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Sustainable Energy Connectivity in Central Asia

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Regional Workshop

Energy efficient budgetary institutions of Shymkent

Shymkent, 24 July 2024

Experience of the EU to improve energy efficiency of the public sector

Ilze Purina,

Key expert in energy sector governance, SECCA

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

WHY TO START WITH ENERGY EFFICIENCY?

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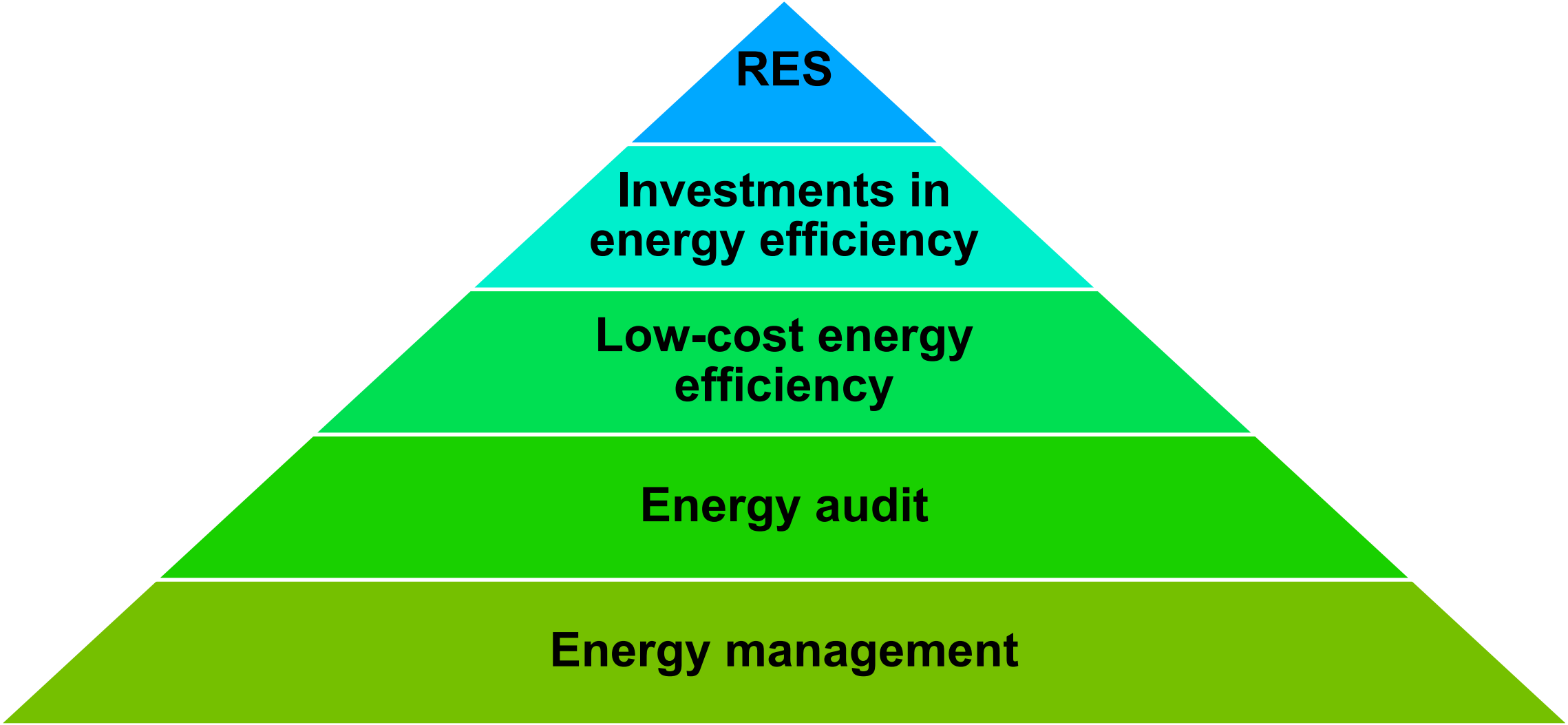
Recommended order of measures



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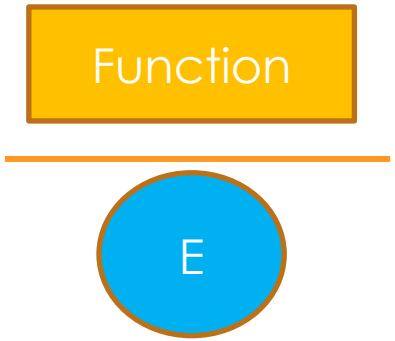
What is energy efficiency & what is not?

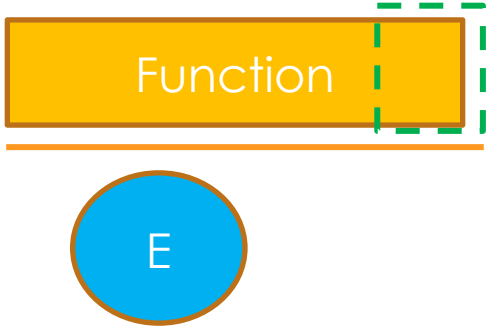
Energy efficiency should be understood as getting the same with less energy, not just using less energy by sacrificing comfort or profit

Energy efficiency:
It is the amount of energy needed to perform specific function

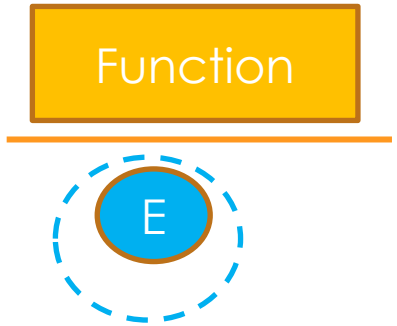


Efficiency improvement:

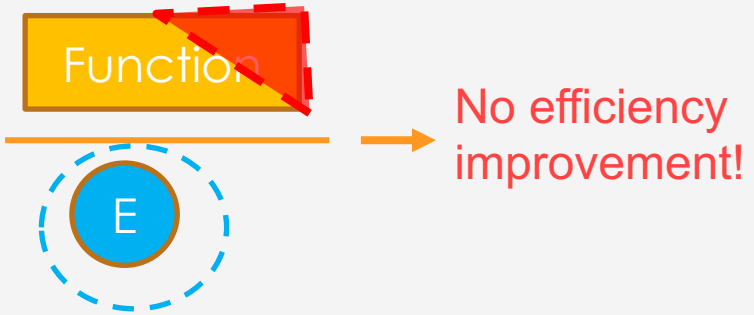
A) Have "more" with less energy



B) Have the same with "less" energy consumed



BUT if we sacrifice the function *(as a comfort or productivity) – **it is not an improvement**:*



Sample functions:

- *Maintain thermal comfort in the building*

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Energy efficiency first principle

- **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

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HOW TO PRACTICALLY PROMOTE ENERGY EFFICIENCY?

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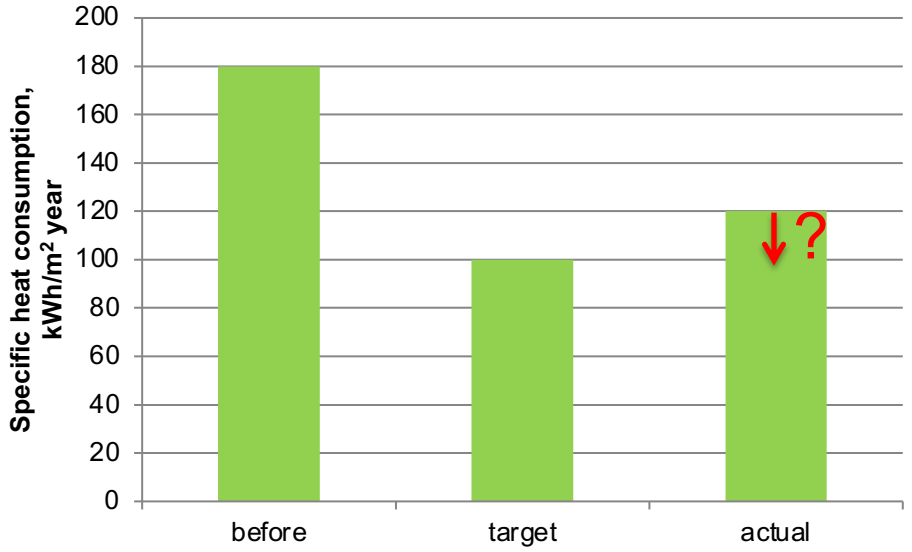
What was and still is the Starting point (motivation) towards energy management in different municipalities?

One of the reasons: **Failure to reach targeted heat consumption**

Grant for renovation of a public building - target values are set (kWh/m^2 year)

1 year later



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What often happens at the building level…

- Kindergarten built in 1970-ies
- Renovated in 2015
- 120 children
- 1566 m^2
- Heat consumption before renovation – 206 kWh/m^2 year
- Heat consumption after renovation (from energy audit) – 99 kWh/m^2 year
- Real consumption 4 years after renovation – 180 kWh/m^2 year
- Building is overheated and ventilation is ensured through open windows
- Automatisation of the heating system was not connected
- Annually lost around 5000 EUR

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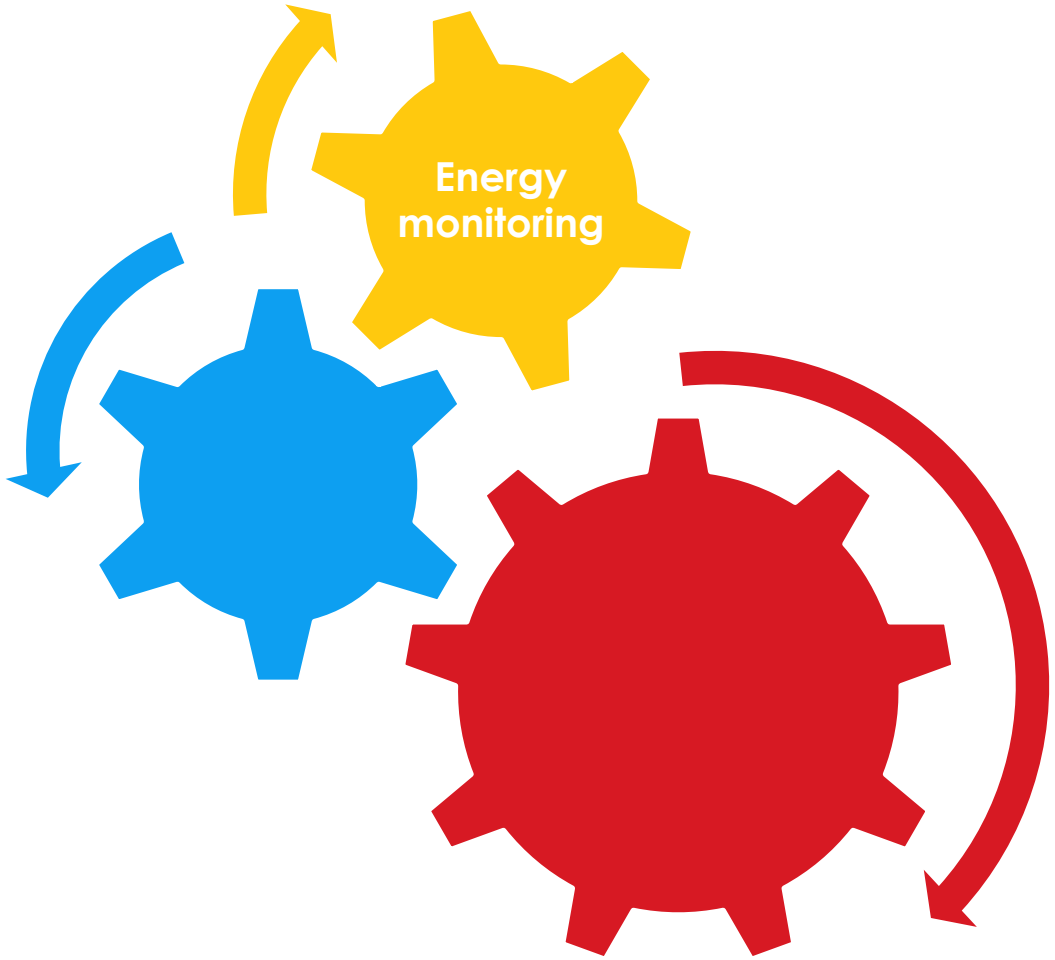
What can help?



Energy monitoring is crucial as **you can influence only what you measure**

But it is not enough…

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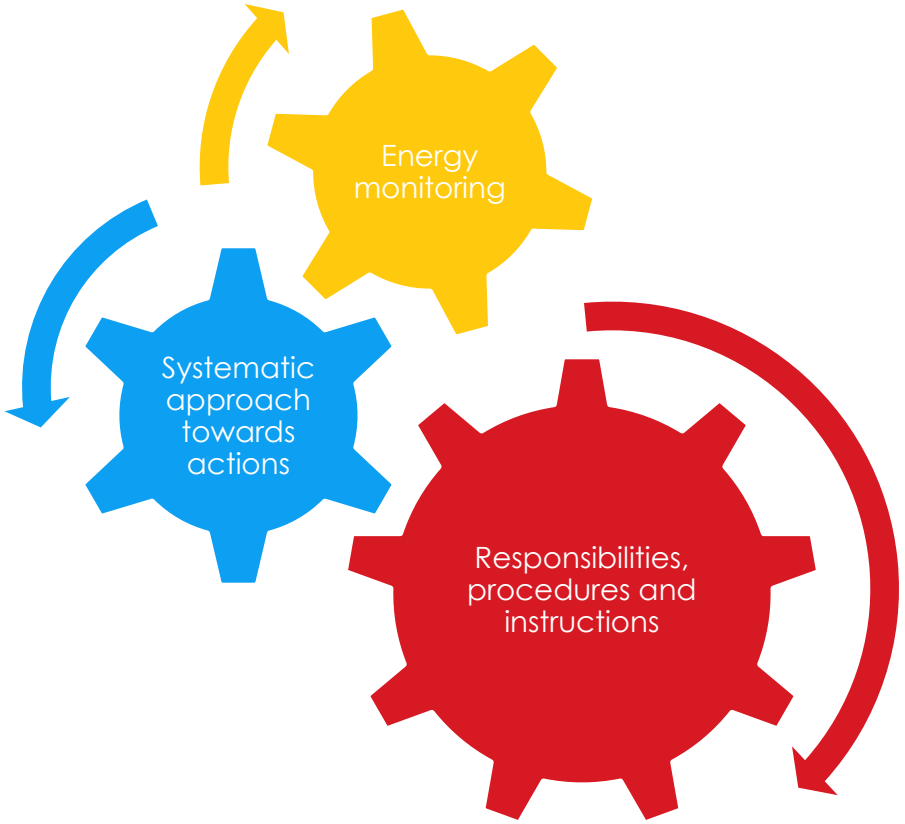
What can help in this case?



Introduction and implementation of Energy Management System

Energy Management System will address challenges like:

1. How many public buildings there are?
2. What is their heat consumption? Do we use it rationally?
3. What is their electricity consumption?
4. How much do we pay for energy in public buildings?
5. What is the air quality in these buildings?
6. Which buildings should be renovated?
7. How to ensure that these buildings are maintained as well as possible?

1. Rational use of energy - targets
2. Efficient and effective actions
3. Use of available resources

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The challenges

At the building level:

- Is the building maintained as well as possible?
- Is heat consumption known? We consume a lot or average?
- Is electricity consumption known?
- Is air quality good?
- Are rooms well ventilated?
- Is lighting appropriate?
- Is system regulated so that there is less heating ensured during the weekends (if building is not used)?

Etc.

At the municipal level:

- Are all buildings maintained as well as possible?
- Do we know heat consumption in each building and how it changes?
- Is electricity consumption known for each building?
- Do we know how much we pay monthly/annually for energy?
- Is air quality good in all schools and kindergartens? Are rooms well ventilated?
- Is lighting appropriate?
- Is system regulated so that there is less heating ensured during the weekends (if building is not used)?
- Etc.

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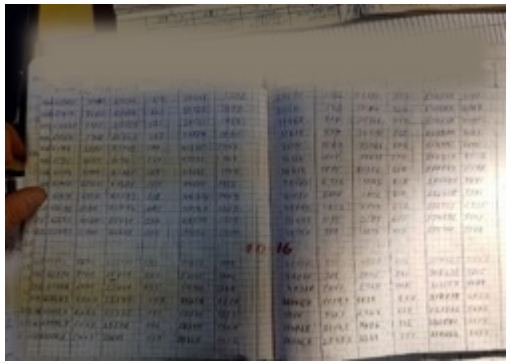
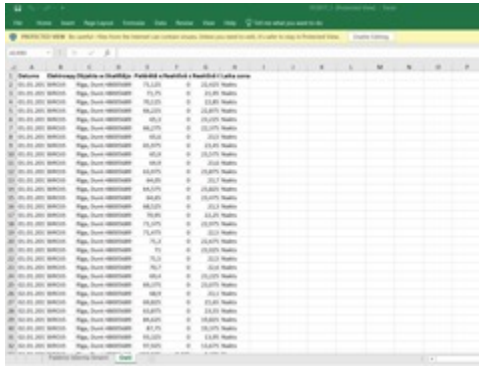
Challenges with energy data monitoring in municipalities

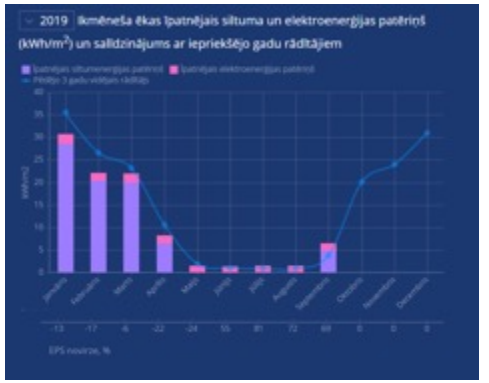
- A lot of time is dedicated to gathering historical energy consumption data
- Rarely collection of actual monthly energy data occurs
- All kinds and types of Excel files are created
- Usually access only to one person
- **People that actually can influence energy consumption are not aware or don't have a duty or don't know what to do and how to measure**



Manual



Digital but manual



Full digitization/smart monitoring

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What can we save with energy management?

- Until 3% per year?
- 3-8% per year?
- Until 10% per year?
- Around 15-20% per year?
- Above 50% per year?

The main point of Energy Management System (EnMS) is to introduce systematic approach towards **rational use of energy with available resources**, i.e. with **small investments and behavior change**.
Once it is done, municipality can **plan large investment projects based on real data and needs**!

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OPPORTUNITIES AND CHALLENGES IN THE BUILDING SECTOR

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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**

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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 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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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 CO_2 efficient
- **Inventory**: Establish/update biennially an inventory of public buildings over 250 m²

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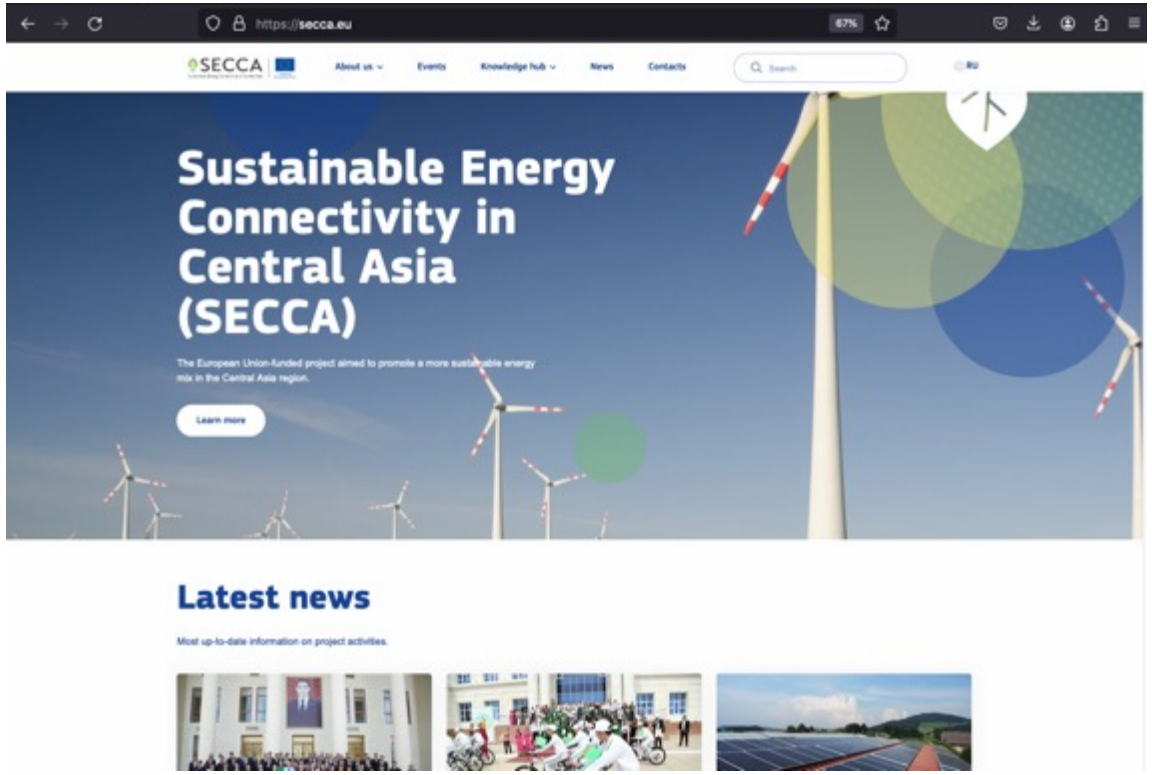
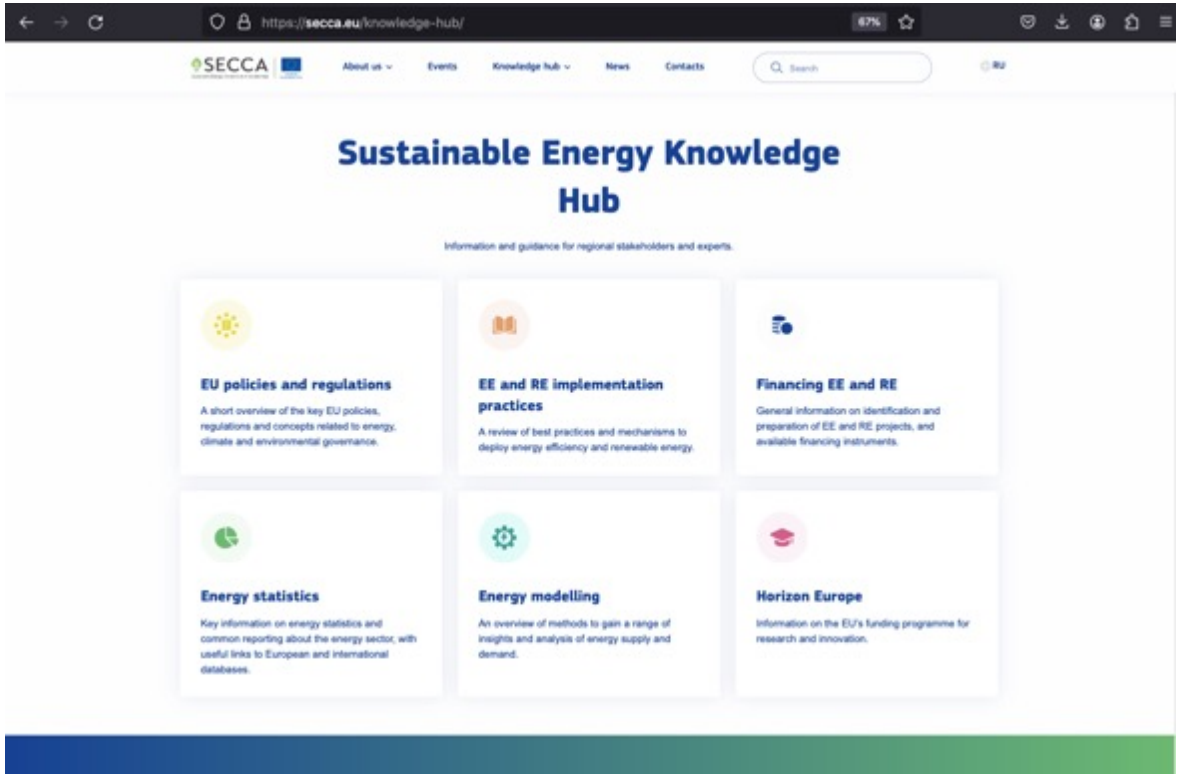
More information on SECCA website

Latest News and Events

Sustainable Energy Knowledge Hub - EE and RE implementation practices

www.secca.eu





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