Rakennusten energiatehokkuus-direktiiviä tukevat uusitut CEN standardit

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EU Mandate (M480) for CEN to develop the second generation CEN-EPBD standards

- The set of 40-50 standards under development
- CEN TC 371 ‘Energy performance of building project group’ coordinates the work with five committees:
  - TC 89, Thermal performance of buildings and building components
  - TC 228, Heating systems in buildings
  - TC 156, Ventilation for buildings
  - TC 247, Building automation, controls, and building management
  - TC 169, Light and lighting
- Communication with the regulators of the EU- member states via the Liaison Committee
- Standards will include a format for national annexes where MS have to report national options and input data
Making the EPBD pieces fit together
EPBD definition for energy performance

EPBD definitions (article 2):

- ‘energy performance of a building’ means the calculated or measured amount of energy needed to meet the energy demand associated with a typical use of the building, which includes, *inter alia*, energy used for heating, cooling, ventilation, hot water and lighting.
<table>
<thead>
<tr>
<th>Region</th>
<th>Country</th>
<th>nZEB Energy performance</th>
<th>RES</th>
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Data from CA EPBD Oct 2013 (Kurnitski et al. REHVA Journal 2/2014)
nZEB requirements up today

• National nZEB applications show remarkably high variation between 20 and 200 kWh/m²y primary energy in ten countries:
  – caused partly due to different energy uses included and partly due to different level of ambition in the definitions
  – exclusion of the energy flows leads to situation where calculated energy use could represent only a small fraction of measured energy use in real buildings

• Requirements only for residential and non-residential show that majority of countries cannot tackle the eight building types specified in EPBD recast Annex

• nZEB primary energy values showed a reduction by factor of 1.6 in Estonia and by 2 in Denmark compared to current EP minimum requirements of office buildings (reduction of 40-50%)
Phase 1 results

- FprEN 15603:2014 Over-Arching EPB Standard
- draft-prTR (Technical Report) 15615:2014 on the prEN 15603

- FprEN 15603:2014 was disapproved in the voting 10/2014, needs revision and resubmission

EXCEL files to support the checking of the calculation procedures as given in the FprEN15603 and generating the examples in the TR
A complex OA structure is needed
Because:... this is what we are calculating
Small existing building?

You just calculate it as one single piece

...as you would eat a small pastry in one single bite..

= no partitioning required
Big building, arcade + office + residential?

... but what if there is a big cake on the table? You have to eat it slice by slice ...

Partitioning required for complex buildings!
The amount of energy involved is so small that any interaction may be relevant. Example domestic hot water losses and cooling...

Also localization of gains is relevant.

Will Solar gains of the big window in the living facing south effectively heat upstairs north rooms?

Thermal zones or even room by room calculation may be required...

- Hourly method as the main method
- Monthly methods also included
- In general, many options – only way to achieve European consensus
Status/Planning M480-Phase 2

- most draft prEN’s are ready and have been published as N-doc’s at the CENTC371 livelink
- **September-December 2014** publication of the prEN’s for enquiry
- It is expected to reach and possibly finish the enquiry stage of all EPB-standards around **April-May 2015**
- **Before the end of 2015** we expect all Enquiry comments to be resolved and Formal Vote versions ready at TC level.
- After publishing and voting we expect that **during 2016** all EPB-standards will ready and available as EN (or EN-ISO) standards
Example case to promote the total set of EPBD standards

• MS’s ask CEN to produce example of real building + systems to illustrate that the set works
• Experts and task leaders of the different TC’s may be requested to contribute to this
• CEN have to put energy on promoting the use of their standards at MS level
Checking the calculation procedures in each Phase 2 EPB standard

- EPB standard with formulas
- Excel files including all calculations and input output
- output data to be used as input for other EPB standards
- final or intermediate results as input for the OAS EN15603 like Energy Performance expressions etc.

defining the data exchange in an unambiguous way offering software developers a clear interpretation how standards shall be used

To other EPB standards
Building and system EP: also depending on product EP: relation to the ECO-DESIGN Directive and connected M495

- Ecodesign EP assessment procedures have been developed independently – the result of not using the EPB procedures for the Ecodesign EP assessment is not predictable.
- Using Ecodesign-EP declared values as input for EPB system assessment procedures may lead to misleading EPBD declarations.
- Ideal situation: USE EPB Procedures:
7.5 Assessment boundaries and perimeters

- Assessment boundary
  - (use energy balance)
  - On-site
  - Nearby
  - Distant

- Thermally conditioned space
  - 1 PV
  - 2 Wind

- Space outside thermal envelope
  - S2

- Boiler room
  - S3

- Kansallisilla valinnoilla verkkoon syöttäminen voidaan mahdollistaa tai ei – monia muitakin kansallisia valintoja
The renewable energy ratio RER is given by:

\[ RER = \frac{E_{\text{Pren;RER}}}{E_{\text{Ptot}}} \]  

(2)

where:

- \( E_{\text{Ptot}} \) is the total primary energy calculated with equation (1) using total primary conversion factors \( f_{\text{Ptot;del;cr,i}} \) and \( f_{\text{Ptot;exp;cr,i}} \).

- \( E_{\text{Pren;RER}} \) is the renewable primary energy calculated with equation (1) in 7.6.1, taking into account the perimeters defined in Table A9;
FprEN 15603:2014 Annex G (informative)
Definition of nearly Zero-Energy Buildings (nZEB)

• G.1 General principles
  • The use of only one requirement, e.g. the numeric indicator of primary energy use, is misleading. Different requirements are combined to a coherent assessment of a nearly Zero-Energy Building (nZEB).

• G.2 First requirement: The building fabric (Energy needs)

• G.3 Second requirement: The total primary energy use

• G.4 Third requirement: Non-renewable primary energy use without compensation between energy carriers

• G.5 Final nZEB rating: Numerical indicator of non-renewable primary energy use with compensation
The CEN proposal for nZEB: a hurdle race

- **Hurdle 1:** Building needs
  - Conditioned space

- **Hurdle 2:** Building use
  - Technical building systems
  - Total primary energy

- **Hurdle 3:** Building use
  - Energy carriers
  - Non-renewable prim. energy

**Arrival**
- **nZEB rating**
  - Primary energy balance
  - Delivered - Exported

**Evolution of assessment boundaries**
At this stage the compensation between energy carriers and the effect of exported energy is taken into account.

The numerical indicator of non-renewable primary energy is calculated according to 7.6 (step B).
Johtopäätökset

- 40-50 uusittua EPBD standardia käytössä 2016, mm. 15603 OAS, sisäilmastostandardi 15251, 13779 ym., valtaosa standardeista saa uuden numeron.

- Standardeja on perinteisesti hyödynnetty kansallisia laskentamenetelmiä kehitettäessä, mutta nyt komission toimesta EN standardien roolia halutaan vahvistaa energialaskennan harmonisointia varten.

- Uusia elementtejä standardien valmistelussa:
  - tuntitason laskentamenetelmät korostetusti esillä
  - kansallisesti valitut parametrit julkaistava kansallisina liitteinä
  - kommunikointi kansallisten lainsäätäjien kanssa ja rakennusten energialaskentaesimerkkien laatiminen

- Kommentointivaihe 4-5/2015 asti ja formal vote versioiden valmistelu 12/2015 mennessä voivat olennaisesti kehitää nykyisiä luonnoksia.