

EU- Kazakhstan: Sustainable Energy Days

International Conference

Sustainable Energy in Kazakhstan: Prospects and Challenges

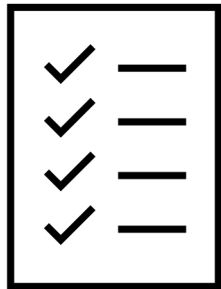
Rixos President Astana Hotel, June 2, 2023

The role of high-quality energy audits in the promotion of energy efficiency in buildings and industry

Karolis Janusevicius,

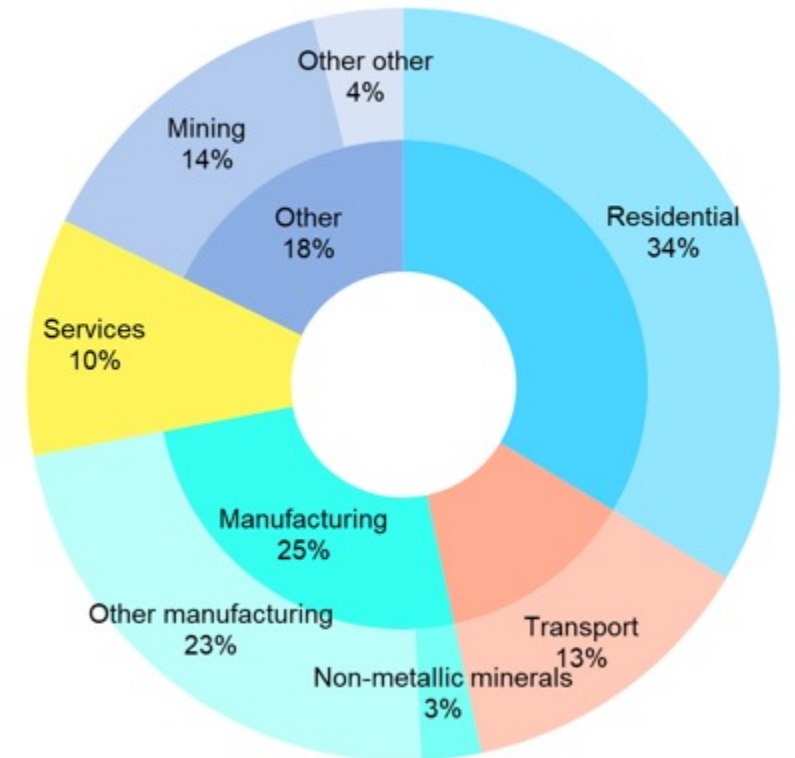
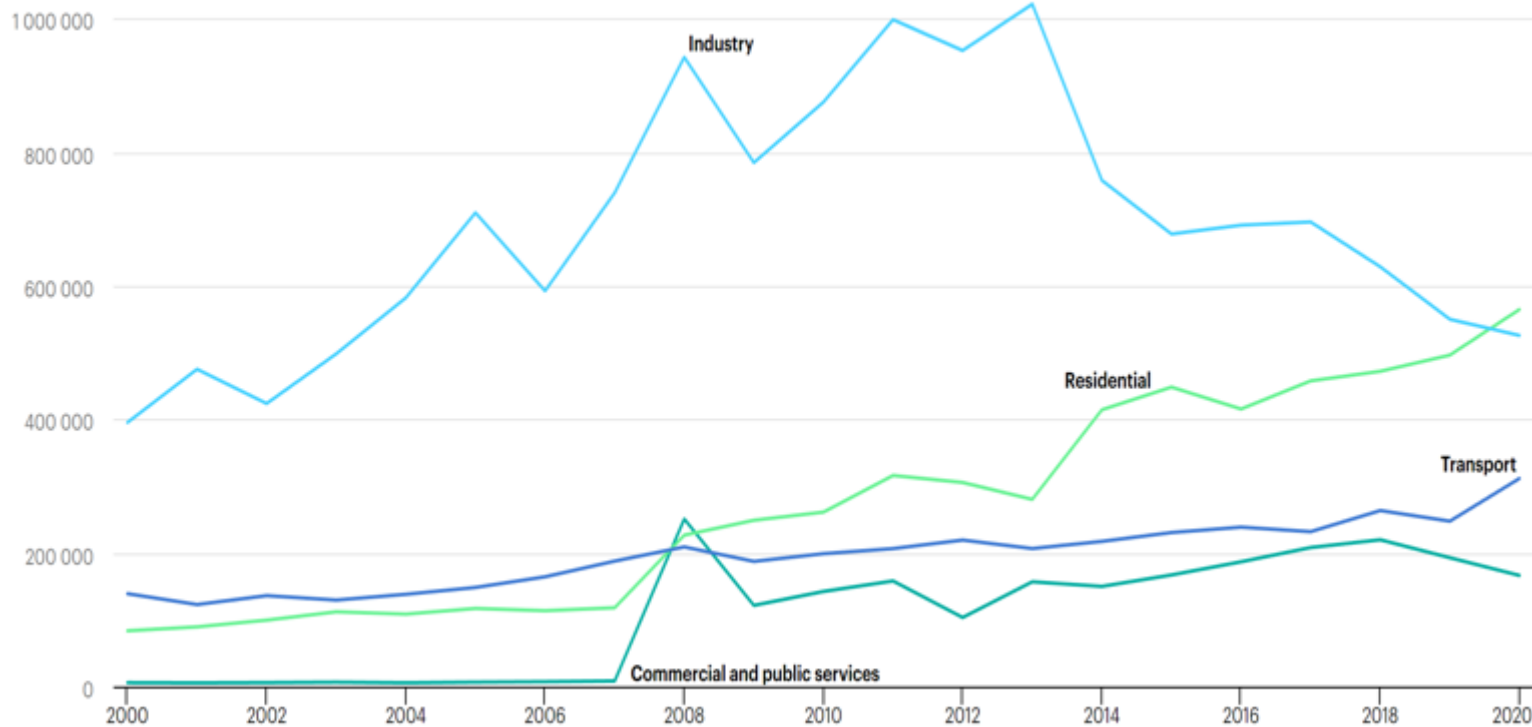
PhD, Expert in energy audits, EU funded Technical Assistance Project “Support of the Georgian Energy Sector Reform Programme” (GESRP)

PRESENTATION OUTLINE



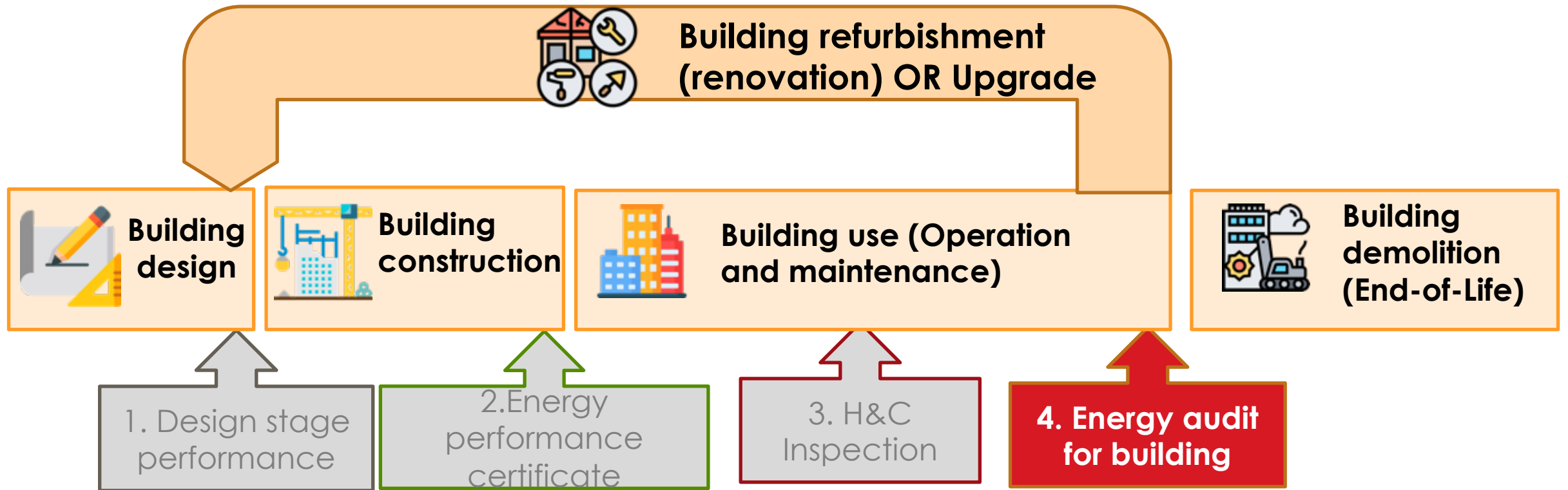
1. What drives energy consumption in Kazakhstan?
2. How energy audit integrates into the building life cycle?
3. What is the place of energy audit and management in developing an enterprise?
4. Energy audit versus High-quality energy audit?
5. What are the types of energy audits?
6. What is the appropriate way to perform an energy audit?
7. What is the difference between EPC and Energy audit?
8. What are the responsibilities of an energy auditor?
9. Why systematic approach is important?
10. What is needed to have an energy audit system?
11. What are the key elements of a quality assurance system?
12. How to know the level of quality?
13. What helps to improve the quality?

1. WHAT DRIVES ENERGY CONSUMPTION IN KAZAKHSTAN?



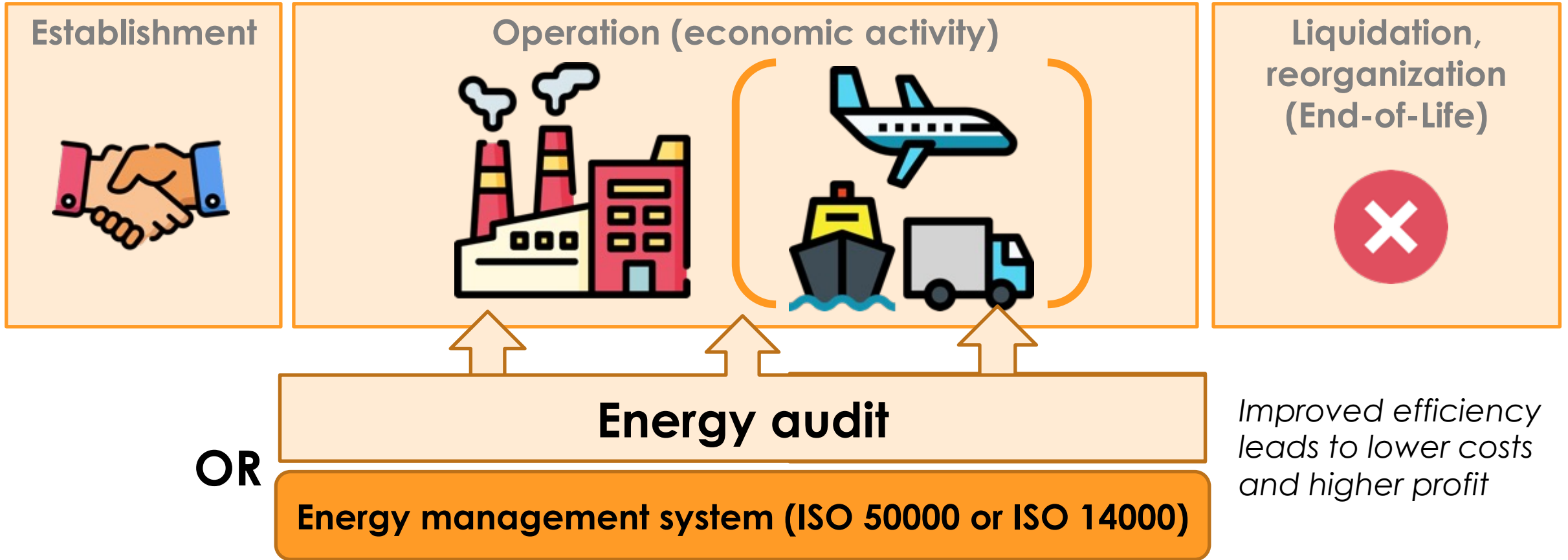
The buildings in residential and commercial sectors are the largest energy consumer. Together with Industry, it influences most of the energy consumption in Kazakhstan. It is worth focusing on this area due to its influence.

2. TOOLS TO MANAGE ENERGY IN BUILDING LIFE CYCLE?



Energy audit plays an important role in managing the energy consumption of a building during its life cycle.

3. WHAT IS THE PLACE OF ENERGY AUDIT AND ENERGY MANAGEMENT IN THE DEVELOPMENT OF ENTERPRISE?



Enterprises may gain a competitive advantage by performing energy audits and implementing cost-efficient measures. It also enables raising awareness about energy use and demand reduction potential.

4. 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**

An energy audit is a tool that helps unlock cost-effective energy efficiency improvements. Quality must be ensured to deliver significant benefits.

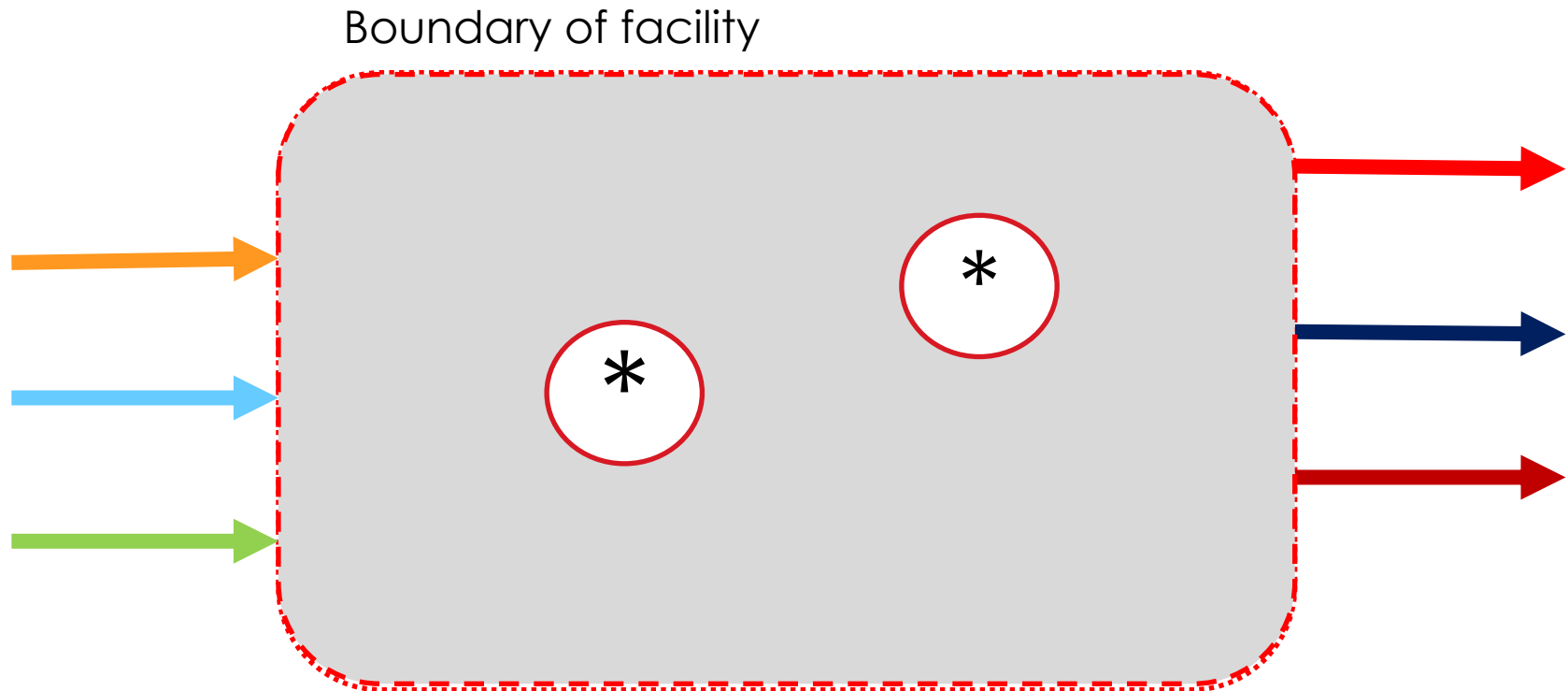
5. TYPES OF ENERGY AUDITS?

Level 1 – “Walk thru” energy audit or “Energy consumption overview”

Level 2 – detailed energy audit

Level 3 – focused energy audit

- Collection of inputs and outputs at the level of facility
- Recommendations of easy visible “low hanging fruit” type efficiency improvements
- Derivation of general energy efficiency indicators



The difference between energy audit types should be clear and well understood to align the results with the needs.

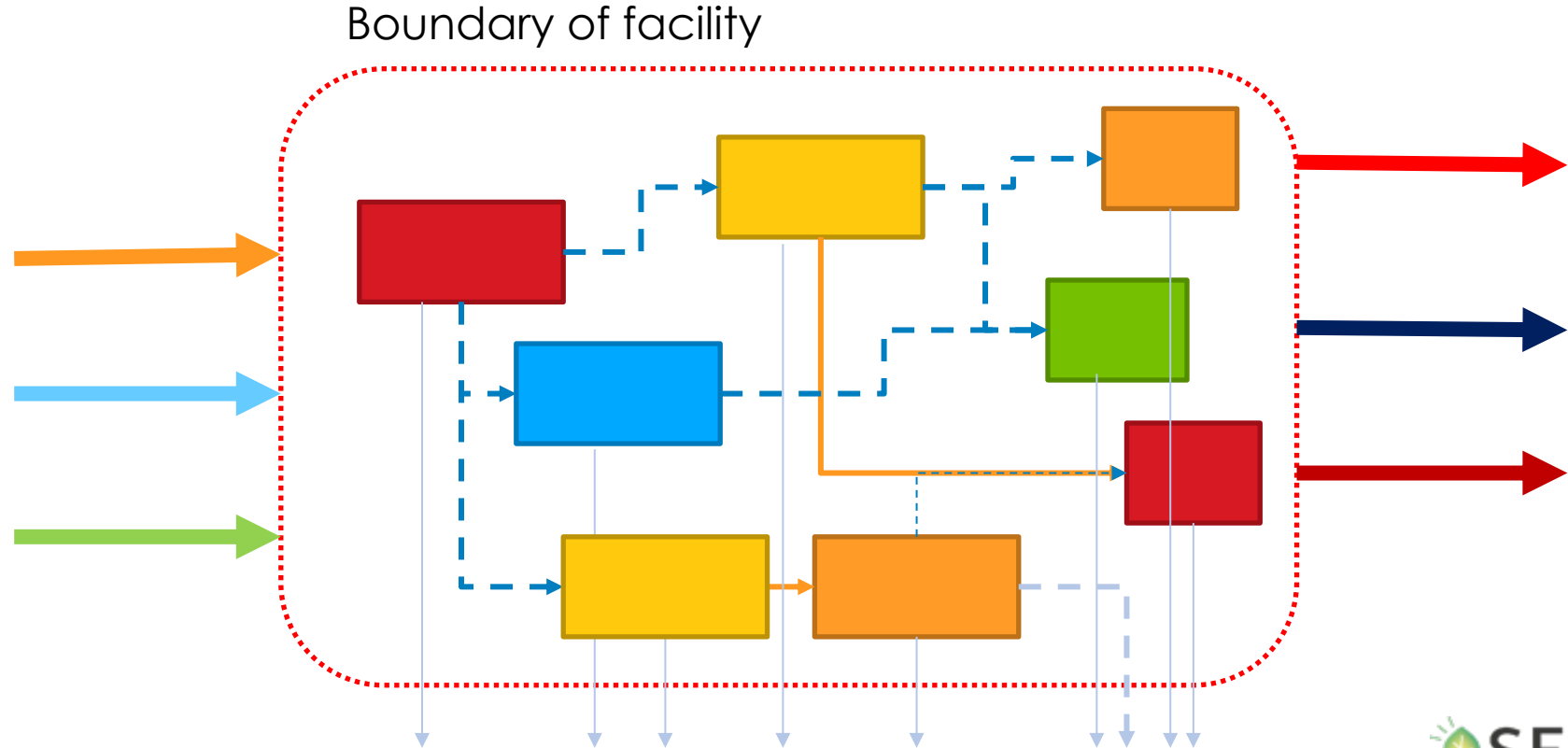
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Level 2 – detailed energy audit

Level 3 – focused energy audit

- Detailed analysis of internal energy and material flows
- Analysis of aspects influencing consumption at each level
- More detailed proposals
- Improvement potential identification



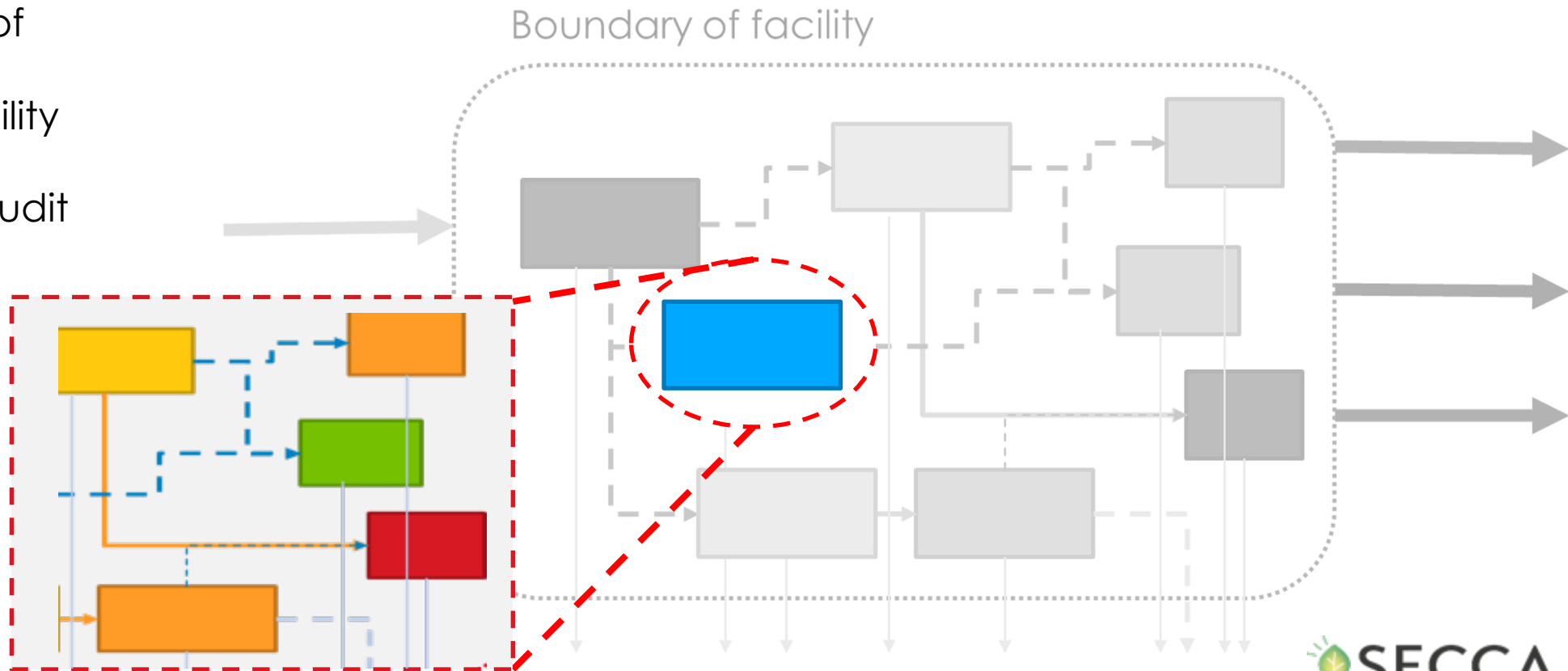
5. TYPES OF ENERGY AUDITS?

Level 1 – “Walk thru” energy audit or “Energy consumption overview”

Level 2 – detailed energy audit

Level 3 – focused energy audit

- High level analysis of specific part or elements in the facility
- Could be following step after Level 2 audit

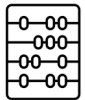


6. WHAT IS APPROPRIATE WAY TO DO ENERGY AUDIT?

Energy audit process



Performing energy audit and preparing the report



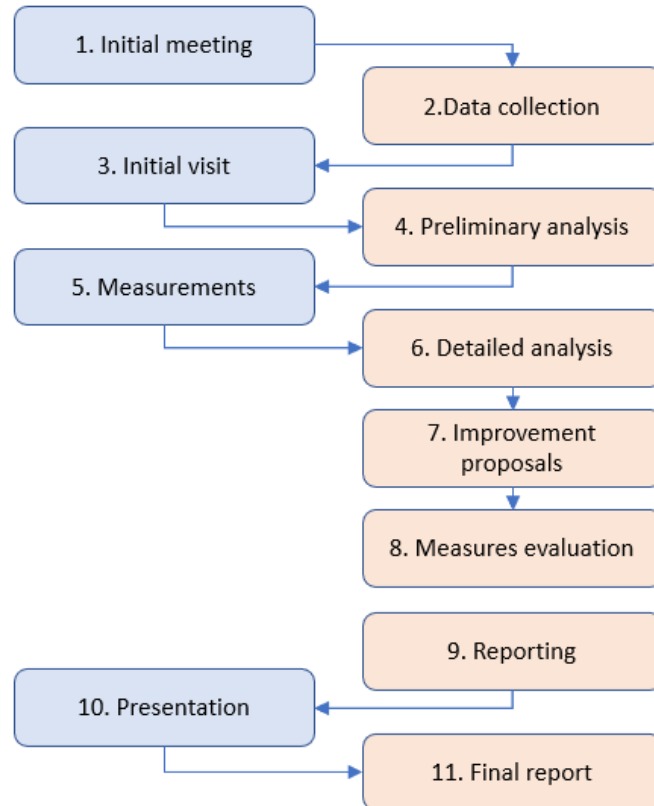
Tools



Templates



Checklists



Need for mutual understanding

Importance for collaboration

Need to provide general picture

Pin-point the important details

Identify the most reliable measures

Ensure that the analysis and proposals are well understood and will be implemented

Energy audits should be done in a standardized way but individualized for every case. Good results are often achieved when an energy professional end client collaborates.

7. ENERGY PERFORMANCE CERTIFICATE VS ENERGY AUDIT

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.

8. RESPONSABILITIES OF ENERGY AUDITOR?

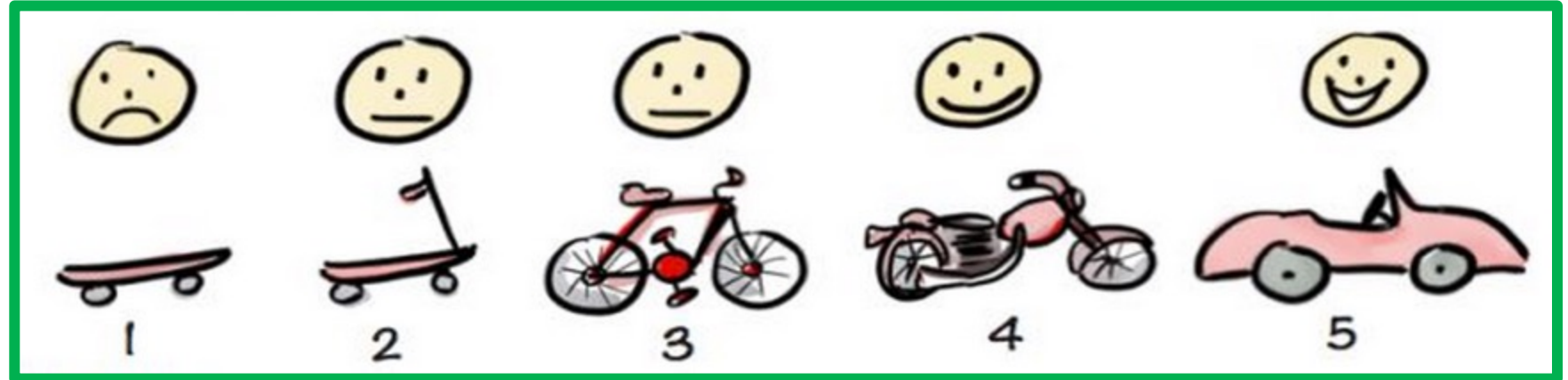
Energy audit could be performed by the single person, but there should not be forbidden to include (or outsource) another specialist:

Action step	Energy auditor	Auditor assistant	Measurement specialist	Solution providers	Cost estimator	Business analyst
General responsibility for process and reporting (as project manager)	X					
Data collection about <i>actual status</i> of systems and process	X	X				
Collection of operational parameters: temperature, air flows, etc.	X	X				
Measurement of parameters influencing energy consumption	*	*	X			
Quantification of energy flows and energy balance	X	X				
Energy demand calculation model	X	X				
Calibration of energy consumption model	X	X				
Normalization of consumption data (for comparability)	X	X				
Identification energy saving measures	X	X		*		
Calculation of actual energy saving rates per measure	X	X				
Financial cost estimation of measures	*	*			X	
Cost benefit analysis of identified measures	*	*				X
Recommendations for decision making	X					

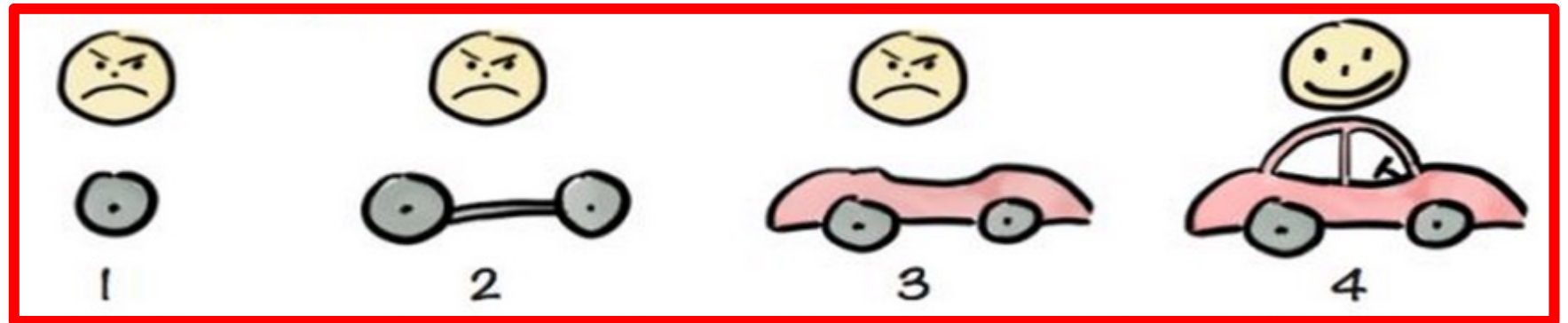
A high-quality audit, which provides cost-efficient, investment-grade advice that delivers customer value, should not be limited to single person's knowledge and competence.

9. HOW TO DEVELOP SYSTEM IN A RIGHT WAY?

The right way to build any system or regulation framework:
(deliver the function from beginning)



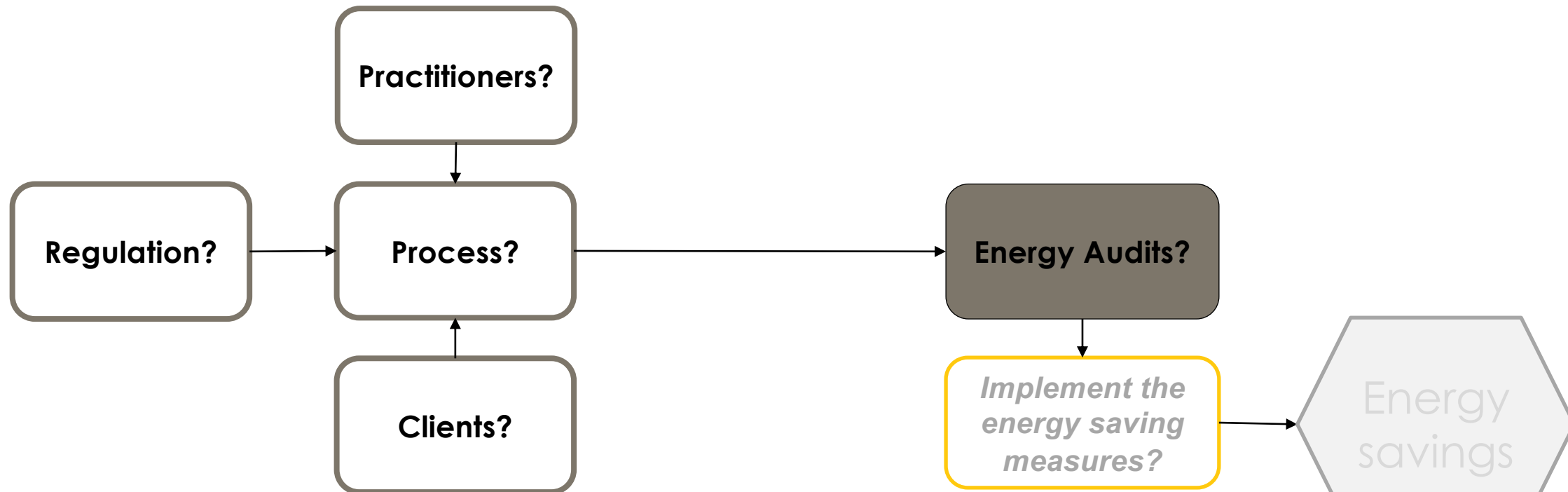
And there is a wrong way of development:
(focusing on elements of "ideal system")



When developing the system – it is better to start with a small and simple system that can perform a function, than deliver separate elements of a highly efficient system which are not connected together and do not deliver the function.

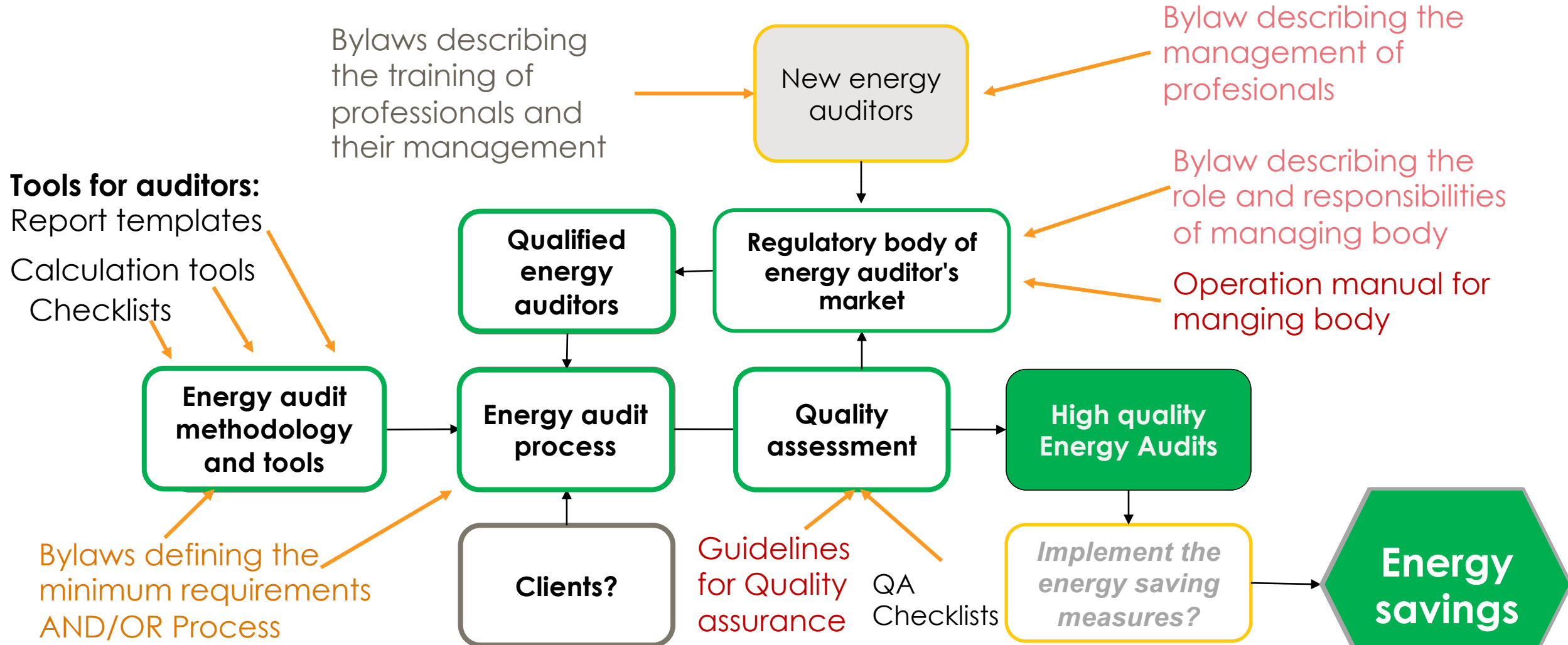
10. WHAT IS NEEDED TO HAVE ENERGY AUDIT SYSTEM?

In most of the countries there are already some elements of energy audit system, as it is a tool widely promoted by financial support donors or legal framework:



The purpose of the energy audit system is to ensure that high quality energy audits and value to all stakeholders will be delivered.

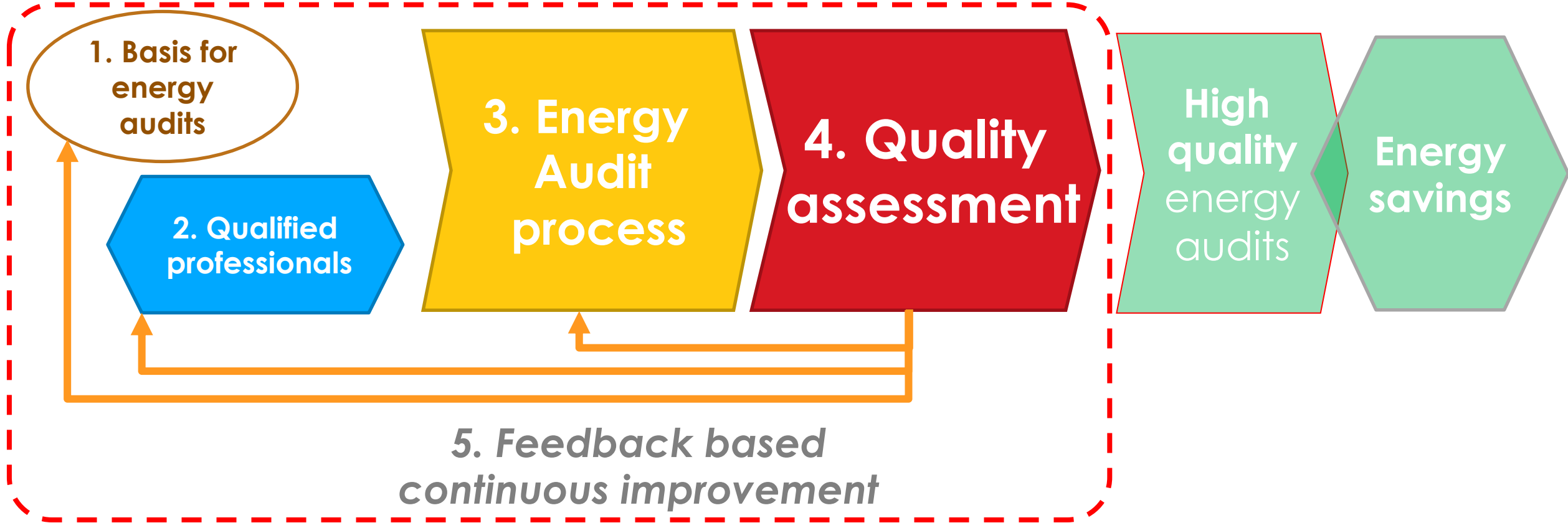
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11. WHAT ARE KEY ELEMENTS OF QUALITY ASSURANCE SYSTEM?

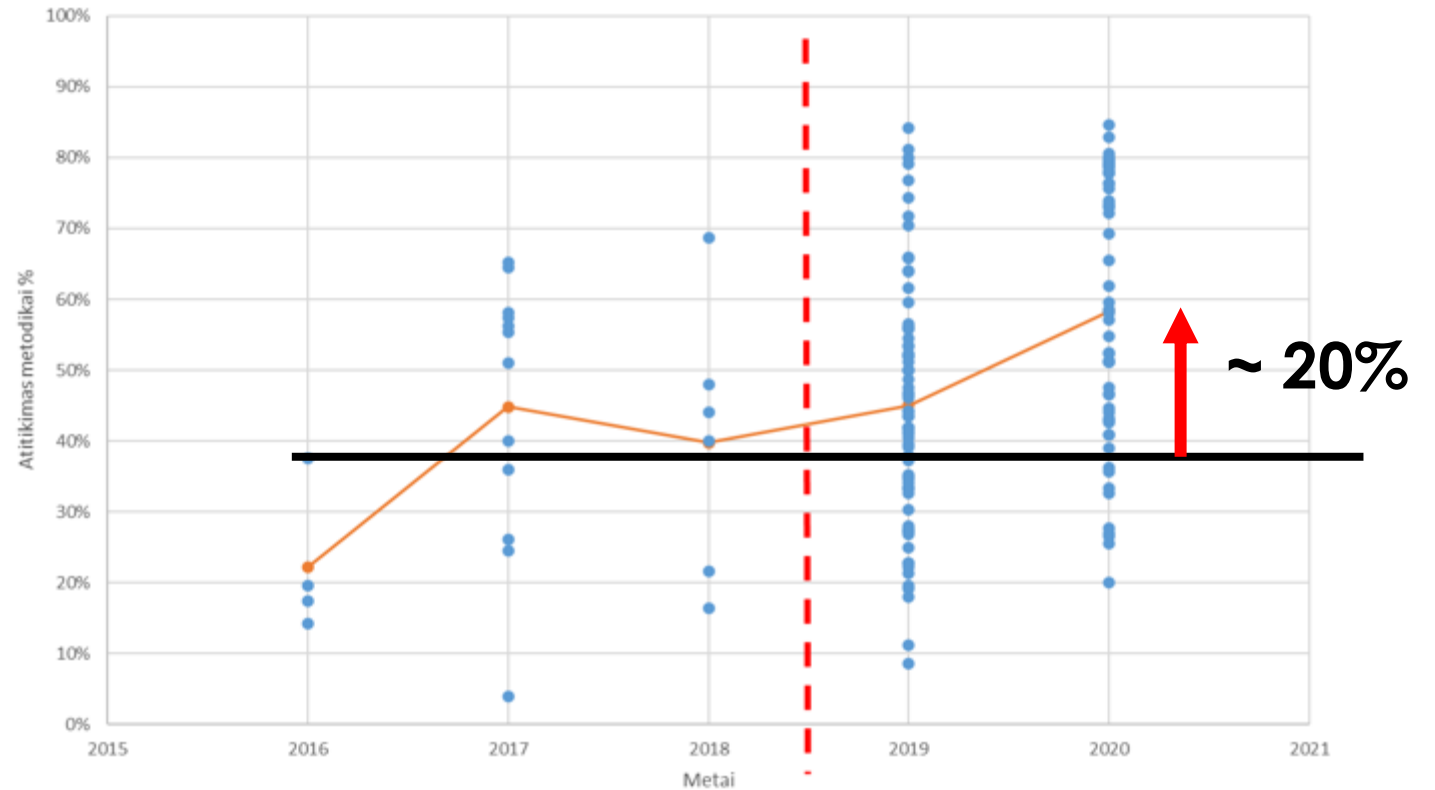
Quality assurance system



Quality could only be ensured with regulations, qualified professionals, defined processes, quality assurance and continuous improvement.

12. HOW TO KNOW THE LEVEL OF QUALITY?

$$I_S = \frac{\text{Satisfied criteria}}{\text{Number of criteria}}$$



- Quality level is often discussed, but measurement is rarely measured
- Example of Lithuania shows that measurement enables to understand and act on quality improvement

**The quality could be known and improved only when measured.
Measured value helps to understand the need for additional actions for
quality improvement.**

13. WHAT HELPS TO IMPROVE THE QUALITY?

As quality checking is important measure to improve the quality of energy audits, other measures should also be considered and applied:

Software calculation tools
(reduces methodical errors)

Stakeholder consultation events
(to involve them in legislation development)

Informational material for energy audit clients

Guidelines for auditors
(overview of most common issues, ways how to address challenges)

Checklist for internal quality assurance

Business training for energy auditors
(helps to understand what brings value to client)

Training events for auditors (as a continuous education)

Multiple tools and actions could be used to improve energy audit quality. The need for those actions depends on the maturity and the situation in the market.

SUMMARY: KEY TAKE AWAYS

1. The buildings in residential and commercial sectors are the largest energy consumer. Together with Industry, it influences most of the energy consumption in Kazakhstan. It is worth focusing on this area due to its influence.
2. Energy audit plays an important role in managing the energy consumption of a building during its life cycle.
3. Enterprises may gain a competitive advantage by performing energy audits and implementing cost-efficient measures. It also enables raising awareness about energy use and demand reduction potential.
4. An energy audit is a tool that helps unlock cost-effective energy efficiency improvements. Quality must be ensured to deliver significant benefits.
5. The difference between energy audit types should be clear and well understood to align the results with the needs.
6. Energy audits should be done in a standardized way but individualized for every case. Good results are often achieved when an energy professional and client collaborate.
7. 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.

SUMMARY: KEY TAKE AWAYS

8. A high-quality audit, which provides cost-efficient, investment-grade advice that delivers customer value, should not be limited to single person's knowledge and competence.
9. When developing the system – it is better to start with a small and simple system that can perform a function, than deliver separate elements of a highly efficient system which are not connected together and do not deliver the function.
10. The purpose of the energy audit system is to ensure that high quality energy audits and value to all stakeholders will be delivered.
11. Quality could only be ensured with regulations, qualified professionals, defined processes, quality assurance and continuous improvement.
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13. Multiple tools and actions could be used to improve energy audit quality. The need for those actions depends on the maturity and the situation in the market.

THE ROLE OF HIGH- QUALITY ENERGY AUDITS IN THE PROMOTION OF ENERGY EFFICIENCY IN BUILDINGS AND INDUSTRY

***THANK YOU FOR
YOUR ATTENTION !***



Karolis Januševičius, PhD ⚡

Energy consultant | Energy efficiency professional

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



Karolis Januševičius



karolis.janusevicius@gmail.com



<http://karolis.janusevicius.lt>



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