

# Voluntary EU certification for non-residential buildings

## Definition of an Energy Performance Scale

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for Energy



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## Context

- Requirements on energy performance scale
  - Proposal for the energy performance scale
  - Comparison with existing scales
  - Conclusions
-

## ● Context

The voluntary scheme has to provide an **added value** in comparison with the mandatory certification schemes in order to **favour voluntary application**.

The voluntary scheme aims to **enhance the transparency** of the energy performance in the Union's non-residential property market.

**The scale should indicate a possible way towards more European wide harmonization.**

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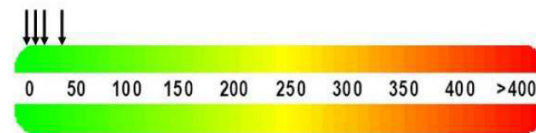
## ● Analysis of the stakeholders requirements

The needs of the stakeholders have been analyzed and resumed in the following requirements:

- One comparable scale for **all countries**;  
(EU comparability is an advantage in international marketing strategy)
- One scale that can be used for **all building categories**;
- Identify and highlight the **best** buildings;  
(Voluntary schemes are front runners of mandatory regulations)
- To be suitable for **existing** buildings in the portfolio;  
(Retrofitting of existing buildings will be a main challenge)
- To provide appropriate resolution to **show improvements**.  
(Comparable efforts and costs should be needed to shift to better class)

# ● Analysis of existing mandatory energy performance scales

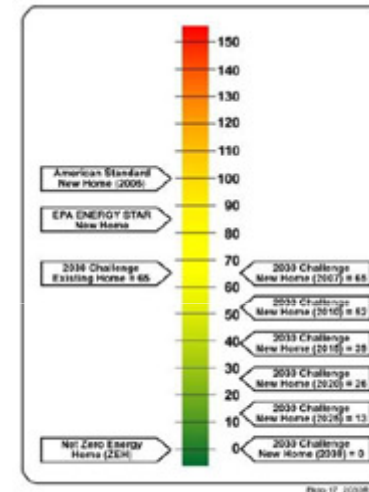
- **Continuous scale** – a coloured band strip with an indication of where the actual building is located on the scale
- **Stepped scale (classes)**



mandatory schemes



Figure 20. Examples of labels, Ireland (left), Denmark (centre) and Sweden (right), all three representing the stepwise energy performance scales.



Source:

*Implementing the Energy Performance of Building directive (EPBD). Featuring country reports 2010.*

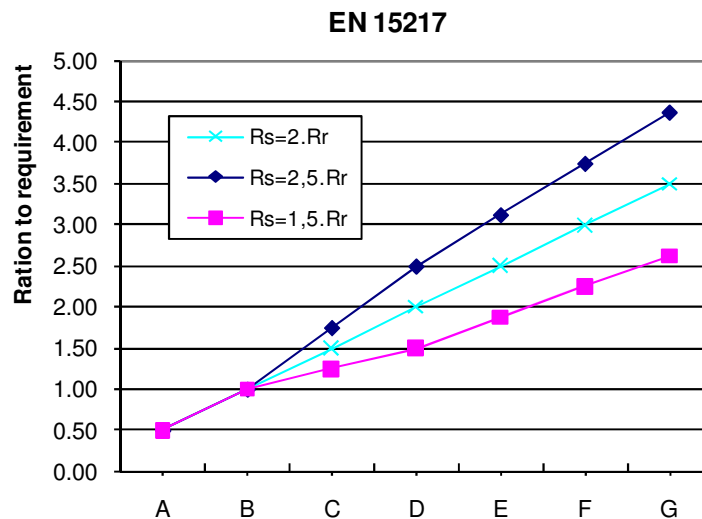
Comparability often = energy consumption (≠ energy performance)

# ● Analysis of existing energy performance scales

## Scale according to EN 15217

- not suitable to classify high performance buildings - focus more on the existing building stock (only 2 classes below minimum EP requirement)
- two reference points are used

$R_r$  EP regulation reference (the minimum EP requirement for a new building);  
 $R_s$  Building stock reference (the median value of the national building stock).



**SCALE EN 15217 based on 2 points**

ENERGY CERTIFICATE		Rating
ENERGY CERTIFICATE	A	$EP < 0.5 R_r$
	B	$0.5 R_r \leq EP < R_r$ <span style="float: right;"><math>R_r</math></span>
	C	$R_r \leq EP < 0.5 (R_r + R_s)$
	D	$0.5 (R_r + R_s) \leq EP < R_s$ <span style="float: right;"><math>R_s</math></span>
	E	$R_s \leq EP < 1.25 R_s$
	F	$1.25 R_s \leq EP < 1.5 R_s$
	G	$1.5 R_s \leq EP$

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## ● Principle of the performance scale (relative value)

Absolute values will not allow an European wide use without corrections ⇒  
**Relative value** (ratio of “real” building energy performance to reference):

$$EP_{(r / ref)} = \frac{EP_{real}}{EP_{reference}}$$

where:  $EP_{real}$  energy performance indicator of the real building  
 $EP_{reference}$  energy performance of the **reference**

**Reference** has to take into account **local conditions**:

- climate,
- specific use patterns,
- the state of the art,
- construction and energy costs.

**National minimum energy performance requirements should be defined by integrating these conditions**

**National legal requirements for new buildings  
have been chosen as a reference point of the scale**

## ● Reference point: National legal requirements new buildings

### Advantages:

- Easy to remember and understand;  
(ratio to requirement = fulfilling or not the legal requirement of country)
- National minimum requirements are well known and available;
- Buildings in national portfolio can be placed on the scale;
- EPC shall include reference values-minimum energy performance requirements (Art. 11 of recast EPBD);
- Link to incentives or high performance and possible NZEB definitions  
(European wide comparable definition).

### Disadvantages:

- Linked to the countries definition of the minimum energy performance level.  
(Low legal requirements = highest performance can more easily be reached)

**[Link with article 5 of recast EPBD](#) (comparative methodology framework calculating cost-optimal level of minimum energy performance requirements) **is important, in order to avoid significant discrepancies among the MSs.****

## ● Expressions of reference point of the scale

**Possible definitions of minimum requirements for overall EP in kWh/(m<sup>2</sup>a) of primary energy used in the MSs :**

**1. absolute values**

related to the energy consumption and climatic zones;

**2. values taking into account building geometry in some way;**

**3. description of the **Mirror Baseline Buildings** (MBB)**

including the description of the recommended / required properties of the building envelope and of the technical systems (Art.4,5,8).

**All 3 possibilities can be used.**

**More detailed the description ⇒ more comparable the evaluation of the performance** (reference point takes better into account the real possibilities of each specific building)

**Most accurate approach = when the EP of the real building and of the reference point is determined by using the same calculation procedures.**

# ● Proposal for the shape of the scale (1/3)

**Stepped scale** with geometric series to express the upper limits of the energy classes

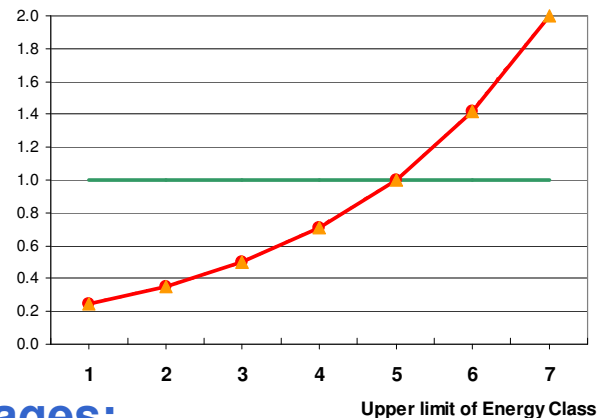
$$y = \sqrt{2}^{(n-n_0)}$$

where:

$n$  is the position of energy class on the scale;

$n_0$  is the position of the energy class for reference point on the scale.

It has been decided to place the reference point on the **limit of classes 5 and 6** ( $n_0 = 5$ ) (EN 15217 places mandatory minimum legal requirements on the limit of classes 2 and 3)



Common EU scheme	Common EU scheme
<b>Outstanding</b>	EP < "positive "
<b>Class 1</b>	EP < 0.25 Ref
<b>Class 2</b>	0.25 Ref ≤ EP < 0.35 Ref
<b>Class 3</b>	0.35 Ref ≤ EP < 0.5 Ref
<b>Class 4</b>	0.5 Ref ≤ EP < 0.71 Ref
<b>Class 5</b>	0.71 Ref ≤ EP < <b>Ref</b>
<b>Class 6</b>	Ref ≤ EP < 1.41 Ref
<b>Class 7</b>	1.41 Ref ≤ EP

## Advantages:

- **One reference point;**
- **Non-linear scale** - better adapted to cover all buildings;
- Respects efforts and costs to shift from one class on the scale to the class above.

## ● Proposal for the shape of the scale (2/3)

Proposed scale with ranking and intervals of classes:

**3 Groups**

**7 Classes + Energy positive**

**4 Awards**

The “podium” is underlined by an additional award (laurel, gold, silver, bronze)

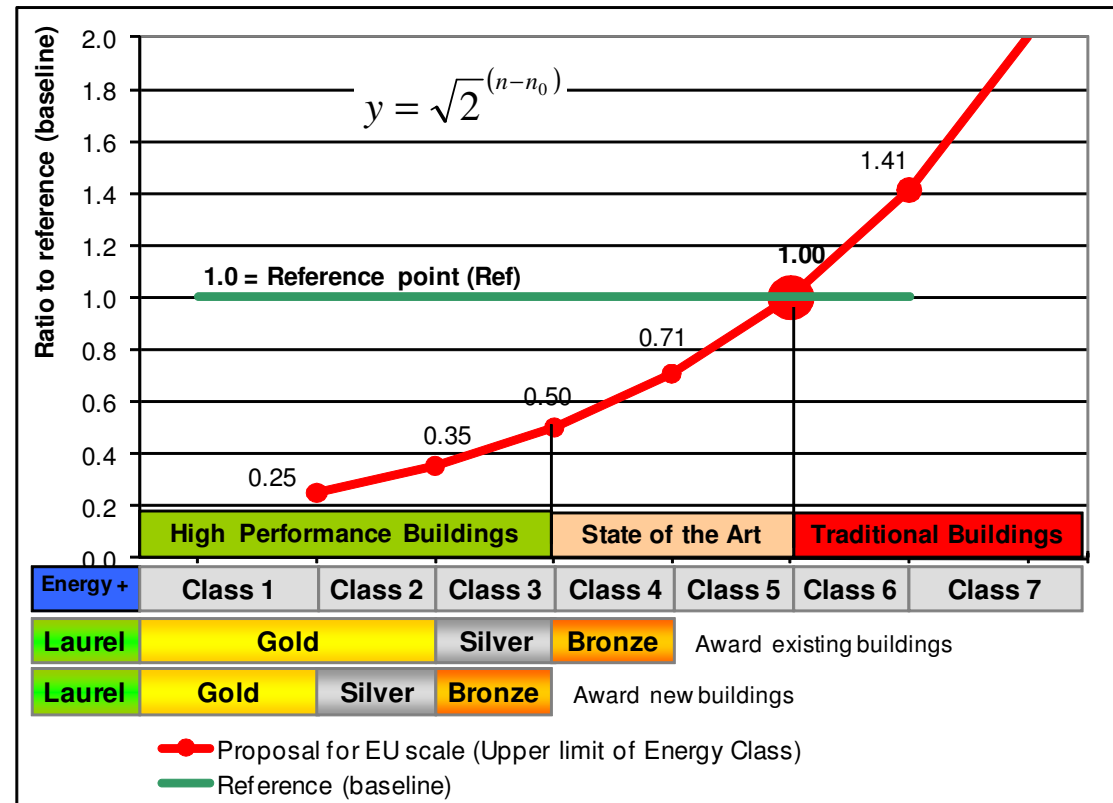
Award new buildings	Award <u>exist. buildings</u>	Common EU scheme	Common EU scheme	Groups
Laurel	Laurel	Outstanding	EP < “positive “	PEB
Gold	Gold	Class 1	EP < 0.25 Ref	<u>HPB</u>
Silver	Gold	Class 2	0.25 Ref ≤ EP < 0.35 Ref	HPB
Bronze	Silver	Class 3	0.35 Ref ≤ EP < 0.5 Ref	HPB
	Bronze	Class 4	0.5 Ref ≤ EP < 0.71 Ref	<u>StoA</u>
		Class 5	0.71 Ref ≤ EP < <b>Ref</b>	<u>StoA</u>
		Class 6	Ref ≤ EP < 1.41 Ref	<u>Trad</u>
		Class 7	1.41 Ref ≤ EP	<u>Trad</u>

# ● Proposal for the shape of the scale (3/3)

## The same scale but different awards for

- new buildings;
- renov./existing buildings;  
(lowered by one class)

Legal requirements for major renovation are lower than for new buildings (e.g. Germany 140 %).



**HPB, NZEB definitions - more understandable,  
European wide comparable for incentives schemes**

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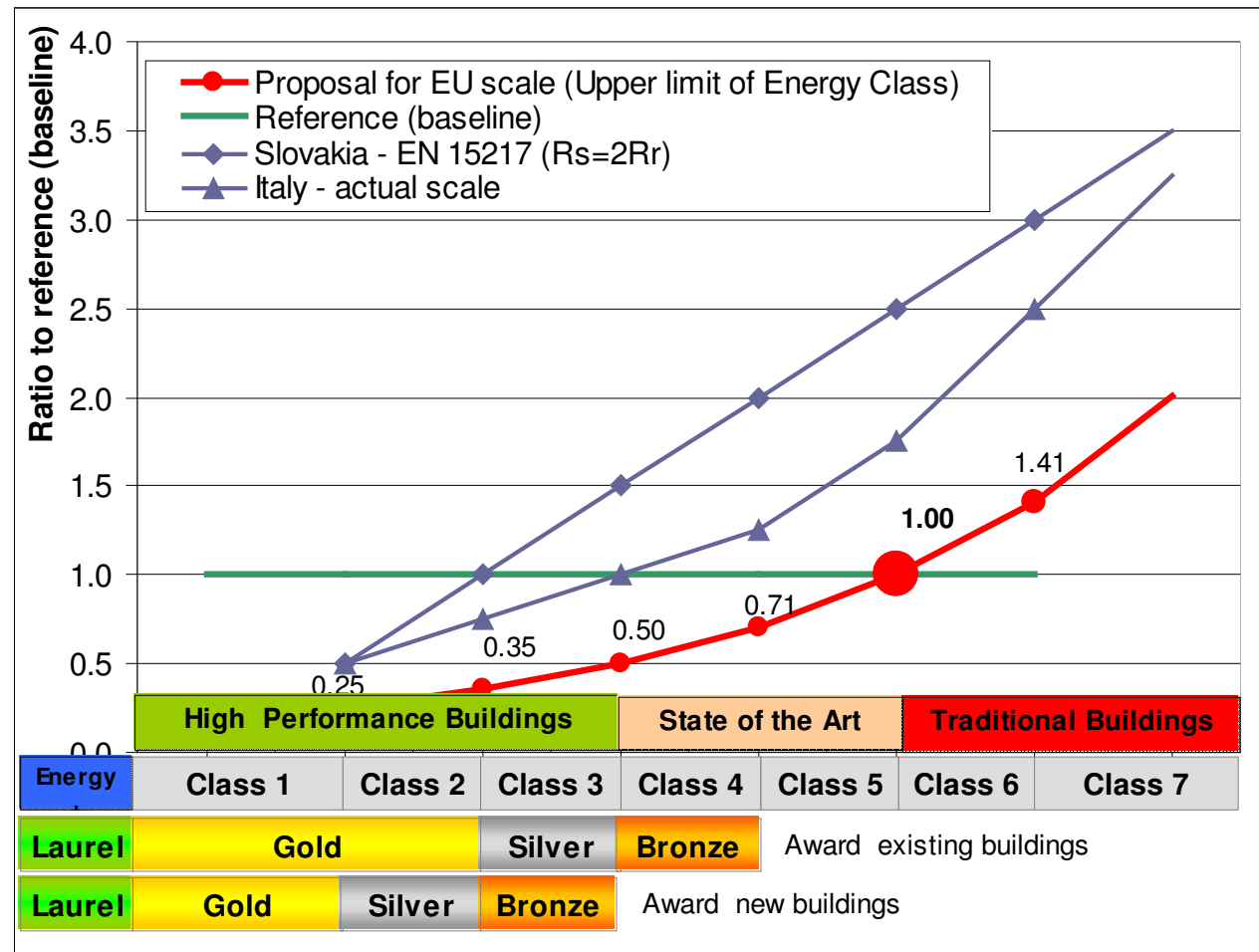
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# ● Comparison with existing scales

## Voluntary schemes

- ✓ Underline high quality ahead of legislation
- ✓ Front runners





## ● Conclusions

### Proposed scale:

- **Easy understandable;**
- **Flexible;**
- **Comparable;**
- **Takes into account other articles of recast EPBD:**
  - the minimum energy performance requirements (art. 4, art.8)
  - the calculation of cost-optimal levels of minimum energy performance requirements (art. 5)
  - the nearly zero-energy buildings (art. 9)

### Principles of scale can also be used for mandatory schemes

Experimental phase is needed for the fine tuning of the scale

Thank you for your attention

Directorate-General  
for Energy



## ● Questions / Discussions

1. Does this scale fit your needs?
2. Should the scheme be applied on **all** existing buildings (also on buildings not undergoing the major renovation) to enable comparison of all buildings in portfolio?
3. Should there be a **separate award for existing** buildings?
4. Is it acceptable that buildings classified in **class 5 or more will have no award**, just class will be presented?
5. What would be the **best symbol for the expression of class** (number, letters, stars, ...)?



6. Do you think that this scale can be used as a support for incentives European wide?
7. **Are you interested to participate in the test run?**