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Technical workshop
"Energy audits in buildings – from theory to practice"
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# The main elements of the energy audit system for buildings

*Karolis Janusevicius*
*Expert in energy audits, SECCA*

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

# THE OUTLINE OF PRESENTATION

- What are the core elements of the energy audit system?
- What role does the demand for energy audits play?
- Why qualified energy auditors are important?
- How the market of energy auditors should be regulated?
- What are the tools and methodologies for energy audits in buildings?
- Key elements of the energy audit process?
- Role of quality control and additional tools?
- What are the additional benefits of the energy audit system?
- What needs to be tracked in the system?

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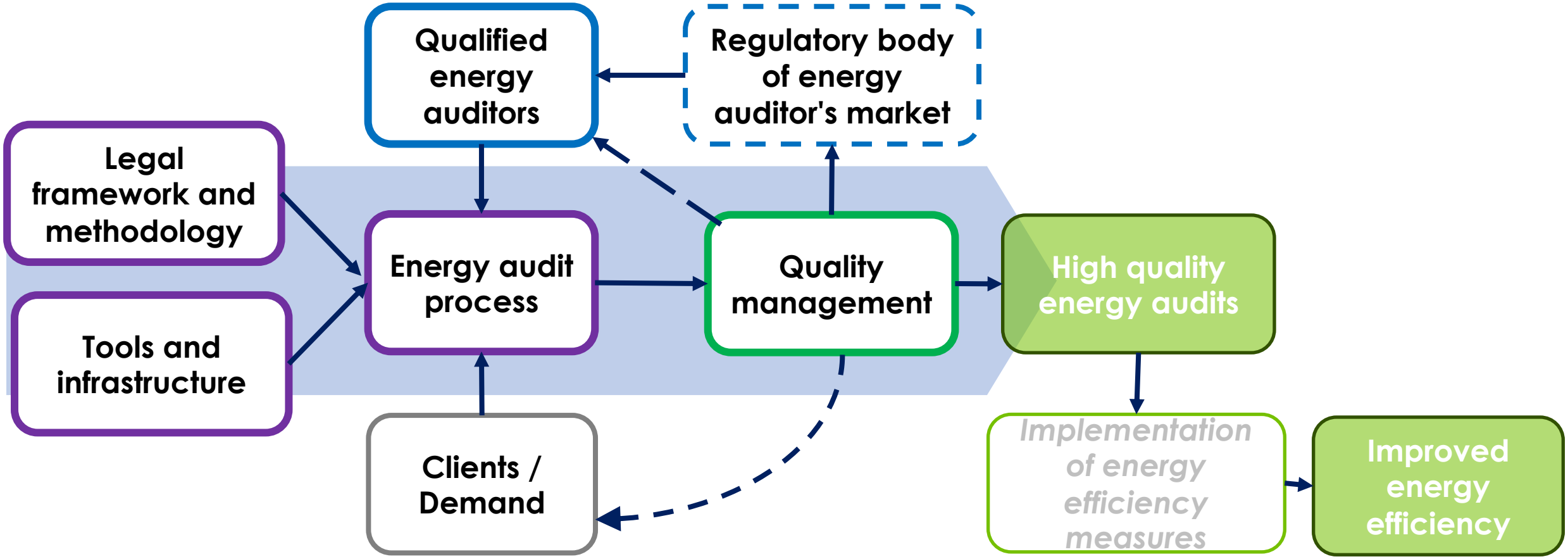
# TO MULTIPLE ELEMENTS ARE NEEDED TO IMPLEMENT ENERGY AUDIT SYSTEM




An energy audit system contains main elements that ensure qualified energy auditors, clear procedures and quality management.

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# THE LEGAL FRAMEWORK SETS THE FOUNDATION FOR THE WHOLE SYSTEM, BY DESCRIBING IT CORE ELEMENTS

***National law level***

- Defines energy audit
- Delegates responsibility to shape secondary legislation to specific ministry
- Sets responsibilities for

**Description of the procedure for conducting energy audits and attestation of auditors**

**The methodology and minimum requirements how to conduct energy audt**

Internal procedures of policy implementing body how to administrate

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# SECONDARY LEGISLATION SHOULD DESCRIBE THE MAIN ASPECTS IN HIGHER DETAIL

The secondary legislation has to define and clearly describe the main aspects of the energy audit process:

**Definitions** used in the framework and **general principles**

**Energy audit process** (steps of execution)

Identify **stakeholders** and define their **Responsibilities** in energy audit process

Describe tools for performing energy audits and infrastructure needed

Define **quality control** procedures and how to comply with it

**Qualification requirements**

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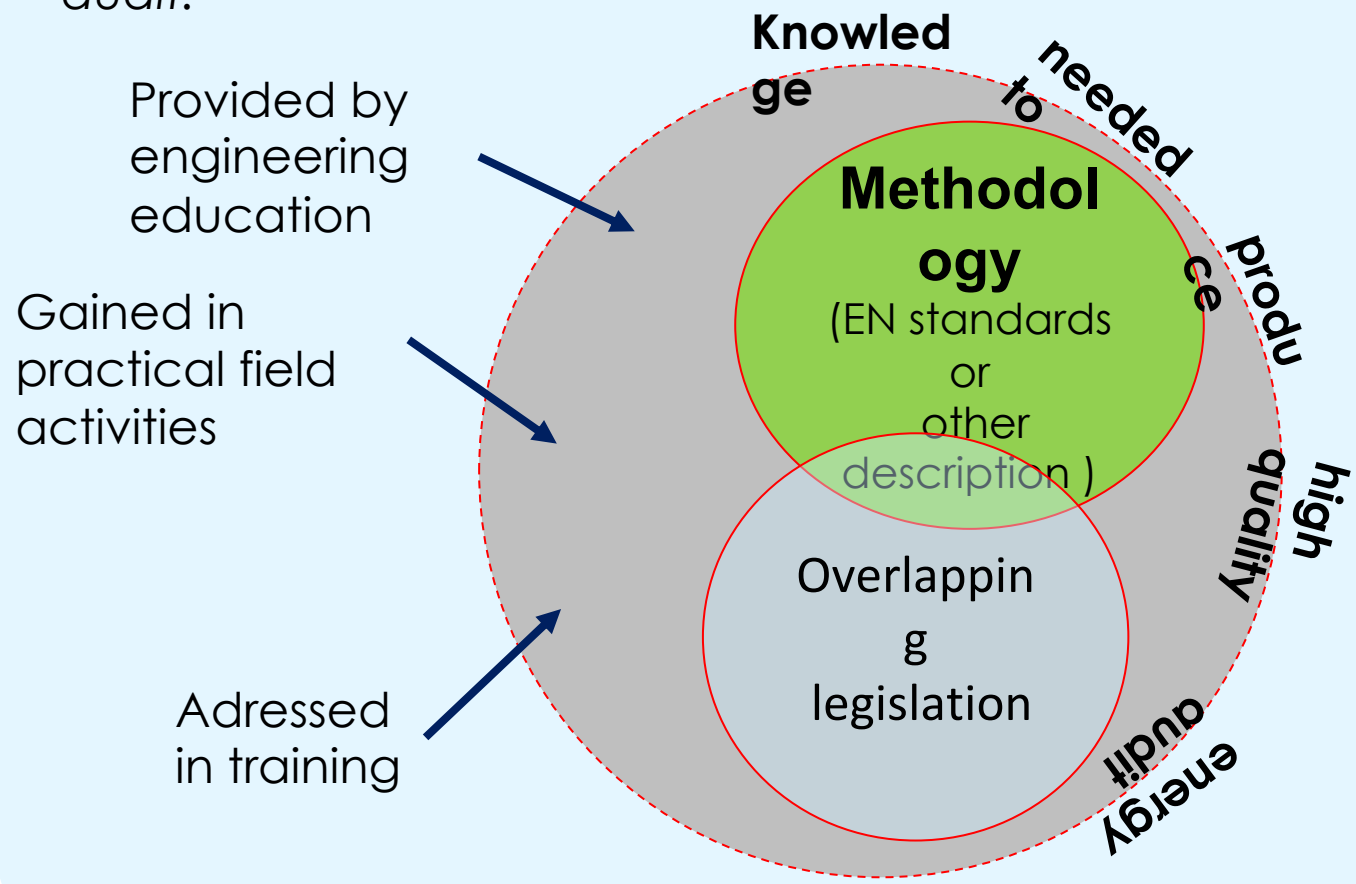
# THE METHODOLOGY SHOULD BE UNDERSTOOD AS A GUIDANCE FOR ENERGY AUDITORS HOW TO DO THE ENERGY AUDIT

*Guidance HOW energy auditor must do energy audit:*




The example of minimum requirements:

1. Use up-to-date, traceable energy consumption data.
2. Conduct a detailed review of energy consumption.
3. Use life-cycle cost analysis whenever possible.
4. Be representative and proportionate to identify significant opportunities.
5. Allow for detailed and validated calculations of potential savings.
6. Store data for historical analysis and performance tracking.

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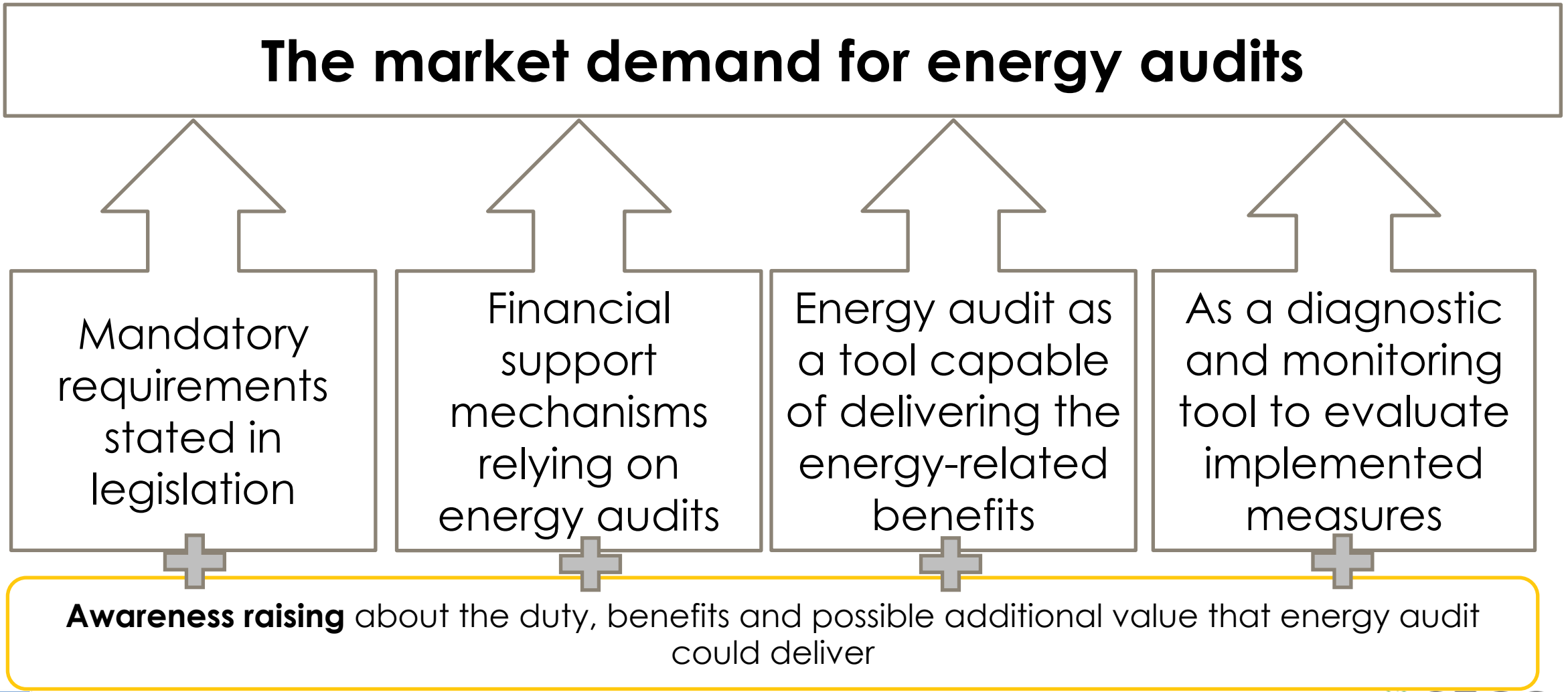
# THE DEMAND FOR ENERGY AUDITS COULD BE STIMULATED NOT ONLY BY THE MANDATORY REQUIREMENT IN THE LEGISLATION

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# TO FUNCTION, THE MARKET NEEDS QUALIFIED PROFESSIONALS WHO ARE CAPABLE OF DELIVER HIGH QUALITY ENERGY AUDITS

## Qualified professionals

- **EDUCATION**
- **PRACTICAL EXPERIENCE**
- **TRAINING** (followed with examination)

## Energy audit Market

**Energy audit process**


## *Unqualified participants*

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# 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 ***actual status*** 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.**

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# WHO SHOULD LEAD THE PROCESS AND ENSURE THE QUALITY IN MARKET?

The market of energy audits

Interaction with market

Energy policy implementation body

Energy professionals' regulatory body

**Role of energy auditors:**

1. Performs audits.
2. Does internal quality assurance.
3. Submits reports to the client.
4. Registers the report.
5. Interacts with quality checking procedure.
6. Provides feedback on legal framework and support tools, and shares client insights.

**Role of implementation body:**

1. Provides technical support for the regulatory body.
2. Supervises training process.
3. Checks the quality and gives feedback.
4. Measures professional and market quality.
5. Aggregates and shares quality checking results.
6. Generates and collects insights.
7. Acts to improve quality.

**The policy implementation body should act (and take leadership) on running the energy audit system.**

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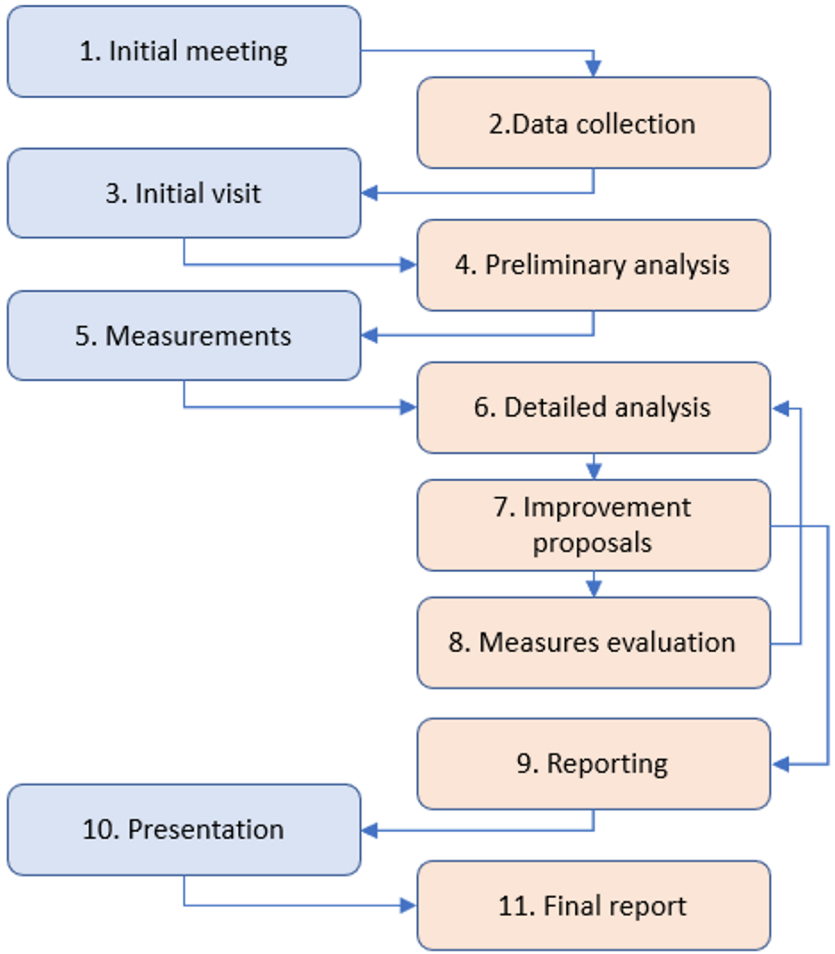
# THE ENERGY AUDIT PROCESS SHOULD BE STANDARDIZED AND CLEAR, BUT HAVE THE FLEXIBILITY TO BE TAILORED FOR SPECIFIC CASES

## Energy audit process

Performing energy audit and preparing the report




Clear process steps, sequences provides guaranty that it will

Importance of collaboration between the client and auditor has to encouraged

The requirements for the output of the process should be clear

The outcomes should be transparent and presented in the understandable way for the client

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# THE TOOLS AND GUIDANCE HELP TO START AND MAINTAIN THE PRODUCTIVITY OF AUDITORS

**TEMPLATES** SHOWCASING THE STRUCTURE, LAYOUT AND MAIN ELEMENTS OF ENERGY AUDIT

**SOFTWARE TOOL** TO PERFORM ENERGY AUDITING PROCEDURES OR PART OF IT.

**CALCULATION TOOLS** TO SIMPLIFY THE CALCULATIONS OF SEPARATE ASPECTS (For example: life cycle costing calculation, creating sankey diagram)

**GUIDANCE DOCUMENTS**, ADDITIONAL INSTRUCTIONS OR CLARIFICATIONS

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# THE INFRASTRUCTURE IS NEEDED TO MANAGE THE PROCESS ENSURE TRANSPARENCY OF SYSTEM

LIST OF APPROVED ENERGY AUDITORS

THE PLACE WHERE TO SUBMIT ENERGY AUDITS AND OTHER REPORTING OPERATIONS

LIST OF CREATED ENERGY AUDITS

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# QUALITY CONTROL AIMS TO ENSURE THAT THE PROMISED BENEFITS OF ENERGY AUDITS WILL BE DELIVERED

## 1. Quality definition

- Minimum requirements for energy audits

## 2.Enable built in quality

- Internal overview checklist
- Template for energy audit
- Client's input
- Provided calculation tool

## 3. Quality assessment

- Quality screening checklist
- In-depth quality assessment
- On-site visit

## 4. Quality improvement

- Awareness rising
- Guidelines for energy auditors

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# POSSIBLE ISSUES WITHOUT QUALITY CONTROL

**NO QUALITY CONTROL**

1. **Lack of Trust and Credibility** of EA
2. **Inconsistent Results in EA**
3. **Potential for Misrepresentation** of EA
4. **Reduced Incentive for Energy Efficiency**
5. **Economic Implications due to misguided investments**
6. **Regulatory Challenges due to quality variation**
7. **Reputation Risk** of the EA system
8. **Barriers to International Collaboration**
9. **Missed Environmental Goals**
10. **Increased Long-Term Costs**

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# HOW THE ENERGY AUDIT SYSTEM MAY HELP IN THE PLANNING OF ENERGY SECTOR?

## DATA FOR ENERGY PLANNING AND SHAPING THE POLICY MEASURES

1. Helps to **identify specific consumption** of produced goods
2. Provides data for **comparing** the local consumption **with** int. **best practices** – enables to know **improvement potential**
3. Helps to **understand** what measures **need** for **financial support**

## DATA FOR ENERGY CONSUMPTION MODELING AND FUTURE PREDICTIONS

1. Provides **data for** country and sector-level **energy modelling**
2. Helps **to** monitor the performance change and rely not only on financial data
3. **Quantify energy consumption** in the national energy balance
4. **Data-based estimations** of future energy savings

**Energy audits system also delivers additional benefits for energy planning modelling and energy planning activities needed for policy making.**

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# TO UNDERSTAND IMPACT OF THE SYSTEM, KEY PARAMETERS HAS TO BE TRACKED

**Sample key parameters to be tracked, in the energy audit system:**

| TOTAL NUMBER OF ENERGY AUDITS | IMPROVEMENT MEASURES PROPOSED IN ENERGY AUDITS | IMPLEMENTED IMPROVEMENT MEASURES | QUALITY LEVEL IN THE MARKET |
|---|---|---|---|
| X units | X GWh | X GWh | X % compliance |

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# SUMMARY: KEY TAKE AWAYS

- Multiple elements are needed to implement an energy audit system
- The legal framework sets the foundation for the whole system by describing its core elements
- Secondary legislation should describe the main aspects in greater detail
- The methodology should be understood as a guide for energy auditors on how to do the energy audit
- The demand for energy audits could be stimulated not only by the mandatory requirement in the legislation
- To function, the market needs qualified professionals who can deliver high-quality energy audits
- The energy audit process should be standardised and clear but have the flexibility to be tailored for specific cases
- The tools and guidance help to start and maintain the productivity of auditors
- The infrastructure is needed to manage the process and ensure transparency of the system
- Quality control aims to ensure that the promised benefits of energy audits will be delivered
- To understand the impact of the system, key parameters have to be tracked

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# THE MAIN ELEMENTS OF THE ENERGY AUDIT SYSTEM FOR BUILDINGS

*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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