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Sustainable Energy Connectivity in Central Asia

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Technical workshop
"Energy audits in buildings – from theory to practice"
Radisson Blu Hotel, Tashkent, 18 October 2023

Role of energy audits of buildings in the promotion of EE in buildings

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

THE OUTLINE OF PRESENTATION

- Why building sector is important for Uzbekistan?
- What drives energy consumption in the building sector?
- Is there any improvement potential in building sector?
- What tools would help to address existing energy saving potential?
- Energy audit versus Energy performance certificates?
- When to use energy audit?
- What benefits do energy audits deliver for the building sector?

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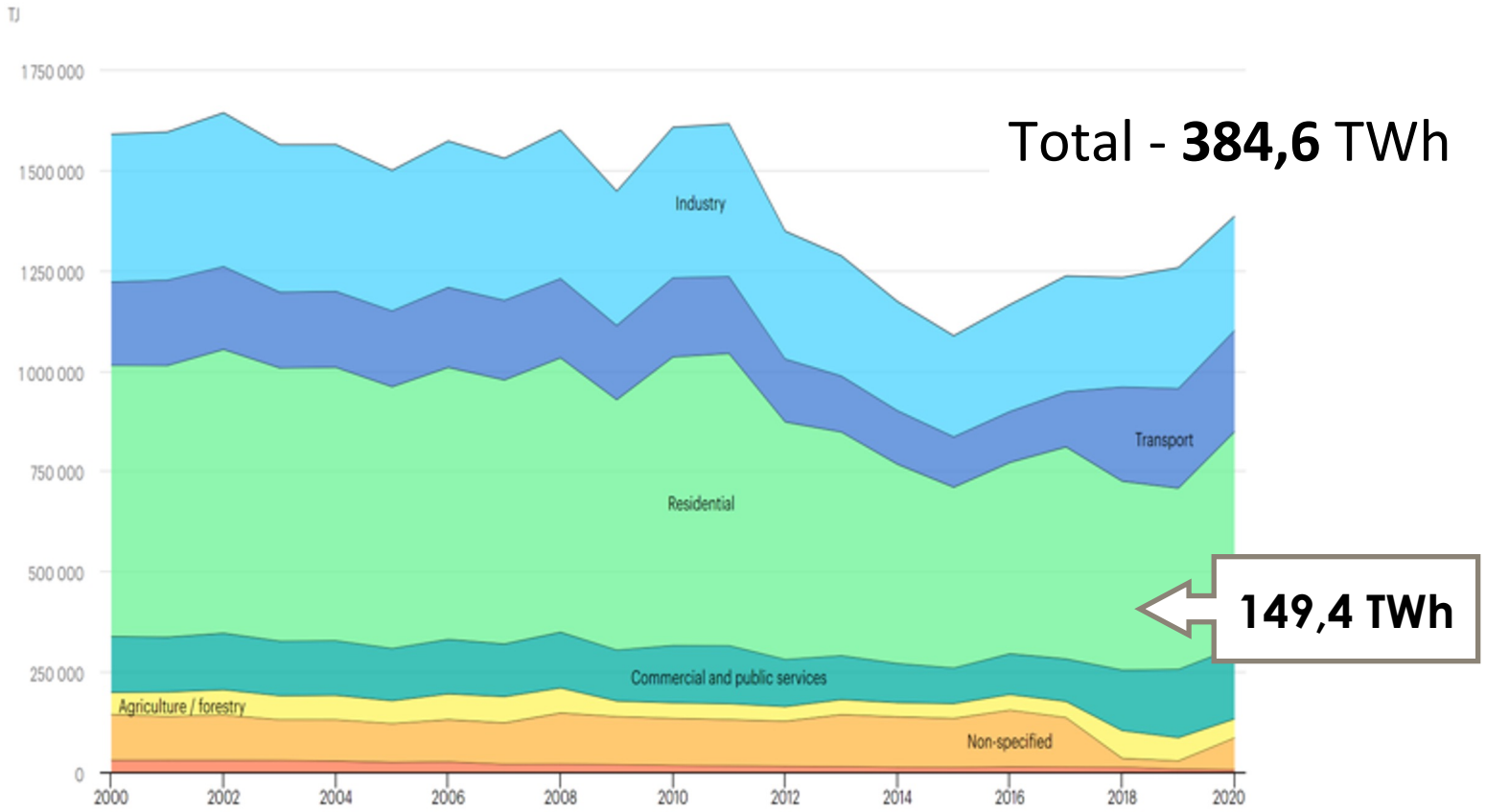
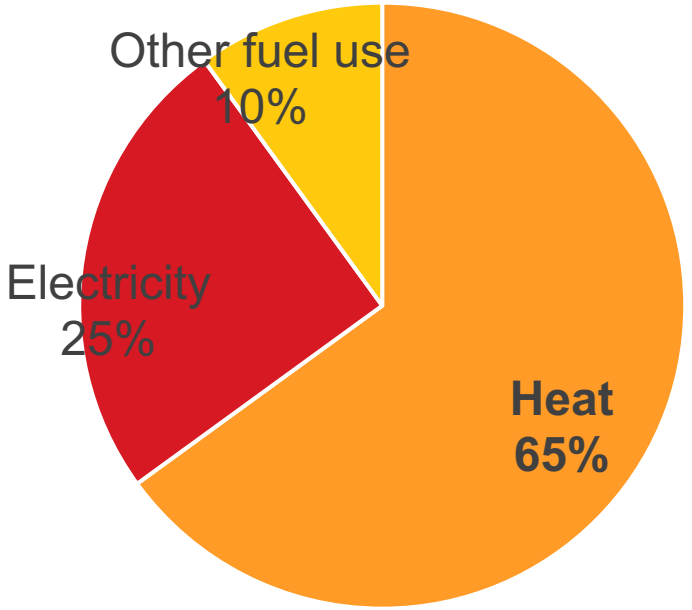
THE BUILDING SECTOR IS THE LARGEST ENERGY CONSUMER IN THE UZBEKISTAN



Total - **384,6** TWh

149,4 TWh



Estimated building stock size:
~560 mln.m2 – Residential
~110 mln.m2 - Public

Source: https://www.iea.org/countries/uzbekistan

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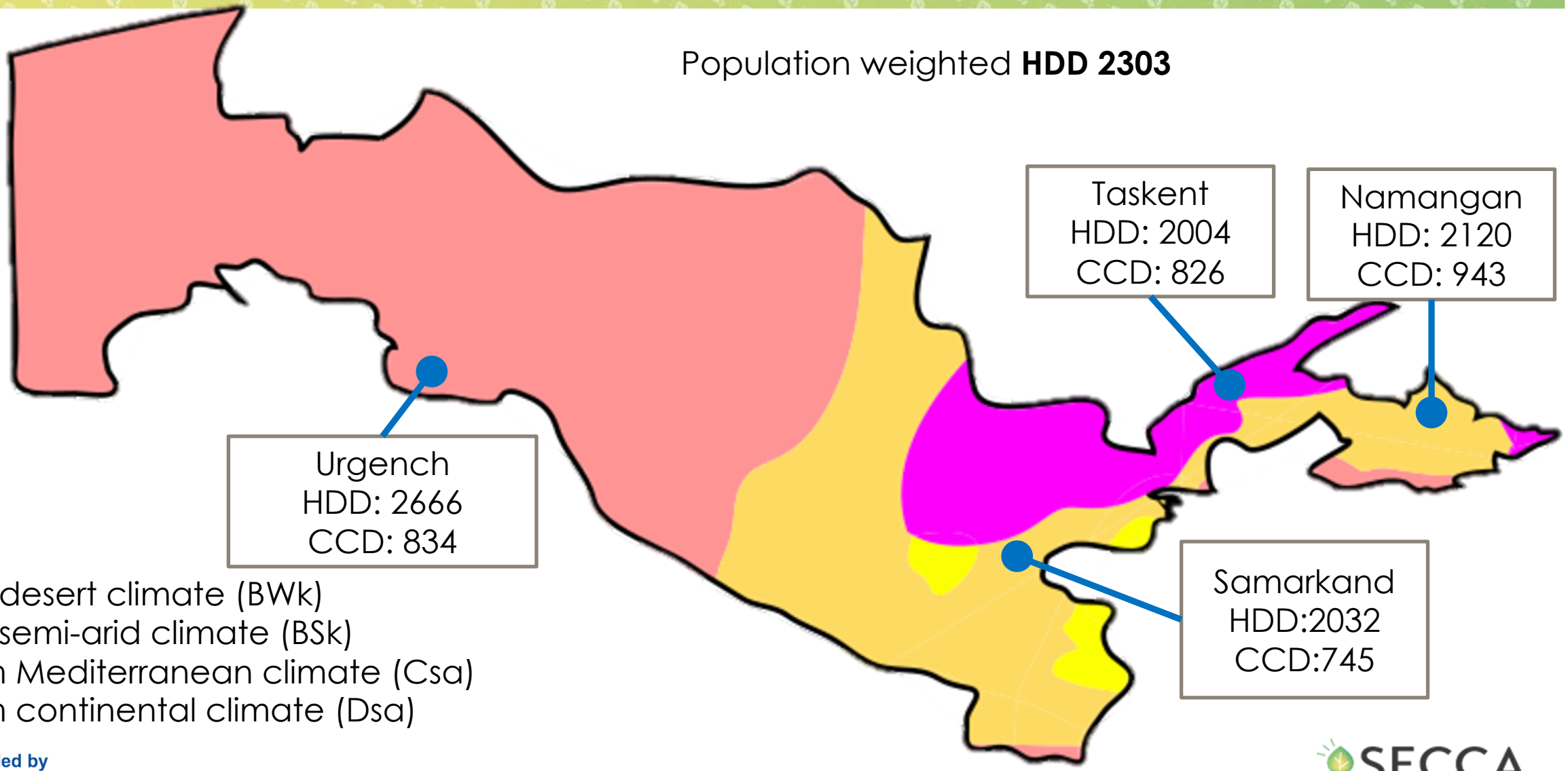
DESPITE HOT SUMMERS AND DESERT CLIMATE, THE HEAT PRODUCTION IS MAIN DRIVER OF CONSUMPTION

Population weighted **HDD 2303**



- Cold desert climate (BWk)
- Cold semi-arid climate (BSk)
- Warm Mediterranean climate (Csa)
- Warm continental climate (Dsa)

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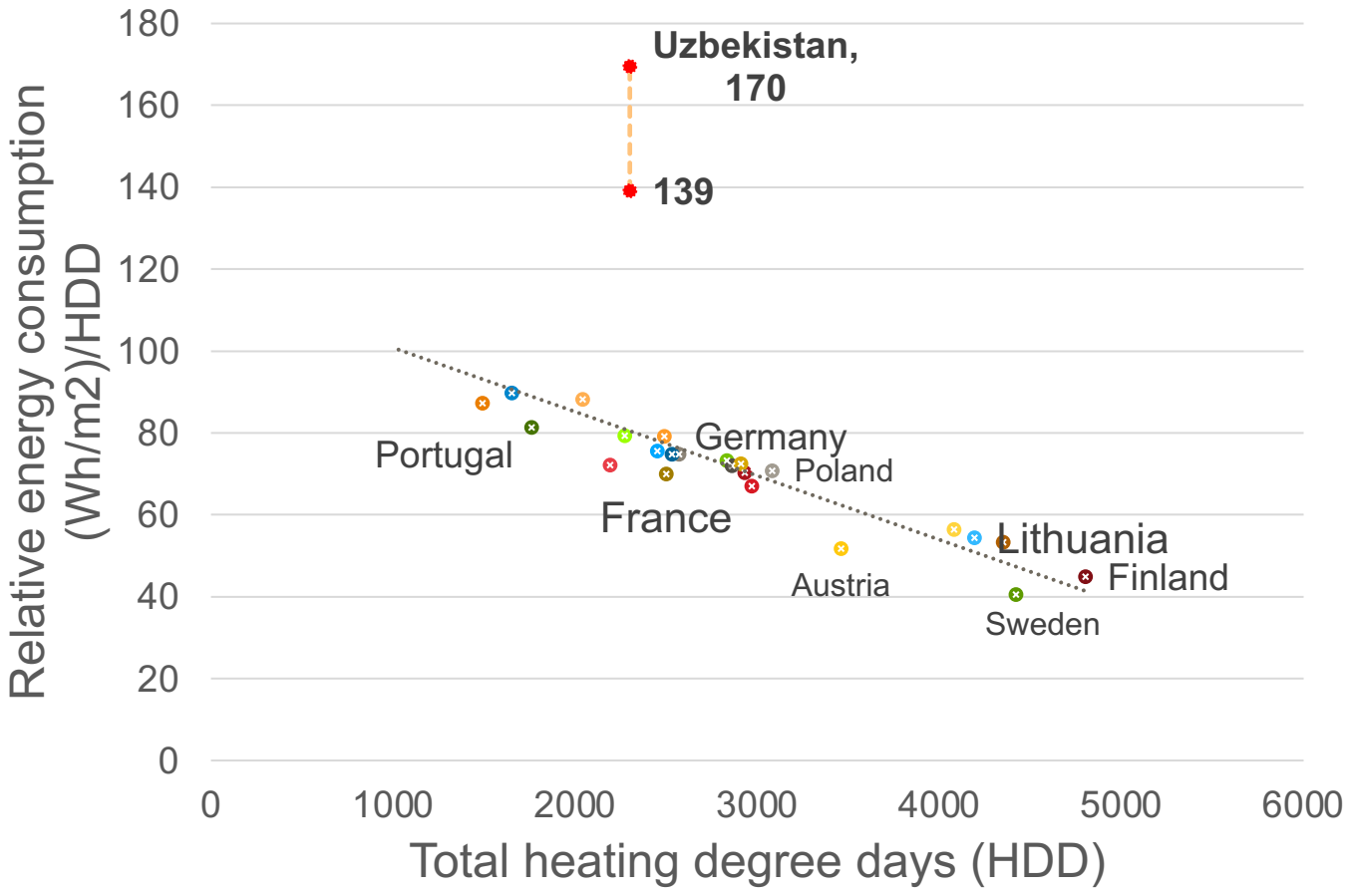
BASED ON RELATIVE ENERGY CONSUMPTION IN BUILDINGS, UZBEKISTAN HAS LARGE IMPROVEMENT POTENTIAL



The relative energy consumption is almost 2-3 times larger than in other countries.

<u>This potential could be addressed by:</u>

- Increasing energy efficiency standards
- Awareness raising about the energy efficiency importance
- ***Activating the tools that will kick-start the energy efficiency improvement***

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TO ADRESS ENERGY SAVING POTENTIAL THERE IS A NEED TO HAVE A TOOLS AND PROFESSIONALS CAPABLE TO APPLY IT

To enable that, the energy professionals is needed:

- Energy performance certification experts
- **Energy auditors**
- Heating and air conditioning systems inspectors

***Tools to transform energy consumption*:**

- ① Energy performance design for new construction
- ② Energy performance certificates of existing buildings
- **③Energy audits in building**
- ④ Heating and air conditioning systems inspection reports

Sustainable growth is enabled by the tools, which are important to foster energy efficiency and promote sustainable economic growth.

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WHAT IS ENERGY AUDIT?

ENERGY AUDIT - systematic procedure with the purpose of obtaining adequate knowledge of the energy consumption profile of a facility, identifying and quantifying cost-effective energy saving opportunities, and reporting the findings.

In other words – *a procedure which aims to document* ***energy flows and losses*** *and then* ***identifies ways to reduce or eliminate those losses*** *by proposing cost-effective measures.*

HIGH QUALITY ENERGY AUDIT - an energy audit that meets the **minimum requirements**, is **performed independently** by **qualified professionals**, and provides **significant benefits** for all stakeholders involved, while being **cost-effective**

Energy audit is a tool that helps unlock cost-effectively energy efficiency improvements. The quality has to be ensured to deliver significant benefits

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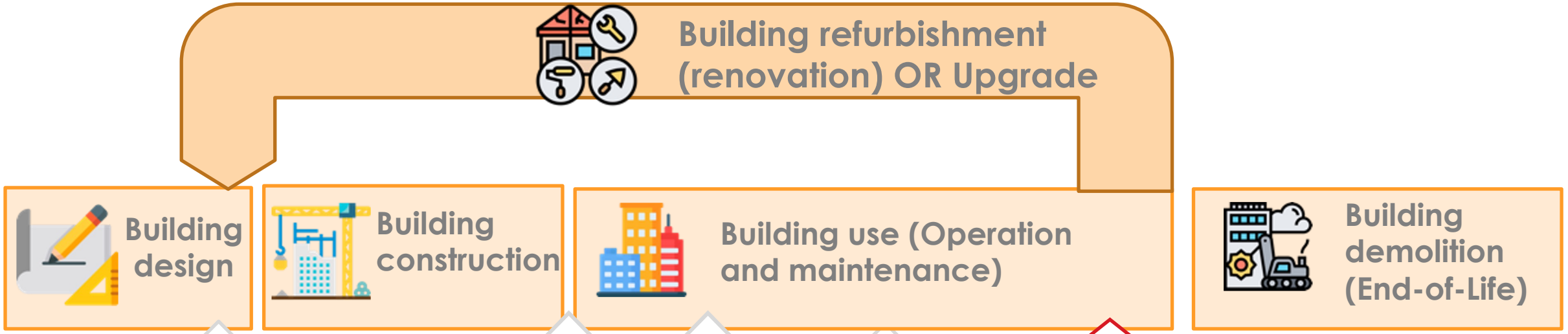
EACH EFFICIENCY IMPROVEMENT TOOL HAS IMPORTANT ROLE IN BUILDING LIFE CYCLE



Tools :

1. Project EPC

2.Energy performance certificate

4. H&C Inspection

3. Energy audit for building

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① ENERGY PERFORMANCE DESIGN DESCRIBES HOW THE BUILDING SHOULD BE BUILT TO MEET ENERGY PERFORMANCE REQUIREMENTS

Energy Performance Design (project EPC) sets the requirement how building should be built if specific energy performance class should be reached. It ensures that energy performance goals are set and detailed since the building design stage.

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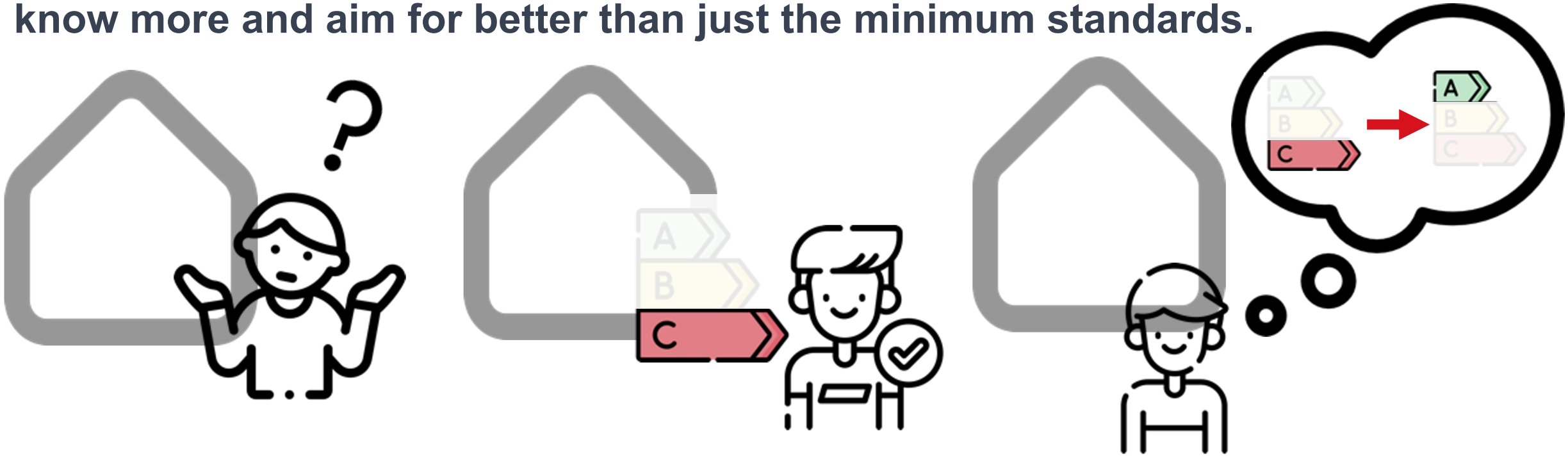
② ENERGY PERFORMANCE CERTIFICATES MAKE BUYERS AND OWNERS LIVES EASIER BY INFORMING THEM ABOUT THE STATE OF THE BUILDING

Energy Performance Certificates (EPCs) make it easier to understand how good in terms of energy consumption the building is. They help customers know more and aim for better than just the minimum standards.



- The role of EPC: how it affects owners, renters, builders, construction material sellers and manufacturers. (more in EU MS and EC experience part)

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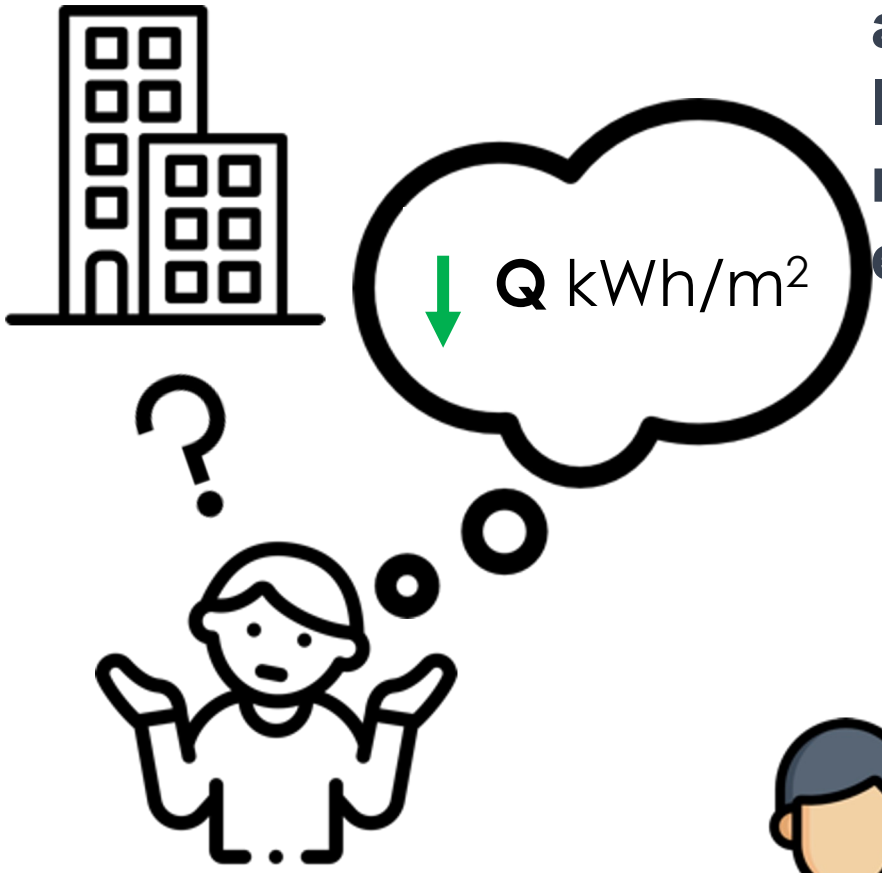
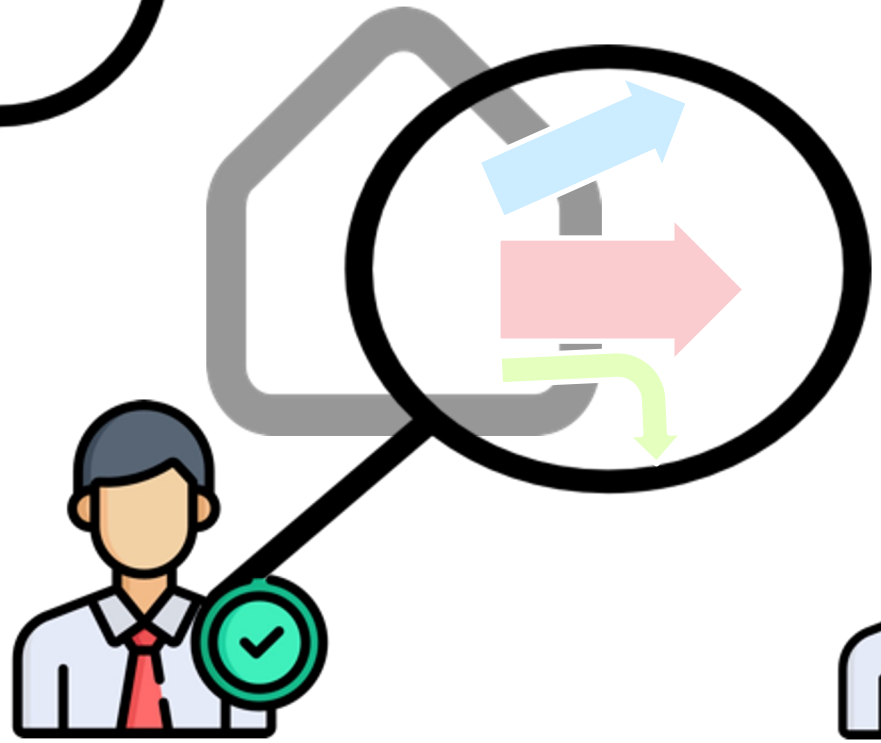
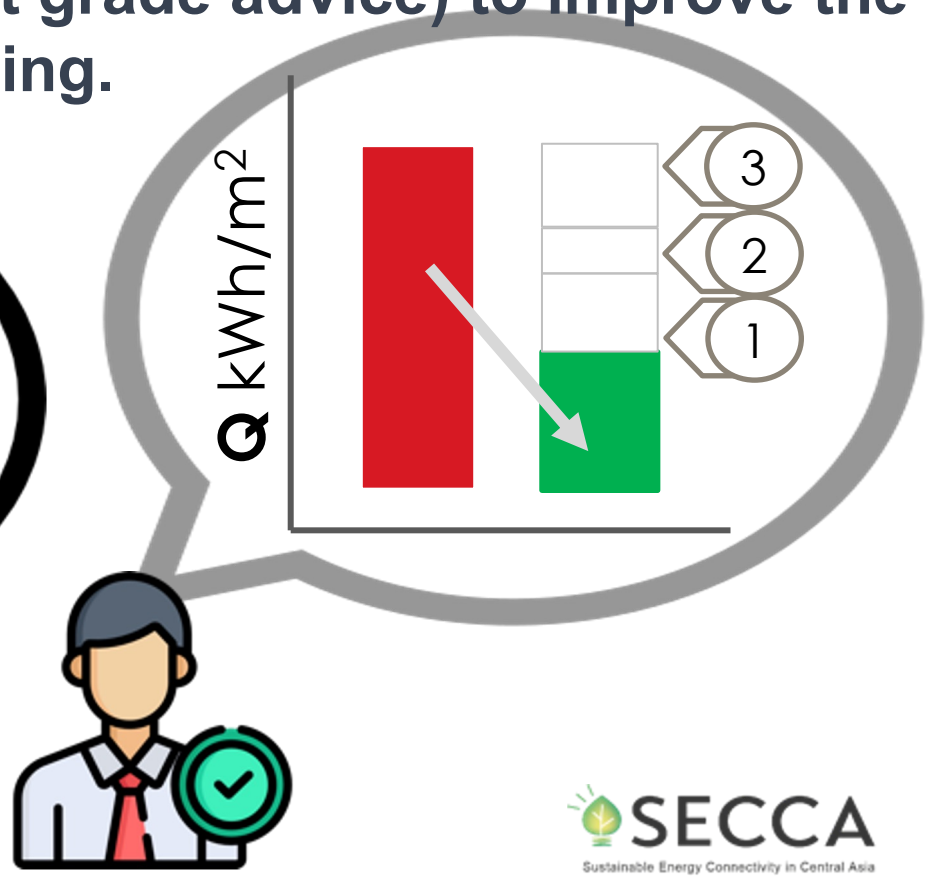
③ ENERGY AUDIT HELPS TO DIAGNOSE THE ISSUES AND PROPOSES THE MEASURES TO IMPROVE ENERGY EFFICIENCY OF BUILDING



An energy audit helps to understand energy flows and their impact on consumption, identifies the losses and proposes the prioritized list of measures (investment grade advice) to improve the efficiency of the building.





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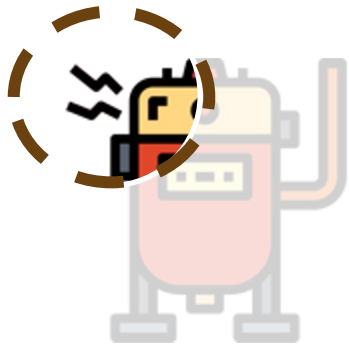
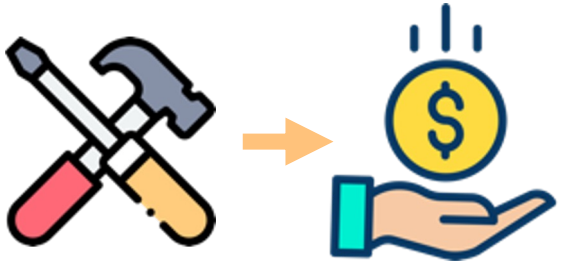
④ INSPECTION HELPS TO MONITOR AND MAINTAIN THE PERFROMANCE OF HEATING AND AIR CONDITIONING SYSTEMS

Inspection aims to identify the performance of the systems, identify issues and propose operational improvements to reduce energy consumption and increase efficiency





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IT IS IMPORTANT TO UNDERSTAND THE DIFFERENCES BETWEEN ENERGY AUDIT AND ENERGY PERFORMANCE CERTIFICATE

Energy audit

Purpose: identify losses and provide investment-grade advice on how to reduce or eliminate them

Targeted at building owners, managers, or energy professionals capable of implementing the recommended measures.

Detailed examination with actionable recommendations for improving energy efficiency.

Costs more due to detailed analysis and the need for qualified and knowledgeable expert

May take **up to 1 month** due to extensive information collection and measurement

Energy performance certificate

Purpose: to inform the consumer about how good building consumes energy (based on grade)

Designed for non-professionals, aiding in comparing the energy efficiency of different buildings at a glance

Surface-level rating based on the building's current energy performance.

Typically – **less costly** than energy audit, due to higher level standardization and surface level analysis

Takes **3-10 days** (calculated rating)

More standardized and automated issuing

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ENERGY AUDIT AND ENERGY PERFORMANCE CERTIFICATE HAVE DIFFERENT SCOPE, BUT BOTH HELPS TO IMPROVE ENERGY EFFICIENCY IN BUILDINGS

Action step	Energy audit	EPC rating type	
		Calculated	Operational
Data collection: building areas, envelope materials, systems	X	X	X
Data collection about ***actual status*** of building and systems	X		
Collection of operational parameters: temperature, air flows, etc.	X		
Measurement of parameters influencing energy consumption	X		
Quantification of energy flows and energy balance	X		
Energy demand calculation model	X		X
Calibration of energy consumption model	X		
Normalization of consumption data (for comparability)	X	X	
Calculation of actual energy saving rates per measure	X		
Financial cost estimation of measures	X		
Cost benefit analysis of identified measures	X		
Recommendations for decision making	X		
Provides comparable information for owners and users		X	X

Energy performance certificates and energy audits for buildings have similar aspects but have different purposes. So the EPC could not be substituted by an energy audit and vice versa.

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ENERGY AUDITS UNLOCKS THE ENERGY EFFICIENCY IMPROVEMENT AND DELIVERS ADDITIONAL BENEFITS

The main benefit – **knowledge about energy consumption structure**, energy losses and **improvement measures**

Energy audits aim to provide a roadmap for achieving actual energy savings

Transparency: Energy audits provide a clear picture of a building's energy efficiency, which can be crucial information for investors during the decision-making process

Informed Decision-Making: With an energy audit's detailed data and analysis, owners and managers can make well-informed decisions regarding energy efficiency investments.

Risk Mitigation: By identifying energy inefficiencies and compliance issues, energy audits can help mitigate risks associated with investments in building assets.

Awareness: Owners and tenants become more informed about the energy performance of the spaces they occupy, which could influence their energy consumption behaviors.

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SUMMARY: KEY TAKE AWAYS

- The building sector is the largest energy consumer in the Uzbekistan
- Despite hot summers and desert climate, heat production is the main driver of consumption
- Based on relative energy consumption in buildings, Uzbekistan has large improvement potential
- To address energy-saving potential, there is a need to have tools and professionals capable of applying it
- Each efficiency improvement tool has an important role in building a life cycle
- Energy audit helps to diagnose the issues and proposes the measures to improve the energy efficiency of the building
- It is important to understand the differences between an energy audit and an energy performance certificate
- Energy audits unlock energy efficiency improvement and deliver additional benefits

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ROLE OF ENERGY AUDITS OF BUILDINGS IN THE PROMOTION OF EE IN BUILDINGS

THANK YOU FOR YOUR ATTENTION !

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„Helping to Unlock the Value of Energy Efficiency and Sustainability for a More Resilient Future “

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