

IEEE European Public Policy Webinar 8

Smart & Energy Efficient Buildings

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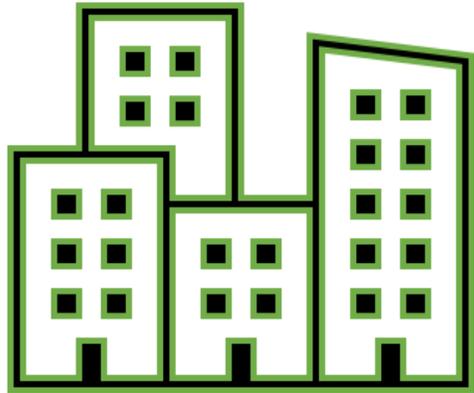
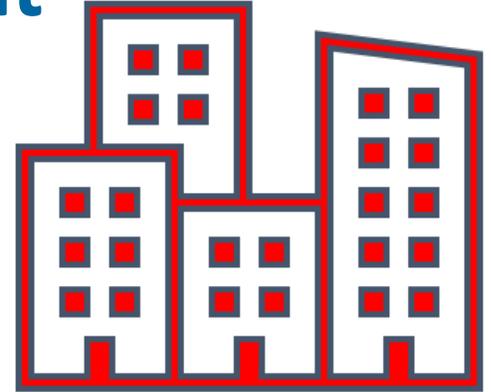
EU climate ambition and European Green Deal

EU Climate Ambition in the built environment

PROBLEM

Buildings are responsible for:

- approx. 40% of the EU's total energy consumption, and for
- 36% of its greenhouse gas emissions from energy



To achieve the 55% emission reduction target, by 2030 the EU should reduce

- buildings' greenhouse gas emissions by 60%,
- their final energy consumption by 14%.

SOLUTION

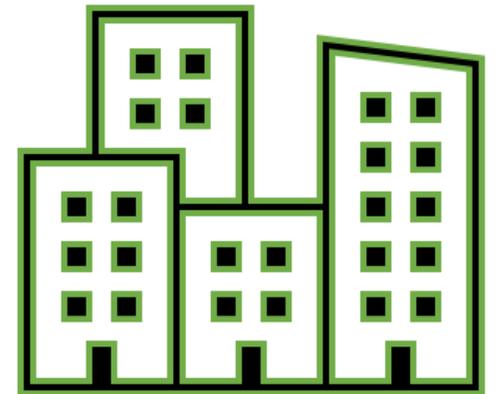
How will the Commission reach a solution ?

By updating current rules in force, and by proposing new measures.

Key focus of EU legislation lies now on renovation. In the past: more on new buildings.

Renovation as an opportunity to renovate the building to make it more:

- **Energy efficient:** the ambition is to move towards zero-energy buildings, not only for new buildings but also existing buildings !
- **Smart:** the Commission sees potential in integrating more smart infrastructure in buildings e.g. smart charging for electric vehicles



Important before we continue...

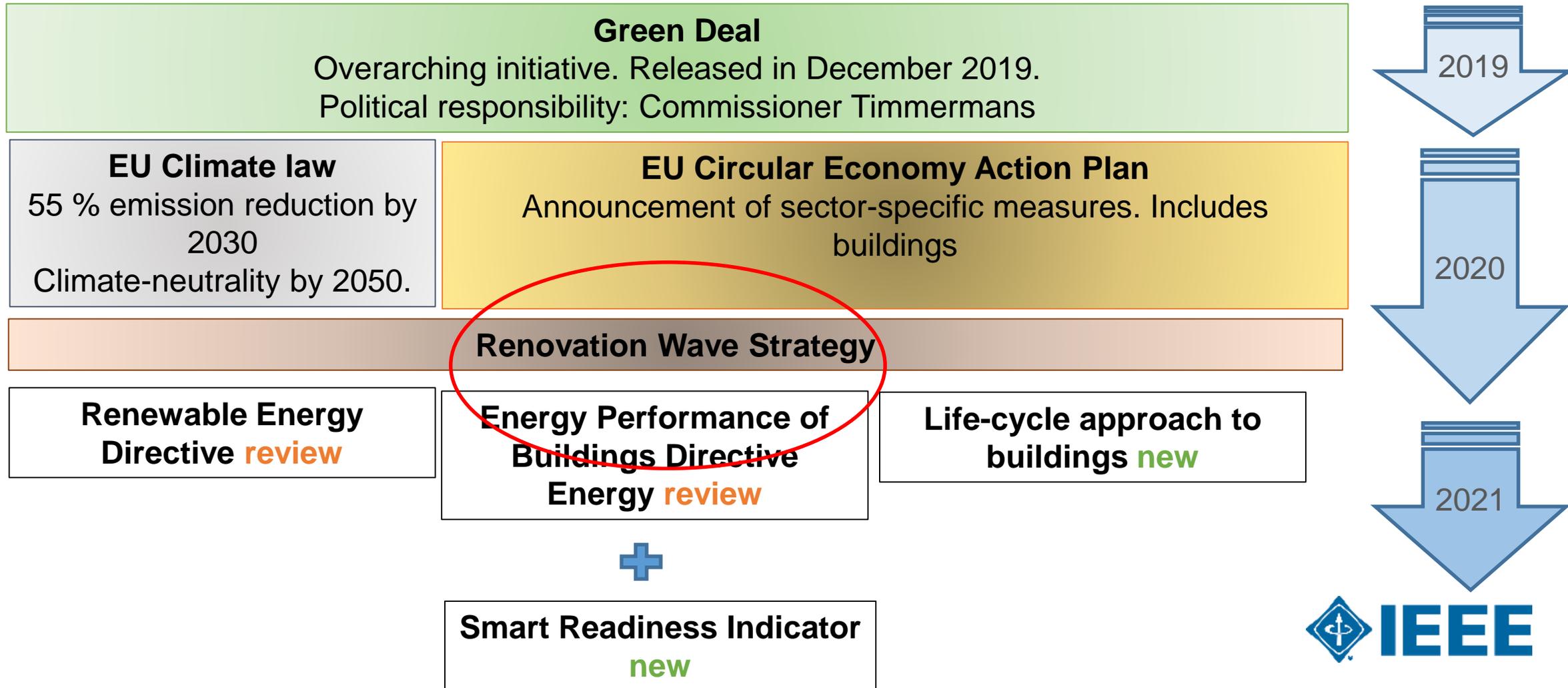


- There is not 1 initiative or piece of legislation on “smart buildings”.
- There are multiple policy hooks that cover aspects of “smart buildings”. For instance the Smart Readiness Indicator Regulations, the Energy Performance of Buildings Directive, and many EU funding initiatives and projects, for instance under Horizon Europe.
- The current EU policy ambition is green & digital. This ambition transpires in every policy initiative taken under this legislature.
- The Green Deal and the Renovation Wave allow to hit two birds with one rock: while renovating buildings to make them more energy efficient, it is an opportunity to also make them smarter through the promotion of building automation technologies.



European Commission's approach to EU energy policies

Green Deal Architecture





The Renovation Wave initiative

What it means for Europe's buildings and the engineering community



Renovation Wave Strategy



I oversee the implementation of the Green Deal. I do not deal with policy details.

Mr Timmermans
Commissioner for
Climate Action

Reports to



I will help implement the Green Deal in the building sector. My priority focus in this legislature will be to renovate buildings to make them more energy efficient and smarter.

Ms Simson
Commissioner for
Energy

The Renovation Wave is in line with the Green Deal objectives

Renovation Wave Strategy



Smart Readiness Indicator

- Idea is to make buildings smarter through benchmarks
- Measure ICT-readiness of a building in 9 technical domains
- Can be compared to Energy Performance Certificate
- Voluntary scheme
- Applies from 1 January 2021

Energy Performance of Buildings Directive

- Idea is to make minimum performance standards mandatory for existing buildings
- All buildings are in scope, but public ones get priority
- Mandatory scheme
- Review of existing rules foreseen in 2021

Renovation Wave Strategy

takes stock of existing initiatives (Smart Readiness Indicator) and new initiatives (review EPBD).

What can you expect as technologists/engineers?

Decentralization of the grid continues:

- More integration of RES in buildings, including in heating and cooling applications
- More demand for demand-response applications, for instance smart charging for EVs
- Development of energy communities, for instance through European Smart Cities Marketplace

Focus on energy efficiency & RES integration:

- Scale of renovations will increase tremendously as existing buildings will need to comply with minimum energy performance standards as well
- “Deep renovation standard”? TBD.
- Strengthening the renewable heating and cooling target and introducing a requirement for minimum proportions of renewable energy in buildings

EU funds for R&D for engineers

- Supporting digitalisation in the construction sector through Horizon Europe, Digital Innovation Hubs and Testing and Experimentation Facilities
- Supporting sustainable and decarbonised energy solutions through Horizon Europe and the R&I co-creation space





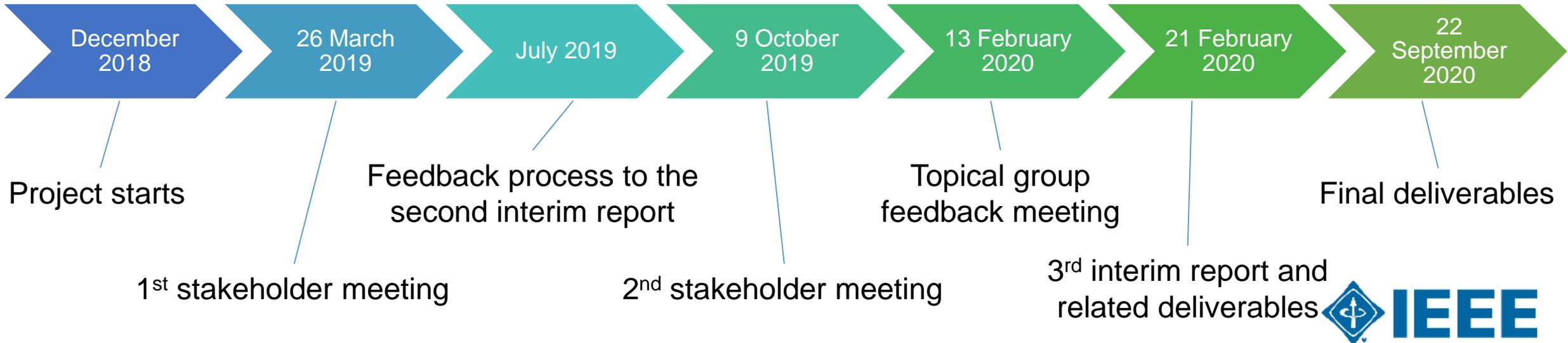
IEEE activities and initiatives in the area of smart buildings



Smart Readiness Indicator in the EPBD

“The indicator is intended to raise awareness about the benefits of smart technologies and ICT in buildings (from an energy perspective, in particular), motivate consumers to accelerate investments in smart building technologies and support the uptake of technology innovation in the building sector.”

1st stakeholder meeting



SRI 1st technical support study

ENER/C3/2016-554

Aim:

To provide technical support to the DG Energy in order to investigate the possible establishment of an SRI under the EPBD.

Study led on the basis of the EC proposal, focus on the calculation methodology.

March 2017 – August 2018

<https://smartreadinessindicator.eu/>



Verbeke S., Waide P., Bettgenhäuser K., Uslar M.; Bogaert S. et al.; “Support for setting up a Smart Readiness Indicator for buildings and related impact assessment - final report”; August 2018; Brussels.



ONE SINGLE SCORE CLASSIFIES THE BUILDING'S SMART READINESS



8 IMPACT CRITERIA



A

Simplified online quick-scan

Example application set-up:

B

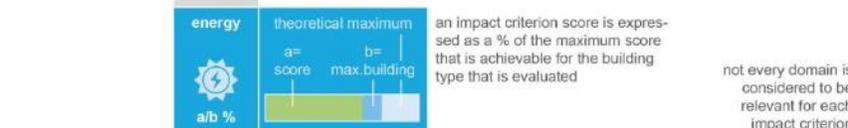
Expert SRI assessment

Example application set-up:

C

In-use smart building performance

Example application set-up:



Checklist approach with limited, simplified services list

Checklist approach, covering catalogue of smart services cf. 1st study outcomes

Measured / metered data (potentially restricted set of domains)

10 DOMAINS



Online

On-site inspection

In-use buildings, metered data
Part of the commissioning?

EACH DOMAIN COVERS A SET OF SERVICES



Self-assessment (or contractor,...)

Third-party qualified expert

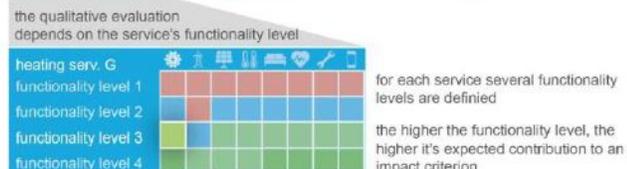
TBS self-reporting their actual performance

15 minutes

Few hours

Gather data over a long period (e.g. 1 year)

QUALITATIVE IMPACT OF A SERVICE ON ALL IMPACT CRITERIA



residential buildings and small non-residential

Non-residential + Residential

Residential and non-residential
Restricted to occupied buildings
(not in design phase)

Topical expert group C: explore future SRI developments

- Investigate requirements and feasibility an SRI assessment “method C”
- Define a process for updating method A and B
- Self-managed working group



EPPC Energy WG – Draft Position Statement on Smart Buildings

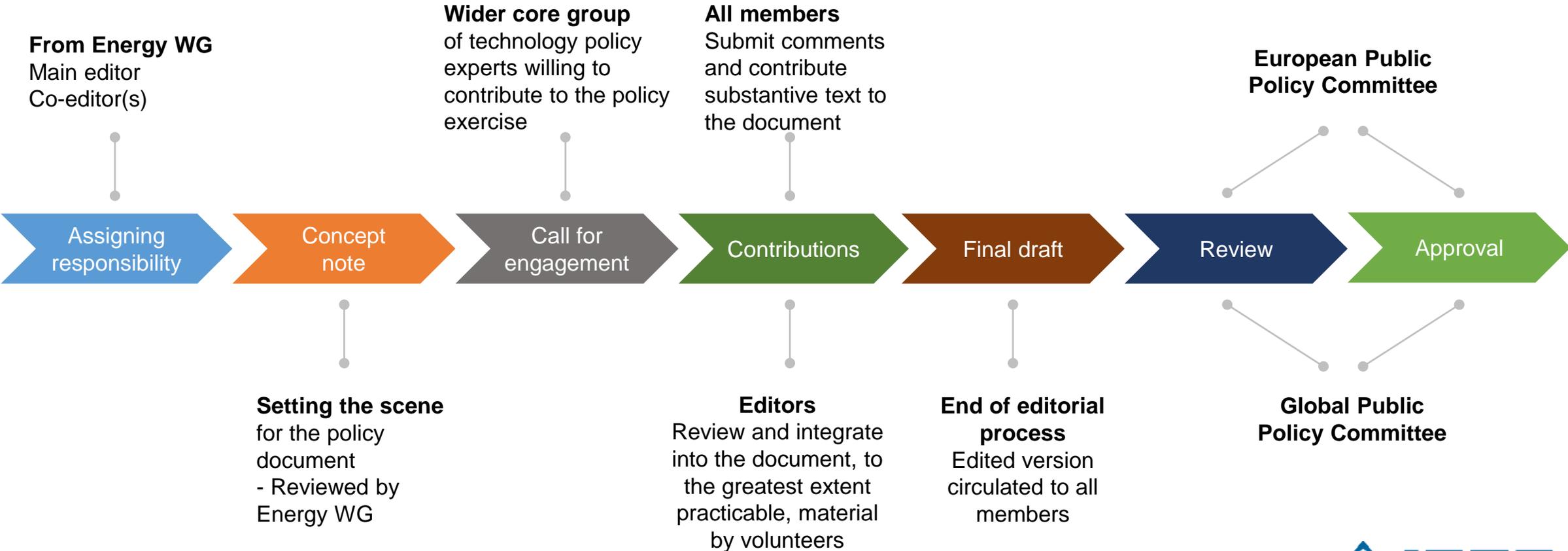
The **purpose** of the position statement is to promote smart buildings as an integrated part of the energy system

Content:

1. Contribution of Smart Buildings to the European Green Deal
2. Role of Smart Buildings in the energy system
3. Risks and opportunities of ICT in buildings
4. Recommendations for Smart Buildings legislative work
 - a. Energy efficiency and smart management in buildings
 - b. Local energy generation, storage and sector integration
 - c. Stakeholder-specific incentives: investors, occupants, facility managers
 - d. Digitalization and buildings



EPPC Energy WG methodology



Other major work of IEEE on Smart Buildings

Many IEEE initiatives and contributions, from components to systems, from education to standards...and more!

TECHNICAL COMMITTEE FOR SMART BUILDINGS



Topics to be covered include, but are not limited to:

- Information acquisition techniques (such as wireless sensor network)
- Building integrated control for energy saving
- Building as a micro grid
- Fire and security in buildings
- Human comfort control in buildings
- HVAC fault detection, diagnosis, and prognosis
- Manufacturing facilities



Smart Buildings as a Transactive Energy Hub



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