

International Conference

“The prospects for introduction of “green” innovative energy efficiency technologies in the electric power industry of Turkmenistan”
SEIT building, 62 Bayram Khan st, Mary, 18 March 2024

International practices in implementation of innovative energy efficiency technologies. Experience of the Republic of Latvia in implementation of energy efficiency technologies in public buildings

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WHY ENERGY EFFICIENCY FIRST?



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Energy efficiency first principle (1)

- **Energy Efficiency** is one of the key pillars not only to meet EU's climate objectives but also to reduce dependence on fossil fuels and increase security of supply and the use of renewable energy
- **Energy efficiency first (EE1st) principle** is generally understood as a **guiding principle for energy-related policymaking, planning, and investments**
- The principle aims to **treat energy efficiency as a source of energy** in its own right in which the public and the private sector can invest ahead of other more complex or costly energy sources
- This includes **giving priority to demand-side solutions** whenever they are more cost-effective than investments in energy infrastructure to meet policy objectives

Energy efficiency first (EE1st) principle (2)

- The EE1st principle was formally introduced into EU legislation in the Governance Regulation (European Union 2018), which includes a formal definition and **requires Member States to report on the implementation of EE1st in their National Energy and Climate Plans (NECPs)**
- In essence, it is meant to **consider and prioritise** investments in both:
 - demand-side resources (end-use energy efficiency, demand response, etc.)
 - supply-side energy efficiency**whenever these cost less or deliver more value** than default energy infrastructure

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**



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.

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)

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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

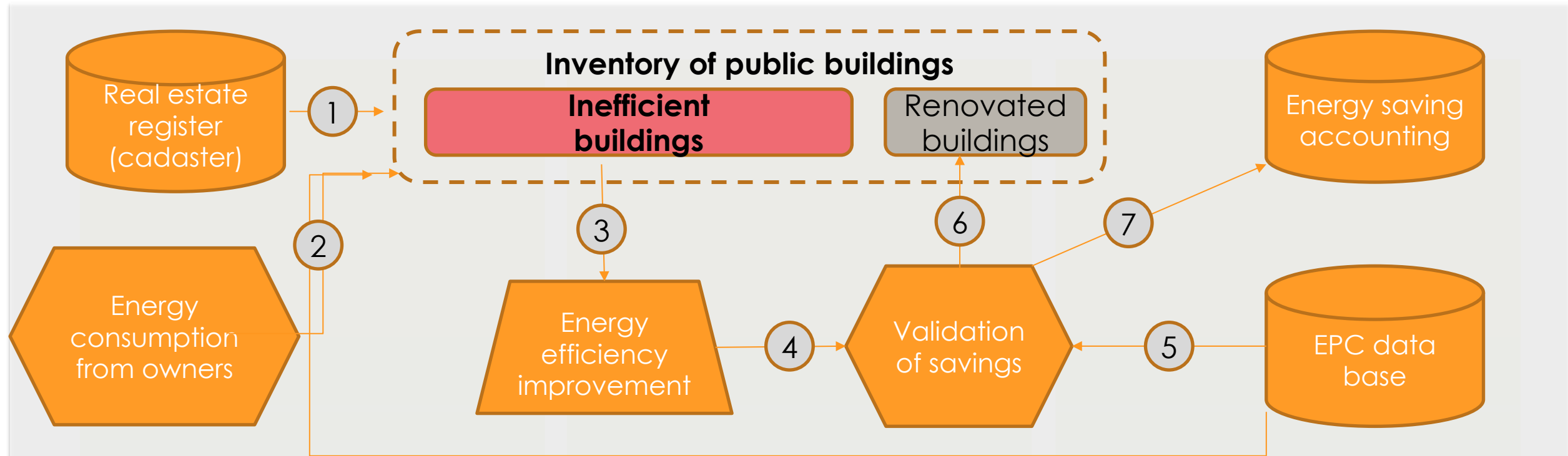
- **Annual Reduction:** Public bodies to reduce energy consumption by 1.9% yearly
- **Exclusions:** Possible to exclude public transport and armed forces
- **Exemptions:** Units with <50,000 population (till 2026) and <5,000 (till 2029) exempt
- **Lifecycle and Performance Considerations:** encourage 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 implementation of EE solutions/ technologies in LV

- 1) **Shallow/step-by-step renovation of buildings** - investment decisions are based on simple payback period calculation (replacement of windows, insulation of walls, etc.)
- 2) **Deep/complex renovation of buildings** - investment decisions are based on cost-benefit analysis (deep renovation, incl. ventilation system, etc.)
- 3) **Renovation to meet Minimum Energy Performance Requirements (MEPRs)** - investment decisions are based on cost-optimal studies
- 4) **Nearly-zero Energy Buildings (NzEB)**
- 5) **Zero-emission buildings (ZeB)**
- 6) **Passive House (PH)**

Start with energy performance requirements for **new buildings** followed by requirements for **existing buildings/ renovation**

The upcoming Building Energy Performance Directive will introduce various changes

2020

All new buildings in EU must be **Near Zero Energy Buildings (NZEB)**

2025

Energy performance certificates (EPCs) must be based on a **harmonised energy performance scale** by 2025

2030

All new buildings in the EU must be **zero-emission buildings (ZEBs)** from 2030

2050

Existing **PUBLIC** buildings must be **renovated to a high energy performance level**, with minimum energy performance standards set at EU level

Building **life cycle carbon emissions calculation** will be introduced

All new **PUBLIC** buildings must be **zero-emission buildings (ZEBs)** from 2027)

DECARBONIZED BUILDING STOCK IN 2050