

Implementing The Amended EPBD

EuroACE Webinar 3

Smart and technology-equipped buildings: new features from the amended EPBD

13th February 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

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Johnson Controls

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KNAUF INSULATION

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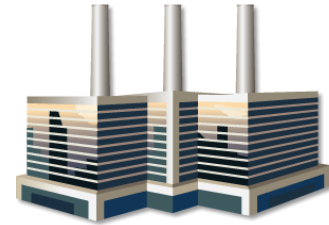
United Technologies

URSA

VELUX®



More than 283,000



More than 1,300

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)

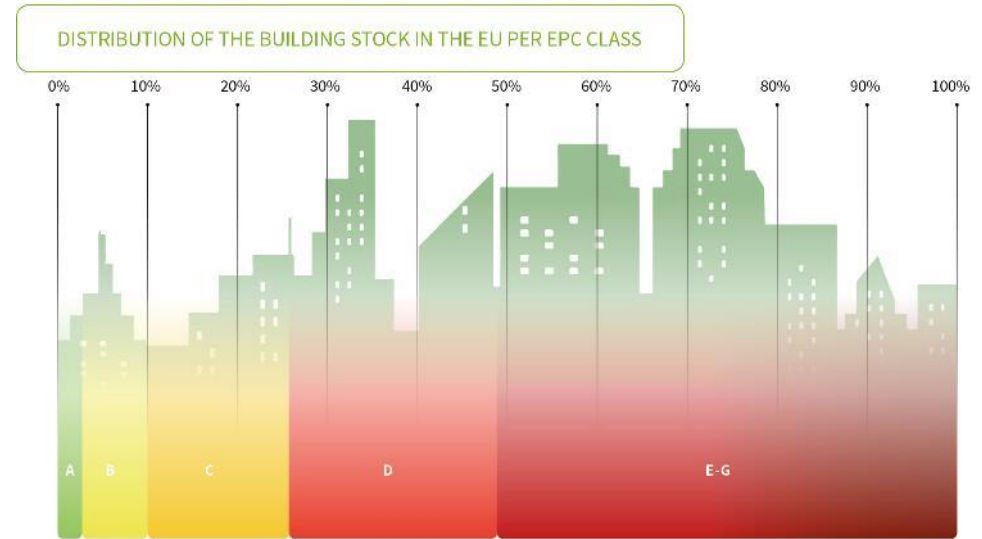
Why a EuroACE Guide?

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



The background image shows a multi-story building with a red-tiled roof and orange-painted upper floors. Scaffolding is erected against the building, and two workers are visible on different levels. One worker in a white shirt and light blue jeans stands on a higher platform, while another in a dark shirt is on a lower one. The building features white architectural details, including decorative window grilles and shutters. A large, semi-transparent circular graphic is overlaid on the left side of the image, containing the title and a bullet point.

2

EuroACE Guide to EPBD Implementation

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

A person with dark hair, seen from behind, is looking out of a large window. The window frame is white, and the view outside is a bright blue sky with some light clouds. The person is wearing a dark and light striped shirt. A large, semi-transparent white circle is overlaid on the left side of the image, containing text.

3

EuroACE Guide to EPBD Implementation

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

A hand wearing a grey glove holds a yellow handheld device. The device's screen displays a bar chart with red and blue bars. The number '4' is at the top left of the screen, '32,1' is at the top right, and '18,2' is at the bottom right. There are also some icons at the top of the screen.

4

EuroACE Guide to EPBD Implementation

- Financing energy renovations, the link to improved energy performance

A photograph of a male technician wearing glasses and a green t-shirt, working on a large industrial machine. The machine features several blue actuators and white pipes. The technician is focused on a component of the machinery. The background shows more of the industrial environment with metal structures and additional piping.

5

EuroACE Guide to EPBD Implementation

- Smart and technology equipped buildings



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

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Smart and Technology-Equipped Buildings (Chapter 5)

A Guide to the Implementation of the Amended EPBD

Stephan KOLB

Director, Industry Affairs Heating,
Danfoss, EuroACE Member



A technician wearing a green shirt and glasses is working on a large industrial pipe. The pipe has a blue valve and various sensors attached to it. The background shows a complex industrial environment with metal structures and wiring.

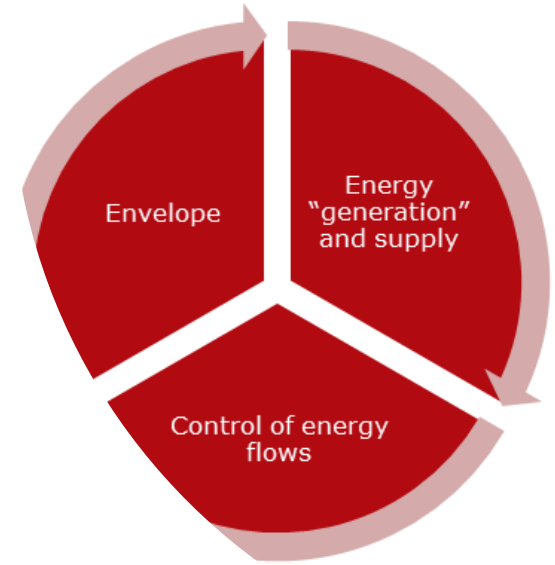
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EuroACE Guide to EPBD Implementation

- Smart and technology equipped buildings: Technical Building Systems and Smart Buildings in the new EPBD

Optimize Technical Building Systems: why?

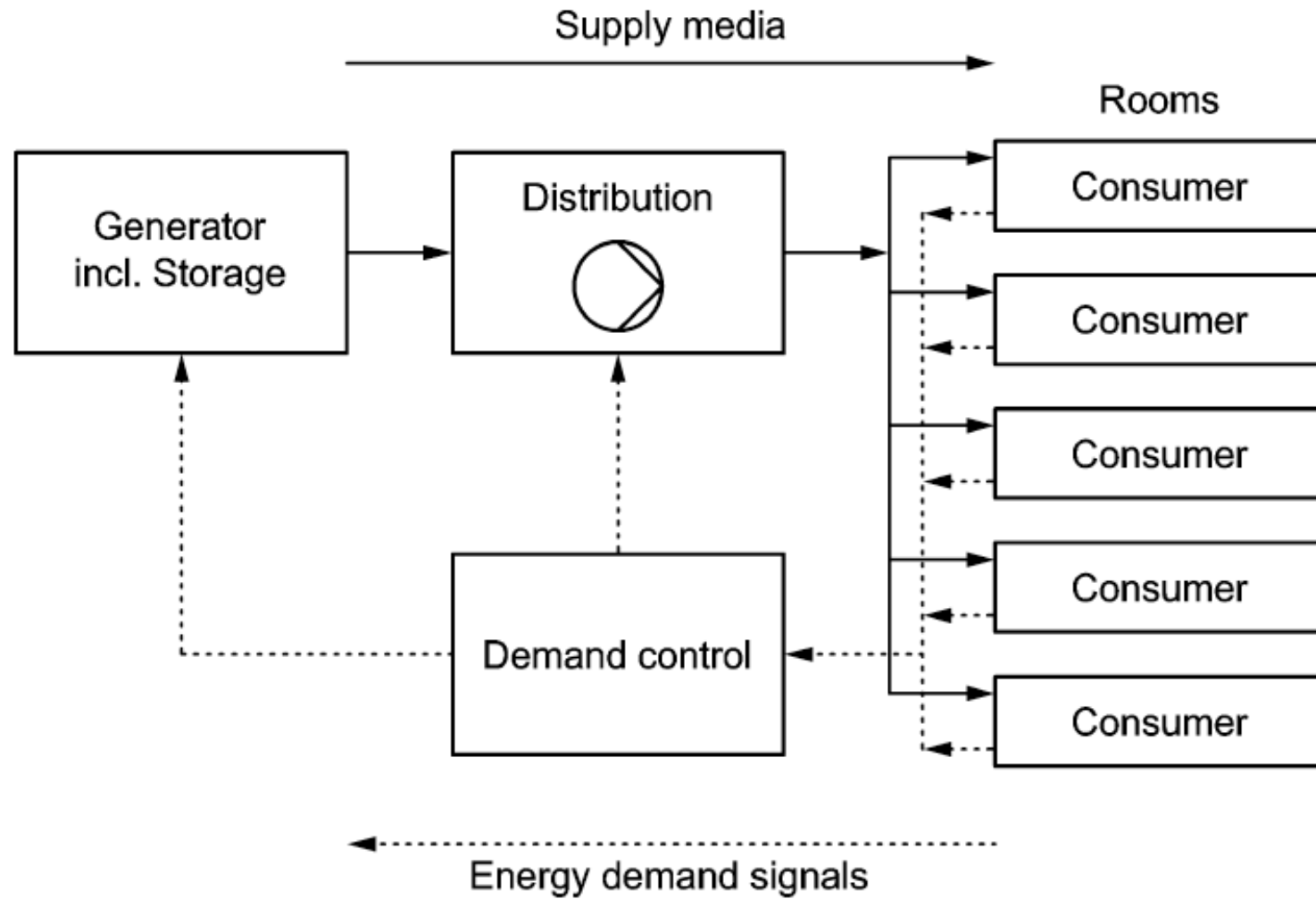
- To achieve optimal building energy and comfort performance, it is crucial to consider adjustment and control of Technical Building Systems, in addition to envelope and energy carriers
- Optimizing basic features of Technical Building Systems can deliver 27 Mtoe/a and 61 Mt/a CO₂equiv by 2030 (Ecofys, 2017)



Optimize TBS: related elements of new EPBD



- **Article 8(1)**: optimize overall energy use of Technical Buildings Systems by requirements on overall energy performance, proper installation, appropriate dimensioning, adjustment and control
- **Article 8(1) 3rd subparagraph**: install self-acting room-per-room control of heat emitter output upon heat generator replacement
- **Article 8(9)**: documentation of compliance with requirements
- **Article 2(3)**: definition Technical Building Systems - space heating, space cooling, ventilation, domestic hot water, built-in lighting, building automation and control, on-site electricity generation
- **Article 2(3a)**: definition building automation and control system



Optimize TBS: example space heating

Optimize heat generation + heat distribution + heat emission

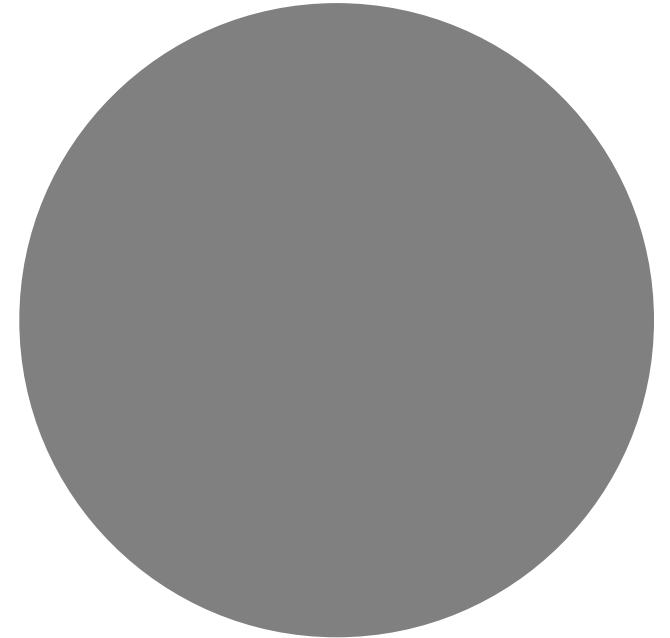
- Ensure balanced distribution of heating energy across the building – “hydraulic balancing”, Rec. (35)
- New cost/benefit analysis on balancing retrofit by iTG Dresden for Germany: amortization period between 3 and 8 years, CO₂equiv reduction potential of 10 Mt in residential buildings only
- Target real-life energy, comfort, health performance under typical, dynamically varying part load building operating conditions – Recital (36), Articles 14(1) and 15(1)
- And beyond, e.g.: adjustment of hot water temperature to outside temperature, time-scheduling of temperature set-points, insulation of piping network

- Smart technologies deliver enhanced energy and comfort performance, and support maintaining actual building performance at expected levels
- A successful Energy Transition means deeper integration of buildings into electricity and district energy infrastructures

Making buildings smart: why?

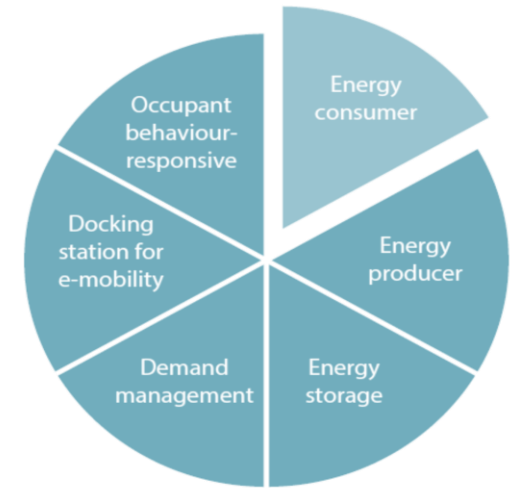
- **Article 8(10):** Develop a Smart Readiness Indicator addressing i) maintaining performance, ii) response to occupant needs, iii) demand response
- **Article 8(2)-8(8):** Bring in e-vehicle charging infrastructure
- **Articles 14(4), 15(4):** Equip non-residential buildings > 290 kW with building automation and control system capabilities by 2025
- **Articles 14(5), 15(5):** Incentivize continuous electronic monitoring and effective control functionalities in residential buildings

Making buildings smart : related elements of new EPBD



Making buildings smart: trends / examples

- “Continuous commissioning” by BACs
- Energy carrier and technology shift in individual heating/cooling and DHC, e.g. heat pumps
- Nearly zero energy buildings
- On-site renewables + PV self-consumption
- On-site e-vehicle charging
- Bi-directional coupling of buildings into electricity and district energy grids
 - Demand-side management to support integration of non-programmable renewable energy carriers
 - Security of supply



Reference: BPIE

- Economic and technical feasibility exemptions should be limited to the “real” problematic cases – the draft EU Commission guidance provides a good yardstick
- Requirements for Technical Building Systems should remove market barriers for short-payback improvements for individual room temperature controls and hydraulic balancing
- Requirements should focus on actual performance and tackle gaps between expected and real-life performance
- The appropriate indicator for economic feasibility is amortization period, not additional Capex
- Implementation of BACs capabilities in non-residential buildings should follow “Class B” defined in EN 15232 and ensure also adequate hydronic performance of heating and cooling systems
- Implementation of inspection and maintenance provisions for residential buildings should provide meaningful incentives for investing into the “desired” continuous monitoring and optimization functionalities
- Renovation strategies should consider synergies between passive and active performance improvement measures, targeting very good envelope, equipment and controls

Keys for transposing and implementing the new EPBD



TBS and smart
buildings
for a highly energy
efficient and
decarbonized
building stock 2050

Smart and Technology-Equipped Buildings

The perspective from policymakers

Sylvain ROBERT

Policy Officer, Unit 'Energy Efficiency',
DG ENER, European Commission





The perspective from policymakers



CLEAN ENERGY FOR ALL EUROPEANS PACKAGE

THE RIGHT REGULATORY FRAMEWORK FOR POST – 2020



Energy Union Governance



Energy Efficiency (Energy Efficiency Directive, European Performance of Buildings Directive)



Renewables (Revised Renewable Energy Directive)



New Electricity Market Design (including Risk Preparedness)



Energy prices and costs report



Energy Efficiency Directive

- 32.5% energy efficiency target for 2030;



Ecodesign Working Plan 2016-2019

- List of new product groups;
- Contribution to circular economy objectives;



Energy Performance of Buildings

- Supportive of renovation;
- **Smarter** – ICT, smart buildings;
- Simpler;



REVISION OF THE EPBD


A STRENGTHENED DIRECTIVE

- ✓ Entered into force on 9 July.
- ✓ Stronger long term renovation strategies

- decarbonisation by 2050,
- solid financial component

- ✓ Promotion of smart technologies

- update of technical building system definition (Art.2),
- update of provisions on inspections of heating, air-conditioning and combined systems (Art.14 and 15),
- new requirements on the installation of self-regulating devices (Art.8) and building automation and controls systems (Art.14 and 15),
- new requirements on electromobility recharging infrastructure (Art.8),
- establishment of a smart readiness indicator (Art.8)

19.6.2018  Official Journal of the European Union L 156/75

DIRECTIVE (EU) 2018/844 OF THE EUROPEAN PARLIAM AND OF THE COUNCIL
of 30 May 2018
amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency
(Text with EEA relevance)

THE EUROPEAN PARLIAM AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 194(2) thereof,

Having regard to the proposal from the European Commission,

After transmission of the draft legislative act to the national parliaments,

Having regard to the opinion of the European Economic and Social Committee (1),

Having regard to the opinion of the Committee of the Regions (2),

Acting in accordance with the ordinary legislative procedure (3),

Whereas:

(1) The Union is committed to developing a sustainable, competitive, secure and decarbonised energy system. The Energy Union and the Energy and Climate Policy Framework for 2030 establish ambitious Union commitments to reduce greenhouse gas emissions further by at least 40% by 2030 as compared with 1990, to increase the proportion of renewable energy consumed, to make energy savings in accordance with Union level ambitions, and to improve Europe's energy security, competitiveness and sustainability.

(2) To reach these objectives, the 2016 review of the Union's energy efficiency legislative act confirms a re-assessment of the Union's energy efficiency target for 2030 as requested by the European Council's conclusions of 2014, a review of the core provisions of Directive 2012/27/EU of the European Parliament and of the Council (4) and Directive 2010/31/EU of the European Parliament and of the Council (5), and a reinforcement of the financing framework, including the European Structural and Investment Funds (ESIF) and the European Fund for Strategic Investments (EFSI), which will ultimately improve the financial conditions of energy efficiency investments on the market.

(3) Directive 2010/31/EU required the Commission to carry out a review by 1 January 2017 in the light of the experience gained and progress made during the application of that Directive, and, if necessary, to make proposals.

(4) To prepare for that review, the Commission took a series of steps to gather evidence on how Directive 2010/31/EU had been implemented in the Member States, focusing on what worked and what could be improved.

(5) The outcome of the review and the Commission's impact assessment indicated that a review was required to strengthen the current provisions of Directive 2010/31/EU and to simplify it.

(6) The Union is committed to developing a sustainable, competitive, secure and decarbonised energy system. To meet that goal, Member States and the Commission should ensure that they are to reach the long-term emissions goal and that decarbonise the building stock, which is responsible for approximately 40% of the Union's greenhouse gas emissions by 2050. Member States should take a comprehensive approach to energy efficiency, energy supplies and reducing final energy consumption. To that end, Member States and the Commission should:



SMART READINESS INDICATOR

PROVISIONS & PROCESS

- ✓ “An optional common Union scheme for rating the smart readiness of buildings” (Article 8(10) amended EPBD)
- ✓ Establishment thanks to:
 - A delegated act for **definition and calculation methodology** and;
 - an implementing act for **implementation modalities**
- ✓ The indicator is **developed by the Commission**, with the support of **technical studies**:
 - 1st technical study: March 2017 – August 2018
 - 2nd technical study: started in December 2018
- ✓ Extensive consultation of Member States and stakeholders

SUPPORT FOR SETTING UP A SMART READINESS INDICATOR FOR BUILDINGS AND RELATED IMPACT ASSESSMENT FINAL REPORT

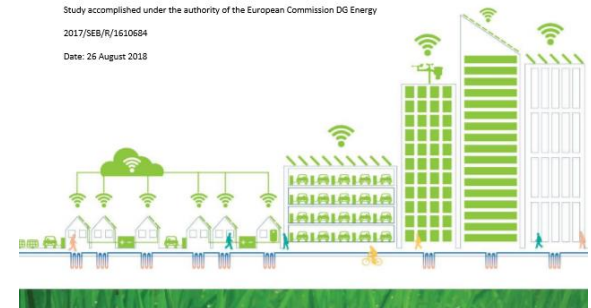


VITO: Stijn Verbeke, Yixiao Ma, Paul Van Tichelen, Sarah Bogaert, Virginia Gómez Oñate
Waide Strategic Efficiency: Paul Waide
ECOFYS: Kjell Bettgenhäuser, John Ashok, Andreas Hermelink, Markus Offermann, Jan Groezinger
OFFIS: Mathias Usler, Judith Schulte

Study accomplished under the authority of the European Commission DG Energy

2017/SEB/R/1610604

Date: 26 August 2018



SMART READINESS INDICATOR

MOTIVATION & SCOPE



The SRI will:

- **raise awareness** about the benefits of smart technologies in buildings,
- **support and orient investments** in smart technologies



The SRI can:

- contribute to enhancing **energy efficiency**, **comfort** and **well-being** in buildings,
- improve **policy linkages** with connected initiatives,
- contribute to the integration of buildings into future **energy systems** and **markets**



The SRI will cover:

- optimisation of **energy performance** and **operation**,
- adaptation to **occupants' needs**,
- **energy flexibility**

SMART READINESS INDICATOR

TECHNICAL WORK

- ✓ The results of the 1st technical study (August 2018) are a good **starting basis**
- ✓ The approach has generally been **welcomed** by the community, with some caveats, e.g. in relation with the fine-tuning of scoring approach
- ✓ The 2nd technical study focuses on the consolidation of the **calculation methodology**, on investigation of **implementation**, and **impact** evaluation
- ✓ Extensive **stakeholder consultation** in the scope of the 1st technical study, to be strengthened in the 2nd study

If interested, please **register** as stakeholder:

<https://smartreadinessindicator.eu/stakeholder-consultation>

Save the date: stakeholder meeting on **26 March** in Brussels

A STRATEGY FOR DIGITALISATION

VISION

Smartness in buildings is an essential element in a decarbonised, renewable-intensive and more dynamic energy system in Europe with the aim of reaching the 2030 EU targets on energy efficiency and renewable energy, and of achieving a decarbonized EU building stock by 2050.

Objectives:

1. Achieve high energy efficiency by optimal operation;
2. Strengthen the role of demand side flexibility;
3. Ensure that the building user's needs are covered.

3 key instruments:

1. Smart Readiness Indicator for buildings under the revised EPBD;
2. Building automation and control systems (**BACS**) under Ecodesign and/or Energy Labelling regulations;
3. **Energy smart appliances** under Ecodesign and/or Energy Labelling regulations.



ENERGY UNION

EnergyUnion #EnergyUnion

European Commission
Commission européenne

Commission européenne
European Commission

Thank you

Sylvain Robert
Unit Energy Efficiency
DG ENERGY, European Commission

<https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings>

INSPECTIONS AND BUILDING AUTOMATION

A GREATER ROLE FOR AUTOMATION



Inspections on heating, air-conditioning and combined systems are updated (Articles 14 and 15) – new provisions on self-regulating devices (Article 8(1)) and update of TBS definition (Article 2(3))



Thresholds for inspections are set up at **70 kW**.



Alternative measures to mandatory inspections based on advice are kept, with reporting to the Commission.



installation of **building automation and control systems** in large non-residential buildings by **2025**



Additional requirements on the installation of **self-regulating devices** for room temperature level control in new buildings or when heat generators are replaced



BACS in the definition of Technical Building Systems

ELECTROMOBILITY

AN IMPORTANT CONTRIBUTION TO TRANSPORT DECARBONISATION

- ✓ **Additional provisions to support the deployment of the EU infrastructure for electro-mobility (Article 8)**
- ✓ By **2025**, Member States will set **requirements** for a **minimum number of charging points** in **all** non-residential buildings with more than 20 parking spaces.
- ✓ **Simplification** of the deployment of recharging points (including - permitting procedure).
- ✓ Requirement for the installation of ducting infrastructure in new and major renovated buildings with more than 10 parking spaces
- ✓ Requirement of at least 1 charging point per building for new and major renovated non-residential buildings with more than 10 parking spaces
- ✓ Targeted **exemptions** (e.g. for SMEs).

Smart and Technology-Equipped Buildings

The experience of building service engineers

Anita DERJANECZ

Managing Director, REHVA –
Federation of European Heating, Ventilation
and Air-Conditioning Associations





The perspective of building services engineers

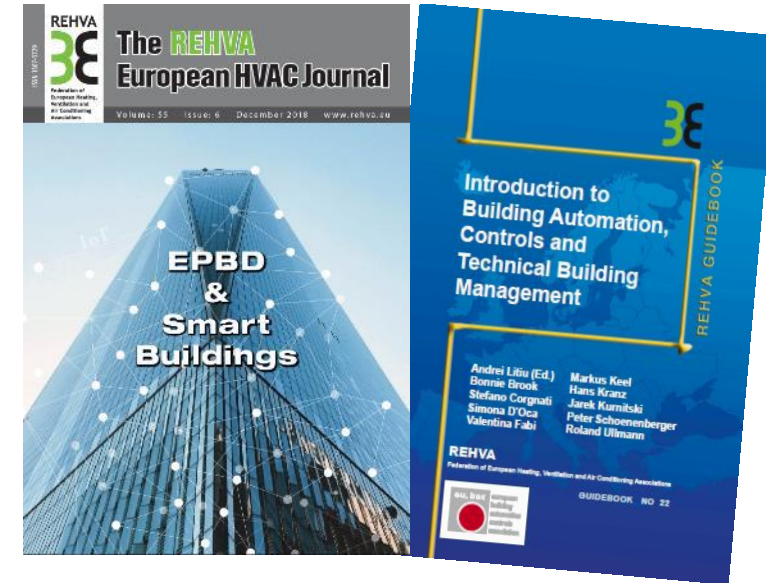
Anita Derjanecz, REHVA

Smart and Technology Equipped Buildings - new features from the amended EPBD

EuroACE - BUILD UP webinar, 13/02/2019

REHVA - Federation of European HVAC Associations

- Engineering societies representing +120.000 **building service engineers**: system designers, commissioning experts, energy consultants, etc. from 27 countries.
- Advocating **the improvement of health, comfort, safety and energy performance** in buildings and communities.
- REHVA European guidebooks and knowledge sources for HVAC engineers to promote **harmonised EPBD implementation** and advanced engineering practice
- **EPB Center** initiative supporting the uptake of **EPBD related standards**.



Revised EPBD & REHVA priorities

Ensuring high indoor environment quality and energy efficiency at the same time

Quality, proper maintenance, and performance through mandatory inspection and technical monitoring

Promoting the harmonised application of EPB standards

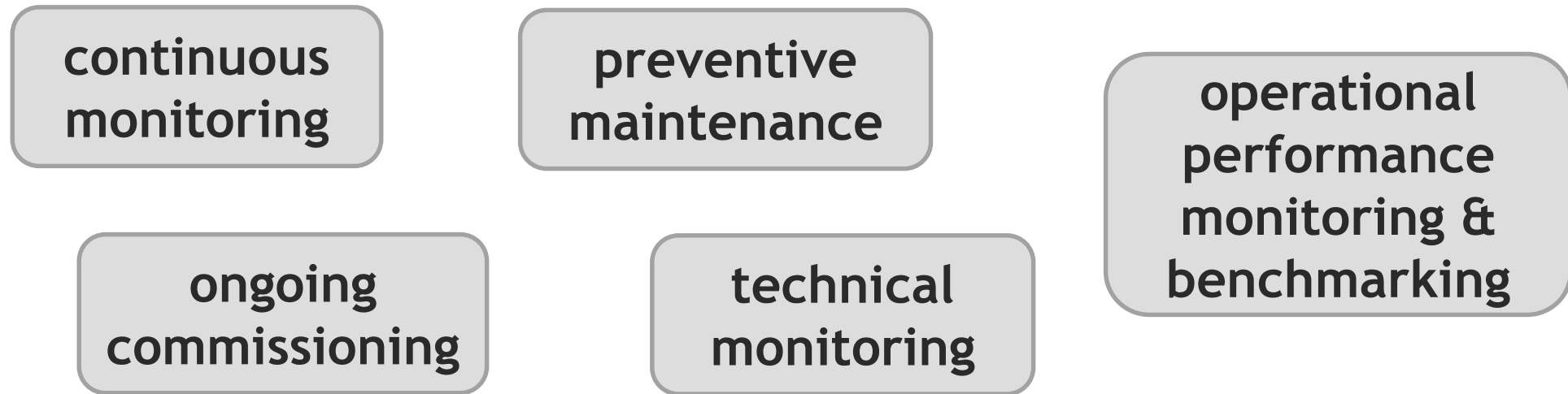


Inspection: independent compliance check and testing

- Regular inspection matters for healthy, safe and high performing operation of HVAC systems.
- Keep existing inspection schemes also for smaller systems. Widening the scope to IEQ criteria/ ventilation.
- Alternative “advice” instead of inspection: less optimal. Quality and impact of these schemes should be verified.
- Importance of third-party inspection and compliance check.



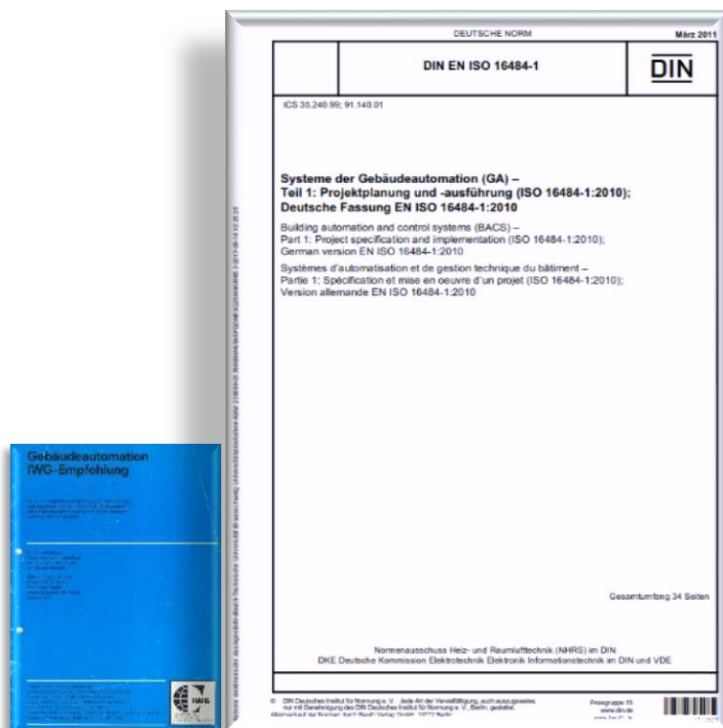
ICT and digitalisation enable cost efficient ways of inspecting and testing system performance.



- ICT enabled inspection/monitoring shall be based on pre-defined parameters & data verified in a transparent way.
- Requiring the delivery of minimum BACS data („data export“) before handover and for inspections.

Challenge: complexity of building systems

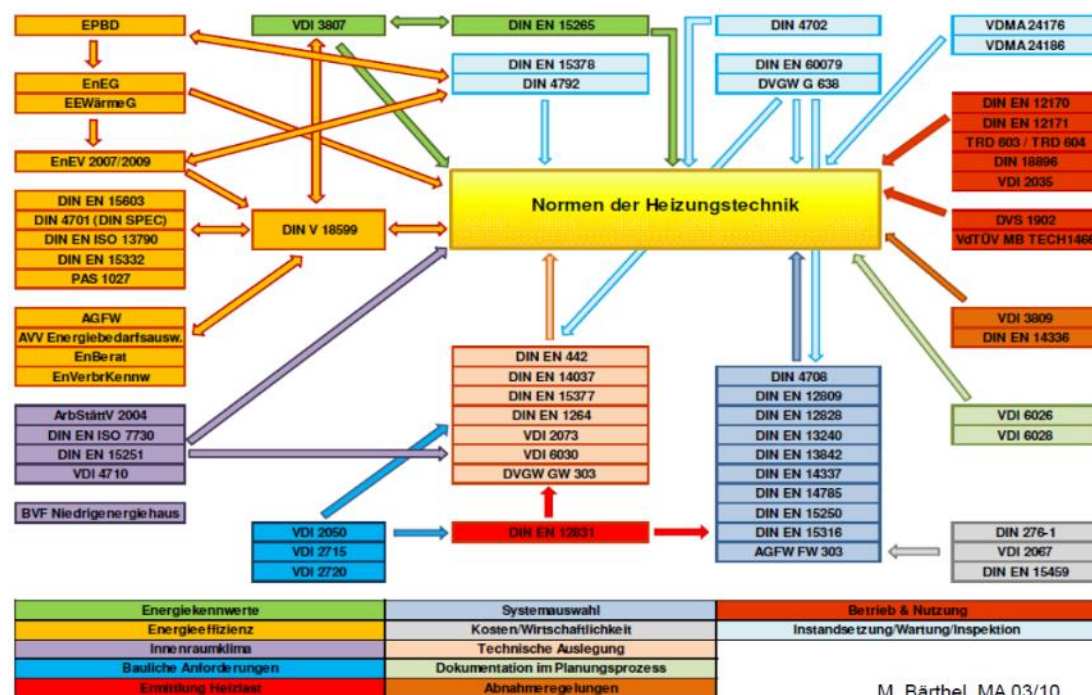
Standards



1973: 15 pages

2018: > 1.000 pages

Building system engineering (DE example)

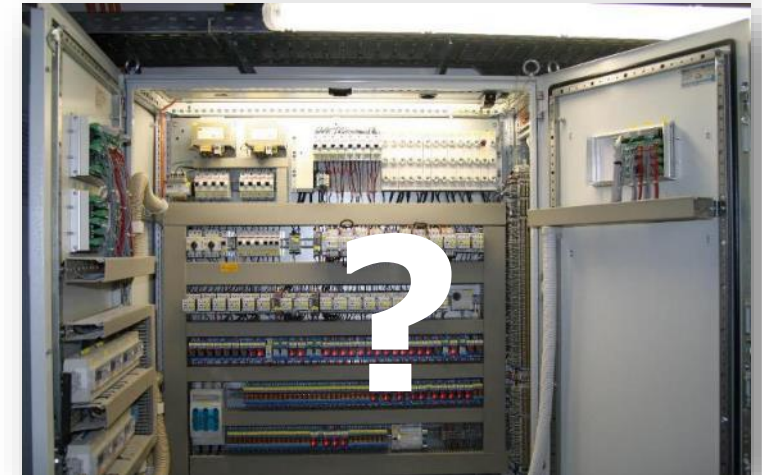
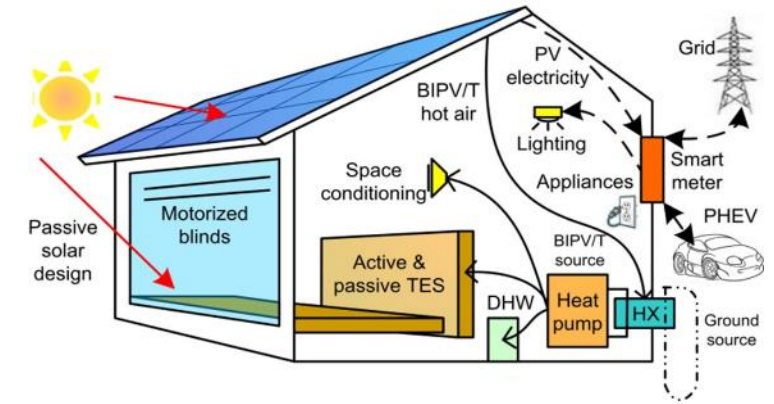


M. Bärthel, MA 03/10



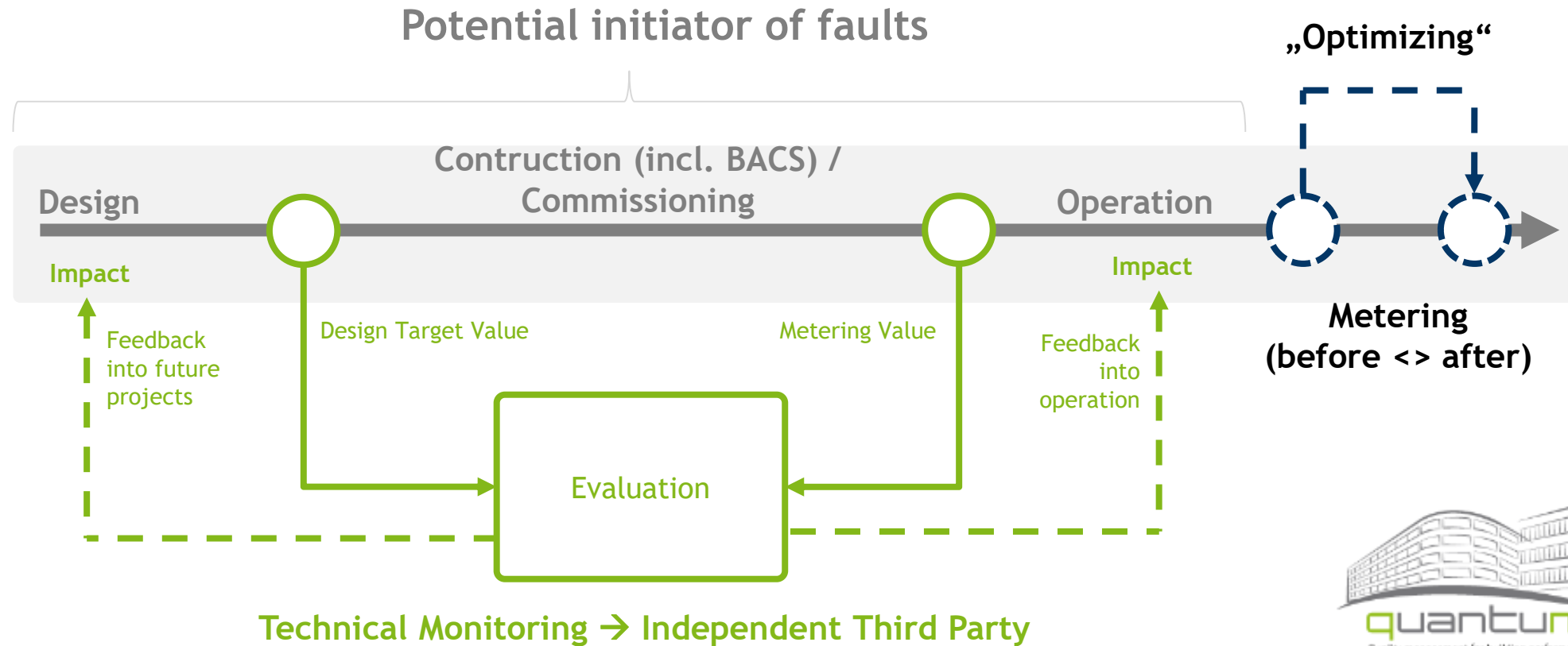
Challenge: the performance gap

- Buildings are complex technical systems.
- Increasing gap between predicted and real building performance.
- High performing buildings need quality management.
- Digitalization make quality management services fast, transparent and cost effective.



Technical Monitoring to close the performance gap

Quality Control Loop to check for fulfillment of requirements.

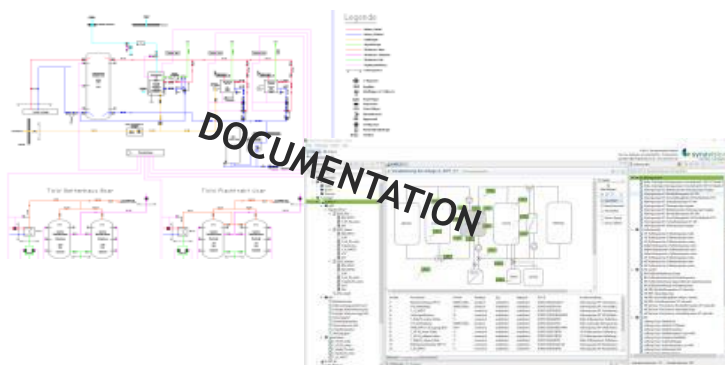


Digitalization of Technical Monitoring

1

Digital Engineering

Fast functional specification on the level of actors and sensors through templates



2

Digital Analyses

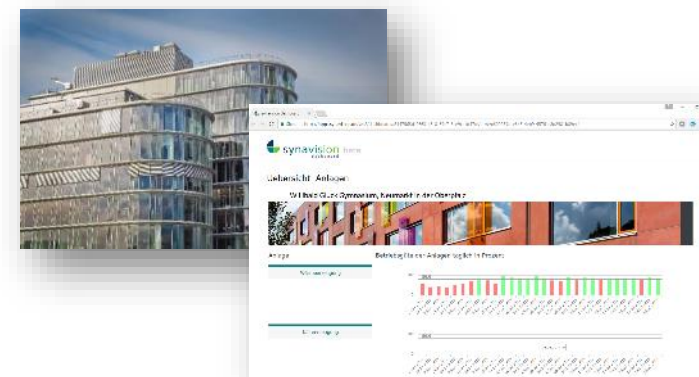
System-independent data import-plugins for maximum compatibility and automated mass data analysis

| Datenpunktadresse | DP_ID_001 | DP_ID_002 | DP_ID_003 |
|-------------------|-------------|--------------|-------------|
| Klartext | Zählerstand | Wirkleistung | Vorlauftemp |
| Einheit | m3 | kW | °C |
| 01.01.2014 22:00 | 14375 | 17,4 | 47,5 |
| 01.01.2014 22:15 | 14378 | 18,3 | 49,2 |
| 01.01.2014 22:30 | 14381 | 16,4 | 48 |
| 01.01.2014 22:45 | 14386 | 18,9 | 47,6 |
| 01.01.2014 23:00 | 14387 | 7,3 | 46,2 |
| 01.01.2014 23:15 | 14393 | | 48,1 |

3

Digital Supervision

Reporting of optimization potential and continuous monitoring of building performance



 synavision

AMEV Technical Monitoring guide - a good policy practice

11

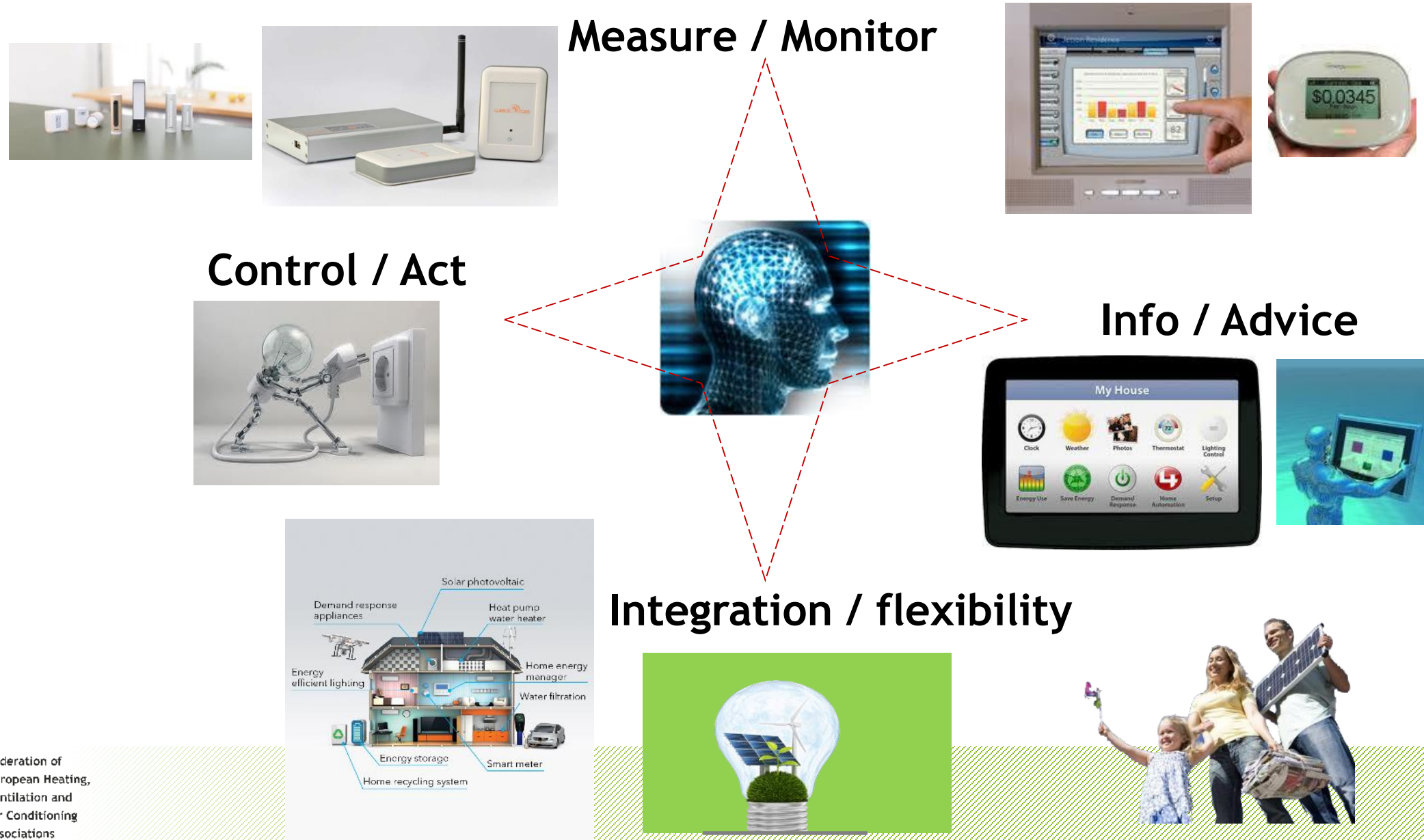
- Official call for quality management in construction projects and for existing buildings in order to ensure that technical and economic potentials are reached in normal operation
- Clear definition of the work packages, services, and results in order to request Technical Monitoring in public tenders
- First to define the role of quality management as a third party service in construction projects
- **Mandatory set of operation data for third party testing defined!**



AMEV: Working committee at the German Ministry of Interior, Building and Community

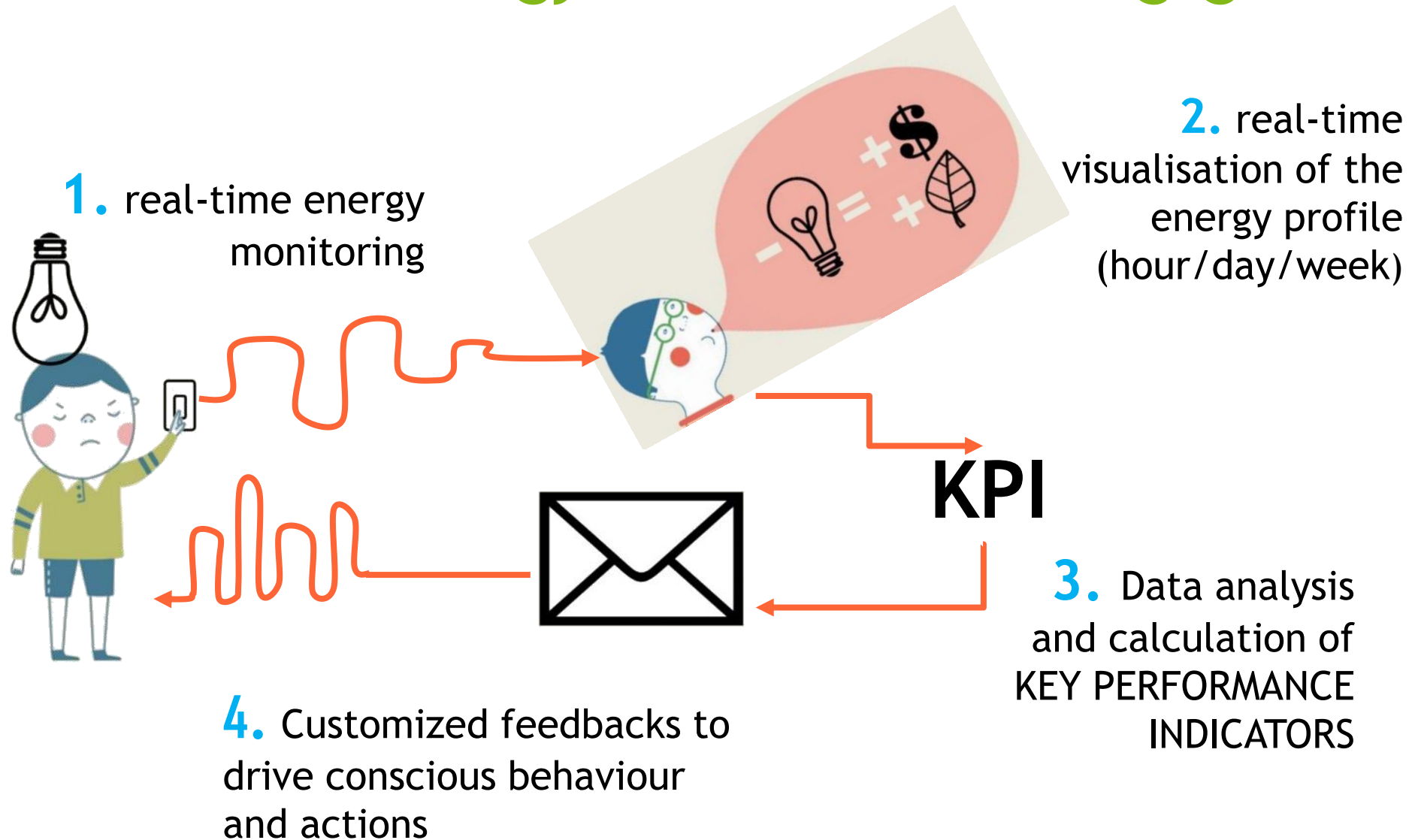
Smart buildings, smart users. ICT & IoT in the HVAC sector

12



HVAC data for user energy awareness and engagement

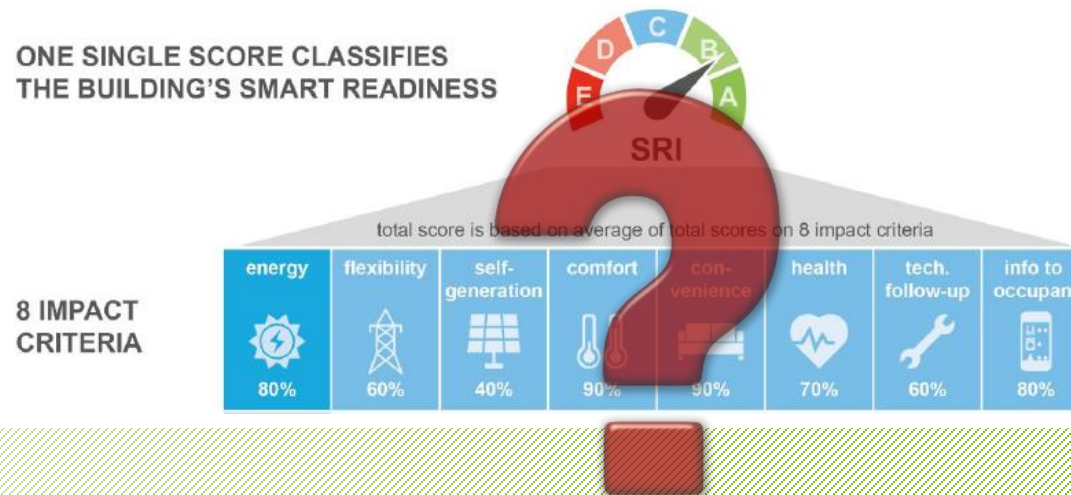
13



Smart Readiness Indicator

A concept that may have positive effect on the market, but ...

- Shall be transparent, simple and meaningful to ensure that end-users get value
- Calculation should rely on performance-based criteria and indicators that can be simulated/measured. Existing energy calculation methods and EN standards can be used.
- The published calculation methodology should be further developed. We look forward to the upcoming 2nd SRI study work.



Thank you for your attention!

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13th February 2019, 12.00-13.15

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