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Lectures to students of higher educational institutions of Turkmenistan

Turkmen State Institute of Architecture and Construction
Ashgabat, Saturday, 27 April 2024

EU approach to promoting energy efficiency in buildings: lessons learned and next steps

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Stantec | intec | ACTED | European University Institute | Robert Schuman Centre for Advanced Studies | FSR ENERGY Florence School of Regulation

Role of Building stock

- Buildings account for approximately **40% of final energy consumption**
- Investing in EE measures in buildings can yield **substantial energy savings**, while **supporting economic growth**, **sustainable development** and **creating jobs**
- Greater use of **energy-efficient appliances** and **technologies**, combined **with renewable energy**, are cost-effective ways of enhancing **the security of energy supply**

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TOWARDS INTEGRATED ENERGY AND CLIMATE PLANNING

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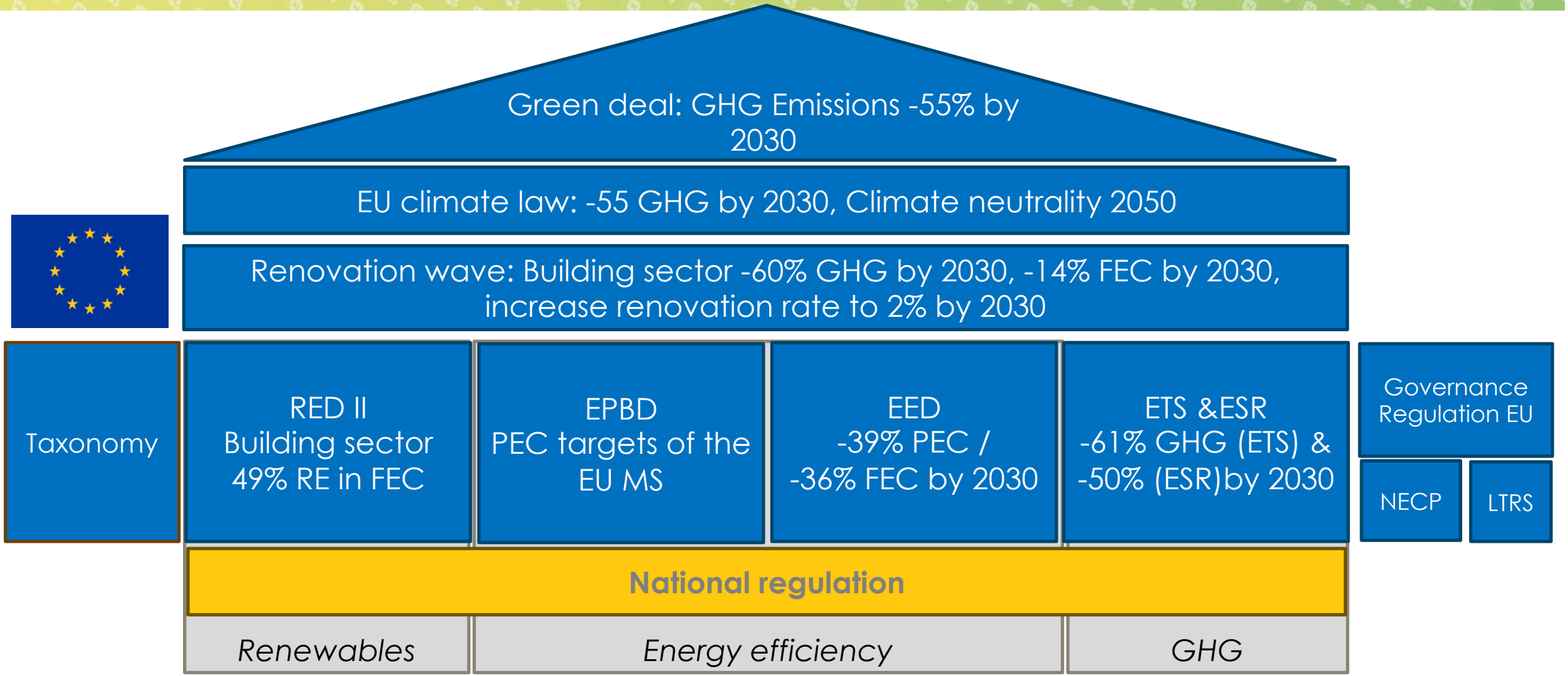
EU policy framework for integrated Energy and Climate planning



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Adopted from: Tobias Kropp, M.Sc. and Univ.-Prof. Dr.-Ing. Kunibert Lennerts, Institute of Technology and Management in Construction, Division Facility Management

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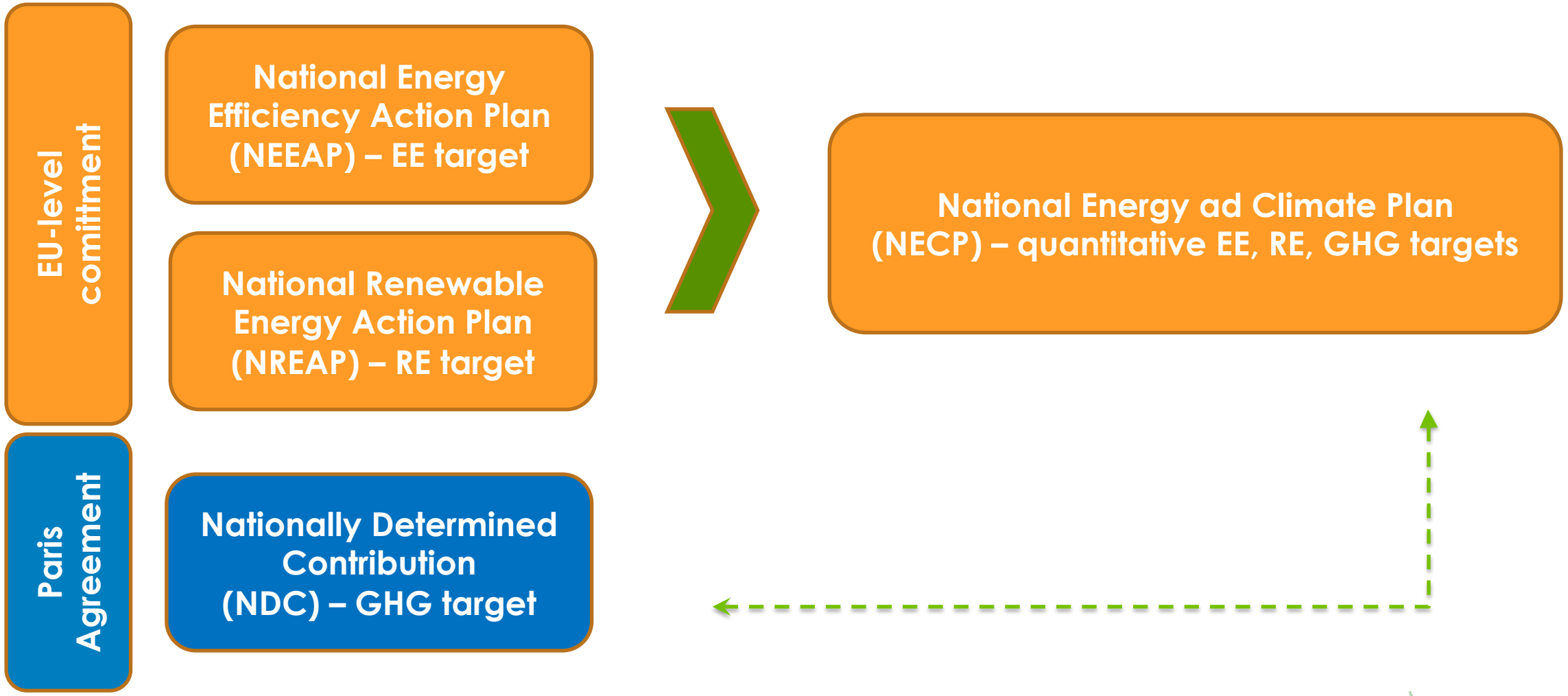
Evolution of energy policy planning process in EU



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National Energy and Climate Plan

NECP for 2021 – 2030
with the outlook to 2050

Five (5) dimensions:

- **Energy Security**
- **Energy Efficiency** as a primary fuel
- **Decarbonization** and **Renewable Energy** development
- **Market integration**
  - Cross-border connections
  - Harmonized Market rules
  - Addressing **energy poverty** and vulnerable customers
- **Research and Innovation** for new technologies

This approach requires **close coordination across all ministries**

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Content of NECP

Narrative part

Current situation - overview of the national energy system and policy context of the national plan across the five dimensions

Objectives, policies and measures for the five dimensions

Analytical basis

Integrated projections and indicators - **a separate section on projections as an analytical basis of the plan**, including reference and policy scenarios assessing the relevant impacts of the policies and measures proposed

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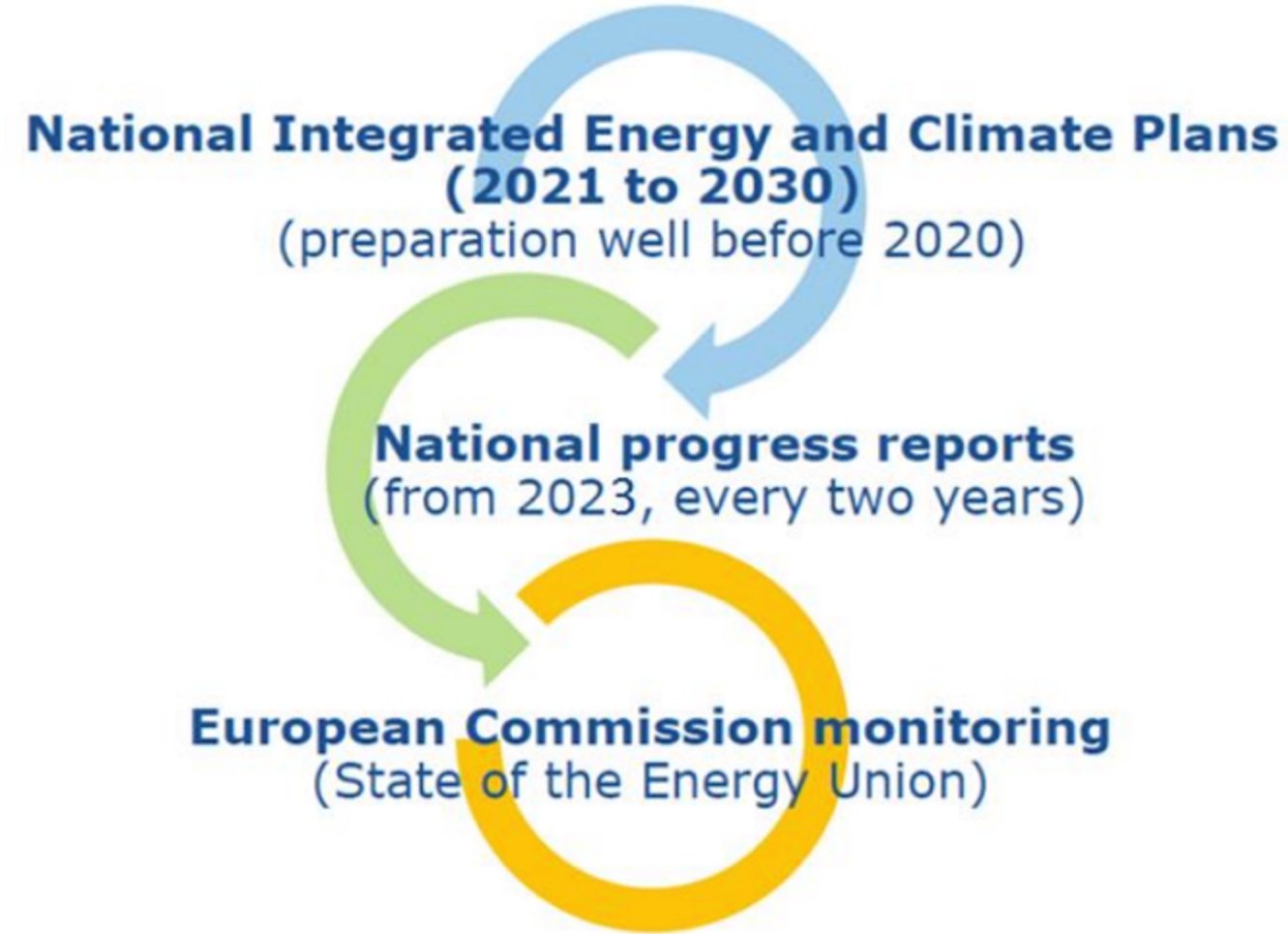
Continuous monitoring of implementation progress and results



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EE IN BUILDINGS

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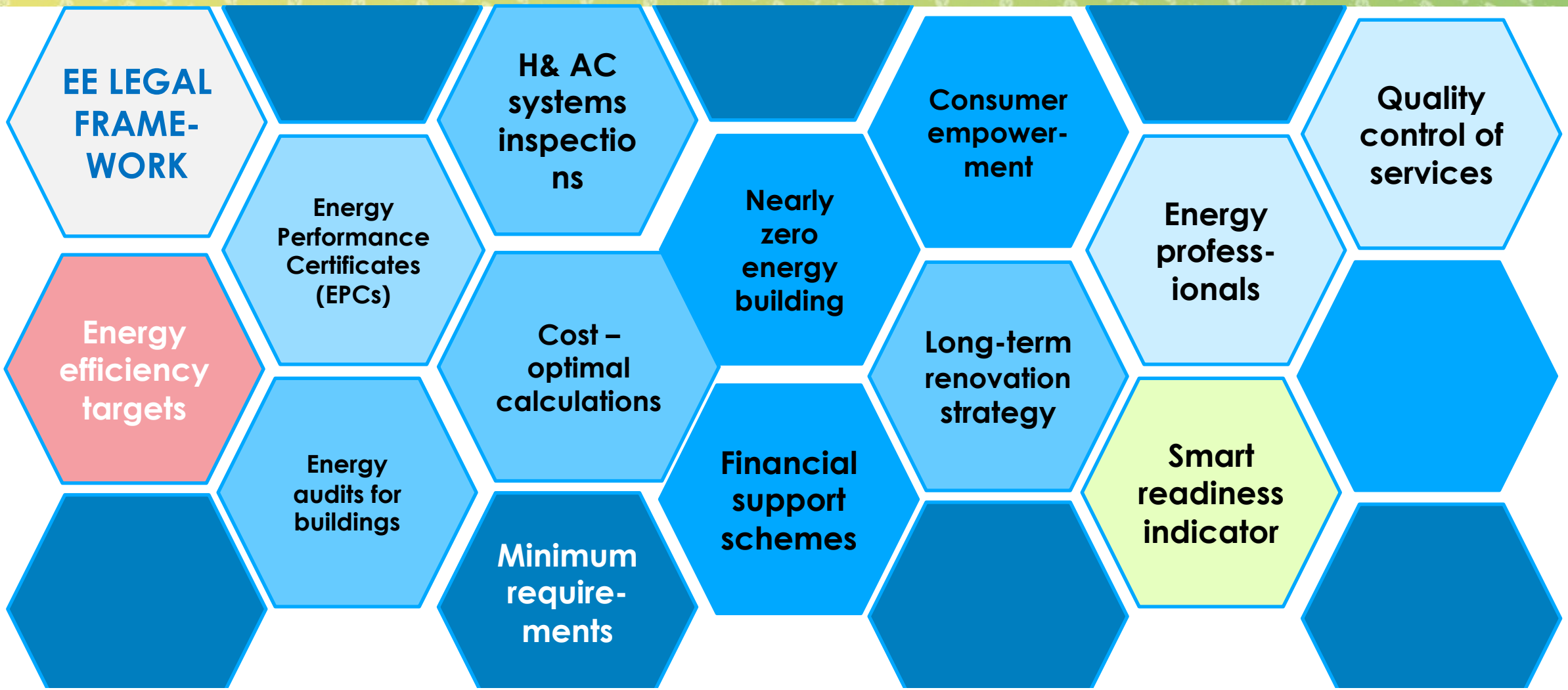
Policy elements and instruments/ tools for EE in Buildings



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Key elements for promotion of EE in buildings

- Minimum energy performance requirements
- Energy performance certification of buildings
- Inspection of heating and cooling systems in buildings
- Energy audits of buildings

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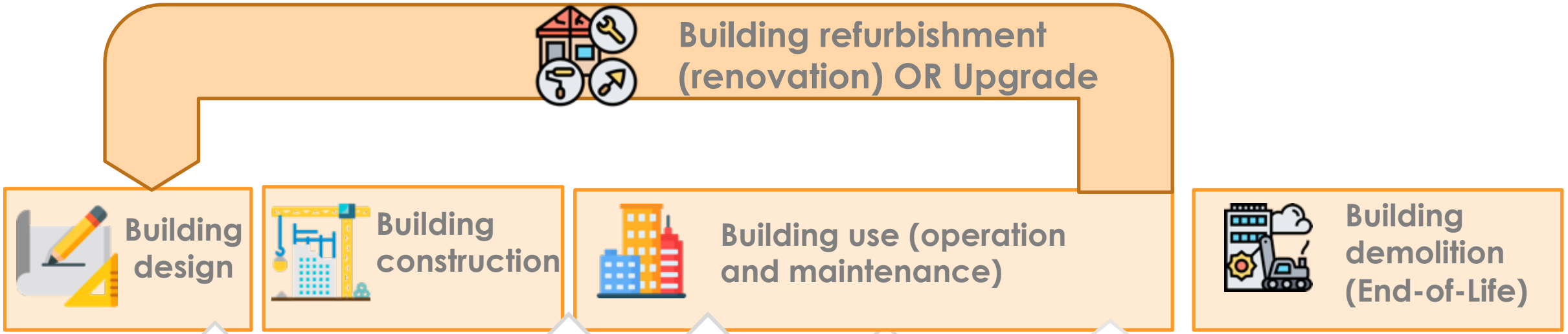
Key tools for promotion of EE improvement in Building life cycle

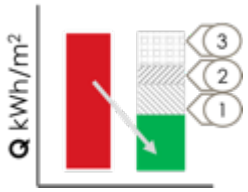


Tools:

① Project __EPC

② Energy performance certificate

③ H&C Inspection



④ Energy audit for building

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Supporting infrastructure for EE policy implementation

Energy efficiency targets could not be achieved without **supporting infrastructure needed for policy implementation**

Energy Professionals

Tools and methods supporting preparation of energy audit

Quality assurance framework for energy auditing

Reporting procedures (need for international recognition of efforts to improve energy efficiency)

Monitoring and verification procedures

The supporting infrastructure is needed as a background process
to ensure that energy efficiency measures will ensure energy savings

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Regulatory and enabling environment for EPCs

DATABASE
Centralized national registry for reports and experts.

NATIONAL CALCULATION SOFTWARE:
A free software tool simplifying the calculation and the processing of EPCs.

EXPERT CERTIFICATION:
Defined process for certifying and registering EPC experts.

QUALITY ASSURANCE:
Oversight of report quality and impartiality of experts.

GUIDELINES & DOCUMENTATION:
Providing templates and guidelines for performance certification

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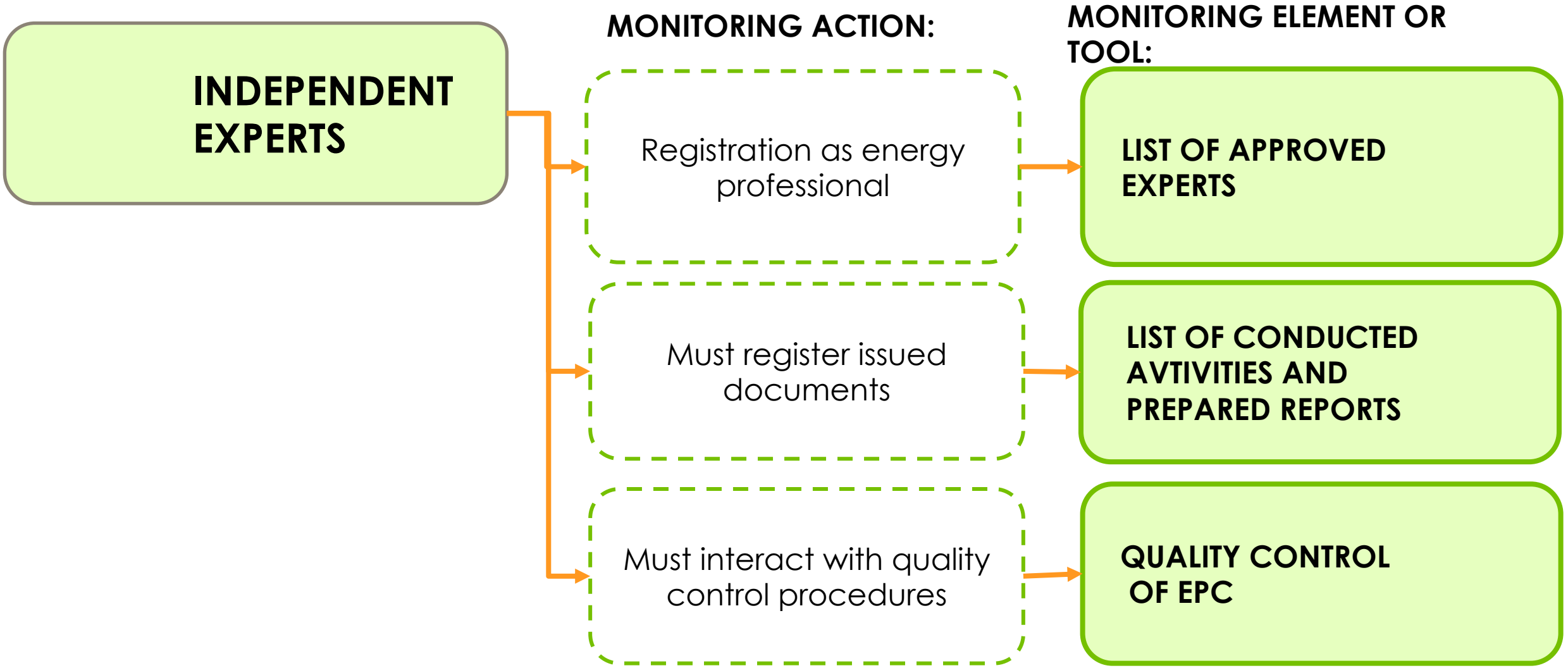
Procedure for keeping registers and monitoring work quality



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TO START WITH - CENTRAL GOVERNMENT BUILDINGS

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Building stock

- Public buildings, incl. Central Government Buildings
- Commercial sector buildings (offices, etc.)
- Industrial Buildings
- Residential buildings
  - Multi-apartment buildings
  - Family houses

Each group/ type of buildings has different features - ownership, operation and maintenance models, etc.

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Purpose of Article 5 of EU Energy Efficiency Directive

EU EED 2012, Article 5 sets the renovation requirement for Central Government Buildings:

- it is mandated to renovate annually **3%** of the total area of heated and/or cooled **buildings owned and occupied by the central government**
- these renovations must ensure that buildings meet at **least the minimum energy performance requirements**
- initially, this requirement applies to buildings with a total useful floor area over **500 m²**, which is later reduced to **250 m²**

The rationale behind the Article 5 implementation:

- **Leadership and Exemplary Role**: it positions public sector buildings as energy efficiency leaders, mandating renovations to meet energy performance standards, thus setting an example for the private sector and the public
- **Economic and Environmental Benefits**: boosting energy efficiency in buildings lowers public spending on energy, freeing up the state budget for other priorities while also yielding environmental gains through reduced energy consumption and carbon emissions, supporting the goals for sustainable development and climate change mitigation
- **Stimulating the Market for Energy Services**: the directive demands public building renovations, boosting demand for energy services and fostering innovation, job creation in the green economy, and new business models needed to spread good practices

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Main steps for promotion of EE in building sector

- It is recommended:

  to start up with selected, prioritized building categories such as **offices for Central Government Building Stock** (**CGBS)** and **step-by-step expand** and include more building categories
  within CGBS to start **with the poorest energy performance buildings to be a priority for energy efficiency measures**, where cost-effective and technically feasible

- The building may be considered as a whole, including the **building envelope, equipment, operation and maintenance**

- **After** renovation buildings **must meet minimum energy performance requirements** (MEPRs)

- Usually a **Program for increasing the energy efficiency of CGBS** is developed

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Central Government Building Inventory (CGBI)

- Implementation should start with establishing a **Central Government Building Inventory (CGBI) -** starting with buildings with a useful area above 500 m², extending to above 250 m²

- **CGBI** shall contain information of
  total floor area of the building
  and **energy performance of each building**

- **CGBI** should be made publicly available
  and updated each year

- Main problems:
  Definition of central government institutions
  Information on energy consumption

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Main criteria for selecting buildings for renovation

Owned by the Governmental institution
(excluding rented)

The building is foreseen to be used for more than 10 years
(There are no plans to sell or demolish the building, there is the basic need for use)

It does not meet the Minimum Energy Performance Criteria

Feasibility to achieve energy savings
(regular construction vs complex architecture vs cultural heritage)

Amount of energy savings per investment
(cost-benefit ratio)

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A WAY FORWARD – TO ALL PUBLIC BUILDINGS

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Upcoming changes with EED 2023

EED 2018*:

Article 5: Exemplary role of public bodies' buildings

- **Renovation**: 3% of government buildings (>250 m²) renovated yearly for energy standards
- **Priority**: Target poorest performing buildings first
- **Exemptions**: Historic, military (with exceptions), and religious buildings
- **Flexibility**: Excess renovations credited; replacements for demolished buildings qualify

*Not all requirements reflected
** Not yet transposed to EU MS national legislation

EED 2023**:

Article 5: Public sector leading on energy efficiency

- **Annual Reduction**: Public bodies to reduce energy consumption by 1.9% yearly
- **Exclusions**: Possible to exclude public transport and armed forces
- **Exemptions**: Municipalities with <50,000 population (till 2026) and <5,000 (till 2029) exempt
- **Lifecycle and Performance Considerations**: encourage consideration of lifecycle carbon emissions and wider benefits

Article 6: Exemplary role of public bodies' buildings

Renovation: 3% of public bodies' buildings floor area to be renovated to nearly zero-energy/zero-emission standards annually

- **Selection**: Based on cost-effectiveness and technical feasibility
- **Exemptions**: Social housing, historically significant buildings, military buildings, and places of worship
- **Negotiations**: For leased buildings to meet standards
- **Credit for New/Replaced Buildings**: Towards the renovation rate if more energy and CO2 efficient
- **Inventory**: Establish/update biennially an inventory of public buildings over 250 m²

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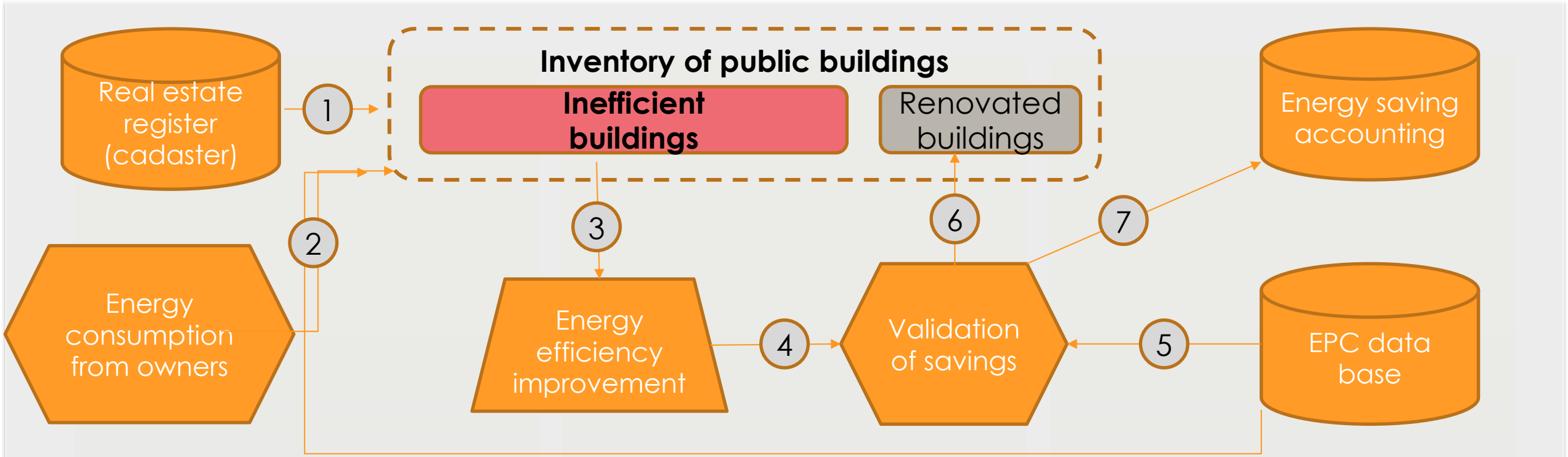
Example of an operational Public Building Inventory linked to EPC DB (Based on current practice in Lithuania)



1. Set of buildings filtered by ownership, floor area
2. Consumption based on owner declaration of actual consumption or EPC
3. Buildings selected for EE improvement
4. Owner declaration about achieved energy saving
5. Cross check to EPC database
6. Change of building status in inventory
7. Taking into account validated energy saving

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Evolution of Energy Performance Certification of Buildings concept

2002 2010 2018 2023

Directive 2002/91/EC – EPBD 2002

- Introduced EPCs for buildings when constructed, sold, or rented
- Emphasized improving energy performance of buildings
- Mandated regular inspection of boilers and air-conditioning systems

Directive 2010/31/EU – EPBD Recast

- Introduced "nearly zero-energy buildings" (NZEB) concept
- All new buildings to be NZEB by end of 2020
- Enhanced user-friendliness of EPCs and promoted wider dissemination

Directive (EU) 2018/844 - EPBD Revision

- Aims to decarbonize building stock by 2050
- Promotes smart technologies and e-mobility
- Encourages use of financial tools for energy efficiency improvements
- Stresses the use of EPC for Long-term renovation strategy

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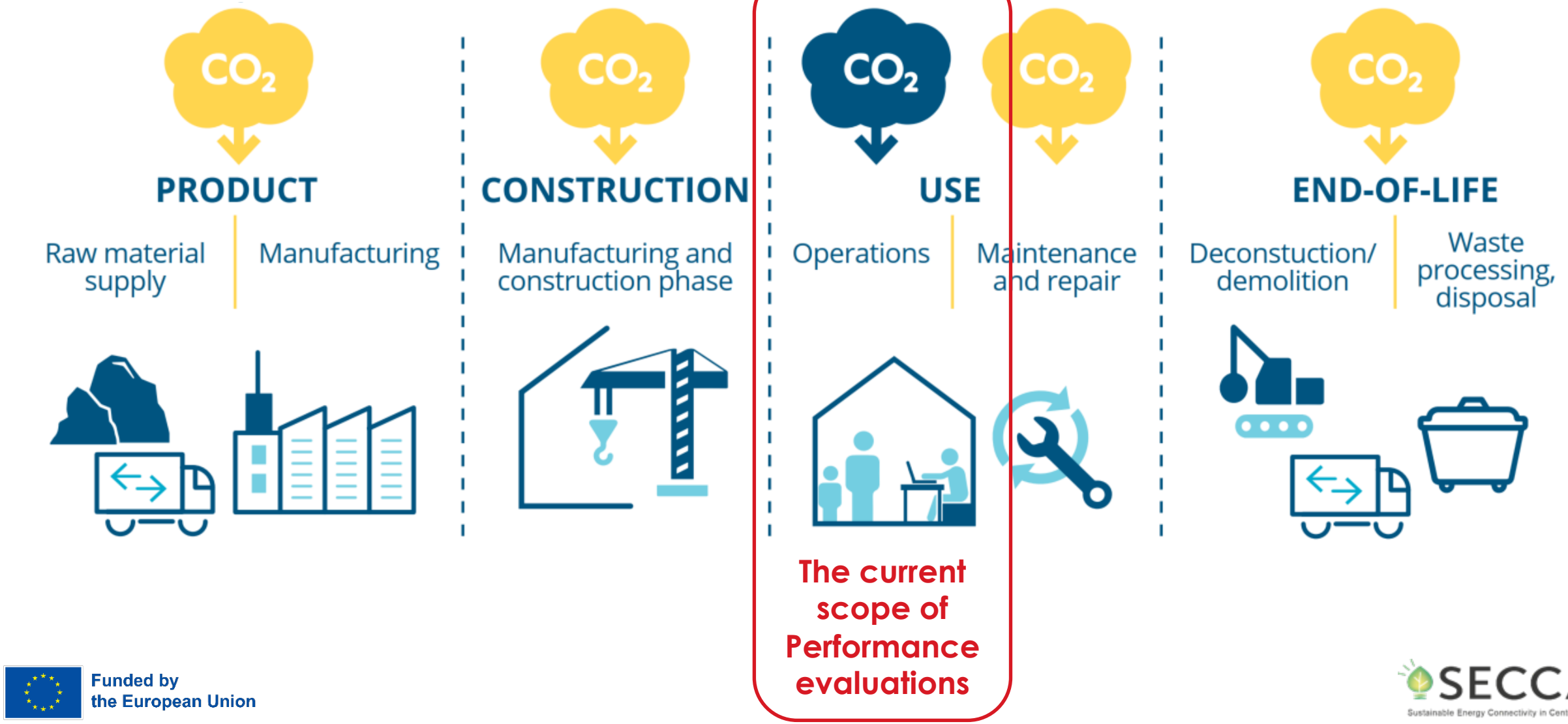
Zero-emission buildings are a new aim for making buildings more climate friendly



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