

# JOINT FINAL CONFERENCE

Next Generation Energy Performance Assessment,  
Rating and Certification

Towards a Smart and Decarbonised Future for European Buildings

**Part 3: Specific Results of the 3 projects**  
**D<sup>2</sup>EPC: Activities for a new EN standard**  
**on buildings operational rating**



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# D<sup>2</sup>EPC: Energy Performance of Buildings: Requirements for assessing Operational rating

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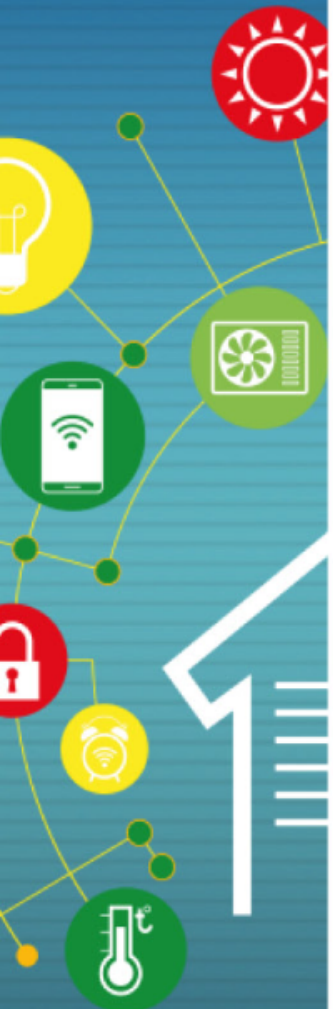
# The Operational Rating

- Unlike Asset Rating, the **Operational Rating** is defined based in the 52000-standard series as the **energy rating based on measured amounts of delivered and exported energy**
- Definition 3.3.16 measured energy performance (EN ISO 52000-1): **Energy performance based on weighted measured amounts of delivered and exported energy**

*Note 1 to entry: The measured energy performance is the weighted sum of all energy carriers used by the building, as measured by meters or derived from measured energy by other means. It is a measure of the in-use performance of the building after correction or extrapolation. This is particularly relevant to certification of actual energy performance.*

# Different Types of Operational Rating

Type	Subtype	Input Data			Type of application
		Use	Climate	Building	
Calculated (asset)	Design	Standard	Standard	Design	Building permit, certificate under conditions
	As built	Standard	Standard	Actual	Energy performance certificate, regulation
	Actual	Actual	Actual	Actual	Validation
	Tailored	Depending on purpose			Optimization, validation, retrofit, planning, energy audit
Measured (operational)	Actual	Actual	Actual	Actual	Monitoring
	Climate corrected	Actual		Actual	Monitoring or energy audit
	Use corrected	Corrected to standard	Actual	Actual	Monitoring
	Standard	Corrected to standard	Corrected to standard	Actual	Energy performance certificate, regulation



# Operational Rating Features

The Operational Rating schemes:

- **deliver more accurate data** , as the classification is conducted based on the actual energy consumption
- require the **use of special equipment and smart meters**, which in most existing buildings in the EU are not yet available.

The **need for equipment greatly hindered** the widespread use of Operational Ratings as a way of certifying buildings in Europe.

This fact, though, is expected to change in the coming years, with the decision of the European Commission to **deploy smart meters in all buildings**.

Operational rating is also in compliance with the needs and conditions of **smart buildings and smart cities**.

# Smart Meters: The occasion

- Close to **225 million smart meters for electricity** and **51 million for gas** will be rolled out in the EU by 2024.
- By 2024, it is expected that almost **77% of European consumers will have a smart meter for electricity**. About 44% will have one for gas
- The cost of installing a smart meter in the EU is on average between €180 and €200
- On average, **smart meters provide savings of €230 for gas and €270 for electricity per metering point** (distributed amongst consumers, suppliers, distribution system operators, etc.) as well as an average energy saving of at least 2% and as high as 10% based on data coming from pilot projects.

# Operational Rating: D<sup>2</sup>EPC proposition

## Energy Performance of Buildings — Operational rating Requirements for assessing Operational rating



This document provides a methodology for data acquisition and data processing, to obtain a measured energy performance assessment and an operational rating of a building.

The measured energy performance may be used for the purpose of:

- rating and entire building and/or providing partial performance indicators;
- validating a calculated energy performance;
- confirming the improvement of the energy performance following the implementation of an energy conservation measure.

# Operational Rating: Scope of the proposed item



A non-exhaustive list of the open topics in the field includes:

1. **Procedures** to provide a measured energy performance assessment
2. The definition of a **reference building or the reference values** of the Operational Rating.
3. The definition of **normalization procedures** for the various parameters affecting the actual performance of a building, mainly the climatic-related parameters as well as the indoor environmental data (IEQ including indoor air quality, thermal comfort or lighting), level of service, domestic hot water use and the person occupancy.
4. The determination of the **performance indicators** which will be assessed with the Operational Rating



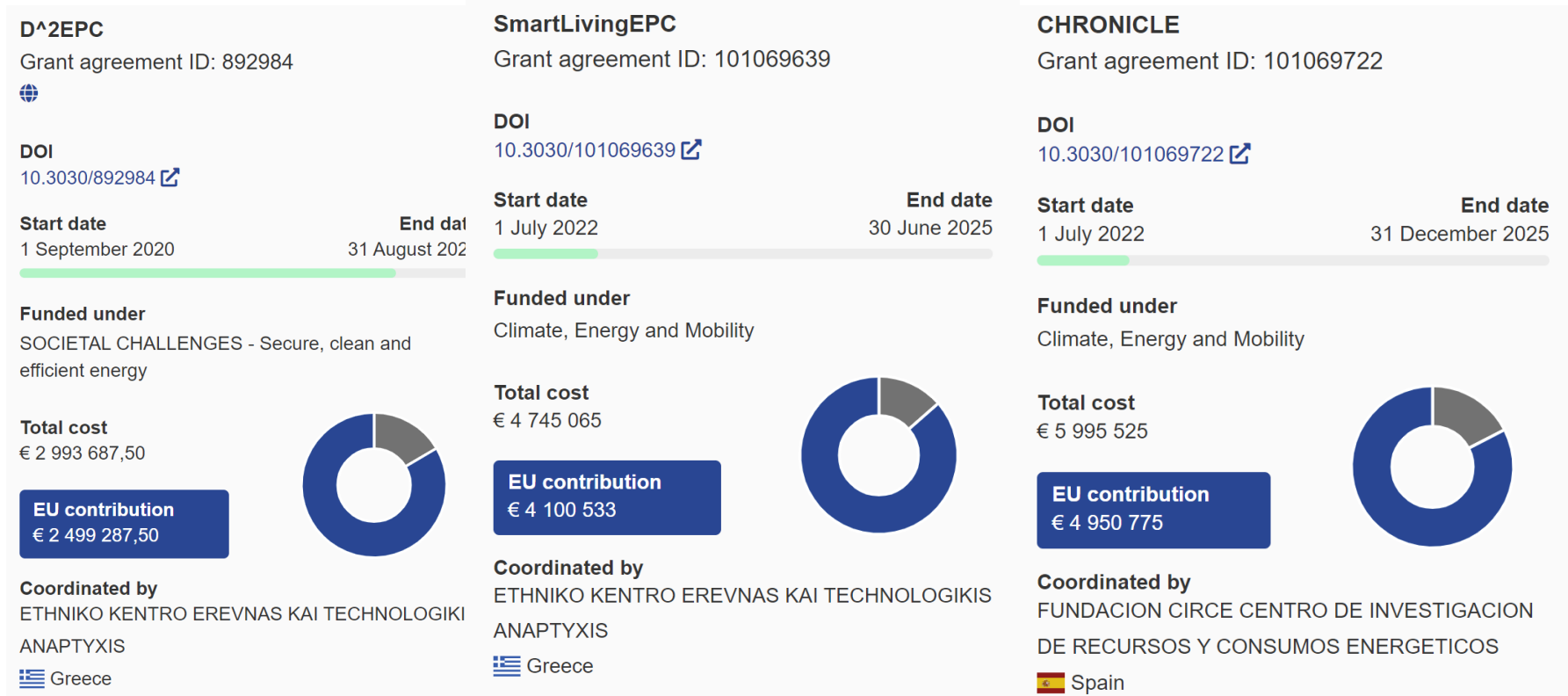
# Operational Rating: Scope of the proposed item



A non-exhaustive list of the open topics in the field includes:

5. The **properties which need to be measured** to define the operational energy rating of a building (like the non-EPB energy use).
6. Procedures to compare the **calculated and the measured energy performance rating and indicators**.
7. The definition of the **minimum classification requirements** for the case of the operational rating (see EN ISO 52003-1).
8. The **minimum requirements** in relation to the **equipment and the data acquisition**, such as the time step, the accuracy and the postprocessing of the measurements.

# EU funded research projects backing up the item



# Tentative standard structure

The standard should address at least the following topics

- **What** is assessed?
- **How** is it assessed?
- What is the assessment required **post processing**
- What is the **deliverable**
- **Comparison** between calculated and measured energy

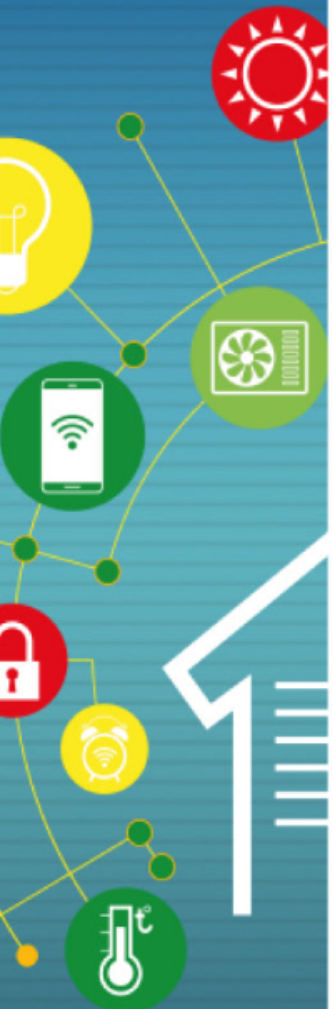
These topics could structure the content of a new standard.

In the following slides a non-exhaustive list of topics to be defined is given

# Tentative standard structure: What is assessed

Definition of

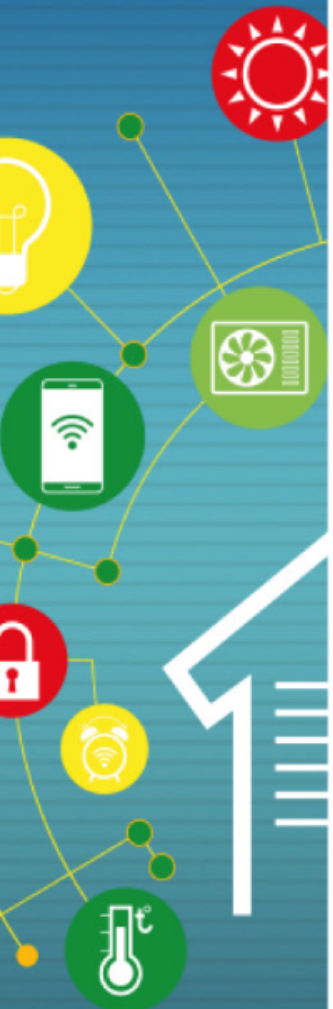
- assessed objects, building category
- assessed technical building systems
- EPB features
- assessment boundaries
- energy carrier
- energy use



# Tentative standard structure: How it is assessed

Definition of

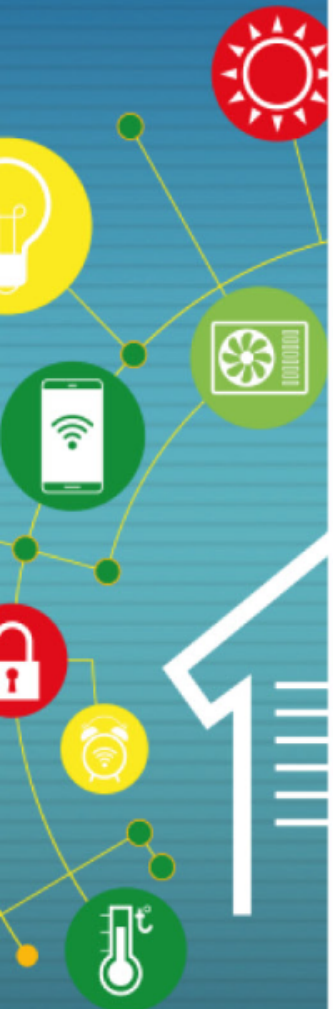
- Equipment/instrumentation/sensors used
- Measurement procedures/practices
- Measurement period
- Measurement interval



# Tentative standard structure: How it is post-processed

Definition of

- Climate corrections
- Use corrections
- Level of service corrections
- Reference values
- Primary, standard energy performance



# Tentative standard structure: What is delivered

Definition of

- List of indicators
- Non renewable energy
- Renewable energy
- Energy uses
- References to design energy performance
- Energy Performance Certificate
- EPB rating



# Tentative standard structure: What is delivered

## Indicative list of indicators

Energy Indicators	Total Power/Occupancy	kWh/occupants
	Total Power/Occupancy Hours	kWh/h*occupants
	Total Power/Area	kWh/m <sup>2</sup>
	Total Power/Volume	kWh/m <sup>3</sup>
	Heating Consumption per Energy Carrier/Occupancy	kWh/occupants
	Heating Consump per Energy Carrier/Occupancy-hours	kWh/h*occupants
	Heating Consumption per Energy Carrier/Area	kWh/m <sup>2</sup>
	Heating Consumption per Energy Carrier/Volume	kWh/m <sup>3</sup>
	Cooling Consumption per Energy Carrier/Occupancy	kWh/occupants
	Cooling Consump per Energy Carrier/Occupancy-hours	kWh/h*occupants
	Cooling Consumption per Energy Carrier/Area	kWh/m <sup>2</sup>
	Cooling Consumption per Energy Carrier/Volume	kWh/m <sup>3</sup>
	Weather-Normalized Heating & Cooling Energy Cons.	---
	Lightning/Occupancy	kWh/occupants
	Lightning/Occupanc-Hours	kWh/h*occupants
	Lightning/Area	kWh/m <sup>2</sup>
	Lightning/Volume	kWh/m <sup>3</sup>
	Electrical Appliances Energy Consumption/Occupancy	kWh/occupants
	Electrical Appliances Energy Cons./Occupancy-hours	kWh/h*occupants
	Electrical Appliances Energy Consumption/Area	kWh/m <sup>2</sup>
Electrical Appliances Energy Consumption/Volume	kWh/m <sup>3</sup>	
DHW Consumption per Energy Carrier/Occupancy	kWh/occupants	
DHW Consump. per Energy Carrier/Occupancy-Hours	kWh/h*occupants	
DHW Consumption per Energy Carrier/Area	kWh/m <sup>2</sup>	
DHW Consumption per Energy Carrier/Volume	kWh/m <sup>3</sup>	







D<sup>2</sup>EPC

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