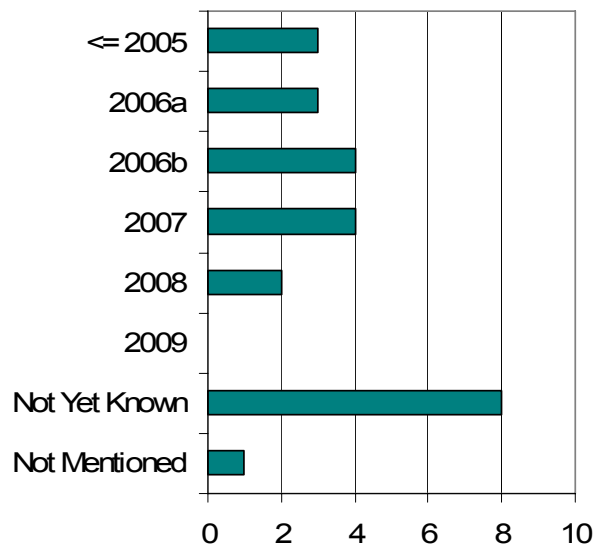
Regular inspection of air-conditioning systems with an output of more than 12kW, including room systems used together.

Inspections of boilers can be replaced by information campaigns.

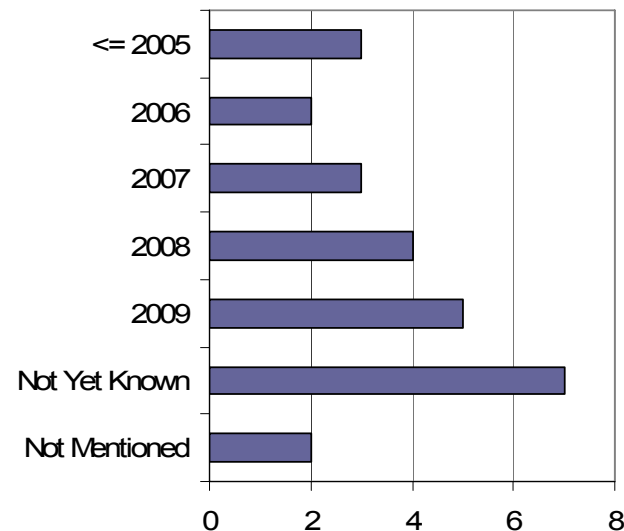
Inspection of boilers

- *Boiler inspection schemes have been introduced by some MS, usually interacting with other services (check of regular maintenance, safety or environmental controls).*
- *Information and advice schemes are being implemented in some countries*

Art.8 Boilers - Published



Art.8 - Boilers- Start



**Some delays
are clear, as
expected**

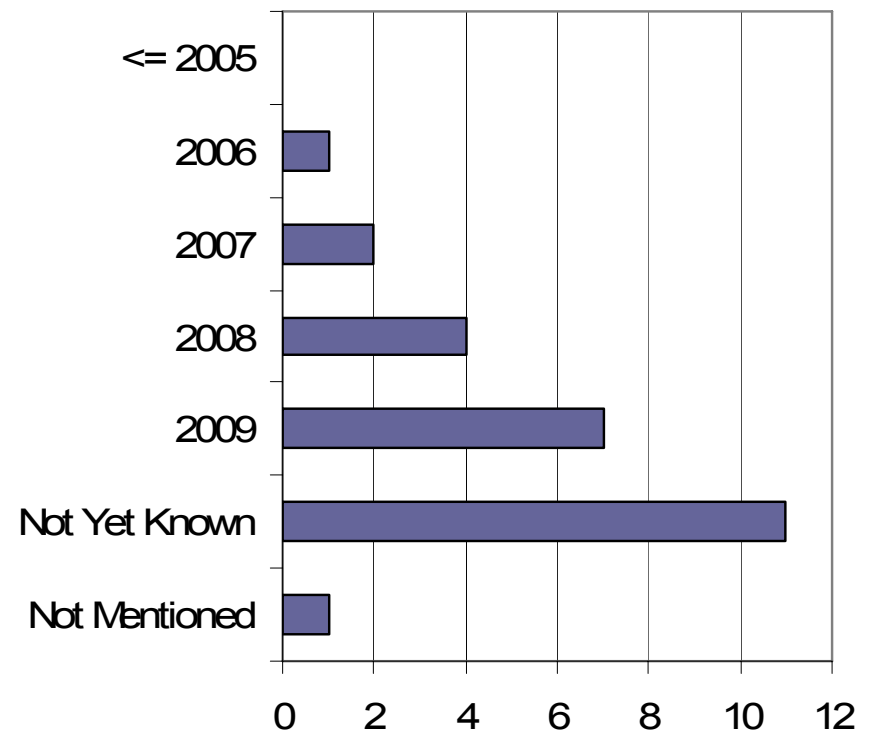
Inspection of air conditioners



■ *Further effort is needed in the field of **air conditioners** inspection:*

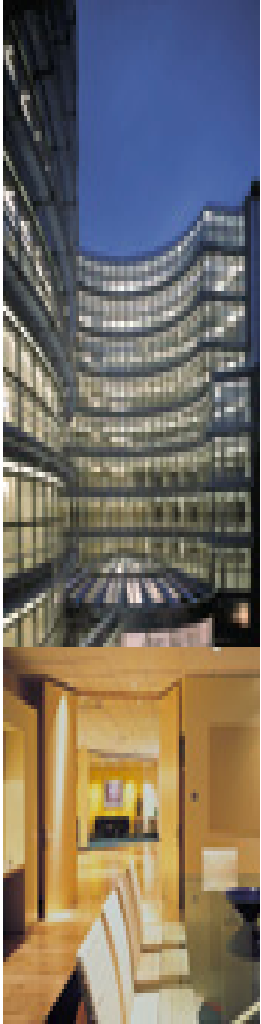
- *Most MS have delayed the decision;*
- *Inspection methods have not yet been tested;*
- *More time needed until a clear picture emerges for AC inspections.*

Art.8 - AC- Start



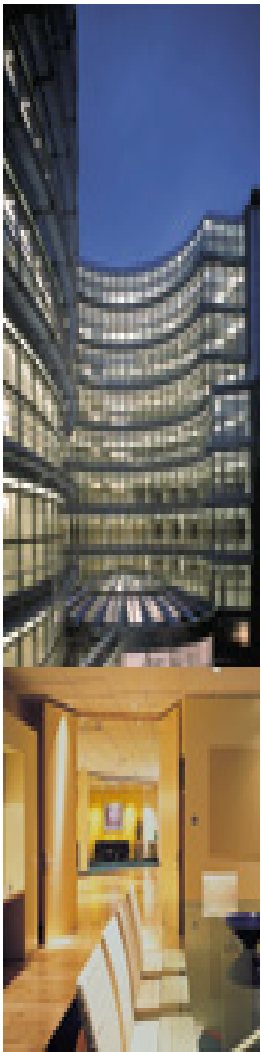


The Status of Transposition



- **D-day, 4 January 2006, is long past...**
- **There are significant delays in most countries and that many technical issues still remain – something that became evident in mid 2005**
- **The number of Full Transpositions is quite small**
- **There are still many unresolved issues in most MS**
- **MS show a clear resistance to change despite all the pressures and indications that the Energy Performance of European Buildings must greatly improve to meet increasing restrictions in CO₂ emissions**

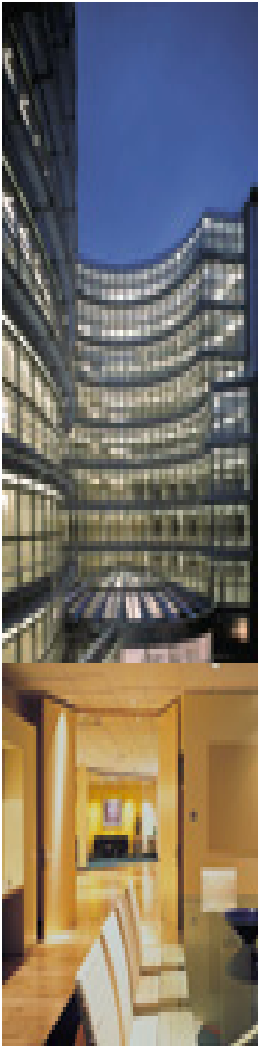
The near future...



- Many countries enacted legislation and regulations before the end of 2006, but not all...
- Most countries will request an extension of 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.
- But the new Energy Action Plan of the EC (January 2007) calls for upgrading the EPBD in 2009...



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.