

The CEN logo consists of the lowercase letters 'cen' in white, set against a dark blue square background. A white swoosh underline is positioned below the letters.

# How do the CEN standards support the implementation of the Energy Performance Buildings Directive (EPBD)

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# EPBD (Dec. 2002)

- Required in all EU Member States, from 2006 (2009). Main elements:
  - General **framework for a calculation methodology** on the integrated energy performance of buildings (article 2&4)
  - Application of **minimum requirements** on the energy performance of new buildings (and major renovation of large buildings) (article 4)
  - Energy performance **certification** of buildings (“energy labels”) (article 7) when buildings are to be sold or rented.
  - Regular **inspection** of boilers and of air-conditioning systems in buildings (article 8 & 9)

The CEN logo consists of the lowercase letters 'cen' in a white, sans-serif font, positioned within a dark blue square. A white, curved line sweeps across the bottom of the square, extending to the right and slightly upwards.

cen

# EU MANDATE to CEN

CEN agreed to produce standards necessary for the implementation of the EPBD

# CEN standards to support the EPBD

- European Commission **Mandate 343** to CEN (Jan.2004):

*...the elaboration and adoption of standards for a methodology calculating the **integrated energy performance of buildings** in accordance with the **EPBD***

- Result: on basis of 32 work items 31 CEN standards have been published (2007-2008)
- Prepared by five different CEN Technical Committees in the agreed timeframe 2004-2007, A mayor achievement of these TC's and the around 50 standard writing experts involved.

# These EPBD standards has been prepared by the CEN TC's:

- CEN/TC 89 Thermal performance of buildings and building components
- CEN/TC 156 Ventilation for buildings
- CEN/TC 169 Light and lighting
- CEN/TC 228 Heating systems in buildings
- CEN/TC 247 Building automation, controls and building management

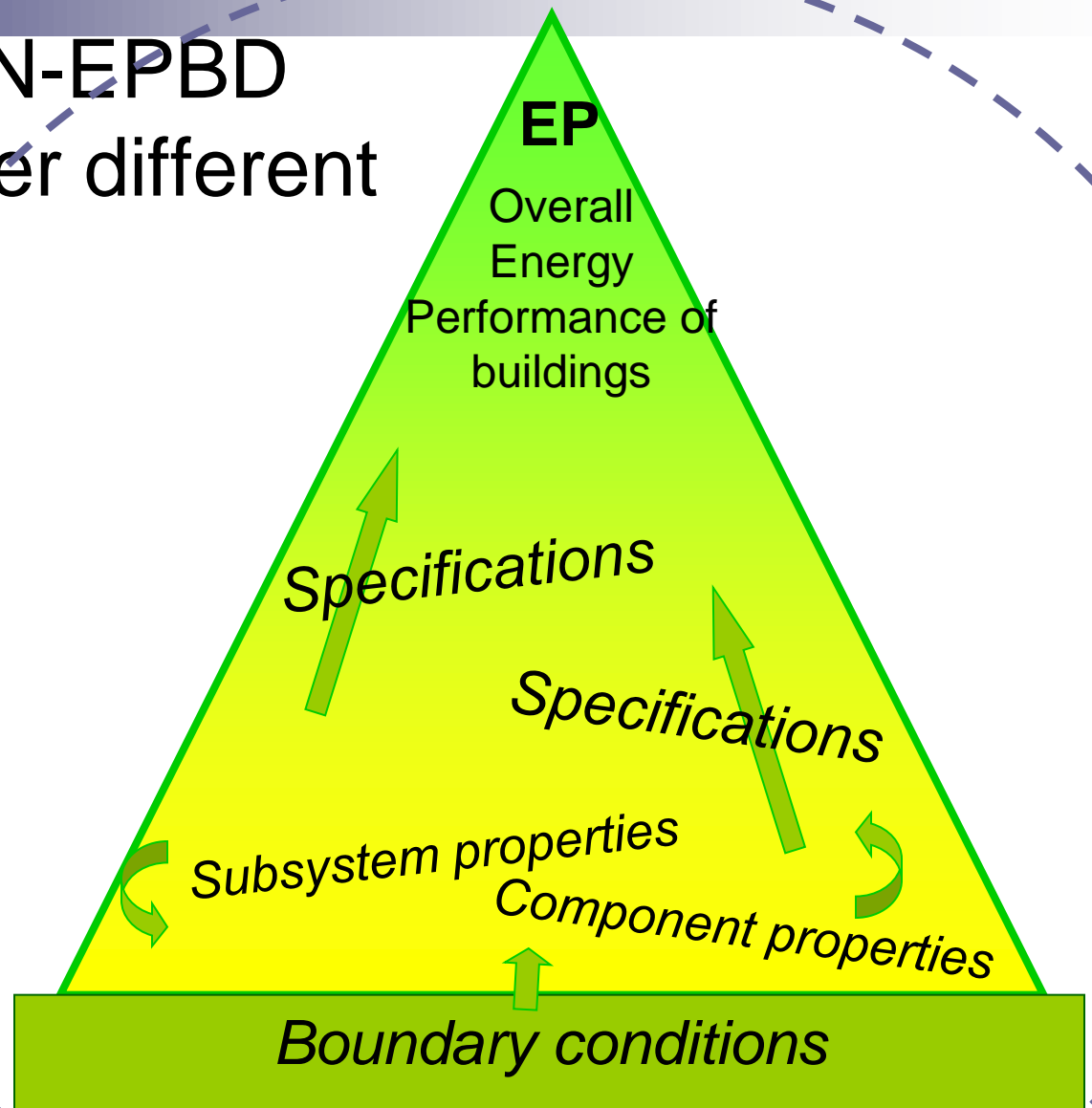
This work is coordinated by:

- **CEN-TC 371 Programme Committee on EPBD ( the former CEN BT TF 173 on EPBD)**

# The set of CEN-EPBD standards cover different levels

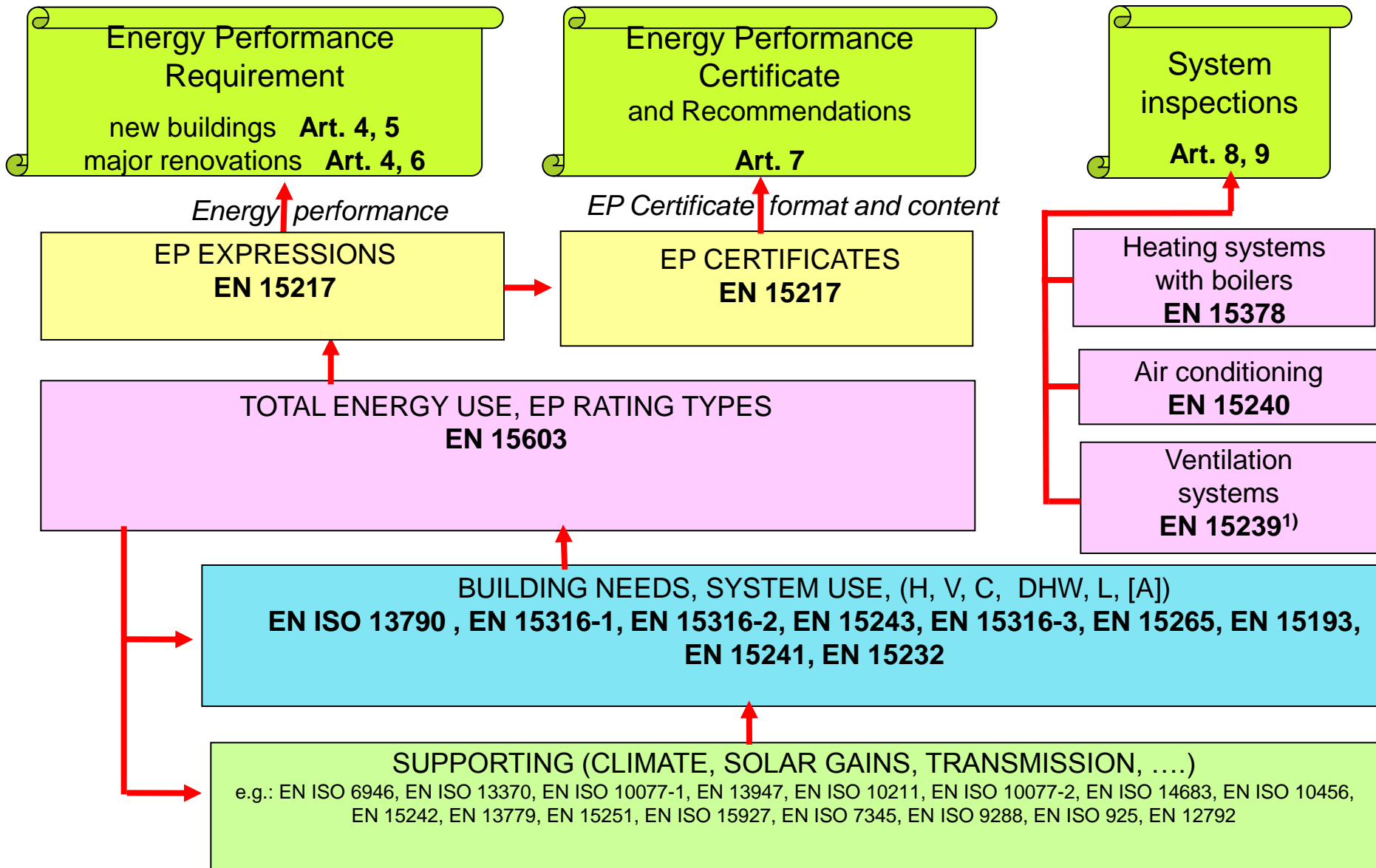
Overall EP:

Energy Performance of the building including its technical building systems



# Main scheme (with reference to EPBD articles)

## Methodology for calculating energy performance (Article 3 and Annex)



1): Not explicitly mentioned in the Directive

# Based on the 32 mandated WI's a set of 43 **CEN** standard documents:

- Apart from the building physics: Heating Ventilation Air-conditioning installations:
- RES: Renewable Energy Systems: Cogeneration, Heat pumps, various generation principles including PV & Biomass etc.
- Energy Performance Certificates, Inspection procedures, economic evaluation for RES
- Criteria for the indoor environment, including thermal, indoor air quality, light and noise..

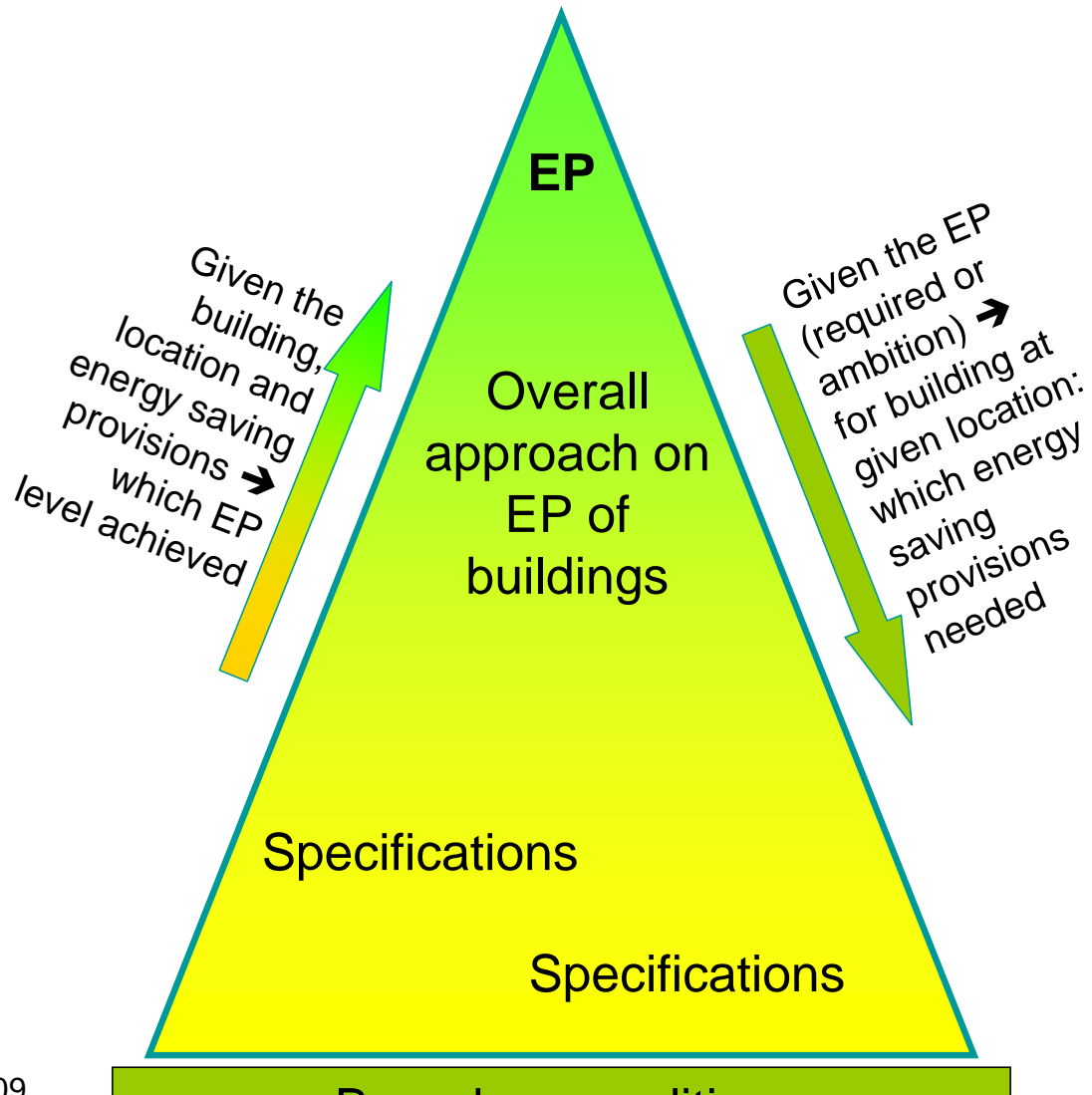
# 43 standards on EPBD

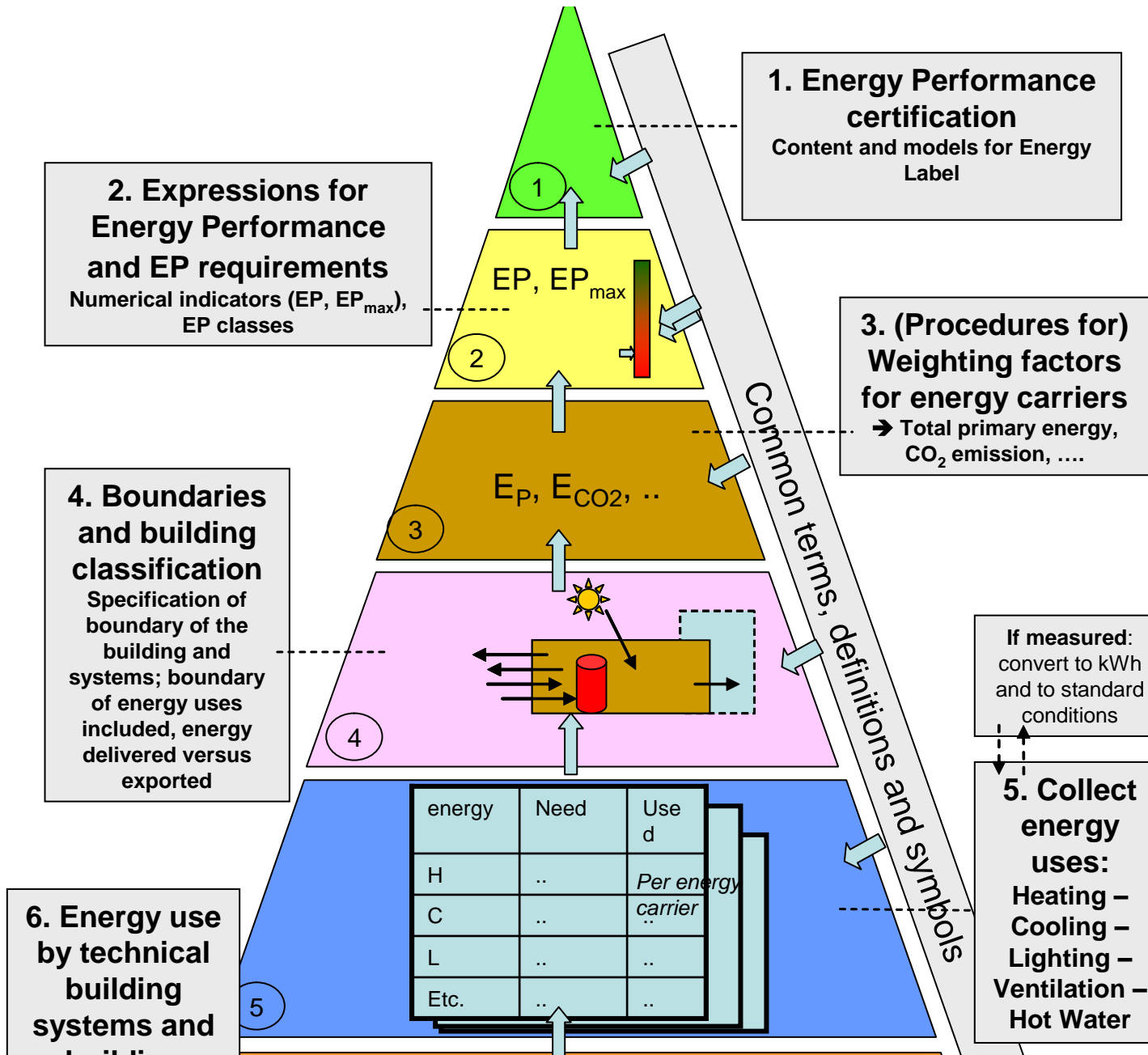
- The Key standards
  - EN15603 : Way of expression Energy Performance and CO2
  - EN15217 : EP certificate
- Standards on thermal property of buildings (TC89)
- Standards on heating systems (TC228)
- Standards on AC, ventilation and cooling systems, indoor environment (TC156)
- Standards on lighting (TC169)
- Standards on building automation and controls (TC 247)
- Standards on inspection (TC156 & 228)

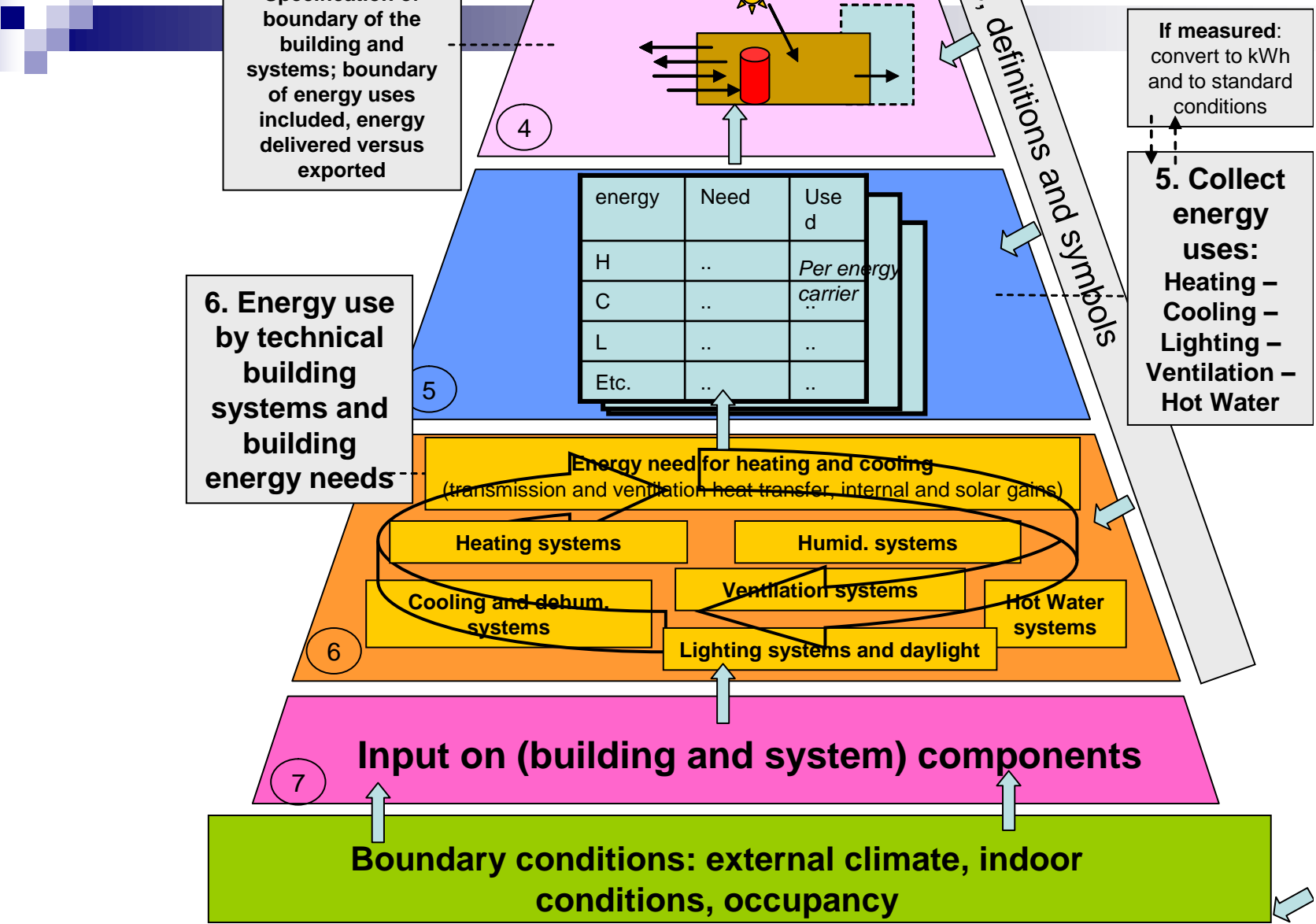
## **The umbrella document CEN TR 15615**

- **Overview**
- **Common definitions**

# Basic model of building energy performance (EP)



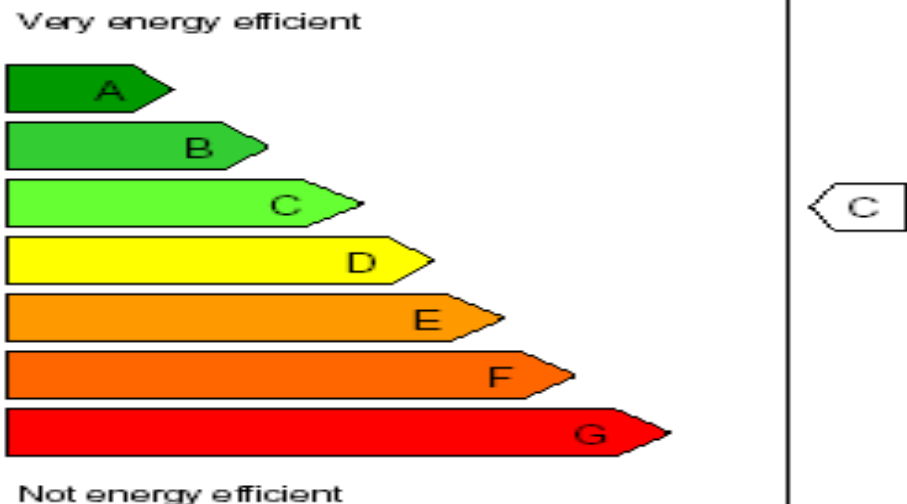




# Key standards on EPBD

- **EN 15217 Methods of assessment for energy certification of buildings, guidelines for certification schemes**
- **EN 15603 Overall energy use, primary energy and CO2 emissions**
- **EN ISO 13790 Calculation of energy use for space heating and cooling**
- **EN 15316 Methods for calculation of heating system energy requirements and system efficiencies (13 parts)**
- **EN15243 Performance requirements for dynamic calculation of room temperatures and of load and energy for buildings with room conditioning systems (including solar shading, passive cooling, position and orientation)**
- **EN 15378 Methods for Boiler inspections**
- **EN 15240 Methods for Air-conditioning inspections**
- **EN 15239 Methods for Inspection of ventilation systems**
- **EN 15251 How to specify criteria for the internal environment (thermal, lighting, IAQ)**

# Example for certificate according EN15217

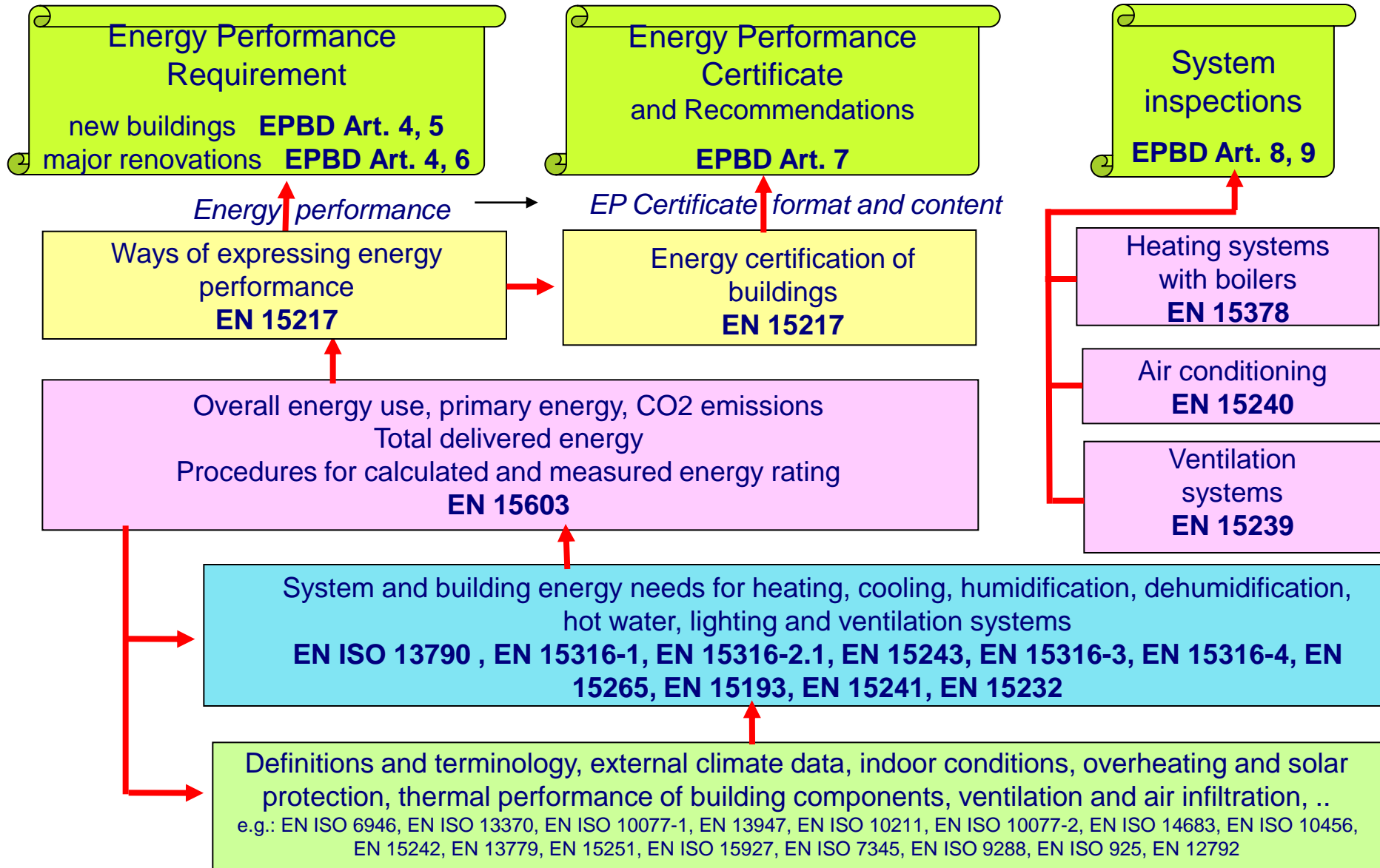
Energy certificate	Building Energy Performance		As built	
	Space to make reference to the certification scheme used			
	Very energy efficient A B C D E F G Not energy efficient			
	Name of the indicator used			calculated
	Unit			130
	Space to include additional information on building energy use			

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

# The Standard for Energy declaration

- EN-15603 : Overall energy use, Primary energy and CO<sub>2</sub> emissions (for certificate and/or MS-authorities )
- –Assessment of energy use and definition of ratings - Total Building Energy Demand, for heating cooling, hot water and lighting, including system losses and auxiliary energy, identified by energy carrier; procedures for:
  - Asset Rating ,
  - Operational Rating,
    - comparing measured data with calculated results
    - Assessing energy saving retrofits

# Methodology for calculating energy performance (EPBD Article 3 and Annex)



# Standard for the calculation of the Building Energy use

- **EN-ISO-13790 : Energy performance of buildings — Calculation of energy use for space heating and cooling**
- **This standard** takes into account all losses and gains and refers to the relevant installation system standards to make it possible to determine the building energy needs for Heating, Cooling, Ventilation, Lighting, Domestic Hot Water, and Auxiliary.

# TC 89 Building Physics standards

- EN ISO 13786- **Dynamic Thermal Characteristics** ,
- EN ISO 13789- **Transmission and ventilation heat transfer coefficients**
- EN ISO10077-1 **Thermal performance of windows, doors and shutters -Calculation of thermal transmittance**
- EN ISO 10456, **Building materials and products —Hygrothermal properties — Tabulated design values and procedures for determining declared and design thermal values**
- EN ISO 13370, **Heat transfer via the ground — Calculation methods**
- EN ISO 10211, **Thermal bridges in building construction — Heat flows and surface temperatures — Detailed calculations**
- EN ISO 14683**Thermal bridges in building construction — Linear thermal transmittance — Simplified methods and default values**
- EN ISO 6946 **Building components and building elements — Thermal resistance and thermal transmittance — Calculation method**

# TC 89 Building Physics standards

**EN15255: Sensible room cooling load calculation – General criteria and validation procedures**

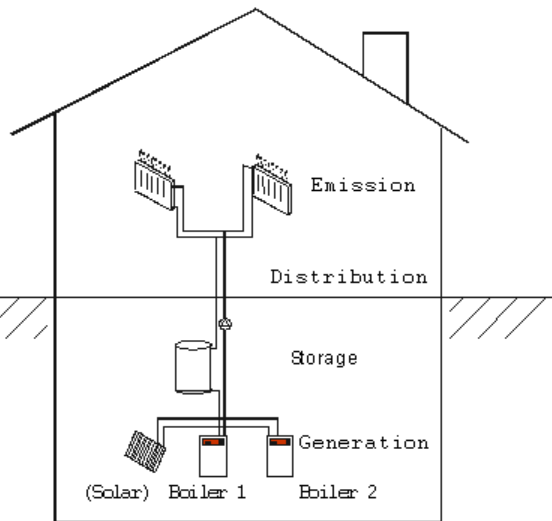
**EN 15265 : Calculation of energy use for space heating and cooling – General criteria and validation procedures**

**EN 13791 Performance requirements for temperature calculation procedure without mechanical cooling (Detailed)**

**EN 13792 Performance requirements for temperature calculation procedure without mechanical cooling (Simplified)**

# TC228: Heating System standards EN15316

## 1) Energy supply



**Needs**

**EN 15316-3.1 DHW needs**

**Emission\***

**EN 15316-2.1 Space heating**

**Distribution\***

**EN 15316-2.3 Space heating  
EN 15316-3.2 DHW**

**Storage +  
Generation\***

**EN 15316-4.1 Combustion (Boiler)  
EN 15316-4.2 Heat pump  
EN 15316-4.3 Thermal solar  
EN 15316-4.4 Micro CHP  
EN 15316-4.5 District heating  
EN 15316-4.6 Photovoltaic  
EN 15316-4.7 Biomass boiler**

**\* Including  
control**

**EN 15316-1 General part**

# EN15316-3- part 1 to 3: Domestic Hot Water

- 1 Characterisation of the needs
- 2 Distribution efficiency and losses
- 3 Generation efficiency
- Thermal Solar Generation: see EN15316-4-3 Thermal solar systems

# Standards on AC and Ventilation

- **EN 15243** Dynamic calculation of room temperatures and of load, energy for room condition systems (including solar, passive cooling, orientation)
- **EN 15242** Calculation airflow rates in buildings including infiltration
- **EN 15241** Calculation of energy due to ventilation systems in buildings
- **EN 13779** Performance requirements for ventilation and room-AC systems

# Standards on lighting and building automation

- EN15193-1: Energy performance of buildings – Energy requirements for lighting – including day lighting
- EN-15232: Calculation methods for energy efficiency improvements by the application of integrated building automation products and systems.

# Recasting EPBD: the 2020 targets require more stringent implementation in EU

- **Clarification or / and simplification.**
- **Broaden scope:**>> remove threshold of 1000m<sup>2</sup> / 25% as many MS already did
- **Strengthen EP certificates** >> require cost effective measures to be taken
- **Strengthen Inspection systems** >> require inspection records and cost effective measures
- **Establishing cost effective EP requirements.**  
>> agree on basics to set them on national level

# FUTUR developments

- Process feedback from users of CEN standards to update and simplify standards the coming years (with help of CENSE and other EU-SAVE-EIE projects)
- Need for updating the current first generation CEN EPBD standards, this may be done in parallel with ISO (TC163 & TC205)
- Show how other EU directives interact with the EPBD:
  - ECO-Design of the EuP directive
  - Energy End-use Efficiency
  - Energy Services directive
- The CEN EPBD standards should be used in the other directives as well

# Will all MS's use CEN standards?

- A first survey (2008) shows that all MS's expect that it will be possible in the future to refer in their national legislation to these CEN EPBD standards (EN & EN-ISO)
- The expected timeframe differs : 2009—2011
  - The first survey shows about 50 % (on average) is already using CEN standards or substantial parts:
    - Direct, with national annexes? Content?
    - Parts of it, given (or referring to ) in covering national standards or publications/procedures
    - It is not yet clear if the national legislation requires them to use these national procedures or allows to use the CEN standards, in combination with national input data, as well.

# Discussion on the CEN standard use

- Strong signals of the industry: differences in use and application of the CEN standards in MS's cause not to justify differences in rewarding certain energy saving technologies. This makes energy saving technology more costly.
- CEN standards have been developed to prevent this, the set of EPBD standards, if applied correctly, is suited for this.
- We have to remove some non functional flexibility of the current set of standards (in some standards to much alternative choices are given to satisfy all).
- However it seems that this will not help if the MS's find their **“holy grail”**: **the national building regulation**, of higher priority, as reaching their 2020 targets

# Discussion on the CEN standard use

- Industry associations, professional associations and energy agencies should work together to convince the EU politicians that one EU common market on energy saving products and services can only be reached if we allow the total set of CEN EPBD standards to be used as they should.
- The use of **one** harmonised EU (and in the future ISO) procedure for the determination of the Energy Performance of buildings will benefit our industry, bring more cost-effective energy saving measures to our consumers and strengthen our position in this field worldwide.
- CEN and their members shouldn't allow or support the national patchwork of parts of CEN standards and national opinions towards national standards or guidelines referred by the national legislation.



Thank you for your attention

5th CEN-CENELEC Annual meeting: Sustainable Use of Energy