Implementing The Amended EPBD

EuroACE Webinar 4

Assessing the Energy Performance of a Building: Putting energy efficiency first

8th April 2019, 12.00-13.15

In partnership with the Build Up Platform

Introduction and Overview (Chapter 1)

A Guide to the Implementation of the Amended EPBD

Hélène SIBILEAU
Senior EU Affairs Manager, EuroACE

EuroACE

The European Alliance of Companies for Energy Efficiency in Buildings

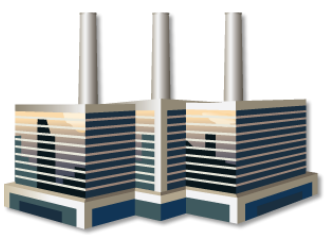
armacell · DAIKIN · Danfoss · GRUNDFOS

Ingersoll Rand · Johnson Controls · Kingspan · KNAUF INSULATION

signify · ROCKWOOL · SAINT-GOBAIN

United Technologies · URSA · VELUX

More than 286,000



More than 1,200

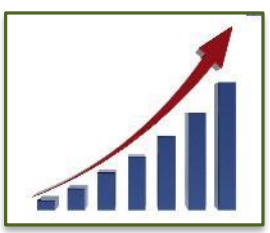
Photos sourced from Norwegian Turkish Chamber of Commerce and SPS Commerce

Why Do We Exist?

To Advocate for Ambitious EU Policies for Energy Efficiency in Buildings

To Bring Benefits to All Through Improved Performance of Buildings

To Increase the Market for the Products, Equipment and Services Offered by Our Member Companies



What do we work on?

EPBD (Energy Performance of Buildings Directive)
Including SRI (Smart Readiness Indicator)

EED (Energy Efficiency Directive)
GOV (Governance Regulation)

EU 2050 Strategy

Financing for Energy Efficiency
(Multiannual Financial Framework, Sustainable Finance)

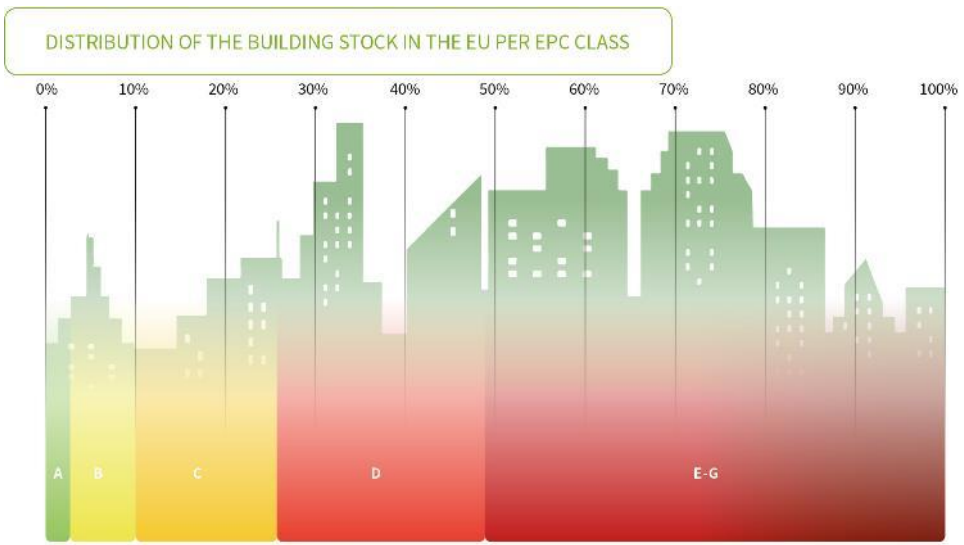
Why a EuroACE Guide?

Set Out Our Views

Followed the EPBD since its first steps
Share our knowledge and experience
Provide high-level recommendations (12 in all)

Inform and Motivate

Member State officials
Other public stakeholders
Private actors and influencers



Source: BPIE Factsheet entitled *97% of buildings in the EU need to be upgraded*

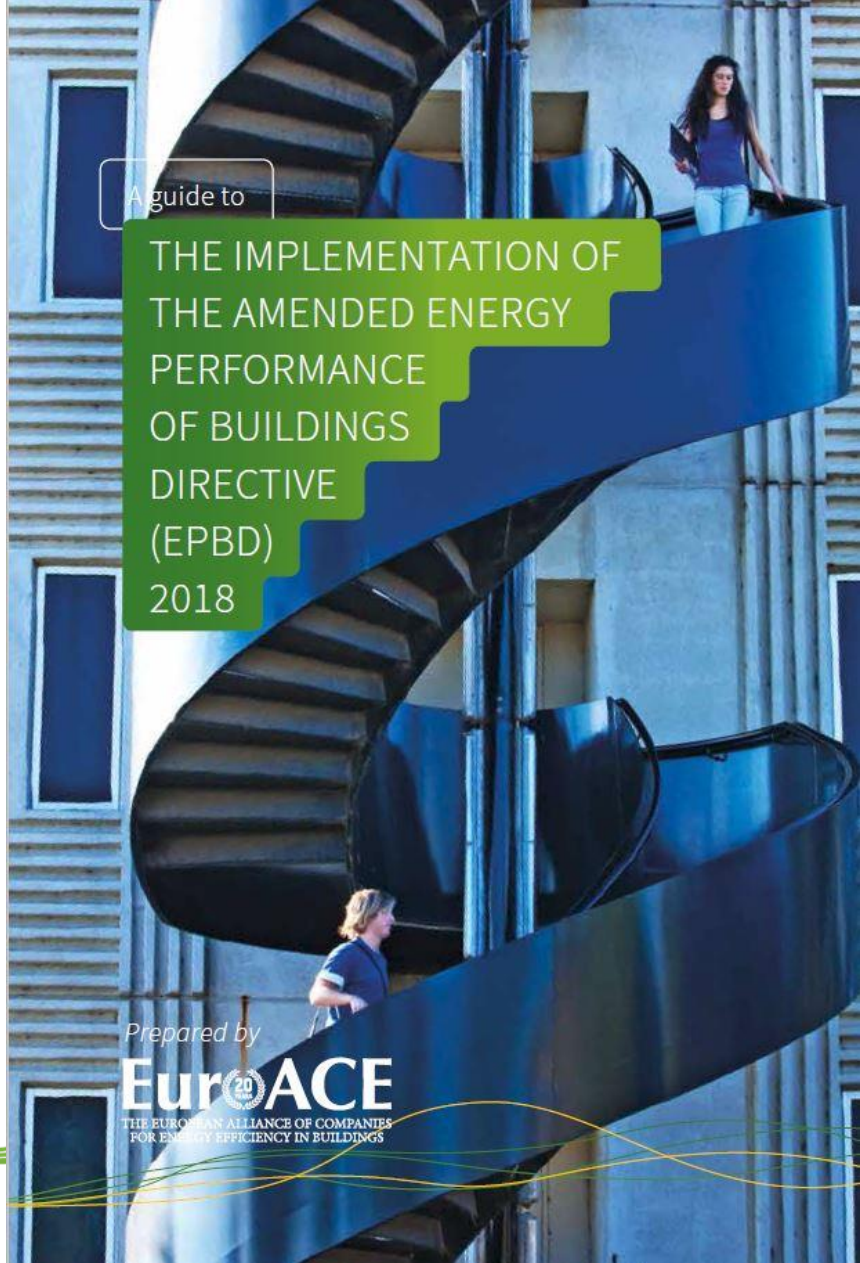
What Approach Did We Take?

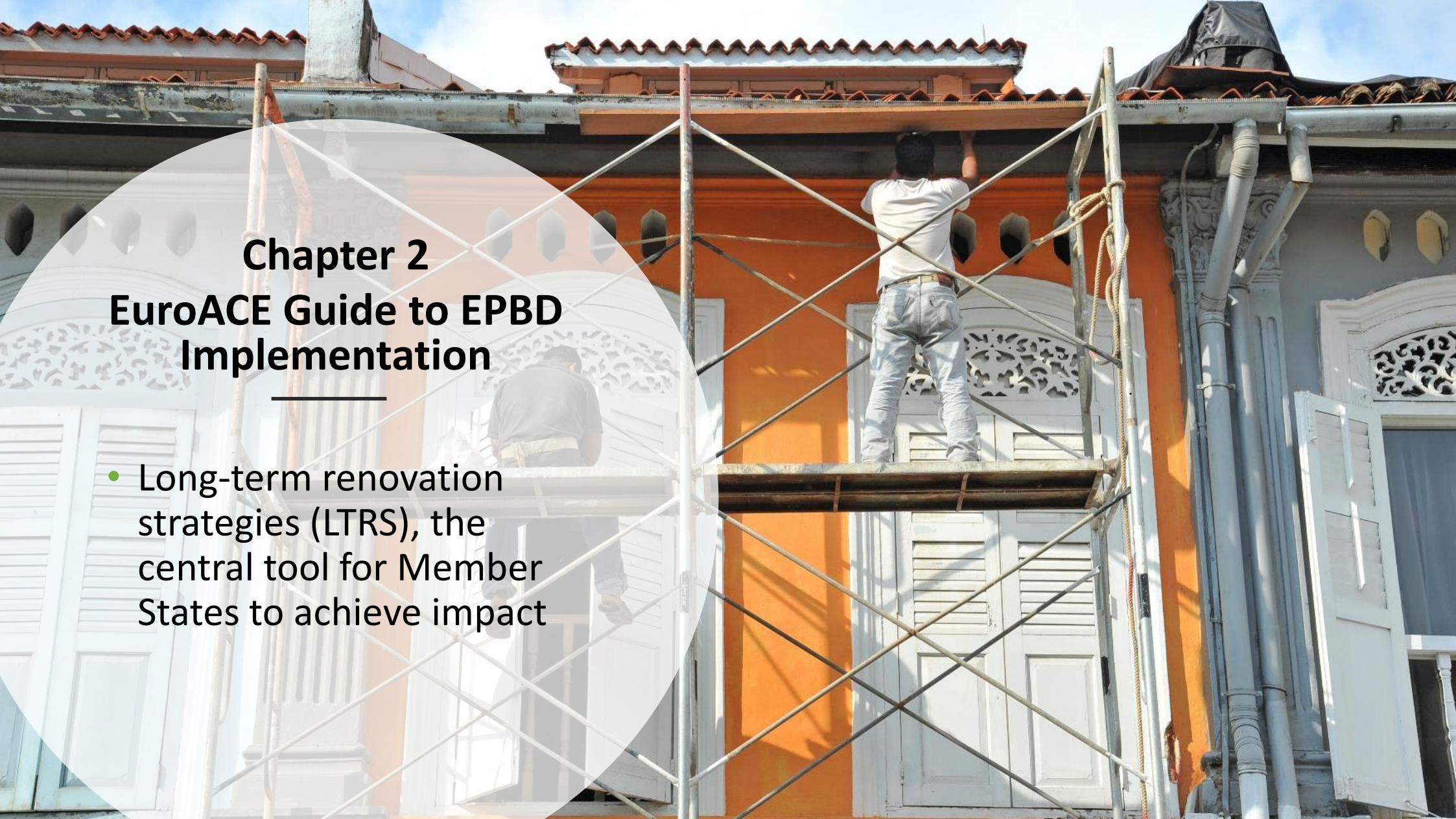
- **Late 2017:** *identified the key aspects to cover*
- **January-May 2018:** *prepared a draft text in consultation with members*
- **May-June 2018:** *invited expert reviewers to comment*
- **June 2018:** *launched public consultation at C4E Forum (Poland)*
- **October 2018:** *finalised text with inputs*

- **8th November:** *first webinar & official launch of the Guide*
- **11th December:** *second webinar*
- **13th February**: *third webinar*
- **April**: *fourth webinar*

A strong EPBD transposed and implemented at national level

- **12 High-Level Recommendations**
- **6 Chapters Covering Key Issues**
- **Chapter 1 gives an overview of the main changes**





Chapter 2
EuroACE Guide to EPBD Implementation

- Long-term renovation strategies (LTRS), the central tool for Member States to achieve impact

Chapter 3
EuroACE Guide to EPBD Implementation

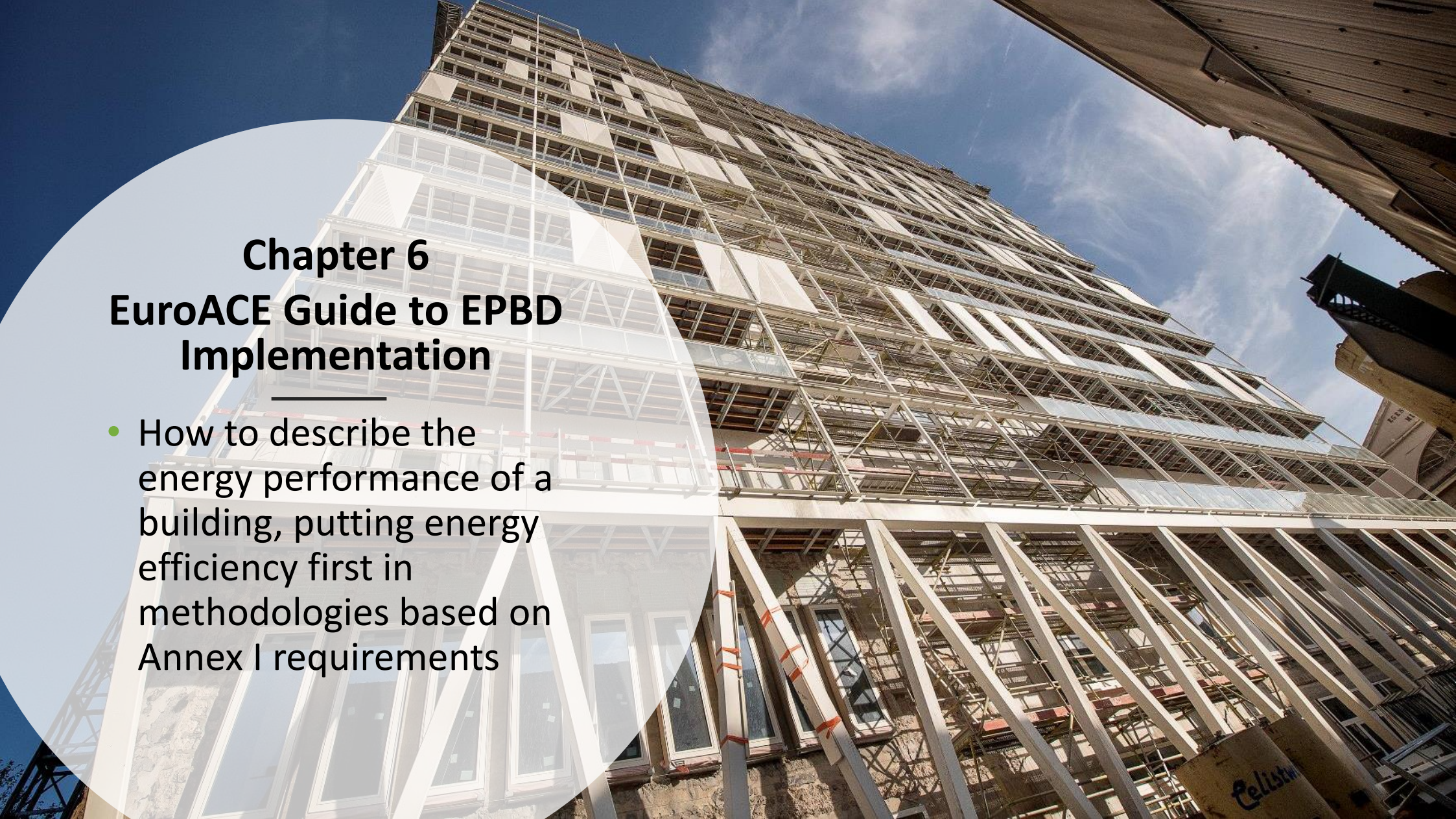
- Building Renovation Passport, a powerful new option for Member States

Chapter 4
EuroACE Guide to EPBD Implementation

- Financing energy renovations, the link to improved energy performance

Chapter 5
EuroACE Guide to EPBD Implementation

- Smart and technology equipped buildings



Chapter 6
EuroACE Guide to EPBD Implementation

- How to describe the energy performance of a building, putting energy efficiency first in methodologies based on Annex I requirements

Thank You for Your Attention!

EuroACE

Rond-Point Schuman 6

8th Floor
1040 Brussels

+32 2 639 10 11

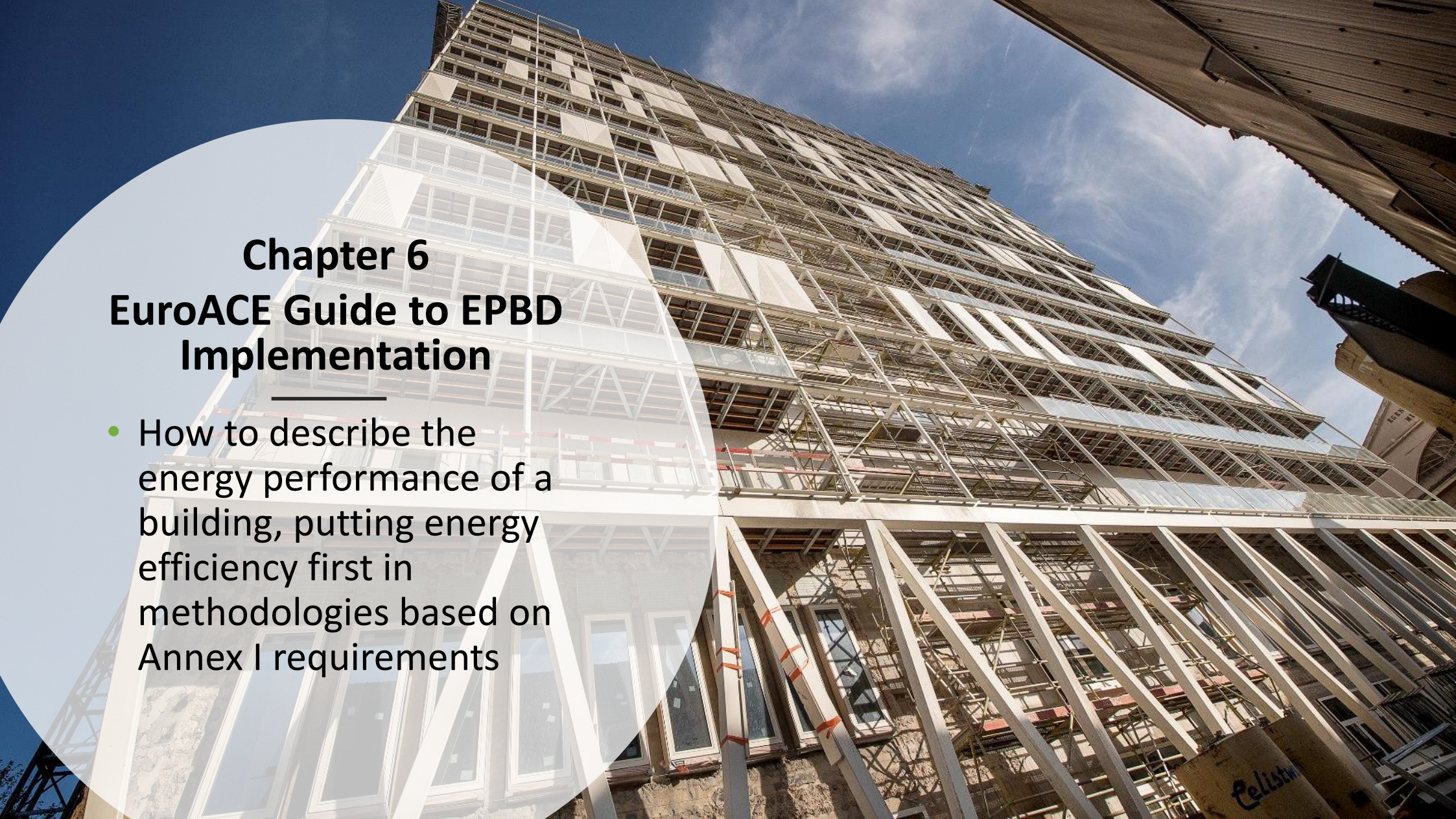
helene.sibileau@euroace.org

www.euroace.org

Assessing the Energy Performance of a Building (Chapter 6)

A Guide to the Implementation of the Amended EPBD

Adrian Joyce
Secretary General
EuroACE



Chapter 6
EuroACE Guide to EPBD Implementation

- How to describe the energy performance of a building, putting energy efficiency first in methodologies based on Annex I requirements

EPBD Annex I – What is it?

A General Framework for Calculating the Energy Performance of Buildings:

Must be used by Member States in devising their national methodologies for:

Energy performance certification
and
Compliance with minimum energy performance requirements
(set nationally)

Result must be primary energy in kWh/m²/year

EPBD Annex I – Why is it important?

Provides transparency on calculation methods used by Member States (MS)

Forms basis for evaluation and reporting on EPBD implementation

MS must use overarching ISO standards in describing their methodologies

Allows for comparisons between MS
(to a certain extent)

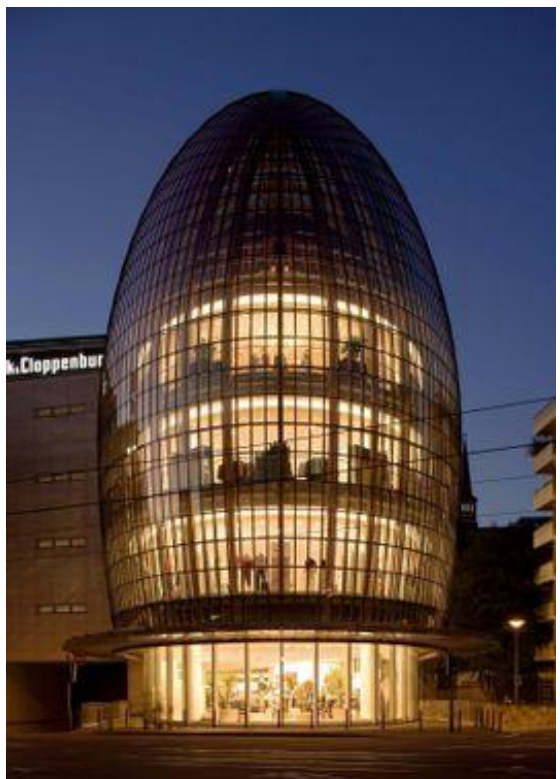
EPBD Annex I – What has changed?

MS must calculate performance to optimise health, indoor air quality and comfort

MS must ensure optimal performance of building envelope

Obliged to take account of certain aspects:

- **Local solar exposure**
- **Active solar and other RES systems**
- **Co-generation**
- **District and block heating and cooling**
- **Natural lighting**

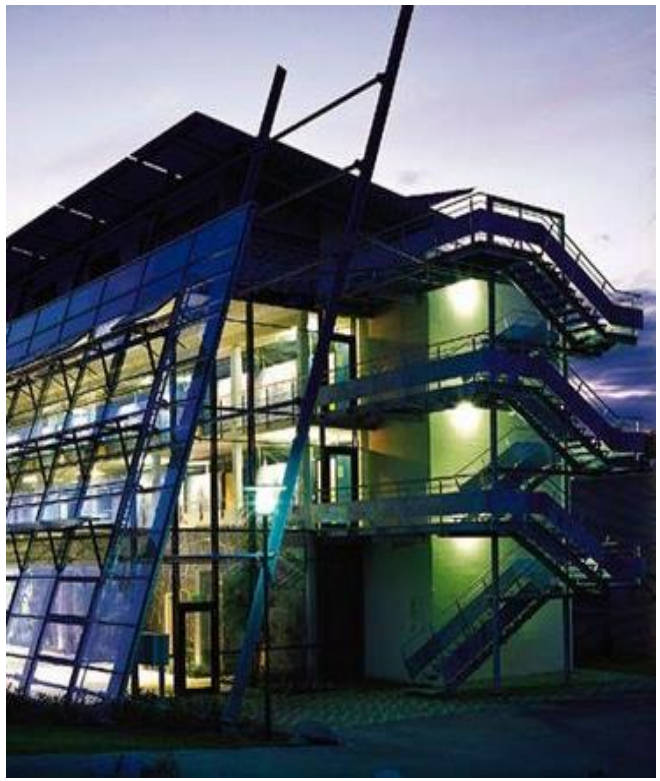


EPBD Annex I – How is RES treated?

Renewable Energy Sources (RES) must be treated in a non-discriminatory way

Counts towards energy performance of the building, reducing demand on grids

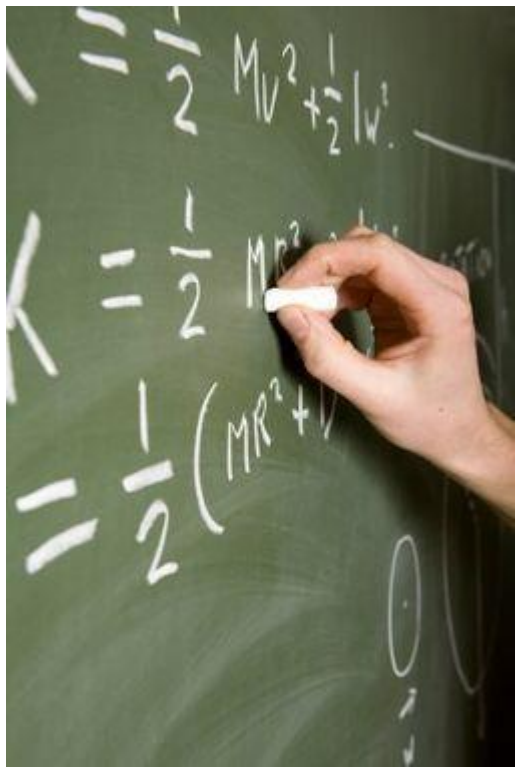
Related to reporting on nZEB penetration in the building stock



EPBD Annex I – Approach to Adopt

First calculate the energy (regardless of source) **needed for the building to perform as intended**

- Heating and cooling
- Hot water
- Ventilation
- Built-in lighting
- Other TBS



Translate result to primary energy in kWh/m²/year using relevant primary energy factors

Then determine proportion of RES used

EPBD Annex I – Potential Impact

Opportunities:

- **Put energy efficiency first (nZEB link)**
- **Increase comparability across the EU**
- **Use standards more**
- **Increase comfort and health**

Risks:

- **Comparisons may not be possible**
- **Dis-continuity from current methodologies**
- **Credibility, if methodology changed**

Thank You!

EuroACE
Rond Point Schuman 6
8th Floor
1040 Brussels

+32 2 639 10 10
adrian.joyce@euroace.org

www.euroace.org

Assessing the Energy Performance of a Building

The perspective from policymakers

Dimitrios Athanasiou
Policy Officer, Unit ‘Energy Efficiency’,
DG ENER, European Commission

EuroACE webinar on
Assessing the energy performance of a building, putting energy efficiency first

The revised Energy Performance of Buildings Directive (Annex I)

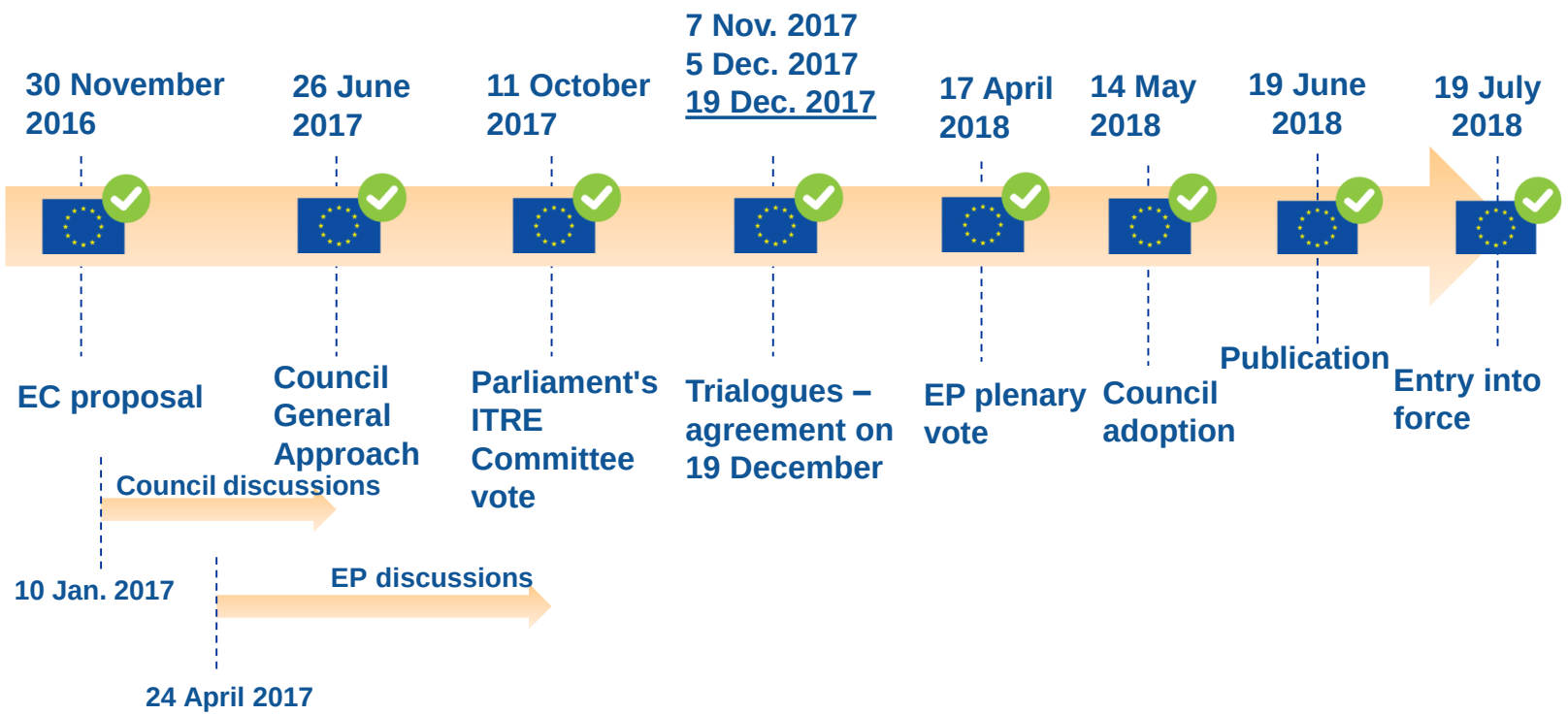
Brussels, 8 April 2019

European Commission

European Commission

EPBD review: the process

From EC proposal to publication



Transposition deadline 10 March 2020 – 20 months after entry into force

Main outcomes of the revision

A strengthened Directive

- Stronger **long term renovation strategies** for Member States, aiming at decarbonisation by 2050 and with a solid financial component
- An optional **Smart Readiness Indicator** for buildings
- Targeted support to **electromobility** infrastructure deployment in buildings' car parks
- Enhanced transparency of national building **energy performance calculation methodologies**
- Reinforcement of **building automation**: additional requirements on room temperature level controls, building automation and controls and enhanced consideration of typical operating conditions

Annex I - Common general framework for the calculation of energy performance of buildings

Directive (EU) 2018/844 introduces changes into Annex I of Directive 2010/31/EU

- Improving **transparency and consistency** of the existing 33 different regional/national calculation methodologies
- Keeping **freedom and flexibility of Member States** to adapt their national or regional calculation methodologies to local and climatic conditions
- Putting more emphasis on **health, indoor air quality** and comfort levels and on the optimal performance of the **building envelope**
- Considering **Primary Energy Factors** (PEFs) and the treatment of on-site/off-site renewables

New obligation for Member States to describe their national calculation methodology following **the national annexes of the overarching standards** (ISO 52000-1, 52003-1, 52010-1, 52016-1, and 52018-1 developed under mandate M/480)

- Improve **transparency and comparability** but no harmonization of calculation methodologies
- **Not an obligation** on MS to comply with the EPB standards [recital 40]
- MS have **flexibility** to adapt the calculation methodologies to local and climatic conditions

Determining & expressing the energy performance

- The energy performance of a building must be determined on the basis of the **calculated or the actual energy use**
- The **typical energy uses of a building** include energy used for space heating, space cooling, domestic hot water, ventilation, built-in lighting and other technical building systems
- The energy performance of a building must be expressed by a common numeric indicator of **primary energy use in kWh/(m².y)**
- The numeric indicators refer to **both Energy Performance Certification** schemes and compliance with **minimum energy performance requirements**
- **Additional indicators** may be added to the common numeric indicator expressed in primary energy use in kWh/(m².y):
  - total, non-renewable and renewable primary energy use, and
  - greenhouse gas emissions produced

Additional aspects must be considered

Deletion of "where relevant in the calculation"

The calculation methodology of the energy performance of a building must take into account the **positive influence** of local solar conditions, electricity produced by cogeneration, district heating and cooling systems and natural lighting

- Even if a factor may not be common, its positive influence must be considered

Considerations for the calculations of Primary Energy Factors (PEFs)

- Calculating Primary Energy Factors:
  - Is Member States responsibility
  - Values differ significantly among Member States
  - The procedures used are not always transparent
- The objective of revised EPBD
  - is not to interfere with Member States competence to define PEFs
  - to improve transparency
- Flexibility on how to define Primary Energy Factors per energy carrier based on weighted averages:
  - national, regional or local
  - annual, and possibly also seasonal or monthly,
  - or on more specific information for individual district systems: it makes sense for some sectors (p/v, district heating, etc.)

Energy needs to be considered

- **The energy needs of a building is an important step for the calculation of its energy performance**
  - The energy needs should cover, inter alia, energy for space heating, space cooling, domestic hot water, ventilation, lighting and other technical building systems
- National calculation methodologies must reflect the energy needs of a building in order to provide the **optimal comfort, indoor air quality and health conditions inside the building**

Pursuing the optimal energy performance of the building envelope

- Reducing the overall energy demand is crucial component when optimising the energy performance of a building
- The consideration of the envelope is not underestimated
- Technical Building Systems and Building Automation and Control Systems are also most easily optimised if a highly-energy performing envelope is also installed
- Member States should always try to find the best combination of energy efficiency and renewable measures
- The use of renewables should be encouraged in conjunction with seeking energy savings from the building envelope and its technical building systems

Treatment of on-site and off-site RES

- RES, on-site or off-site, **may** be considered in the calculation of Primary Energy Factors **but** on a non-discriminatory basis
  - RES consumed by the building, whether on-site or off-site, improves the energy performance of the building
  - Flexibility to Member States to choose the regime which corresponds best to its particular situation, taking into account the specific national circumstances
  - The energy produced on-building reduces the primary energy associated with the delivered energy
  - The calculation of primary energy factors includes both non-renewable energy and renewable energy supplied to the building (total PEF)
  - A distinction between renewable and non-renewable primary energy factors can help understand the energy consumption of a building
  - Comparable situations must not be treated differently and different situations must not be treated in the same way unless such treatment is objectively justified

Thank you!

Dimitrios ATHANASIOU

Policy officer, Buildings team of Unit C3
European Commission - DG Energy
dimitrios.ATHANASIOU@ec.europa.eu

European Commission

Assessing the Energy Performance of a Building

Using the set of EPB standards at national level for calculation methodologies

Jaap Hogeling
Director
EPB Centre, The Netherlands

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

Supporting the use of the EPB standards at national level: Roll out of the set of EPB standards

Jaap Hogeling

jaap.hogeling@epb.center

This project is facilitated by the EU-Commission Service Contract ENER/C3/2017-437/SI2.785185

Start 21 September 2018 for 3 years

EuroACE webinar on Assessing the energy performance of a building, putting energy efficiency first Brussels, 8 April 2019

Background on set of EPB standards

December 2010: Mandate M480 European Commission to CEN

To develop a consistent set of standards to assess overall Energy Performance of Buildings

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

Set of EPB standards: the holistic approach

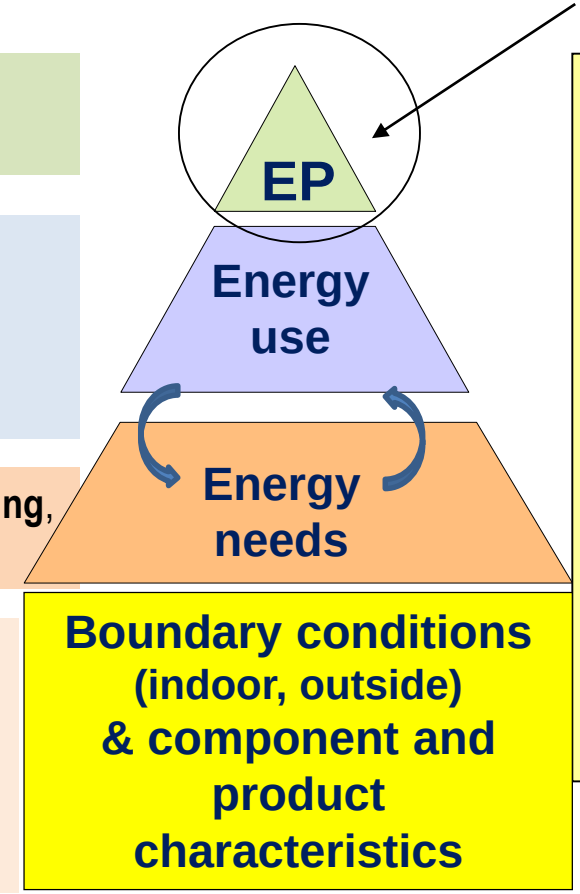
From *product* standards to *overall* energy use

Energy ratings
Overall energy use

Technical building systems standards (H, C, V, W, L) (system loss calculations), renewable energy

Energy needs heating & cooling, ventilation, DHW,

Climatic conditions , conditions of use (indoor temp. set points, vent., …)
Input data on components & products



EN ISO 52000-1
Overarching EPB standard

Product no longer evaluated as a product
but as a
part of a system

Example:
Requirement
in building regulation :

"Overall EP < 50 kWh_{PEnren}/m^2"

Current status

- The whole set of EPB standards was published in 2017[1)]:
  - 17 EPB standards at European (CEN) ánd global (ISO) level
    - The **ISO 52000** family
  - 36 EPB standards (for the moment..) at European (CEN) level only
  - 39 accompanying technical reports
- Now: to be implemented in national building regulations
  - Referring to art. 3 of the EPBD
  - EPBD:2018, Annex I :new obligation for MS's to describe the national calculation methodology following the national annexes of the 5 "overarching" EPB standards

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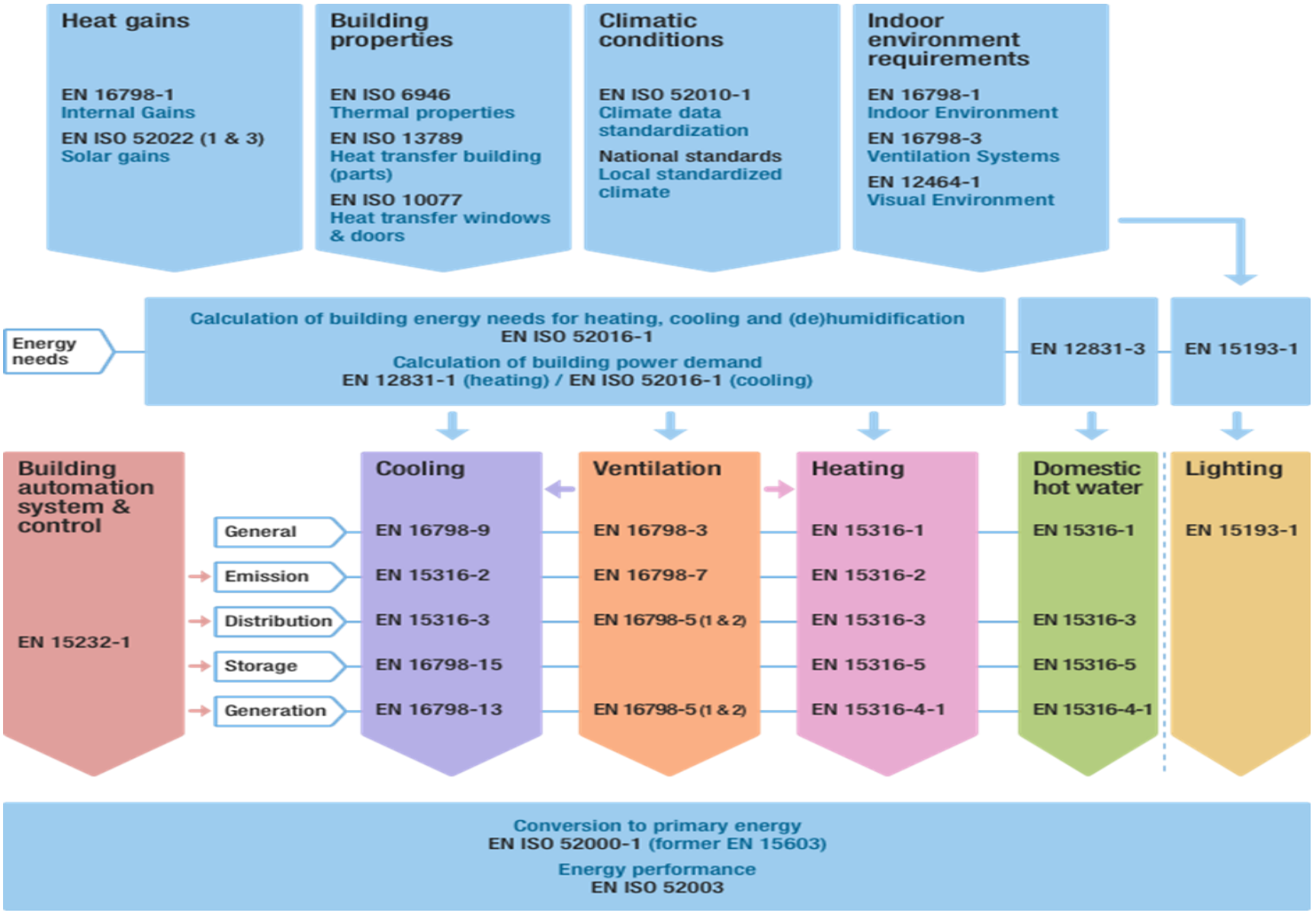
[1)]: 1 standard the EN 16798-1 on Indoor Environmental input parameters for EPB calculations in 2018

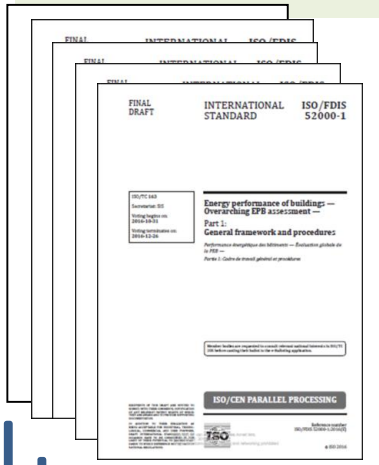

Heat gains
EN 16798-1
Internal Gains
EN ISO 52022 (1 & 3)
Solar gains
Building properties
EN ISO 6946
Thermal properties
EN ISO 13789
Heat transfer building (parts)
EN ISO 10077
Heat transfer windows & doors
Climatic conditions
EN ISO 52010-1
Climate data standardization
National standards
Local standardized climate
Indoor environment requirements
EN 16798-1
Indoor Environment
EN 16798-3
Ventilation Systems
EN 12464-1
Visual Environment
Energy needs
Calculation of building energy needs for heating, cooling and (de)humidification
EN ISO 52016-1
Calculation of building power demand
EN 12831-1 (heating) / EN ISO 52016-1 (cooling)
EN 12831-3
EN 15193-1
Building automation system & control
EN 15232-1
General
Emission
Distribution
Storage
Generation
Cooling
EN 16798-9
EN 15316-2
EN 15316-3
EN 16798-15
EN 16798-13
Ventilation
EN 16798-3
EN 16798-7
EN 16798-5 (1 & 2)
EN 16798-5 (1 & 2)
Heating
EN 15316-1
EN 15316-2
EN 15316-3
EN 15316-5
EN 15316-4-1
Domestic hot water
EN 15316-1
EN 15316-3
EN 15316-5
EN 15316-4-1
Lighting
EN 15193-1
Conversion to primary energy
EN ISO 52000-1 (former EN 15603)
Energy performance
EN ISO 52003

Overarching		Building (as such)		Technical Building Systems										
	Descriptions		Descriptions		Descriptions	Heating	Cooling	Ventilation	Humidifi Cation	Dehumidification	Domestic Hot water	Lighting	Building automation & control	Electricity production
Sub 1	M1	Sub 1	M2	Sub 1		M3	M4	M5	M6	M7	M8	M9	M10	M11
1	General	1	General	1	General									
2	Common terms and definitions; symbols; units and subscripts	2	Building Energy Needs	2	Needs									
3	Applications	3	(Free) Indoor Conditions Without Systems	3	Maximim Load and Power									
4	Ways to Express Energy Performance	4	Ways to Express Energy Performance	4	Ways to Express Energy Performance									
5	Building Functions and Building Boundaries	5	Heat Transfer by Transmission	5	Emission & control									
6	Building Occupancy and Operating Conditions	6	Heat Transfer by Infiltration and Ventilation	6	Distribution & control									
7	Aggregation of Energie Services and Energy Carriers	7	Internal Heat Gains	7	Storage & control									
8	Building Zoning	8	Solar Heat Gains	8	Generation & control									
	Calculated		Building		Load									

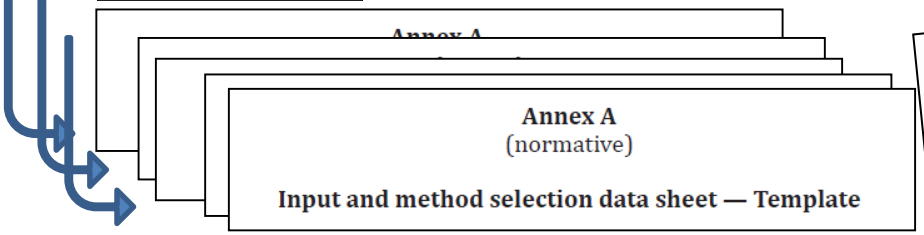
Harmonized but flexible

- A harmonized & modular set of EPB standards:
  - Consistent and transparent package of harmonized procedures
  - Fit for use in the context of EPB regulations
- Flexible as clearly identified options and national data are necessary due to differences in:
  - Climate (national , regional)
  - Culture, building tradition and the way building are used
  - building typologies
  - policy
  - legal frameworks related to the national building regulation (including the type and level of quality control and enforcement)

How to implement EPB standards?



Each EPB standard contains an Annex A
to be completed at national level:
National Annex (datasheet)
with national choices of options in methods, policy factors and default input data



Examples of the many choices that can be made in the national datasheets:

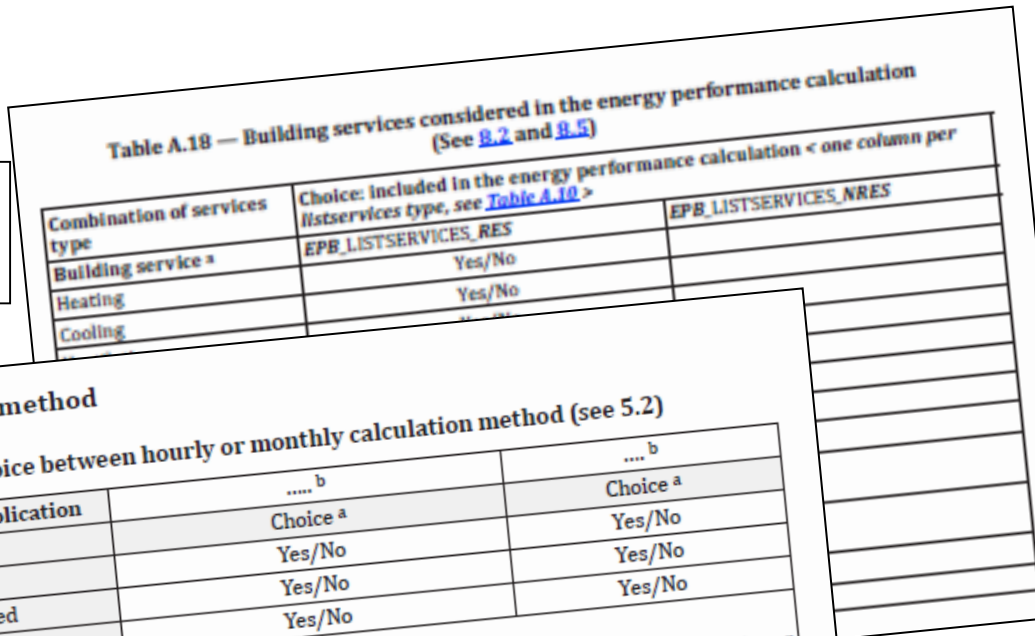


Table A.18 — Building services considered in the energy performance calculation (See 8.2 and 8.5)

Combination of services type	Choice: included in the energy performance calculation < one column per listservices type, see Table A.19 >	
Building service [a]	EPB_LISTSERVICES_RES	EPB_LISTSERVICES_NRES
Heating	Yes/No	
Cooling	Yes/No	

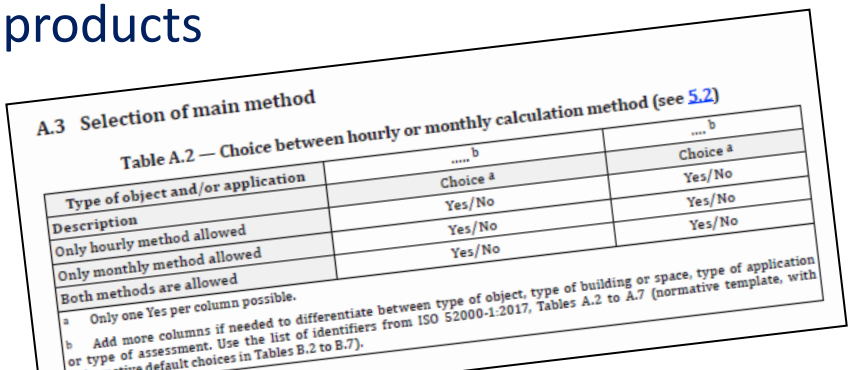
A.3 Selection of main method

Table A.2 — Choice between hourly or monthly calculation method (see 5.2)

Type of object and/or application	..... [b]	.... [b]
Description	Choice [a]	Choice [a]
Only hourly method allowed	Yes/No	Yes/No
Only monthly method allowed	Yes/No	Yes/No
	Yes/No	Yes/No

Flexible: “National Annexes”

- Each EPB standard has a **template** for a **national annex** that enables Member States to tailor the methodology to the national situation
- Examples of types of choices:
  - Climatic data
  - Policy factors (e.g. primary energy conversion)
  - Building categories, space categories to be considered
  - Set of user conditions, indoor env. parameters per space category or at whole building level;
  - Choice between specific detailed or simplified procedures
  - Default values for specific components or products
  - Replacement of specific EPB standards by national procedures (to enable a “step by step” implementation of the whole set)



A.3 Selection of main method

Table A.2 — Choice between hourly or monthly calculation method (see 5.2)

Type of object and/or application	..... [b]	..... [b]
Description	Choice [a]	Choice [a]
Only hourly method allowed	Yes/No	Yes/No
Only monthly method allowed	Yes/No	Yes/No
Both methods are allowed	Yes/No	Yes/No

[a] Only one Yes per column possible.

[b] Add more columns if needed to differentiate between type of object, type of building or space, type of application or type of assessment. Use the list of identifiers from ISO 52000-1:2017, Tables A.2 to A.7 (normative template, with ... default choices in Tables B.2 to B.7).

The role of the EPB Center

Type	Service Contract
Contract	ENER/C3/2017-437/SI2-785.185
Title	SUPPORT THE DISSEMINATION AND ROLL-OUT OF THE SET OF ENERGY PERFORMANCE OF BUILDING STANDARDS DEVELOPED UNDER EC MANDATE M/480
Start	September 21, 2018
Duration	Three years

Services

- Support Member States 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

- FAQ on key issues (*How to fill in the annexes? How to use the standards?, How to find my way…, How to understand…., Where to find…..*)
- Calculation tools for key individual standards
- Case studies: pool of practical examples tailored to the needs of different stakeholders

- Hands-on workshops and offline training sessions
- EPB Standards webinar series

National Annexes to the 'overarching' standards

Priority is given to the 'overarching' standards: mentioned in Annex 1 of the revised EPBD.

Each standard describes an important step in the assessment of the energy performance of buildings

EN ISO 52000-1: Weighted overall (primary) EP, share of renewables

- EN ISO 52003-1: Overall EP indicators
- EN ISO 52010-1: Climatic data for energy calculations
- EN ISO 52016-1: Energy needs (heating/cooling) and indoor temperatures
- EN ISO 52018-1: EP indicators at building fabric level

Case Studies

- To demonstrate the usability of the EPB standards
- Two types are considered: Partial and full EP calculations
  - Preparation of case studies of the application of the standards in real buildings, both residential and non-residential, across the 28 Member States and the various climatic zones of Europe
  - Mostly as partial case studies, together with a few case studies covering simplified full EP calculations.

Database of Frequently Asked Questions

- The frequently asked questions will be formulated on the questions posed to the EPB Center
- When placed on the website and communicated (e.g. e-newsletters), it will trigger new questions and answers
  - *A well-structured Q&A section on the website, with links to more information, will also help to find your way through the information*
- See www.EPB.Center (the current website will be upgraded in the coming weeks, more functionalities will be added)

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

This document has been produced under a contract with the European Union, represented by the European Commission (Service contract ENER/C3/2017-437/SI2-785.185).

Assessing the Energy Performance of a Building

Questions & Answers Session

Assessing the Energy Performance of a Building

Thank You!

EuroACE
Rond Point Schuman 6
8th Floor
1040 Brussels

+32 2 639 10 10
adrian.joyce@euroace.org
www.euroace.org