EN ISO 13 790
Slovene ways and sideways

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Based on presentation by
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EPBR - recast

- *Article 3*
  Adoption of a methodology of calculation of the energy performance of buildings
- Member States shall apply a methodology, at national or regional level, of calculation of the energy performance of buildings on the basis of in accordance with the common general framework set out in the Annex I

Annex I/1

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

(a) the following actual thermal characteristics of the building

- (i) thermal capacity;
- (ii) insulation;
- (iii) passive heating;
- (iv) cooling elements; and
- (v) thermal bridges;

These characteristics may also include air-tightness.

Annex I/2

(b) heating installation and hot water supply, including their insulation characteristics;

(c) air-conditioning installation installations;

(d) natural and mechanical ventilation, which may include air-tightness;

(e) built-in lighting installation (mainly in the non-residential sector);

(f) the design, position and orientation of the buildings, including outdoor climate;

(g) passive solar systems and solar protection;

(h) indoor climatic conditions, including the designed indoor climate;

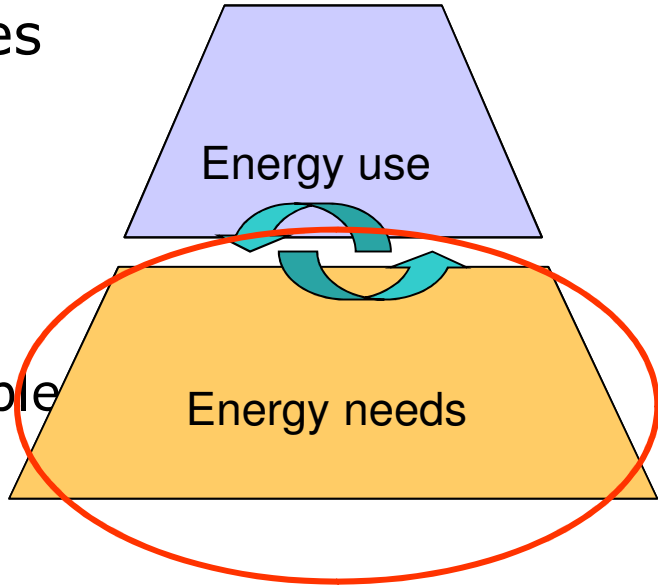
(i) internal loads.

EN ISO 13790, energy use for heating and cooling

- Key data:
  - Published in 2008
  - Widely used in the EU Member States
  - One common methodology
  - But with options for national choice

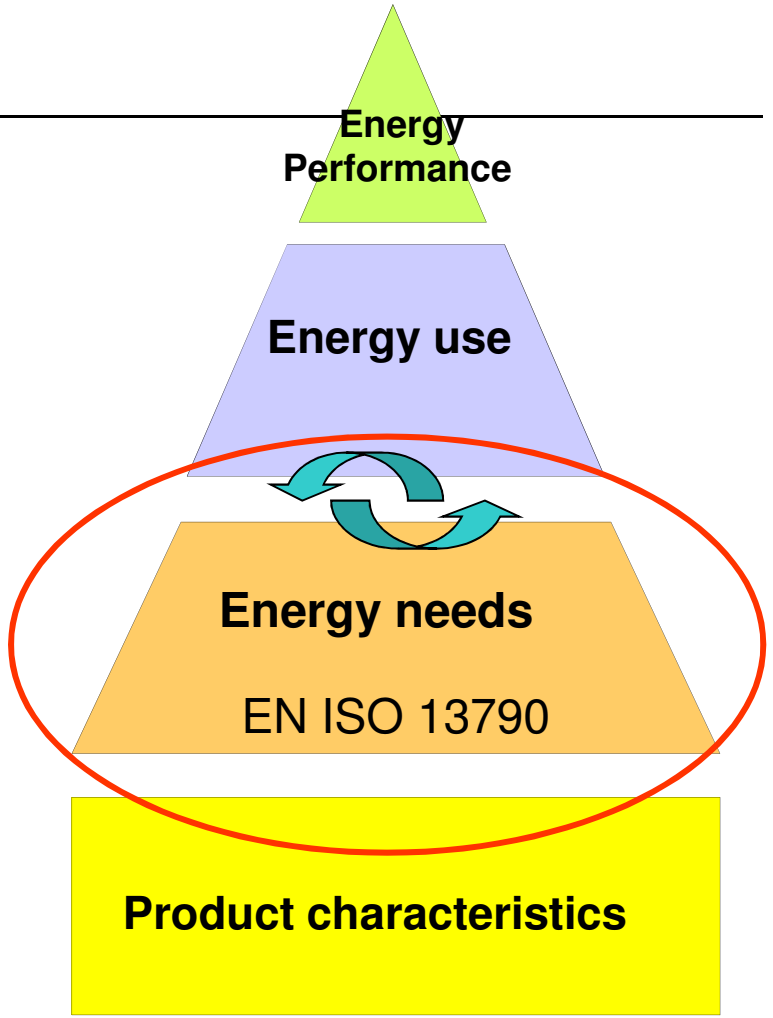
Scope of EN ISO 13790:2008

- For specified building boundaries and partitioning (calculation zones):
- Calculation of energy needs for heating and cooling
  - Including influence of recoverable system losses
- For residential and non-residential buildings
- For buildings at design stage and for existing buildings



Position in set of standards to support the EPBD

EN ISO 13790 is one of the key standards in the set of standards to support the EPBD



Position in set of standards to support the EPBD (more detailed)

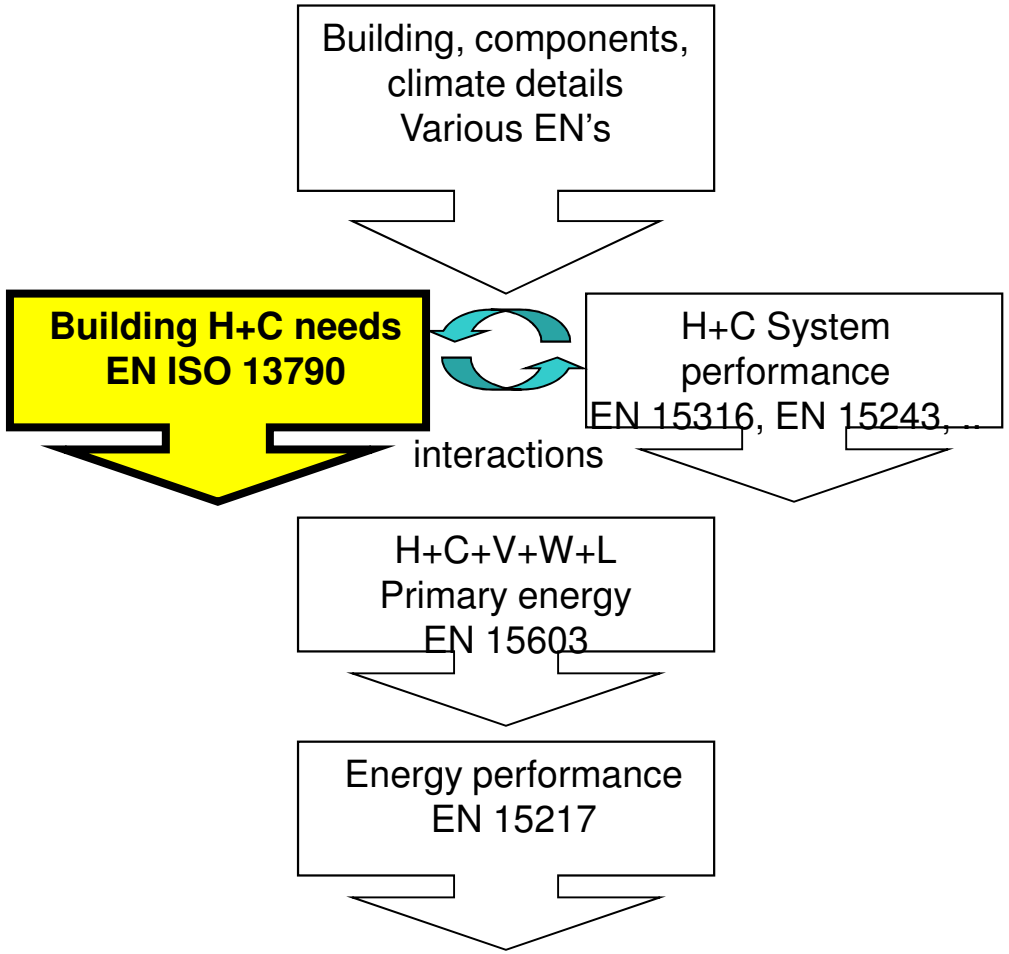
Core element of EN ISO 13790:

1. Calculation of building energy needs for heating and cooling

Including interaction with heat losses of systems:

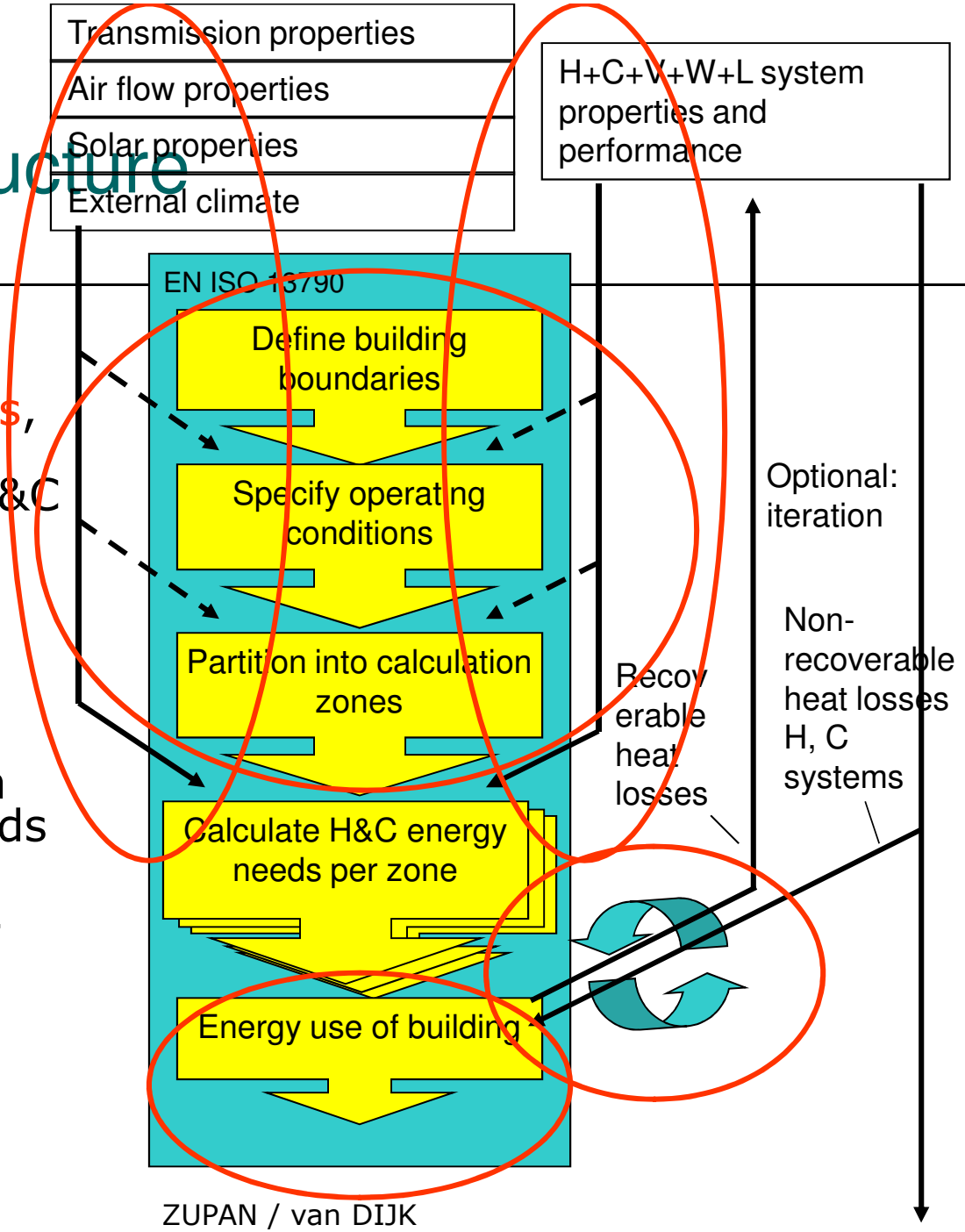
H = heating C = cooling
V = ventilation (fans)
W = hot water L = lighting

2. Energy use = sum of H&C needs + H&C system energy use



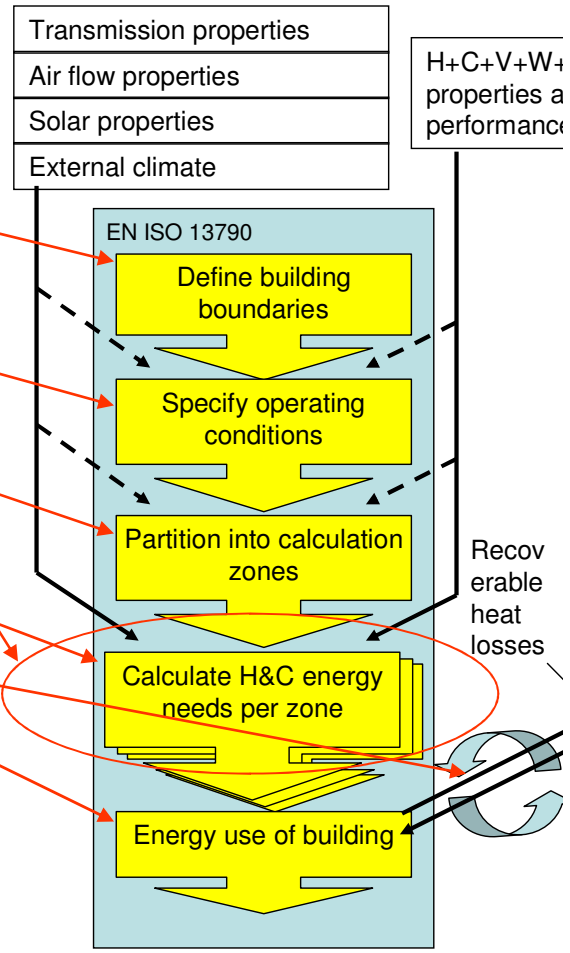
Main structure

- Number of successive steps, preceding calculation of H&C energy needs
- Input from several other standards
- Interaction with system standards
- Output to other key standards: EN 15217 and EN 15603



The Calculation Steps

1) Choice of type of calculation **method**
2) Definition of boundaries
3) Definition of internal conditions and external input data (e.g. climate)
4) Partitioning into building zones for the calculation
5) Calculation of the energy needs for each time step and building zone
6) Combination of zone-results with corresponding system losses
7) Consideration of **interactions** between zones and/or systems

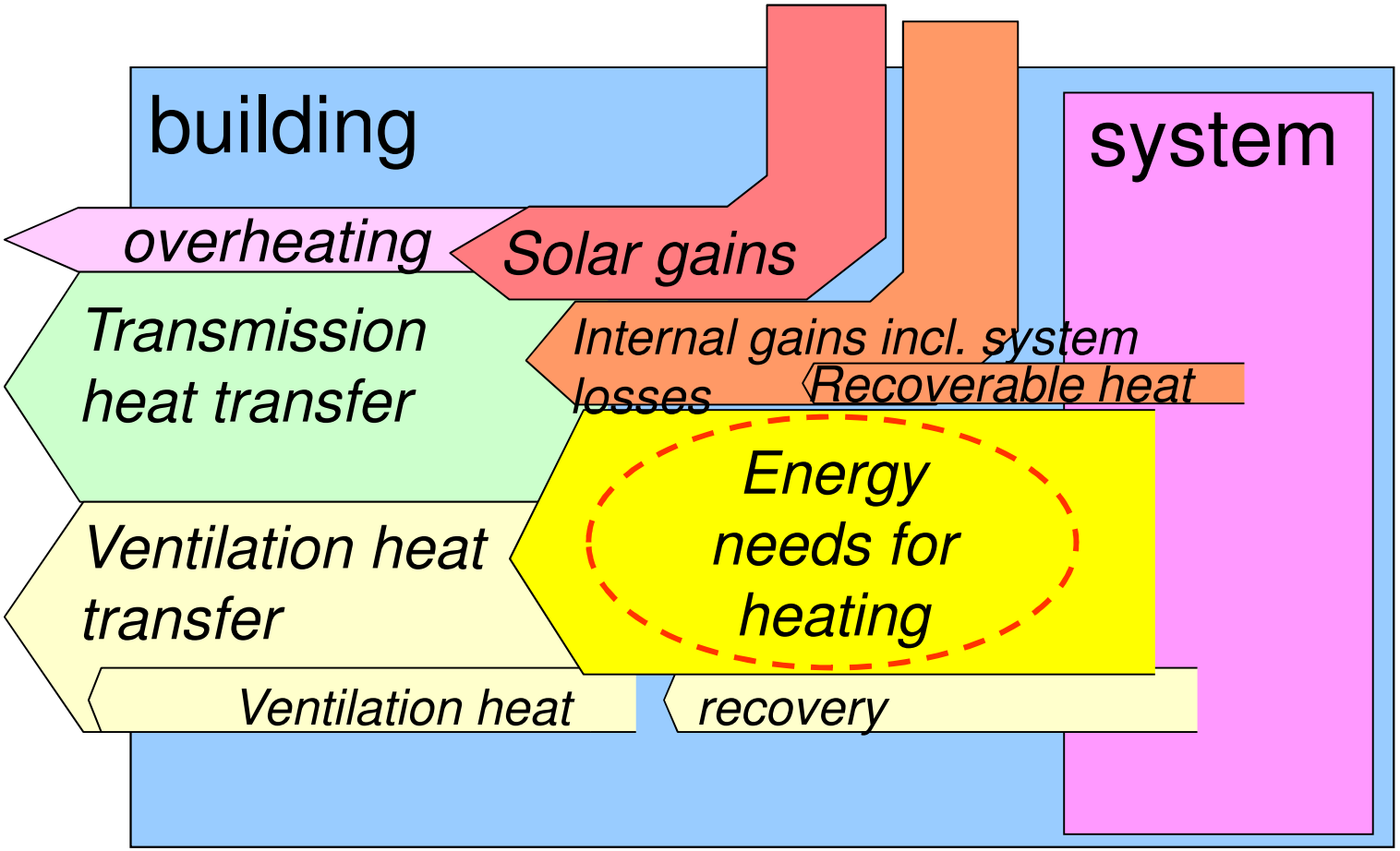


National choices

For steps 1) and 7) two different approaches are possible:

1) time step used in calculation: long (month, period) or short (hour)
6) dealing with interactions: simplified or holistic approach

Core calculation: Energy needs for heating and cooling as function of the energy balance (simplified)



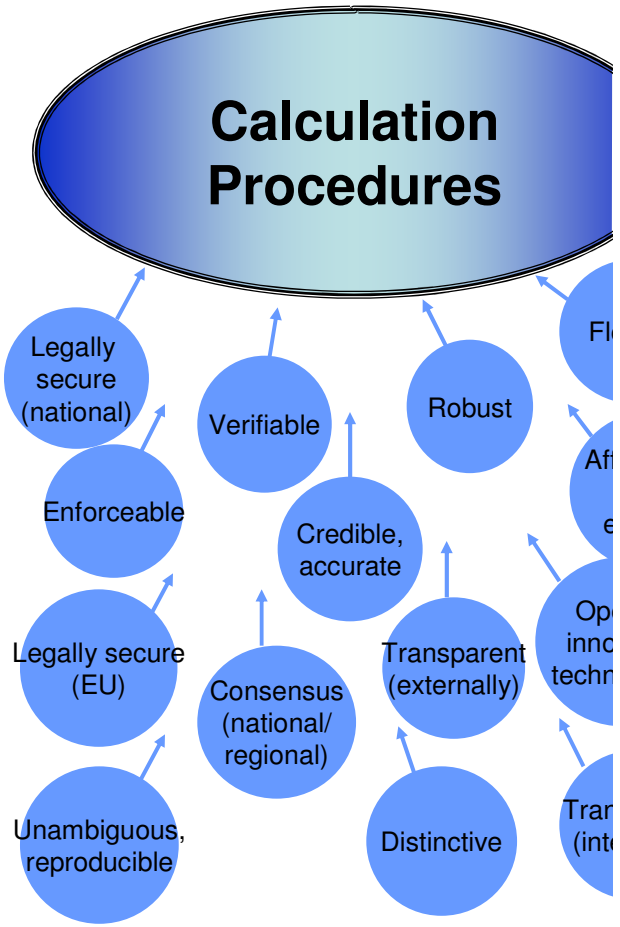
Options for national choice (1)

Calculation method

- Simplified monthly method
- Simplified hourly method
- Input and boundary conditions for detailed simulation tools
  - Level playing field (building regulations!)

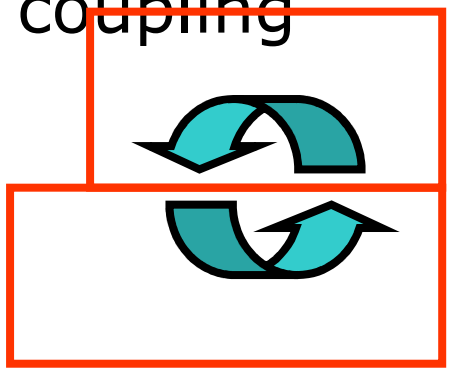
(National) choice of method depends on

- Application (purpose of the calculation)
- Building type or use of building
- Complexity of building and systems



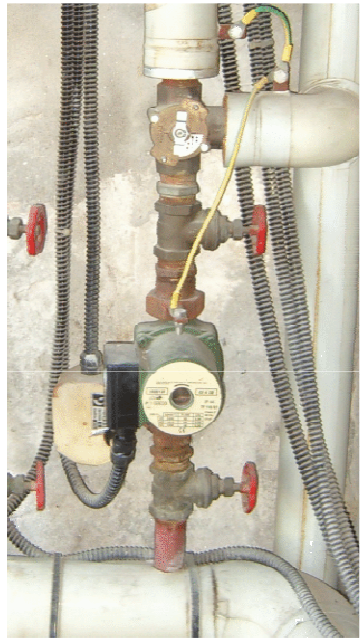
Options for national choice (2)

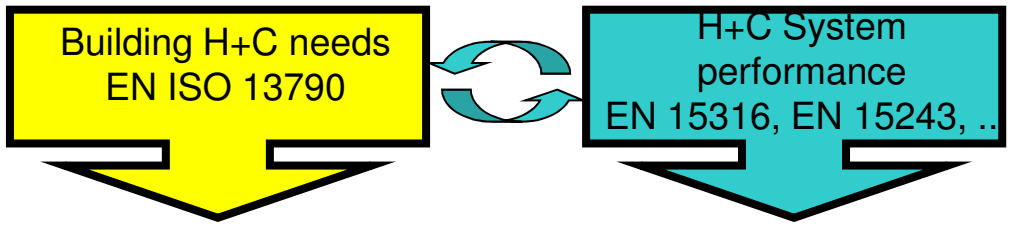
- Interaction between zones in building
  - Single zone
  - Multi-zone, no thermal coupling (adiabatic)
  - Multi-zone, thermal coupling



Options for national choice (3)

- Interaction with systems (H, C)
  - Simplified: fixed portion of dissipated heat in building assumed
  - Holistic: amount of dissipated heat in building is function of system losses
    ➔ iteration between calculations of system loss and building needs





Existing SLO legislation

- 2002: regulation based on EN 832 – heating energy demand – still valid
- 2007: regulation based on EN ISO 13 790 was prepared – not used!
- 2008: regulation based on JUS U.J5.600 was adopted - postponed
- 2009: regulation on energy certificates based on EN ISO 13 790

Present situation

- Regulation based on EN ISO 13 790 is in preparation
- Calculation procedure for systems etc. is prepared on basis of prEN 15 316 xx
- It will be isued by June 2010

Decisions to take

- Choices
- Climatic data
- Material data
- Default values
- Simplifications

Slovene decisions - method

- Simplyfied monthly method
- No daily climatic data available, yet
- Problem with calculation of overheating – no degree hours for summer

Slovene decisions - zones

- According to EN ISO 13 790
- if one zone >80% => one zone
- if <20% unheated (corridors, stairs…) => one zone
- Contact of 2 zones: adiabatic

Climatic data

- Based on X Y coordinates
- Monthly values
- Average temperature
- Degree days
- Solar irradiation
  - S, SE, E, NE, N, NW, W, SW
  - 15, 30, 45, 60, 75, 90^{o}

Material data

- CE declaration of conformity
- List of materials – updated
- Problems with calculation of condensation for “new” materials

Deafault values

- A lot of default values and simplifications are to be prepared in order to “make life easy”

Internal gains

- Default values
  - 2002: residential - 5 W/m^2
  - 2007: residential, schools, … - 4 W/m^2
  - 2007: other – 6 W/m^2
  - PHPP: ~2 W/m^2 (???)
  - 2009: ???

Question by Igor Balen

EN ISO 13790:

What is exactly the consequence on the solar gains result of neglecting, for example, thermal radiation to the sky and can it be compensated by neglecting the heat flow from the solar source in the adjacent unconditioned space? (That was recommended for Croatian national procedure)

Answer by D. van Dijk

Concerning the question on EN ISO 13790:

Thermal solar radiation to the sky (actually not solar...; but I admit: this part of the calculation is presented in the solar radiation chapter) can often be neglected in particular if also solar gains at opaque constructions is neglected. However, for large surfaces facing the sky (large flat roofs) both effects can be quite significant, in particular for badly insulated constructions. In that case you better not assume that both effects cancel out; e.g., in summer, when the sun position is high. Note that the number of extra input data needed for the calculation can be kept very low to zero, in particular if national default data are given.

I don't see the link with the heat flow from the solar source in the adjacent unconditioned space. I guess that a sunspace is meant by that, but what has that to do with e.g. a large roof of a single storey building?

If you have more questions, or whatever, please let me know!

best regards,

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