

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

**Structuring the methodology of energy  
audits of buildings for uzbekistan**

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

# THE STRUCTURE OF THE PRESENTATION



① THE  
CLARIFICATION OF  
THE PURPOSE AND  
NEEDS

② THE PROPOSAL  
OF THE  
METHODOLOGY  
CONCEPT STRUCTURE

③ NEXT STEPS IN  
DEVELOPMENT OF  
METHODOLOGY  
CONCEPT



Funded by  
the European Union

# THE PURPOSE AND VISION HAS TO BE CLARIFIED BEFORE DEVELOPING THE CONCEPT



## There is a need to discuss and clarify:

- What will be the purpose of the energy audit in Uzbekistan?
- For what type of buildings, is it going to be used?
- Should it be seen as a “diagnostic” tool or only for a planning of renovation?



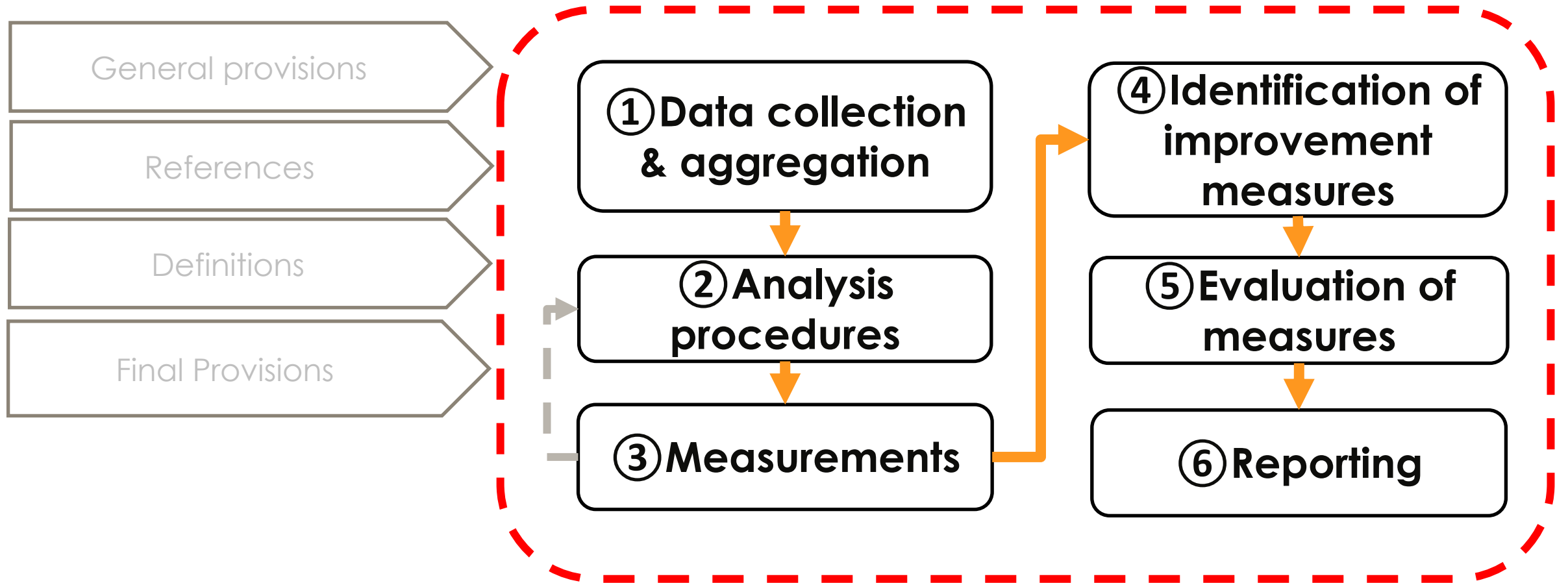
*Climate stripes by Prof. Ed Hawkins.*

# THE PROPOSAL



Funded by  
the European Union

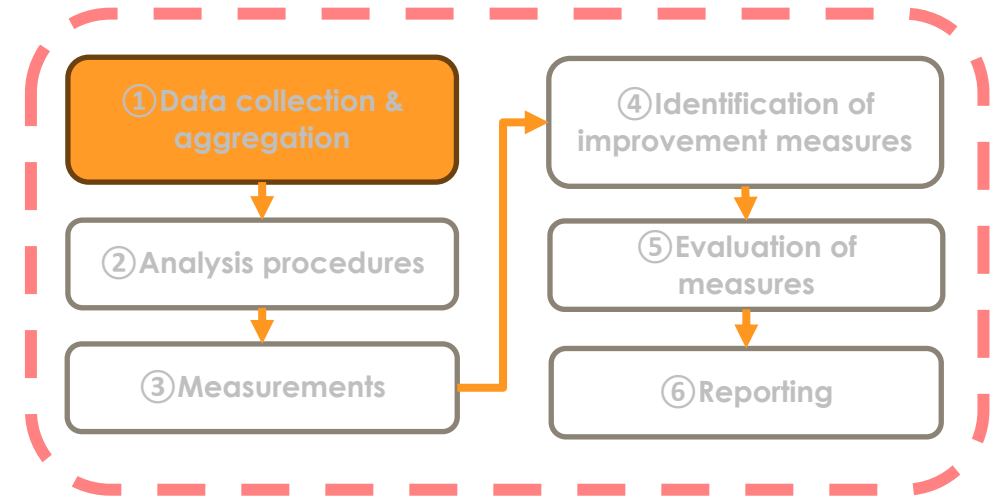
# THE OVERAL STRUCTURE OF THE METHODOLOGY CONCEPT



# ① DATA COLLECTION & AGGREGATION



**The Principle:** Collect data needed to perform the energy audit according to requirements



## KEY GROUPS OF INFORMATION TO BE COLLECTED:

### Information on the Object and Buildings:

- Collect essential data about the object and individual buildings, documented in various Annexes.
- Source this information from inventories, design documents, and inspections.

### Information on Energy Consumption and Costs:

- Document energy and hot water consumption and costs, along with the heating season dates
- If actual costs are unavailable, make calculations and document assumptions.

### Partial Building Inspections:

- Inspect and document details about the building envelope and any defects found.
- Examine building engineering systems, including heating, ventilation, cooling, and lighting, focusing on their energy efficiency and defects.

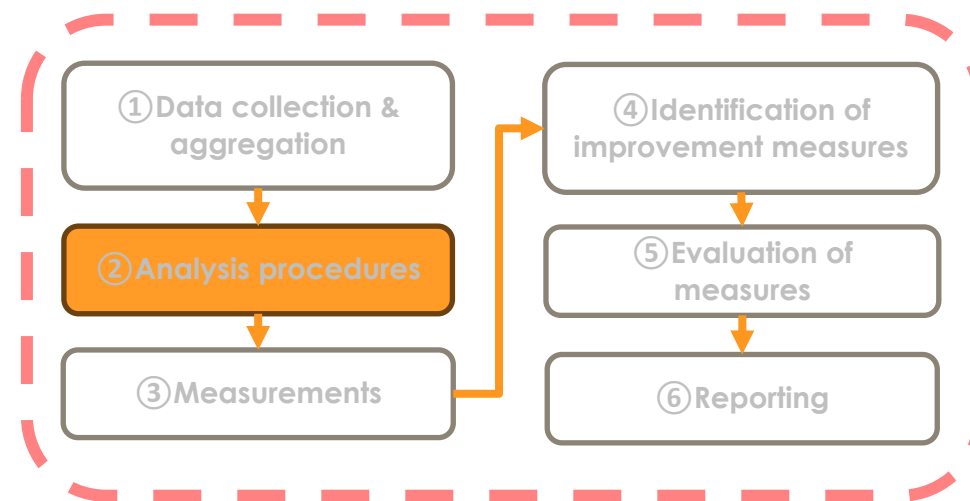
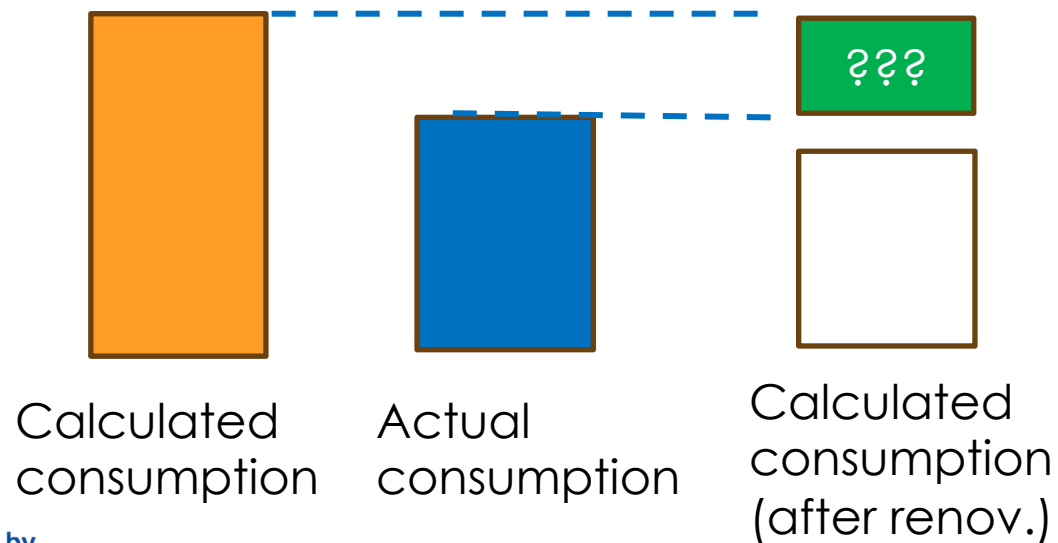
## ② ANALYSIS PROCEDURES



**The Principle:** perform procedures needed to analyse the energy consumption of the building

### Key aspects:

- Building energy balance model
- Normalization of energy consumption
- Calibration of calculation model



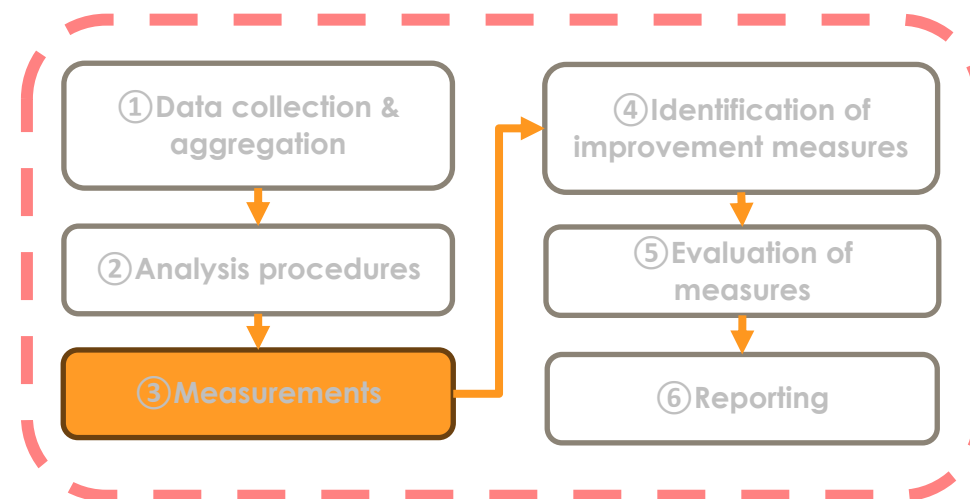
Funded by  
the European Union



# ③ MEASUREMENTS



**The Principle:** collecting data to calibrate analytical model and identify actual conditions



## KEY GROUPS OF MEASUREMENTS:

### Measurement of energy consumption

- Energy parameters can be determined either through measurements during the heating season or by using results from third parties.
- Various methods are acceptable for collecting this data.

### Internal/external microclimate parameters

- **Measurement Scope:** Indoor and outdoor climate parameters are captured.
- **Data Accuracy:** Guidelines ensure frequent and accurate measurements.
- **Data Analysis:** Collected data is analyzed and reported in audit documents.

### Calculating Average Microclimate Parameters

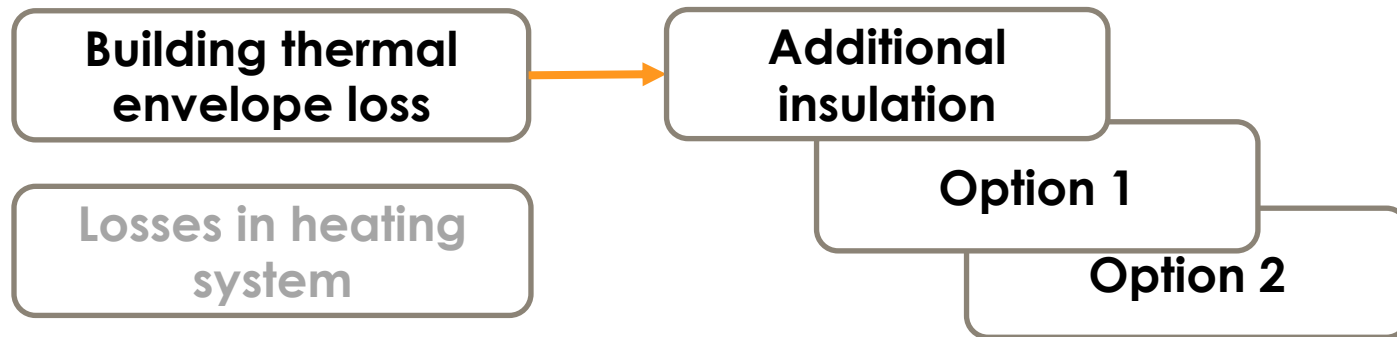
- Characteristic groups of premises (like cabinets, corridors, etc.) should be identified for accurate measurements.
- Premises can be grouped in various ways, such as by temperature or working time.



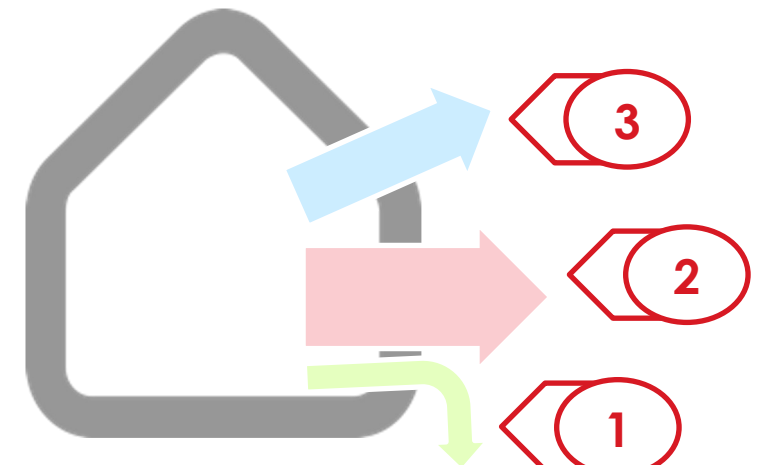
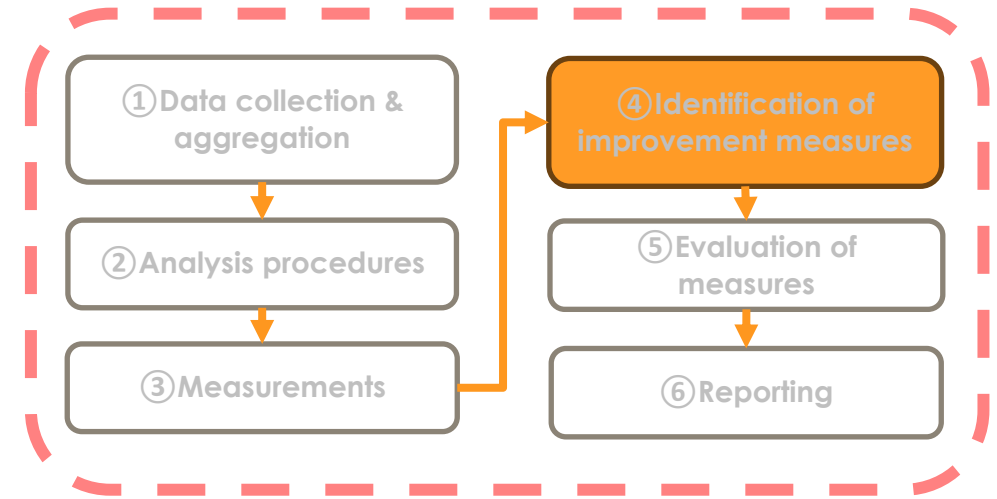
## ④ IDENTIFICATION OF IMPROVEMENT MEASURES



**The Principle:** selecting the measures that would help to eliminate or reduce the losses identified and quantified in the analysis



By knowing the best possible performance of a specific element, the potential could be evaluated and based on technical knowledge, the improvement measures must be identified.

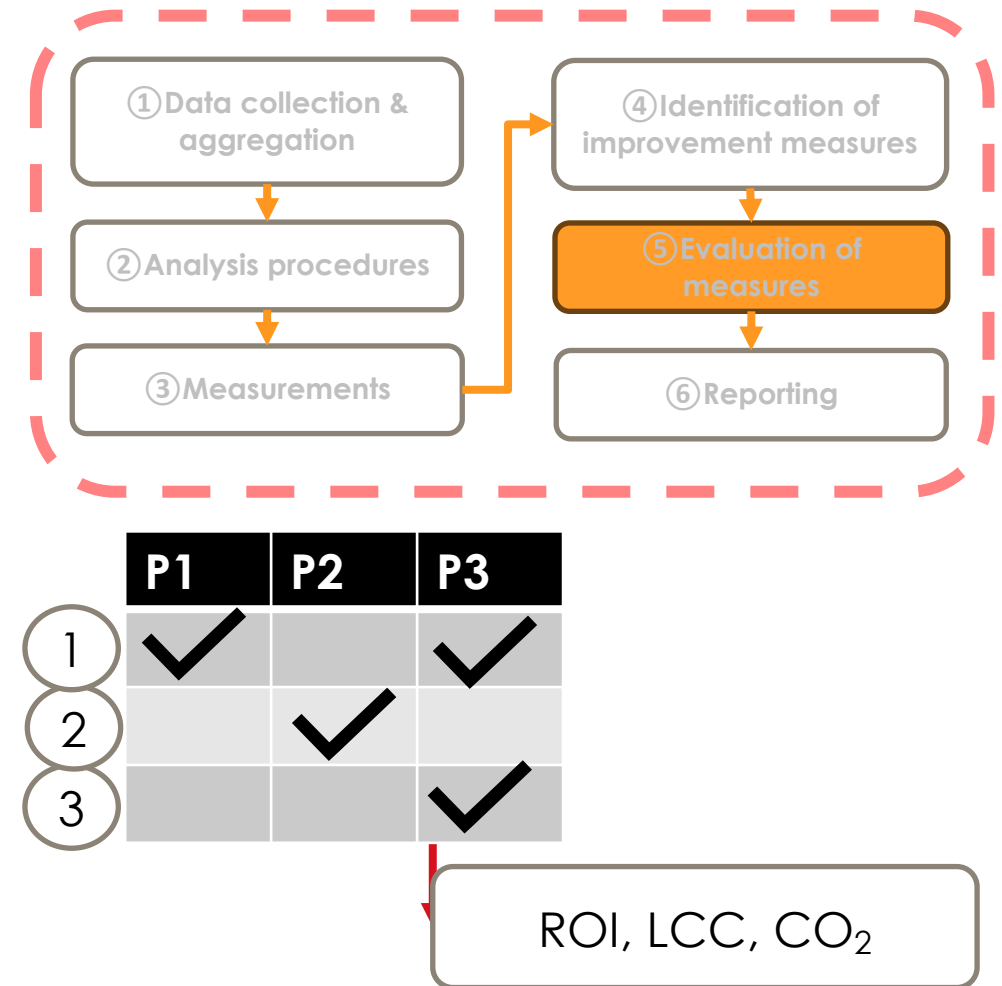


## ⑤ EVALUATION OF MEASURES



**The Principle:** identified measures has to be evaluated and ranked based on their feasibility

1. Evaluate the measures or packages of measures based on:
  - *Simple payback time*
  - *Net present value*
  - *Internal rate of return*
  - *Saved energy cost*
  - *Life cycle cost*
  - *Carbon emission reduction*
  - .....
2. Create a priority list for the measures (or packages) to be implemented, and provide recommendations based on the criteria



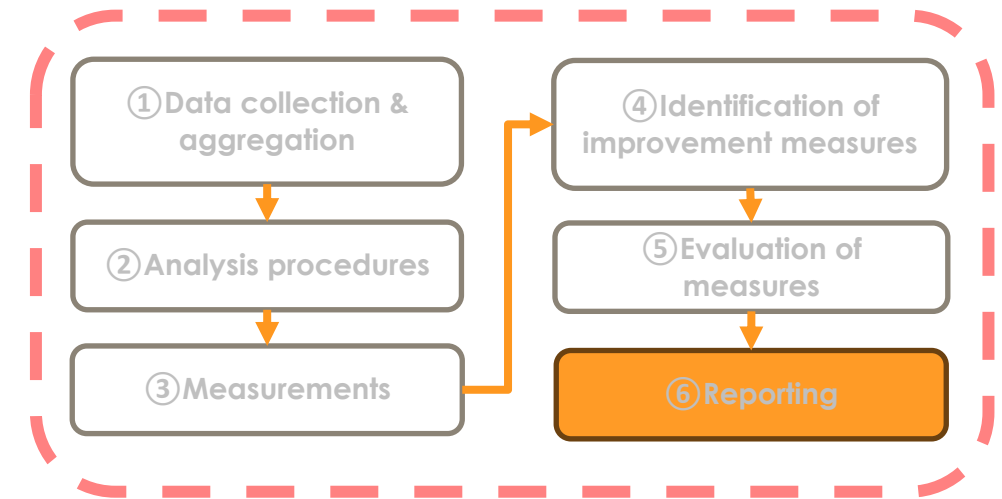
## ⑥ REPORTING



**The Principle:** describing the way how energy audit report should be shaped and presented

### Key aspects:

- General structure of the report
- Define mandatory chapters
- Describe the requirements for the audit report



### ELEMENTS OF MANDATORY STRUCTURE FOR ENERGY AUDIT REPORT:

Executive  
summary

Building  
descriptio  
n

Building  
energy  
needs  
+Normaliz  
ation

Calculati  
on model  
+  
calibratio  
n

Options  
for  
improve  
ment

Predicted  
energy  
consumpt  
ion.

Recomm  
endations



# PROPOSED TABLE OF CONTENTS FOR METHODOLOGY



## **METHODOLOGY FOR CARRYING OUT A COMPREHENSIVE ENERGY AUDIT IN BUILDINGS**

### **General Provisions**

### **References**

### **Definitions**

### **Data collection and aggregation**

Information on the Object and Buildings

Information on Energy Consumption and

### **Costs**

Partial Building Inspections

### **Analysis procedures**

Energy Balance Model of Building

Normalisation of energy consumption

Calibration of the calculation model

### **Measurements**

Measurement of energy consumption

Internal/external microclimate parameters

Calculating Average Microclimate Parameters

### **Identification of improvement measures**

### **Evaluation of improvement measures**

Financial indicators

Life cycle cost analysis

Environmental evaluation

Requirements of evaluation

### **Reporting**

The structure of the report

General requirements for reporting

### **Final Provisions**



Funded by  
the European Union





# NEXT STEPS



Funded by  
the European Union



# NEXT STEPS



**Presentation  
and review of  
the concept**

**Development  
of the draft  
document**

**Round table  
discussion  
with  
stakeholders**

**Final  
document**



Funded by  
the European Union

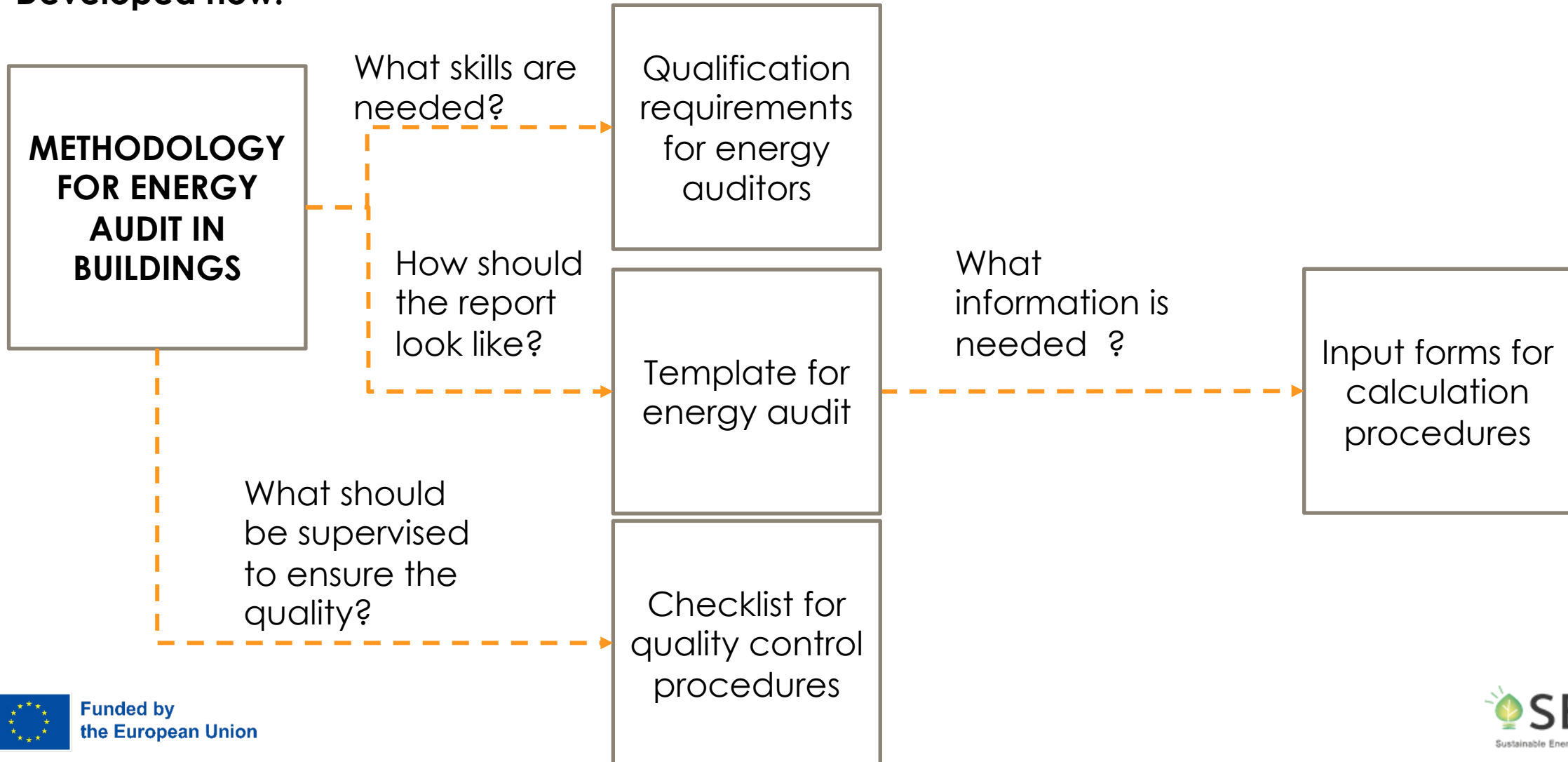


# METHODOLOGY IS CORE ELEMENT, WHICH HELPS TO START DEVELOPING OTHER ELEMENTS OF ENERGY AUDIT SYSTEM



**Developed now:**

*Future development:*



# STRUCTURING THE METHODOLOGY OF ENERGY AUDITS OF BUILDINGS FOR UZBEKISTAN



***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>



Funded by  
the European Union