

Lectures to students of higher educational institutions of Turkmenistan

Magtymguly Turkmen State University
Ashgabat, Monday, 29 April 2024

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

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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**

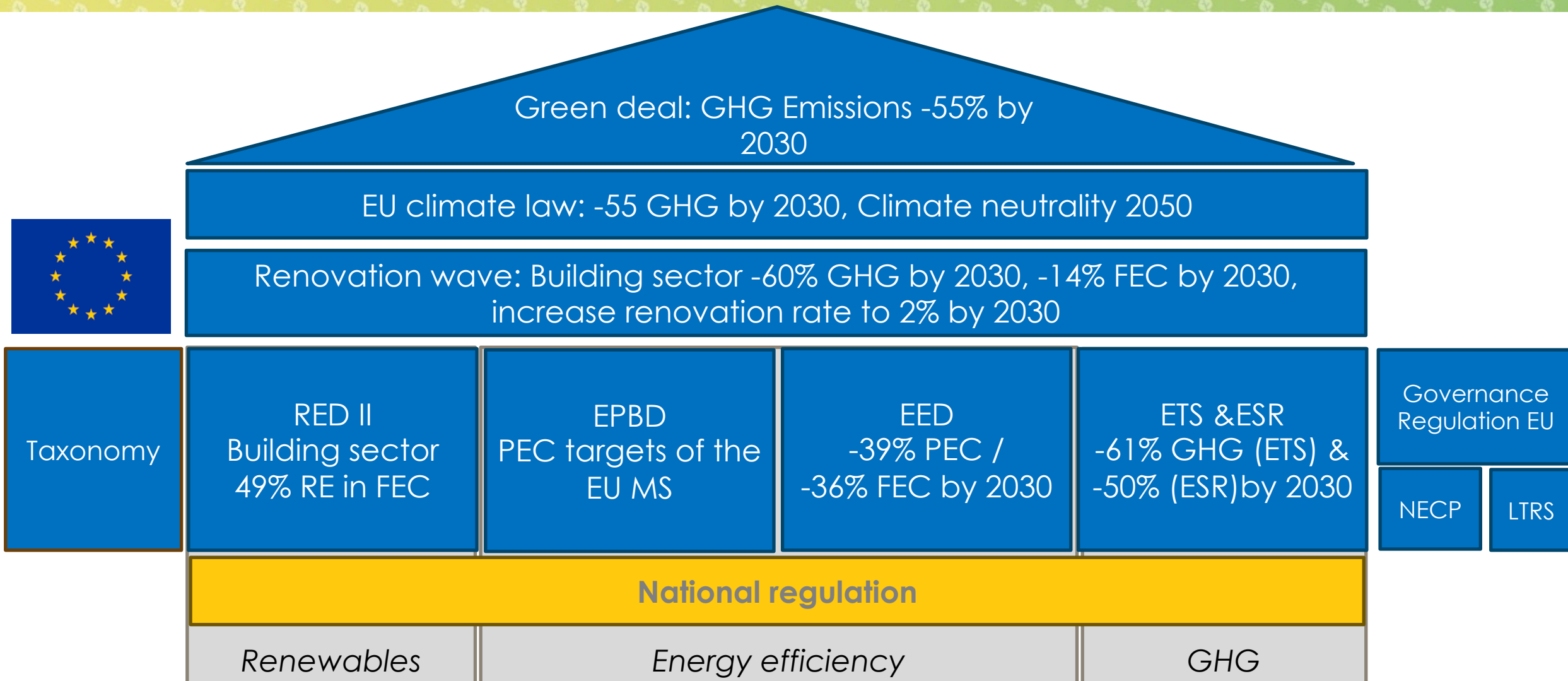


TOWARDS INTEGRATED ENERGY AND CLIMATE PLANNING

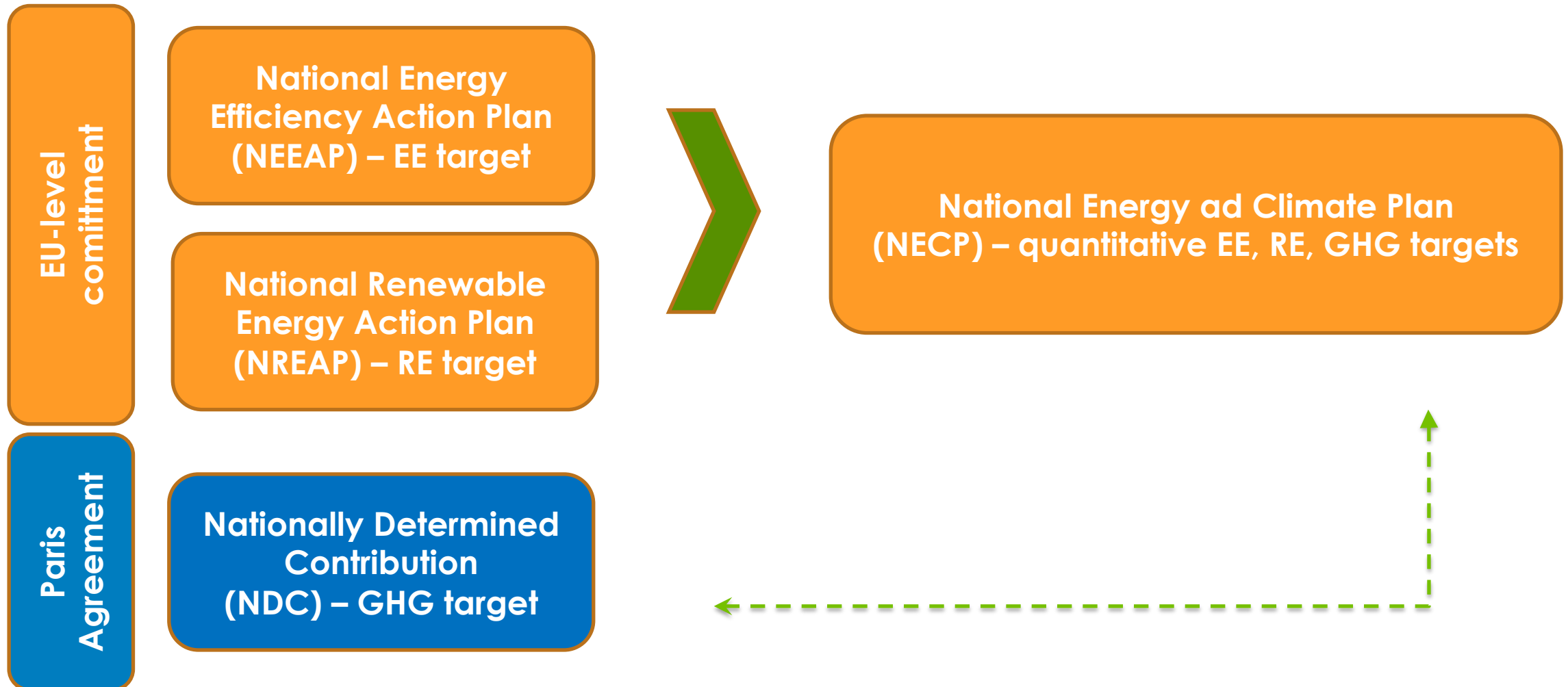


Funded by
the European Union

EU policy framework for integrated Energy and Climate planning



Evolution of energy policy planning process in EU



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**

Content of NECP

Narrative
part

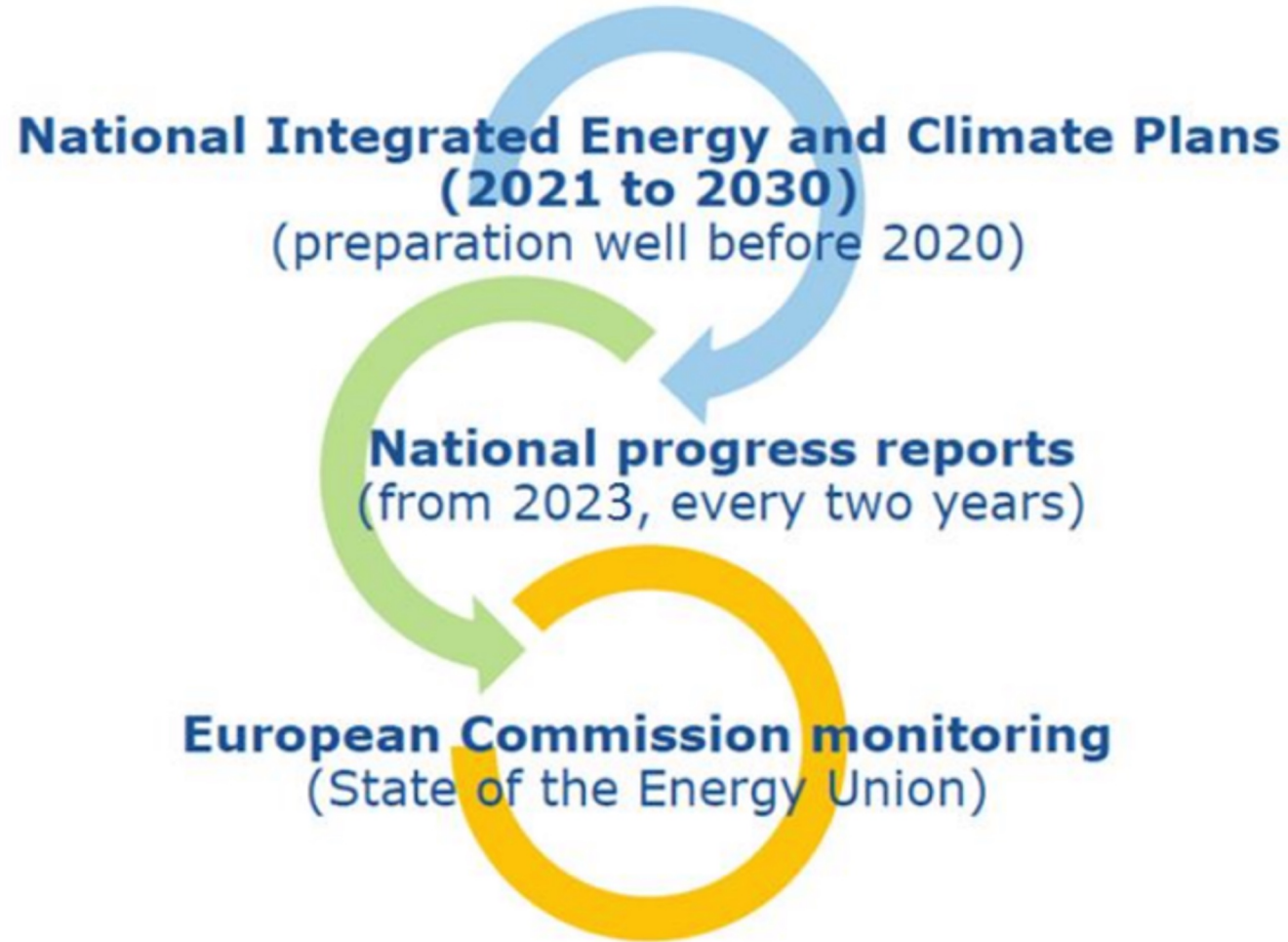
Current situation - overview of the national energy system and policy context of the national plan across the five dimensions

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

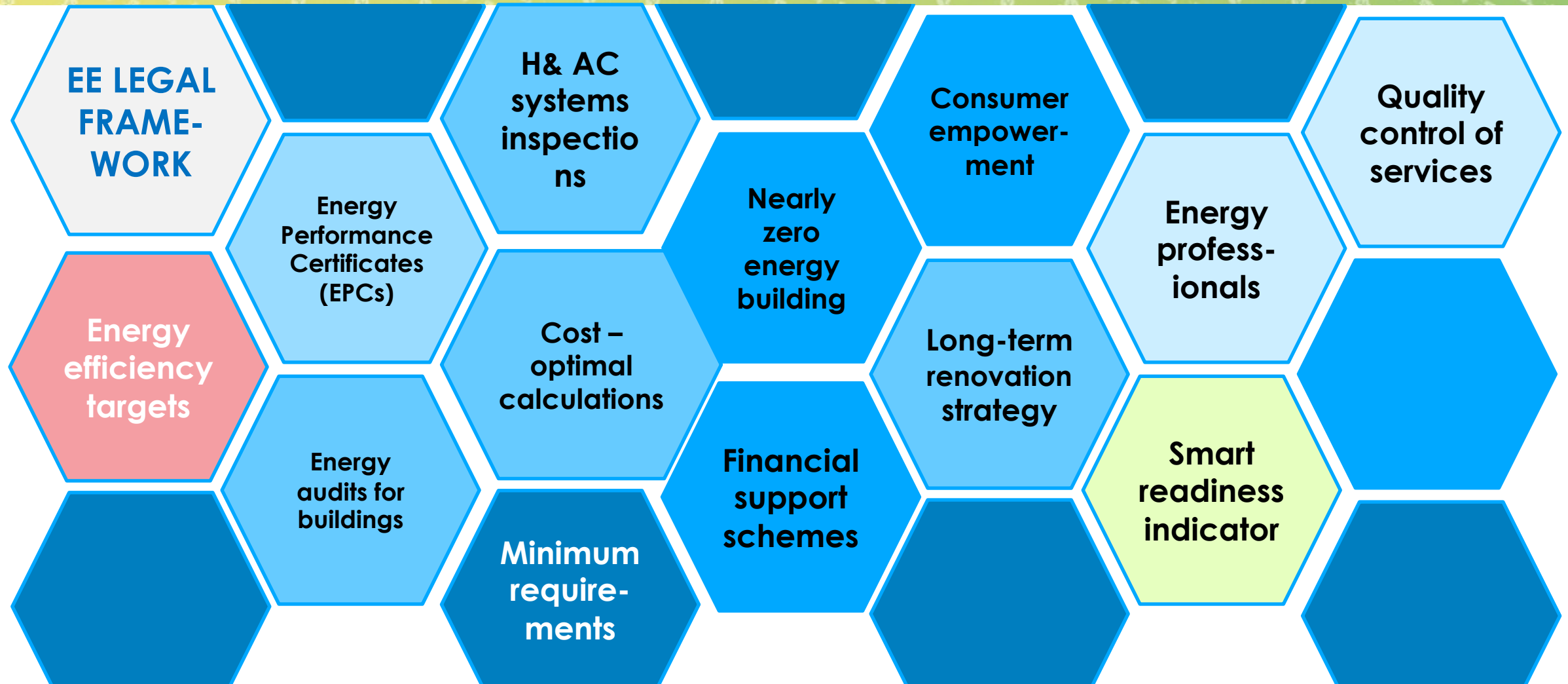
Continuous monitoring of implementation progress and results





EE IN BUILDINGS

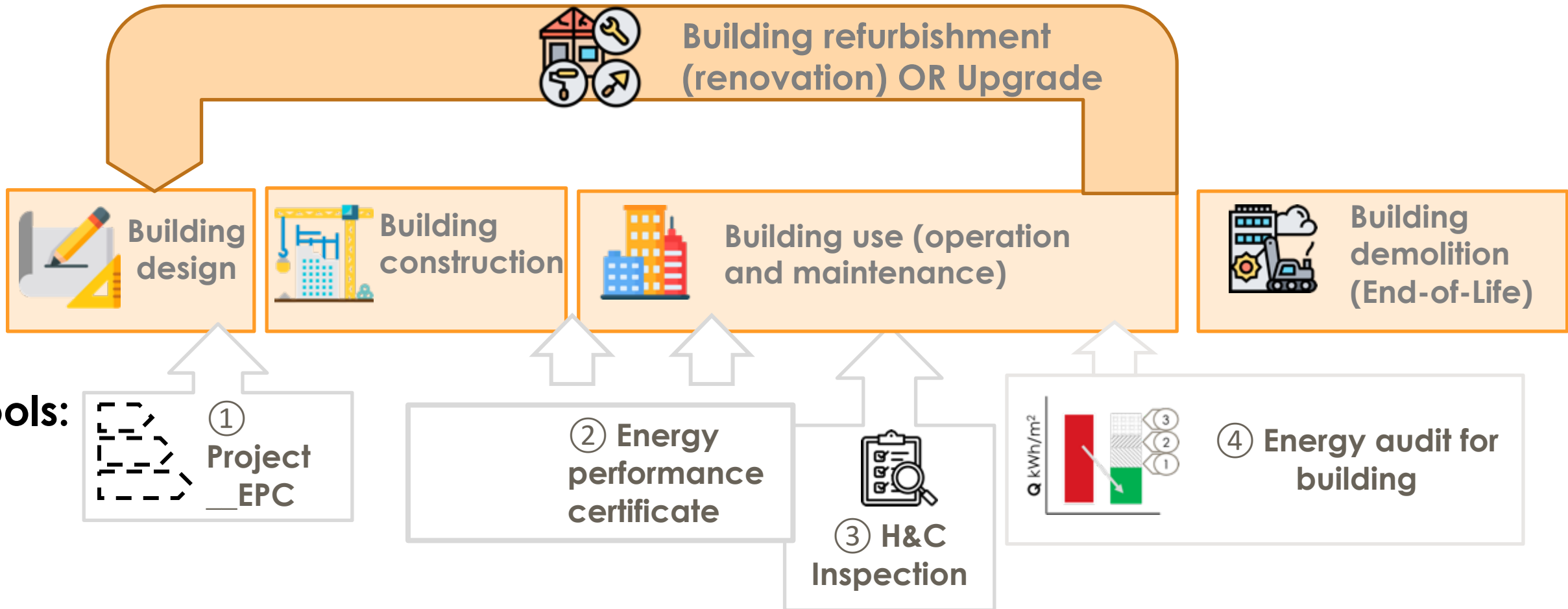
Policy elements and instruments/ tools for EE in Buildings



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

Key tools for promotion of EE improvement in Building life cycle



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

Regulatory and enabling environment for EPCs



Procedure for keeping registers and monitoring work quality

INDEPENDENT EXPERTS

MONITORING ACTION:

Registration as energy professional

Must register issued documents

Must interact with quality control procedures

MONITORING ELEMENT OR TOOL:

LIST OF APPROVED EXPERTS

LIST OF CONDUCTED ACTIVITIES AND PREPARED REPORTS

QUALITY CONTROL OF EPC



TO START WITH - CENTRAL GOVERNMENT BUILDINGS

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.

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

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

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



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)

...



A WAY FORWARD – TO ALL PUBLIC BUILDINGS

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

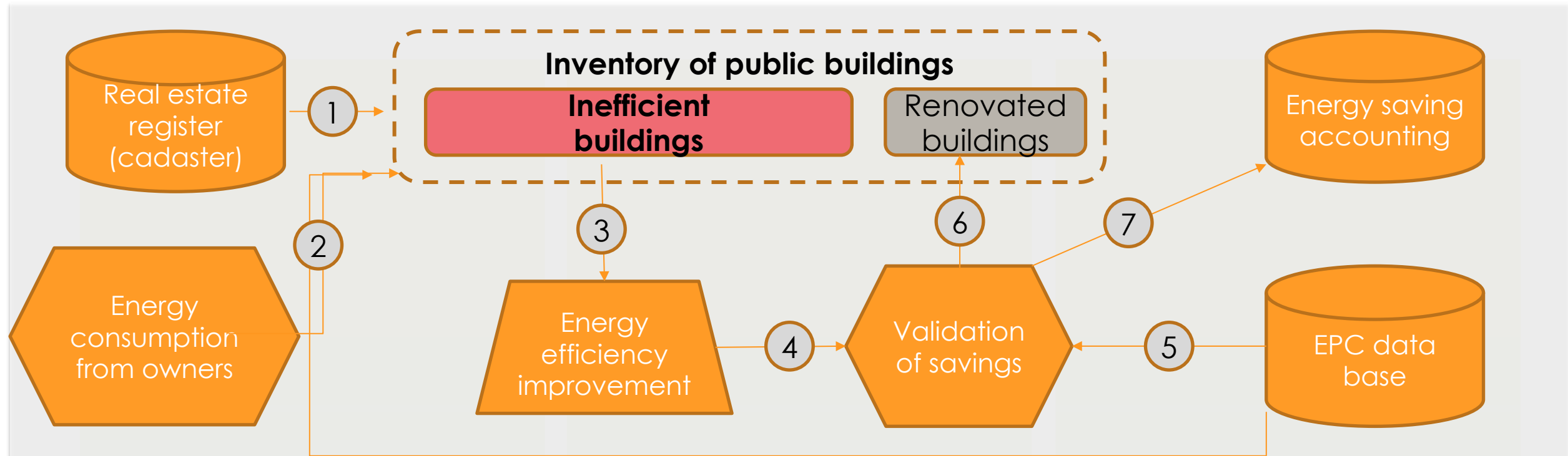
- **Annual Reduction:** Public bodies to reduce energy consumption by 1.9% yearly
- **Exclusions:** Possible to exclude public transport and armed forces
- **Exemptions:** Municipalities with <50,000 population (till 2026) and <5,000 (till 2029) exempt
- **Lifecycle and Performance Considerations:**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

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

Evolution of Energy Performance Certification of Buildings concept

2002

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

2010

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

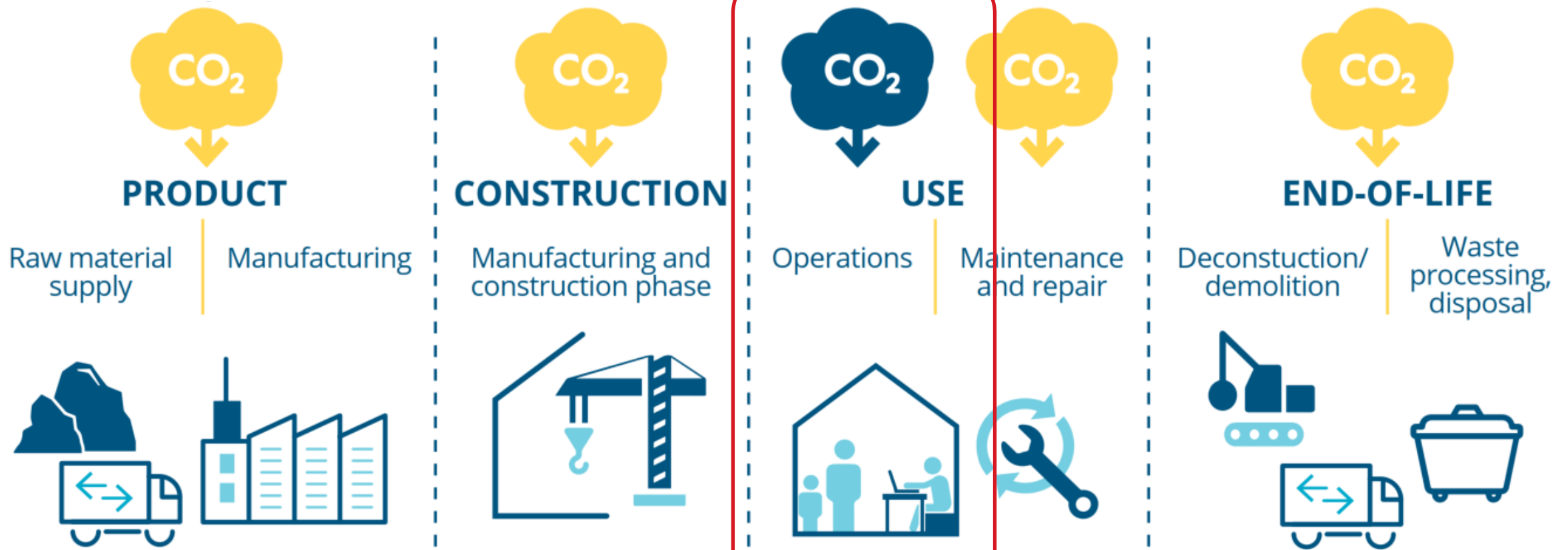
2018

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

2023

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



The current scope of Performance evaluations

More information on SECCA website

Latest News and Events

Sustainable Energy Knowledge Hub - EE and RE implementation practices

www.secca.eu