



Your service center for information and technical support on the new set of EPB standards

WHY : do we need EPB standards to support the implementation of the Energy Performance of Buildings Directive
and
what is: Relation to ongoing EU policy developments on building performance (e.g. energy, environment, people)

Jaap Hogeling

Manager international standards at ISSO

Chair CEN/TC 371 Energy Performance of Buildings project group

Member ISO/TC 163/WG 4: Joint Working Group (JWG) between ISO/TC 163 and ISO/TC 205:

Energy performance of buildings using holistic approach

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This EPB Center is supported by the EU-
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437/SI2.785185

Start 21 September 2018 for 3 years

BUILD UP Webinar series
Webinar 2: EPB standards
overview: why, how, what!
March 19, 2020



My background



- CEN/TC 371: Energy Performance of Buildings project group, chairperson since 2004
- Project leader of the EU Mandate/480 to CEN regarding the development of the set of EPB standards.



- Participation in 5 CEN/TC's and 2 ISO/TC's related to Energy Performance of Buildings
- Manager international standards at ISSO, Rotterdam, the Netherlands
- Initiator of EPB Center (an initiative of ISSO and REHVA)
- Fellow of ASHRAE and REHVA



2010: EU Mandate/480 to CEN, supporting the EPBD implementation.

- FOR THE ELABORATION AND ADOPTION OF STANDARDS FOR A METHODOLOGY CALCULATING THE INTEGRATED ENERGY PERFORMANCE OF BUILDINGS AND PROMOTING THE ENERGY EFFICIENCY OF BUILDINGS, IN ACCORDANCE WITH THE TERMS SET IN THE RECAST OF THE EPBD (2010/31)

The set of EPBD standards shall:

- be systematic, clear and comprehensive package
- benefit professionals, **EU Member States** and **relations with third countries**.
- Have a **continuous but modular overall structure enabling a step-by-step implementation** by EU MS's.
- have a **balance between the accuracy and level of detail**,
- Have **flexibility: Not a “one size fits all”, but: harmonized with national choices (-> see webinar 1)**
- **Follow a holistic approach, as key driver for technological innovation and change**

Increased urgency

Paris Agreement 2016



- ... to keep global warming below 2°C above pre-industrial levels and to make efforts to limit the temperature rise to 1.5°C above pre-industrial levels

...

- EUROPE:
- Revised EPBD 2018 and Annex I
- December 2019: GREEN DEAL

Revised EPBD 2018: Towards more transparency (Annex I) and better data



New obligation to describe national calculation methodology following the national annexes of the overarching EPB standards

(EN ISO 52000-1, 52003-1, 52010-1, 52016-1, and 52018-1 developed under mandate M/480)

- Considerations for the **calculations of Primary Energy Factors (PEFs)**
- National calculation methodologies must reflect the energy needs of a building respecting the **IEQ in buildings** (where people are for > 80% of time)
- Pursuing the **optimal EP of the building envelope**
- Requirement for EPC databases to allow gathering data for the (measured or calculated) energy consumption of buildings

Building and renovation: Start Renovating Now

Green Deal December 2019

➤ Buildings account for
40% of energy consumed

Source: Eurostat, Energy balances 2019 edition, final energy consumption in year 2017.



The current rates of renovation of public and private buildings should at least double

Better energy performance of buildings

➤ Prices of different energy sources should incentivise **energy-efficient buildings**



➤ Design of buildings should be in line with the **circular economy**



➤ Increased **digitalisation**



➤ More **climate-proofing** of buildings



➤ Strict enforcement of rules on **energy performance of buildings**

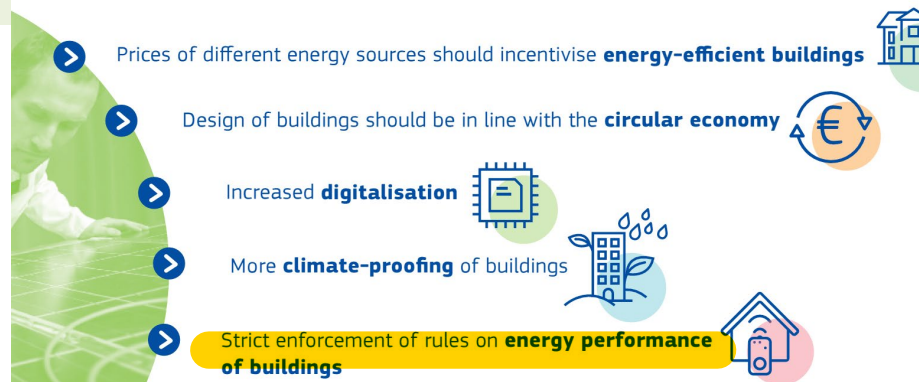




SET of EPB standards supports the EU Green Deal & EPBD implementation

- Energy Efficiency First
- Use of Renewable Energy
- Monitor the NZEB uptake and cost optimal minimum EP Requirements
- Reinforce the EP Certification
- Enhanced Transparency/Consistency of the EP assessment procedures allowing flexibility
- Long-term renovation strategy of MS's towards decarbonisation of the building stock by 2050 and maintaining or achieving healthy IEQ in buildings
- Optimal partial EP of building envelope and systems
- Transparency/Consistency on the use of PEF and CO2 emission factors

Better energy performance of buildings

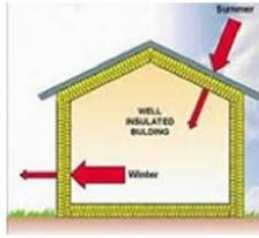
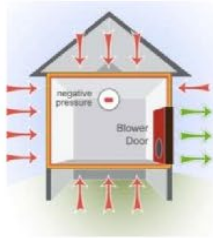
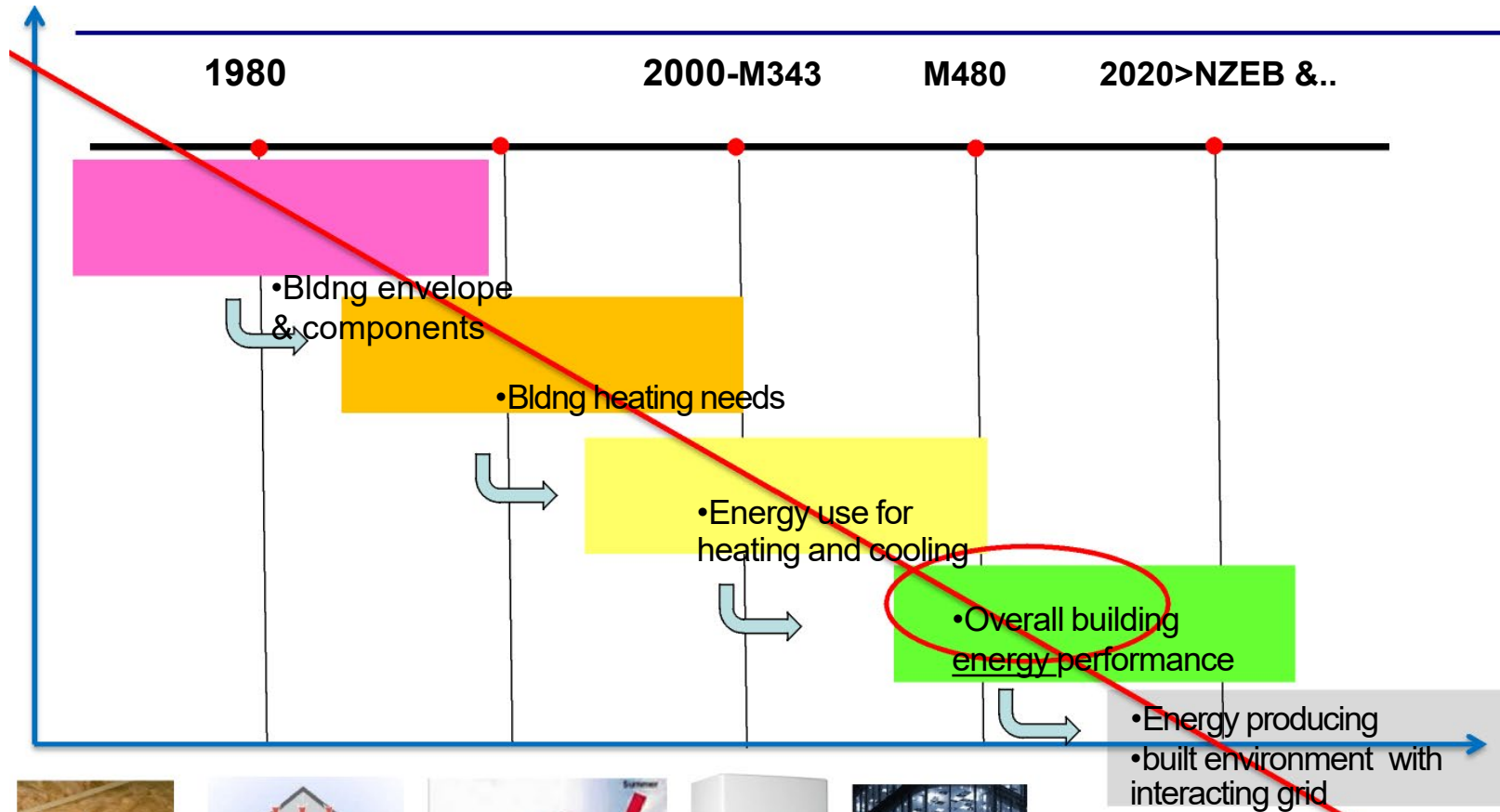




Why this Mandate M/480-2010 on EPBD for CEN?

Why a set of European/international EPB standards?

- Supporting **harmonization** of the various measures improving energy efficiency of buildings and their energy using systems.
- “**Harmonization** is the process of minimizing redundant or conflicting standards which may have evolved independently”.
- “**Harmonization** cuts compliance costs and simplifies the process of meeting requirements”
- Increase the **accessibility, transparency** and **objectivity** of EP-assessment of buildings and connected energy infrastructure (defining Primary Energy Factors and CO2 emission factors).
- **Avoid new trade barriers for energy related products and services in Europe and beyond**
- Adopt the same structure for EP assessment procedures: – the **starting point for national/regional building codes on EPB**





consistent set of standards to assess overall Energy Performance of Buildings



European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

To support the EPB Directive (EPBD)

- For energy performance certification and to check compliance against minimum EP requirements
- Harmonized procedures, but:
with flexibility for national situations

&

**As basis for the customised advise
to renovate the existing building stock**

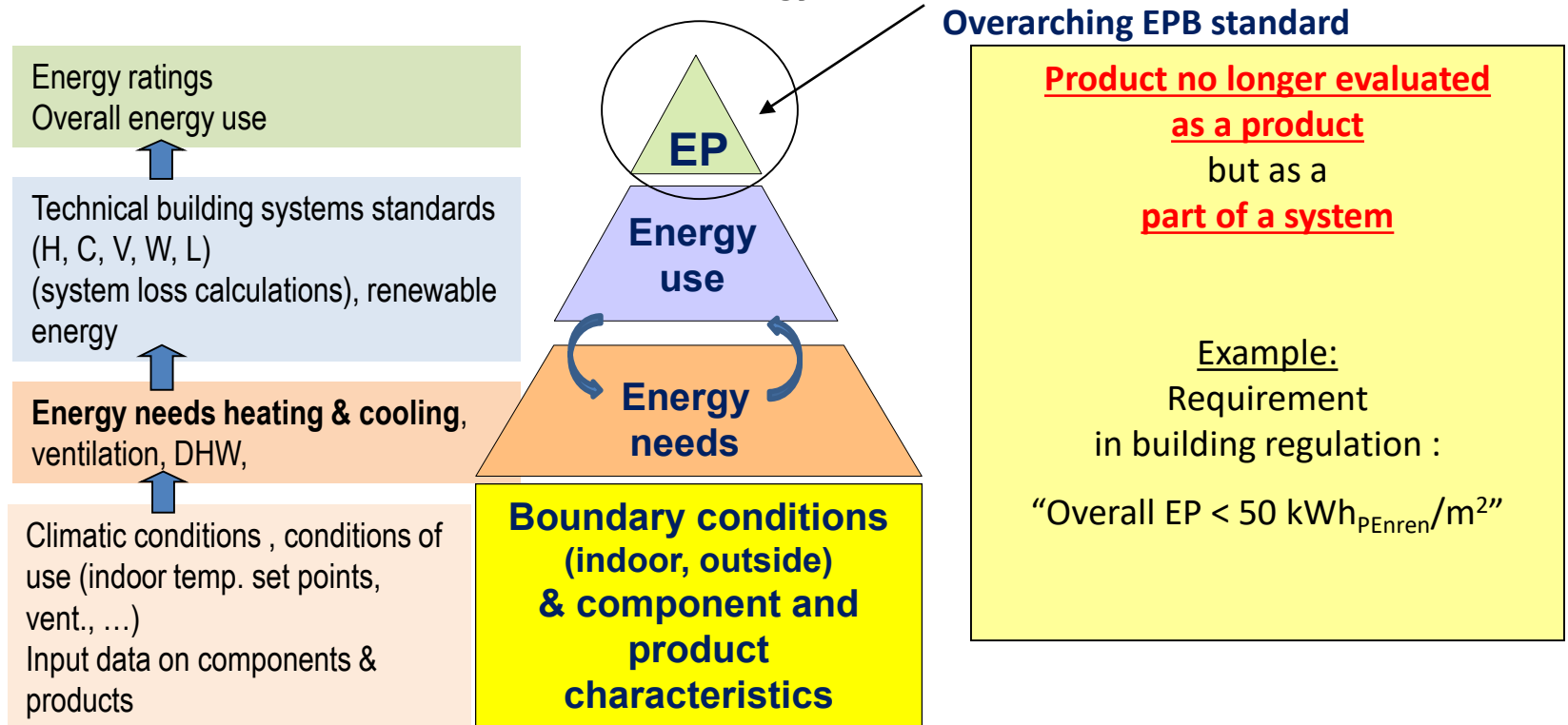


Set of EPB standards: the holistic approach

From *product* standards to *overall* energy use

EN ISO 52000-1

Overarching EPB standard



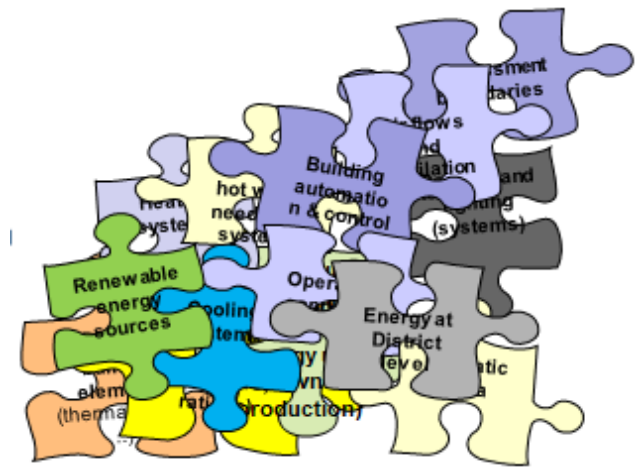
Set of CEN standards on Energy Performance of Buildings (EPB)

- The SET of 53 standards is based on a holistic (systemic) approach:
- To assess the **integrated impact** on the energy performance of buildings (EPB)
 - Covering e.g. heating, cooling, ventilation, DHW, lighting and the impact of building automation and smart controls,
 - Also covering energy-using and renewable energy producing appliances
 - Respecting the IEQ requirements
- All published in 2017-2018
Full and coherent set of 53
European EPB standards (CEN)
 - and subset (key EPB standards) also already at global level (ISO):
The (EN) ISO 52000 family



Set of EPB standards: **coherent** but flexible

- Each EPB-standard respects specific requirements to ensure overall integrity, consistency and quality of the whole set (both in CEN and in ISO)
- *Because there are many interactions between the standards: heating, lighting, cooling, ...*





-



EPBD Annex 1: Common general framework for calculation of EP of buildings:

- The EP shall be expressed in kWh/(m².y) primary energy use and MS's are encouraged to include the connected GHG emission produced in kgCO₂.eq/(m².y)
- Methodology shall be transparent and open to innovation.
- MS's shall describe their national procedures following at least the EPB standards: EN ISO 52000-1; 52003-1; 52010-1; 52016-1; 52018-1.



The overarching type ISO EPB standards required by the EPBD (This 52000 series of standards are also accepted at CEN level in Europe)



- EN ISO 52000-1: Overarching EPB assessment —General framework and procedures
- EN ISO 52003-1: Indicators, requirements, ratings and certificates —General aspects and application to the overall energy performance
- EN ISO 52010-1: External climatic conditions —Conversion of climatic data for energy calculations
- EN ISO 52016-1: Energy needs for heating and cooling, internal temperatures and sensible and latent heat loads —Calculation procedures
- EN ISO 52018-1: Indicators for partial EPB requirements related to thermal energy balance and fabric features —Overview of options



European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung



Flexibility is achieved by having in all EPB standards and annex A & B

- **Annex A (normative): template for choices and input data**
- Annex B (informative): informative default choices and input data (could e.g. be used for a voluntary EU certification system)
- In general:
 - It is expected that choices (levels of simplification) and input data (related to the national building regulations) may differ for:
 - Existing buildings
 - Residential and non-residential buildings
 - New (NZEB) building designs (where more detailed data is available)
 - Use of the EPB assessment for deep renovation towards NZEB
 - Etc...

Observation regarding the set of EPB Standards

- **This modular, transparent, unambiguous, but flexible* set of EPB standards is:**
 - **The important instrument to support the proper implementation of the EPBD**
 - **Supporting the defining of Nearly Zero Energy Buildings (NZEB)**
 - **Supporting the decarbonisation of the building stock by 2050**



*: for local climate, national legal framework, building tradition, building use, energy infrastructure, etc...



Your service center for information and technical support on the new set of EPB standards

Roll out of the set of EPB standards

Jaap Hogeling

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Start 21 September 2018 for 3 years



Services

- Support Member States regulators and National Standardization Bodies (NSB) to complete the national annexes of the overarching EPB standards
- Disseminate information and promote the use of the overarching and other EPB standards
- Information services for all involved stakeholders, such as industry, researchers, engineers and building professionals, financial institutions on the EPB standards

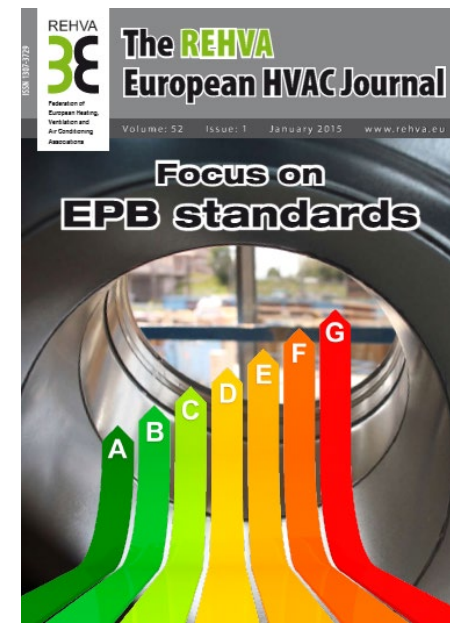


Knowledge tools & building a community of practitioners

- FAQ on key issues (*How to fill in the annexes? How to use the standards?, ...*)
- Calculation tools (spreadsheets) for the individual standards
- Case study pool of practical examples tailored to the needs of different stakeholders
- Hands-on workshops and offline training sessions
- EPB Standards webinar series
- Building an EPB Standards Community of practitioners to share knowledge and support the ambitious uptake of standards



Public Information on several of these EPB standards
see: www.rehva.eu



More
information on
the set of EPB
standards:
www.epb.center
Contact:
info@epb.center

Thank you!

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Thank you for your attention





Your service center for information and technical support on the new set of EPB standards

How by design the EPB standards are meant to facilitate the EU-wide transition to a sustainable built environment

Dick van Dijk

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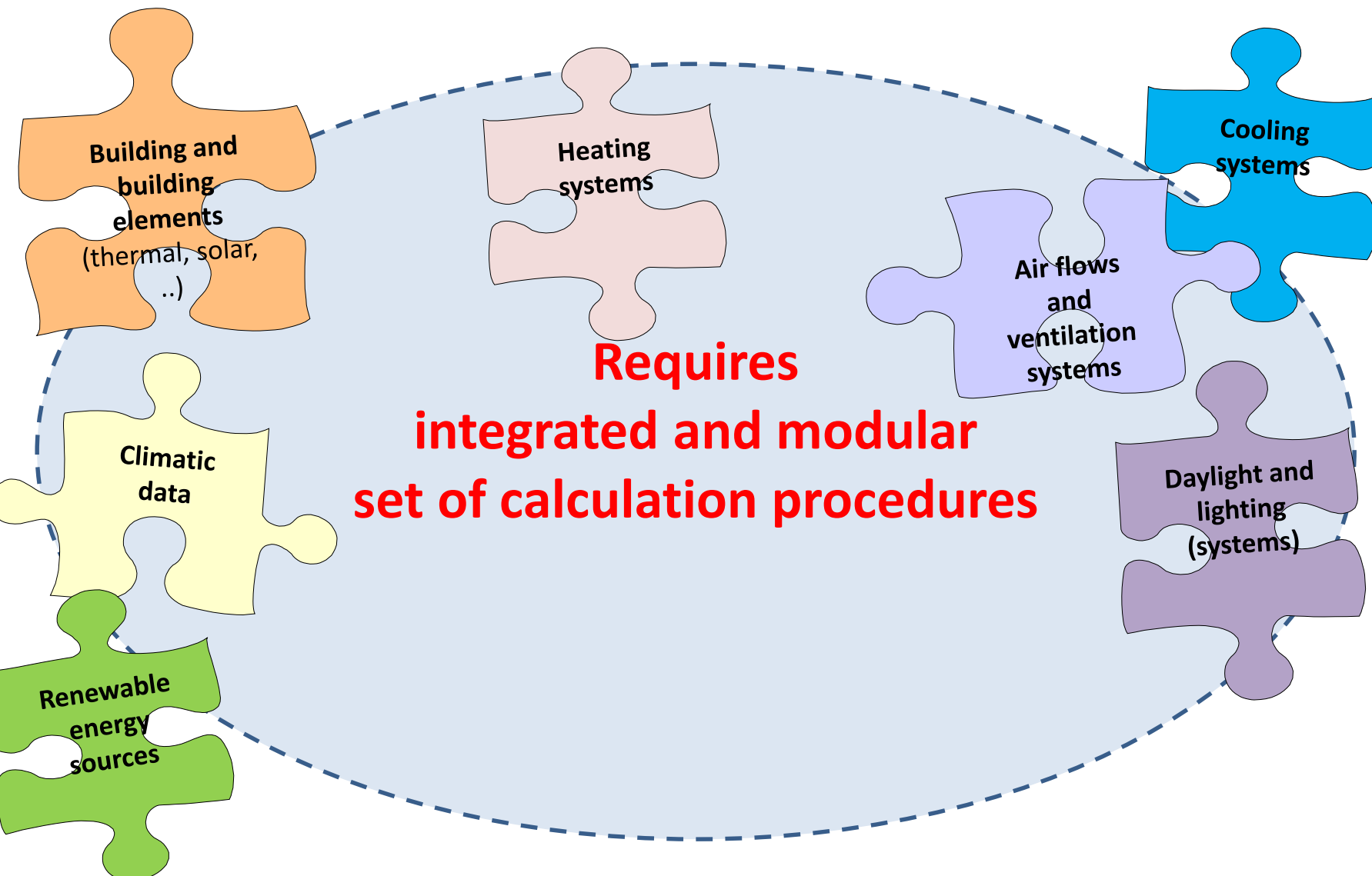


My background



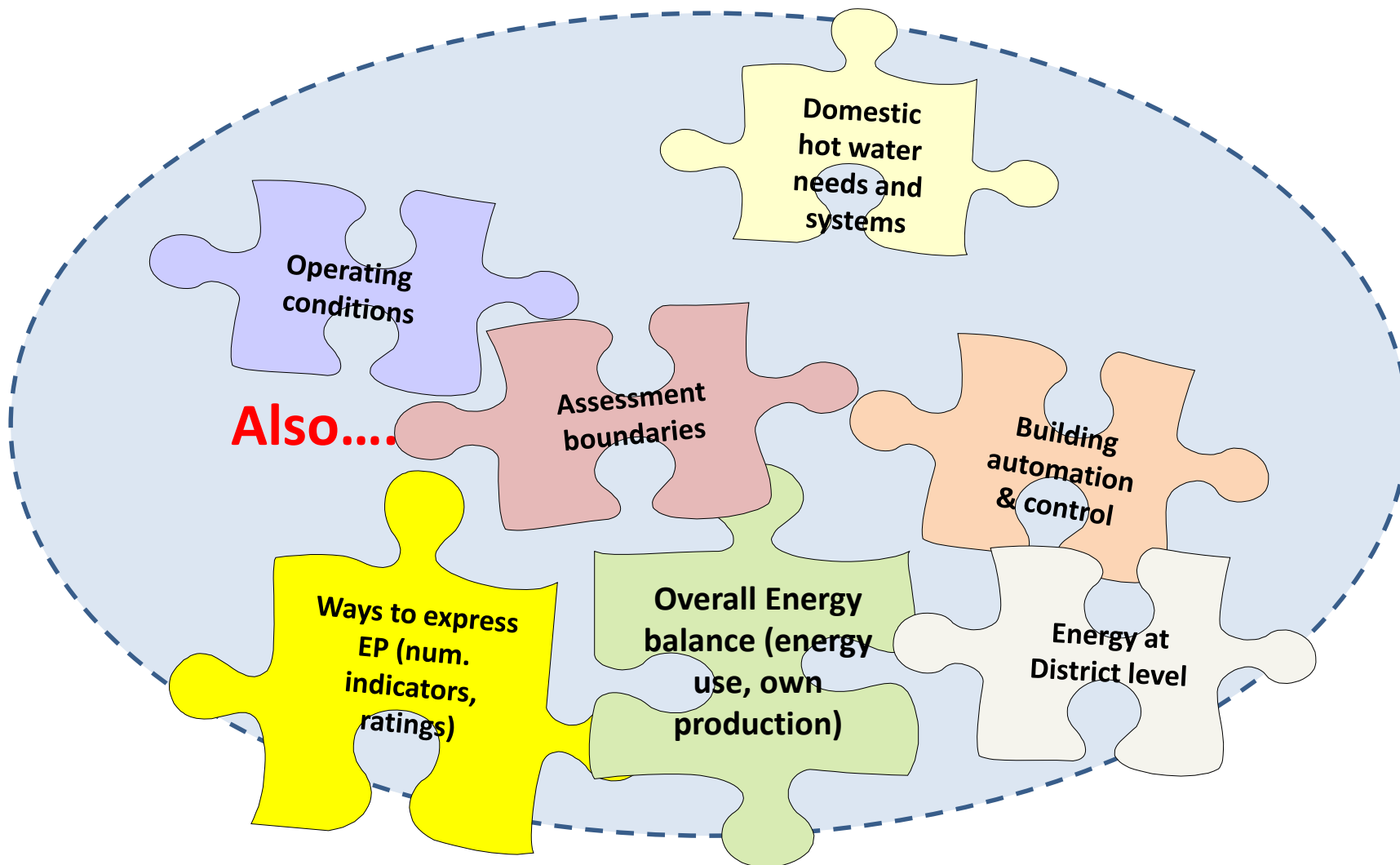
- EPB Center expert (> 2017)
- Involved in initiation, preparation and coordination of set of EPB standards (2012-2017)
- Co-convenor of ISO Joint Working Group on the overall set of EN ISO EPB standards, in collaboration with CEN
ISO/TC 163 & ISO/TC 205, CEN/TC 371
- Convenor of ISO Working Group responsible for few key EPB standards:
Energy needs heating/cooling, Climatic data, Partial EP indicators (ISO/TC 163/SC 2/WG 15)

Overall energy performance of buildings (EPB)



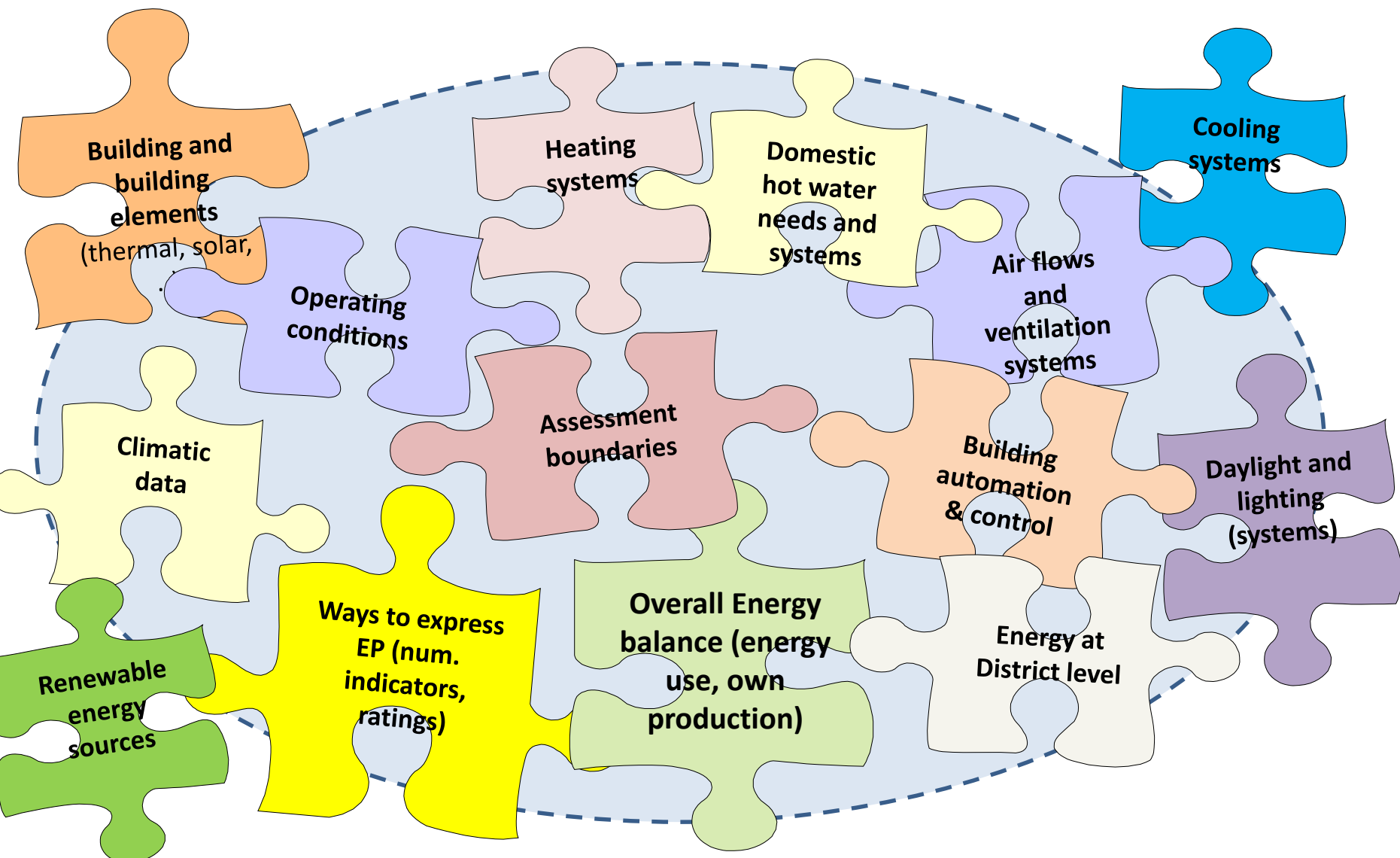


Overall energy performance of buildings (EPB)



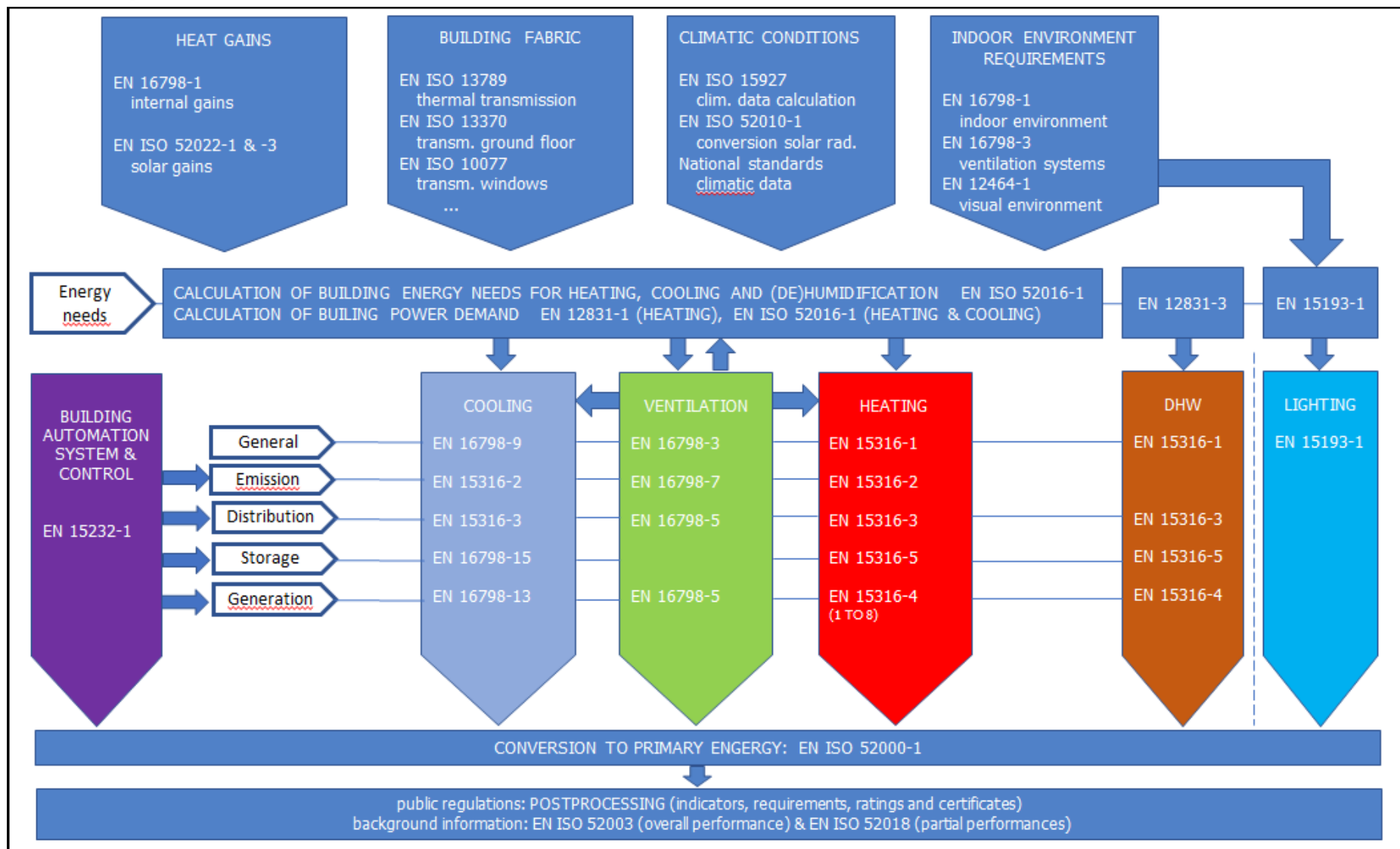


Overall energy performance of buildings (EPB)



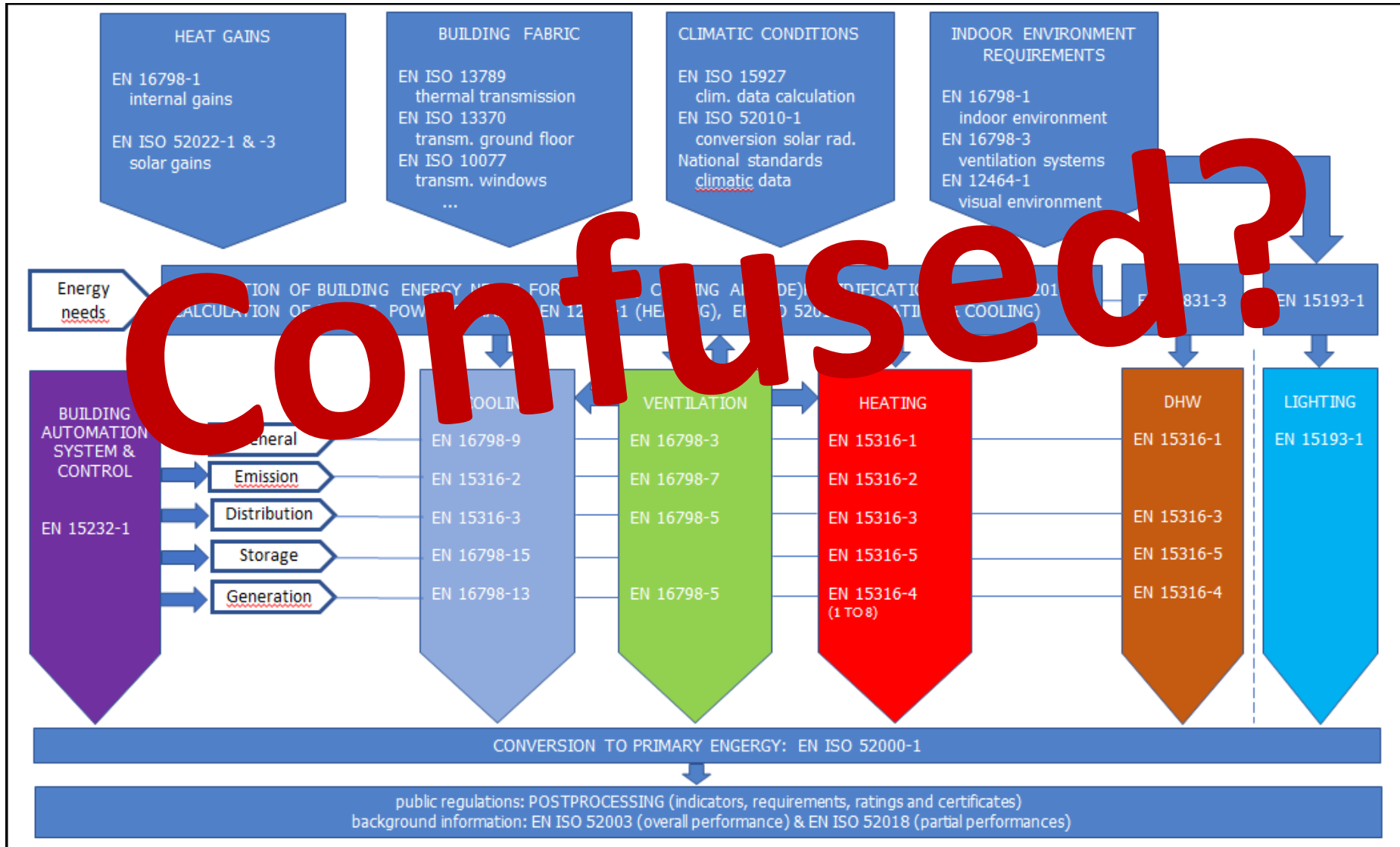
The result...

presented at webinar 1, Feb 4, 2020)



The result...

presented at webinar 1, Feb 4, 2020)

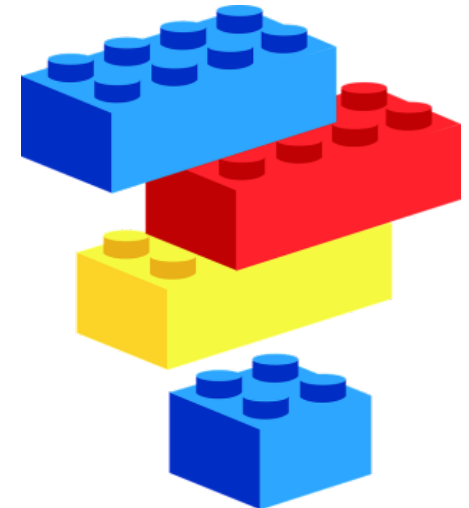


Don't worry!

- Short video explains overall scheme
 - Go to epb.center/documents (-> presentations)



- Core of EPB calculation method:
only handful of EPB standards





True: Set of EPB standards
> 50 documents

But....



The set of EPB standards

Not only calculation procedures!

- Several: on energetic properties of components /products

- *E.g. U-value of window or wall*
- *Used by manufacturer or supplier*



The set of EPB standards

Not only calculation procedures!

- Several: on boundary conditions
 - *E.g. climatic conditions*
 - *E.g. standard conditions of use*
 - *Usually **fixed** by national or regional regulators*





The set of EPB standards

Not only calculation procedures!

- Other: on special topics

E.g.:

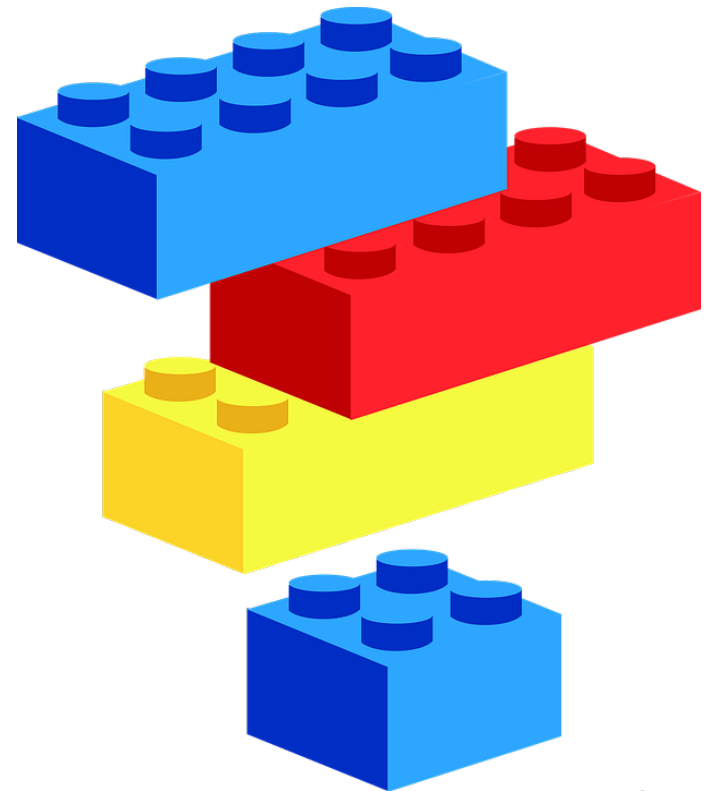
- *Guidance on inspection*
- *Economic evaluation procedures*
- *System (design/sizing) requirements*
- *Measured energy performance*
- *Reference procedures*





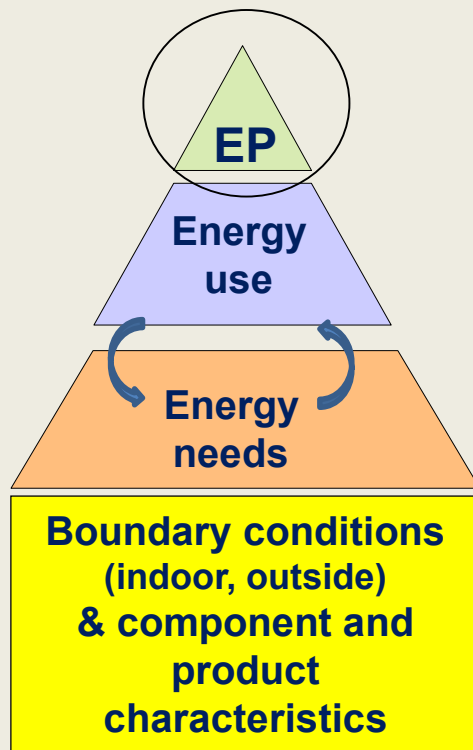
Conclusion

Set of EPB standards
includes many standards
not needed for practitioners
to assess EP of specific
building!



Five key EPB calculation standards

EN ISO 52000-1, Overall EPB Framework (common terms, modular structure, ...)



EN ISO 52000-1 Aggregation & conversion to primary energy

EN ISO 52003-1
Overall indicators,
requirements, ratings

<< Several system standards >>

EN ISO 52016-1 Energy needs
heating and cooling

EN ISO 52018-1
Partial indicators
(building fabric, needs)

EN ISO 52010-1
Climatic conditions

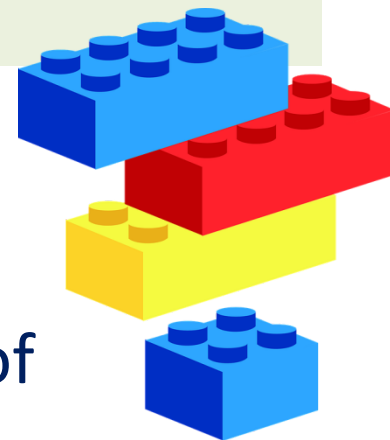
Moreover...

- Detailed calculation procedures, but
 - in practice: software tools
 - Number of **input** data \neq Complexity of calculation **method**

Tip: Webinar 4 (May 26):

on hourly versus monthly method!

- in numbers, most input data = building envelope:
'nothing new'
(and.....: function of national zoning rules!)
- increasing number of product data are in data
bases



(EN) ISO 52000 family

All new or strongly revised (since 2017) EPB standards at global level (CEN and ISO): *member of the new **ISO 52000 family***

= international standards on EPB using holistic approach

- Strong brand name
 - Overarching **framework** (EN ISO 52000-1)
 - Common **quality** requirements
 - Overall **consistency** (incl. output -> input links)
 - Common **format**
 - **Managed** by multi-disciplinary international team of experts
(ISO/TC 163, ISO/TC 205, CEN/TC 37, with contributions from sister committees representing specific disciplines)
 - Explanation, justification and examples in accompanying set of **Technical Reports** (e.g. CEN ISO/TR 52000-2)
 - Validation and worked examples in accompanying **spreadsheets**



Frequent misunderstanding (1)

“I don’t believe in a ‘one-size-fits-all’ method for such diversity of countries (Europe, global)”



Response:

(Based on EU Mandate)















EPB standards  ‘one-size-fits-all’!

EPB standards  harmonized approach, with **flexibility** to **tailor** to national situation

See next slide... 17

No “One size fits all”

- Many options to **tailor** to national/regional situation. *See recording of webinar 1 (Feb. 4, 2020)*

User behaviour	External influences	Cultural influences
Number of users 	Actual climate (cold/warm winter/summer) 	building tradition 
Ventilation etc. behaviour 	Actual climate on site (next to sea, in a windy place, etc...) 	building typologies 
Temperature etc. set points 	Actual location (latitude) 	culture 
Use of shading devices 	Shading from other buildings/trees 	policy and legal frameworks (including the type and level of quality control and enforcement) 
Maintenance of equipment 	Annexed buildings 	

Frequent misunderstanding (2)

*“In the EPB standards I can’t find the **EP requirements**, like minimum values for efficiencies, maximum values for energy use, ...”*



Response:

- **Methods** and **scales** = the EPB standards
- **Requirements** and **limits** = (trans-)national or regional regulations

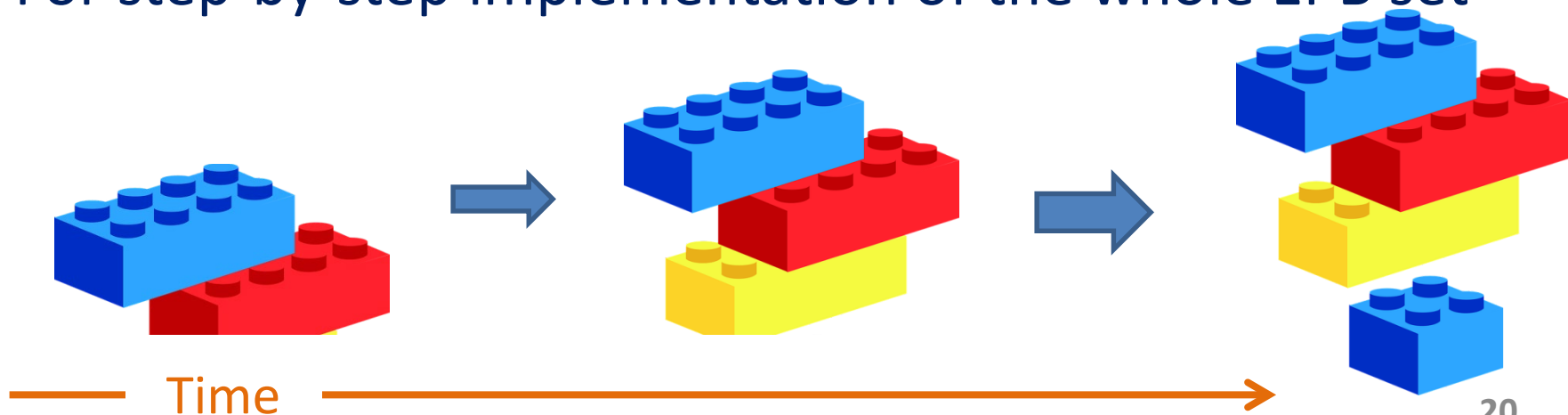
*Tip! Webinar 3 (April 16): focus on **scales** = EP indicators, requirements and rating*

Step-by-step implementation

Flexibility also applies to references to other EPB standards

- ~~Reference to a specific EPB standard~~
- Reference to a specific national standard
if fits in the modular system (consistent input and output)

For step-by-step implementation of the whole EPB set





So it is all really simple?

Well, of course:

- NZEB asks for
 - novel technologies
 - Designed, operating and interacting correctly
 - under time varying, low energy use conditions
 - specific technologies = specific EPB standards
 - Heat pump, renewable energy, heat storage, adaptive facades
- Simpler buildings = simpler calculations
 - *Only partly true: to get simple buildings to NZEB level may not be simple*

Conclusion

- The set of EPB standards to assess the energy performance of buildings
 - Harmonized, transparent and consistent
 - Flexible: to tailor to national/regional climate, building tradition, legal framework, ..
 - Modular
 - Step-by-step implementation
 - Regular maintenance and updating (knowledge, technologies)
 - Fit for nearly zero energy buildings, new or renovated
 - Small core of standards, with others for specific applications
 - (EN) ISO 52000 family, with common quality requirements

Even if you are more familiar with the subject (EPB standards, regulations)... you probably (still) have many questions

- *Ranging from: “What is ‘EN ISO’?” to “What are links with EPBD?”*
- *Or maybe you have more technical questions....*
- *Please check the FAQ sections at our website or contact us (www.epb.center/contact)*



Thank you!

EPB Center is also 'available' for specific services requested by individual or clusters of stakeholders

More information on
the set of EPB standards:

www.epb.center

Contact: info@epb.center



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Trustable information: online resources & tailored services

REHVA



Federation of
European Heating,
Ventilation and
Air Conditioning
Associations

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WHAT! #EPBstandards





Social media #EPBstandards



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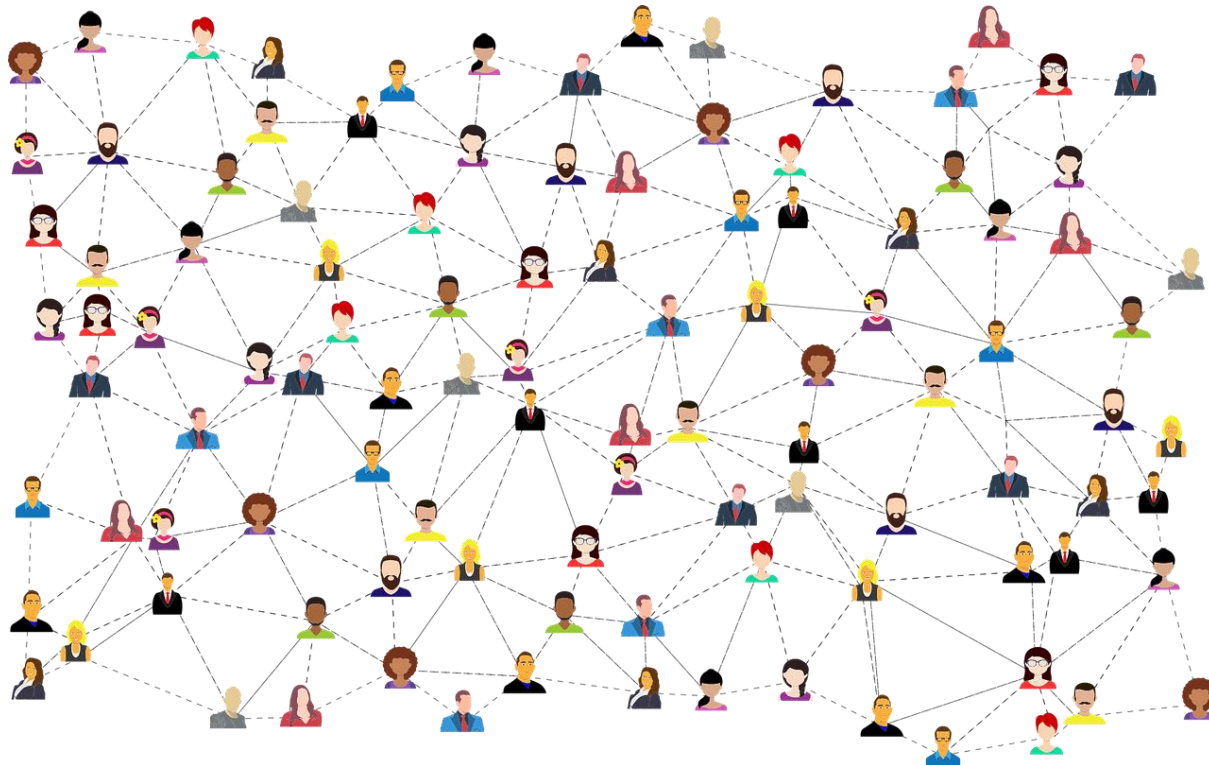
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Overview #EPBstandards



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Sub-Modules	M3 Heating	M4 Cooling	M5 Ventilation	M6 Humidification	M7 Dehumidification	M8 Domestic Hot Water	M9 Lighting	M10 Building Autom. & Controls	M11 Photovoltaic, Wind
General	EN 15316-1	EN ISO 16798-9	EN 16798-3	EN 16798-3	EN 16798-3	EN 15316-1	EN 15193-1	EN 15232-1	
Needs						EN 12831-3	EN 15193-1		
Maximum Load and Power	EN ISO 52016-1 EN 12831-1	EN ISO 52016-1		EN ISO 52016-1	EN ISO 52016-1	EN 12831-3			
Ways to Express Energy Performance	EN 15316-1	EN ISO 16798-9	EN 16798-3	EN 16798-3	EN 16798-3	EN 15316-1	EN 15193-1	EN 15232-1	
Emission & Control	EN 15316-2 EN 15500-1 EN 12098-1 EN 12098-3 EN 12098-5	EN 15316-2 EN 15500-1	EN 16798-7 EN 15500-1	EN 16798-5-1 EN 16798-5-2	EN 16798-5-1 EN 16798-5-2			EN 15232-1	
Distribution & Control	EN 15316-3 EN 12098-1 EN 12098-3 EN 12098-5	EN 15316-3	EN 16798-5-1 EN 16798-5-2			EN 15316-3		EN 15232-1	
Storage & Control	EN 15316-5 EN 12098-1 EN 12098-3 EN 12098-5	EN 16798-15				EN 15316-5 EN 15316-4-3		EN 15232-1	
Generation & Control	EN 12098-1 EN 12098-3 EN 12098-5 EN 15316-4-1 EN 15316-4-2 EN 15316-4-3 EN 15316-4-4 EN 15316-4-5 EN 15316-4-8	EN 16798-13 EN 15316-4-2 EN 15316-4-5	EN 16798-5-1 EN 16798-5-2	EN 16798-5-1 EN 16798-5-2	EN 16798-5-1 EN 16798-5-2	EN 15316-4-1 EN 15316-4-2 EN 15316-4-3 EN 15316-4-4 EN 15316-4-5		EN 15232-1	EN 15316-4-3 EN 15316-4-4 EN 15316-4-5 EN 15316-4-10
Load Dispatching & Operating Conditions	EN 15316-1	EN ISO 16798-9						EN 15232-1	
Measured Energy Performance	EN 15378-3					EN 15378-3	EN 15193-1	EN 15232-1	
Inspection	EN 15378-1	EN 16798-17	EN 16798-17	EN 16798-17	EN 16798-17	EN 15378-1	EN 15193-1	EN 16946-1	
BMS								EN 16947-1	



Overview #EPBstandards



epb.center

General

Frequently asked questions, highlights, documents,
... on the set of EPB standards as a whole

Overarching

Frequently asked questions, highlights, overview of
EPB standards and technical reports, tools and tips,
...

Building as such

Frequently asked questions, highlights, overview of
EPB standards and technical reports, tools and tips,
...

Heating systems

Frequently asked questions, highlights, overview of
EPB standards and technical reports, tools and tips,
...

Cooling systems

Frequently asked questions, highlights, overview of
EPB standards and technical reports, tools and tips,
...

Ventilation systems

Frequently asked questions, highlights, overview of
EPB standards and technical reports, tools and tips,
...

Domestic hot water systems

Frequently asked questions, highlights, overview of
EPB standards and technical reports, tools and tips,
...

Lighting

Frequently asked questions, highlights, overview of
EPB standards and technical reports, tools and tips,
...

Building automation and control

Frequently asked questions, highlights, overview of
EPB standards and technical reports, tools and tips,
...



#EPBstandards Explained



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EPB Standards Explained

2 videos • 10 views • Last updated on Feb 4, 2020



REHVA HVAC

SUBSCRIBED



1



EPB Standards Explained - Your map for the EPB standards

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2



EPB Standards Explained - How can exported energy be considered?

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15316-4-2. [Read more or download!](#)



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If you wish to stay informed on new developments concerning EPB standards and services, fill out your email address below.

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Gender

- ☐ Male
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Organization

Country

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Series of webinars on the EPB standards!

A [series of webinars](#) on the EPB standards is organized throughout 2020 by BUILD UP in cooperation with EPB Center's experts under the scope of the Service Contract with EU DG ENER.

The 1st webinar was held 4th February 2020, on "Guidance and examples for the EPB standards' flexibility".

[Read more](#) about how the set of EPB standards combine a harmonized approach with room for tailored national or regional choices.

Or watch and listen to the [short webinar's presentations and discussion!](#)

The 2nd webinar is organized on **Thu 19th March 2020 (12h00-13h30)** on "EPB standards overview: why, how, what !"

[Read more and register here!](#)

[Questions?](#)



#EPBstandards webinar series

BUILD UP portal



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WEBINAR

**How to use the outputs of the
EPB assessments in regulation:**

overview of EN ISO 52003 & EN ISO 52018

16th April | 12.00H

 **BUILD UP**

The European Portal For Energy Efficiency in Buildings



**[Registration](#)
[open for](#)
[next](#)
[webinar!](#)**

Webinar series: Energy Performance of Buildings standards (EN/ISO) supporting the implementation of EPBD

This webinar will take place on the 16th April, 12.00 to 13.30.

[Register here.](#)



#EPBstandards tailored services

Contact

All fields marked with an asterisk (*) are required.

Salutation:*

- ☐ Sir
- ☐ Madam

Preferred title:

Name:*

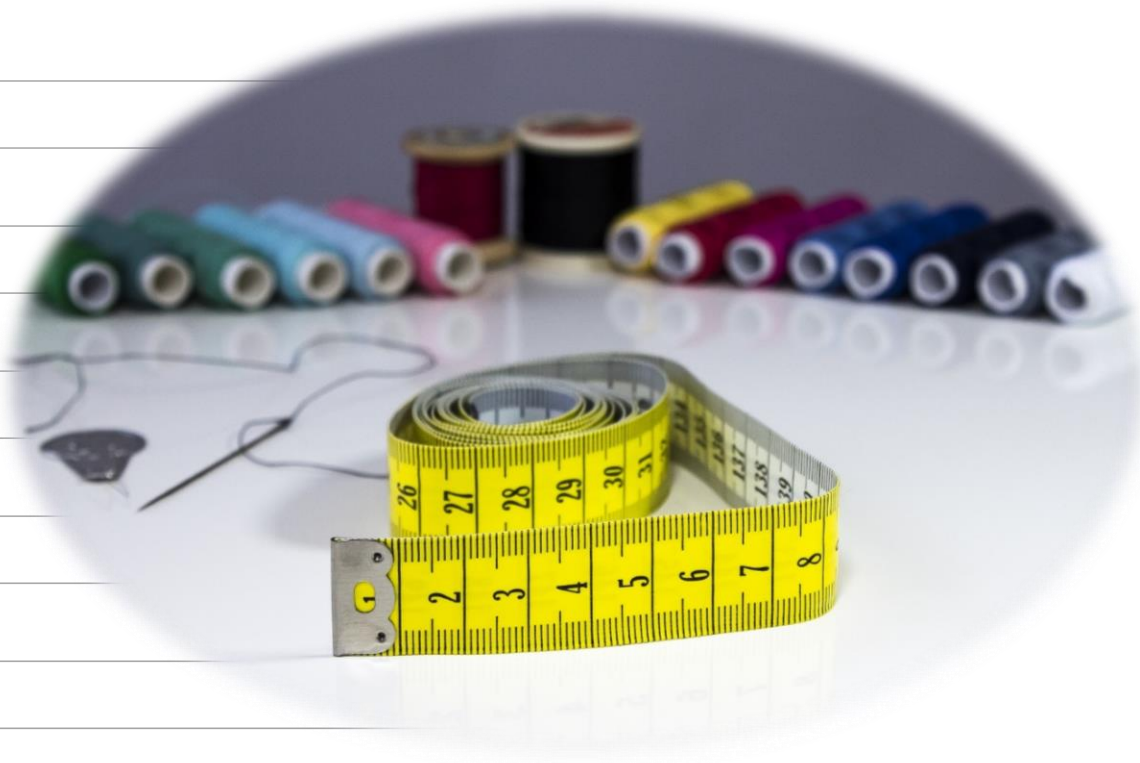
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Thank you!

EPB Center is also 'available' for specific services requested by individual or clusters of stakeholders

More information on the set of EPB standards:

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