

Technical workshop “Energy audits in buildings – from theory to practice”

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Energy audits of buildings in EU MSs and EnC CPs

Karolis Janusevicius
Expert in energy audits, SECCA

THE OUTLINE OF PRESENTATION



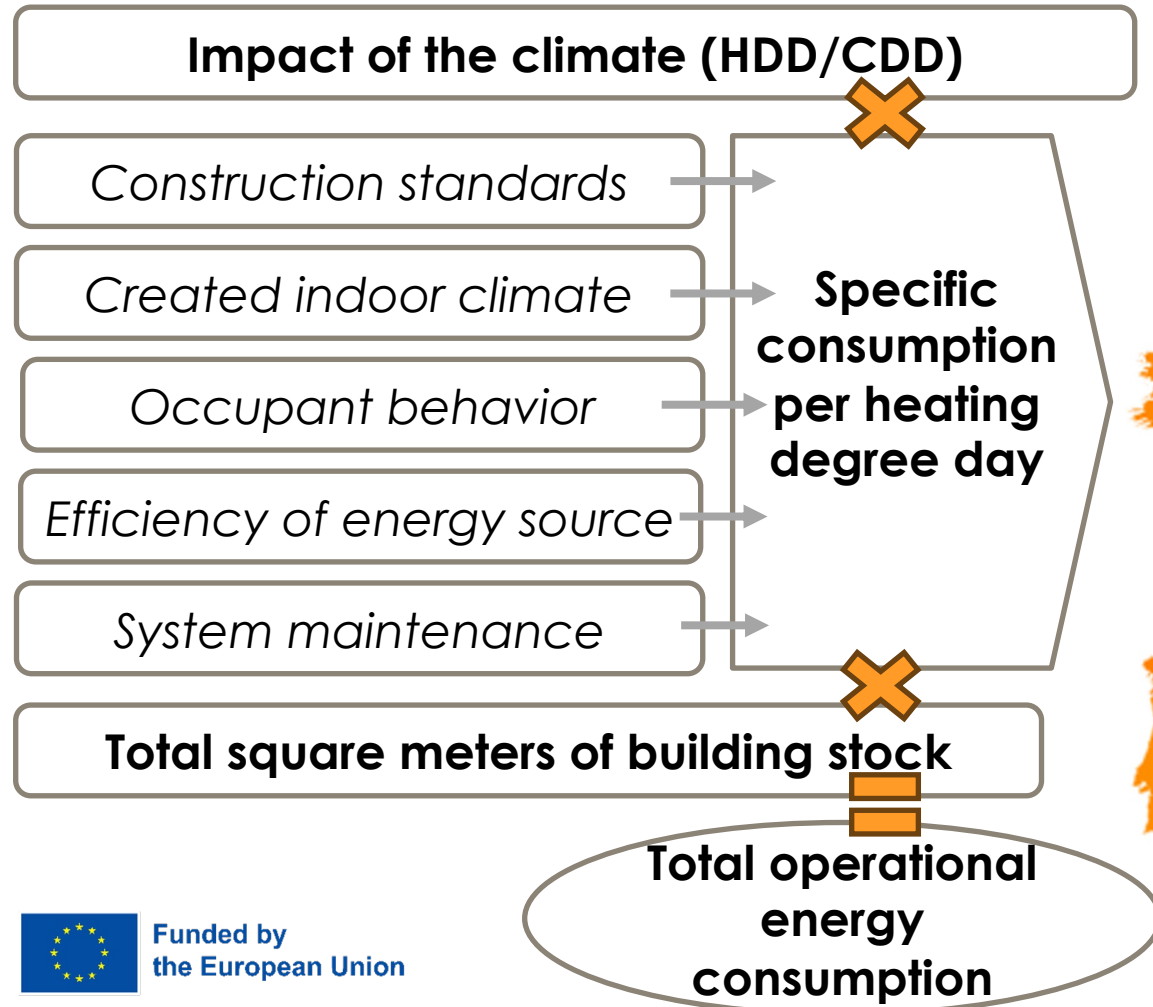
- What is the role of energy consumption in the European Union?
- When were energy audit principles created, and how were they developed?
- How energy audit is understood in EU countries
- How do Energy Community contracting parties collaborate towards common goals?
- What are the key principles defining elements of energy audit systems in EU and EnC countries
- How the basic principles are set for energy audits in buildings
- What are the concepts for minimum requirements for energy audits
- What challenges were faced during the implementation over almost 20 years
- What are future development directions for energy audits



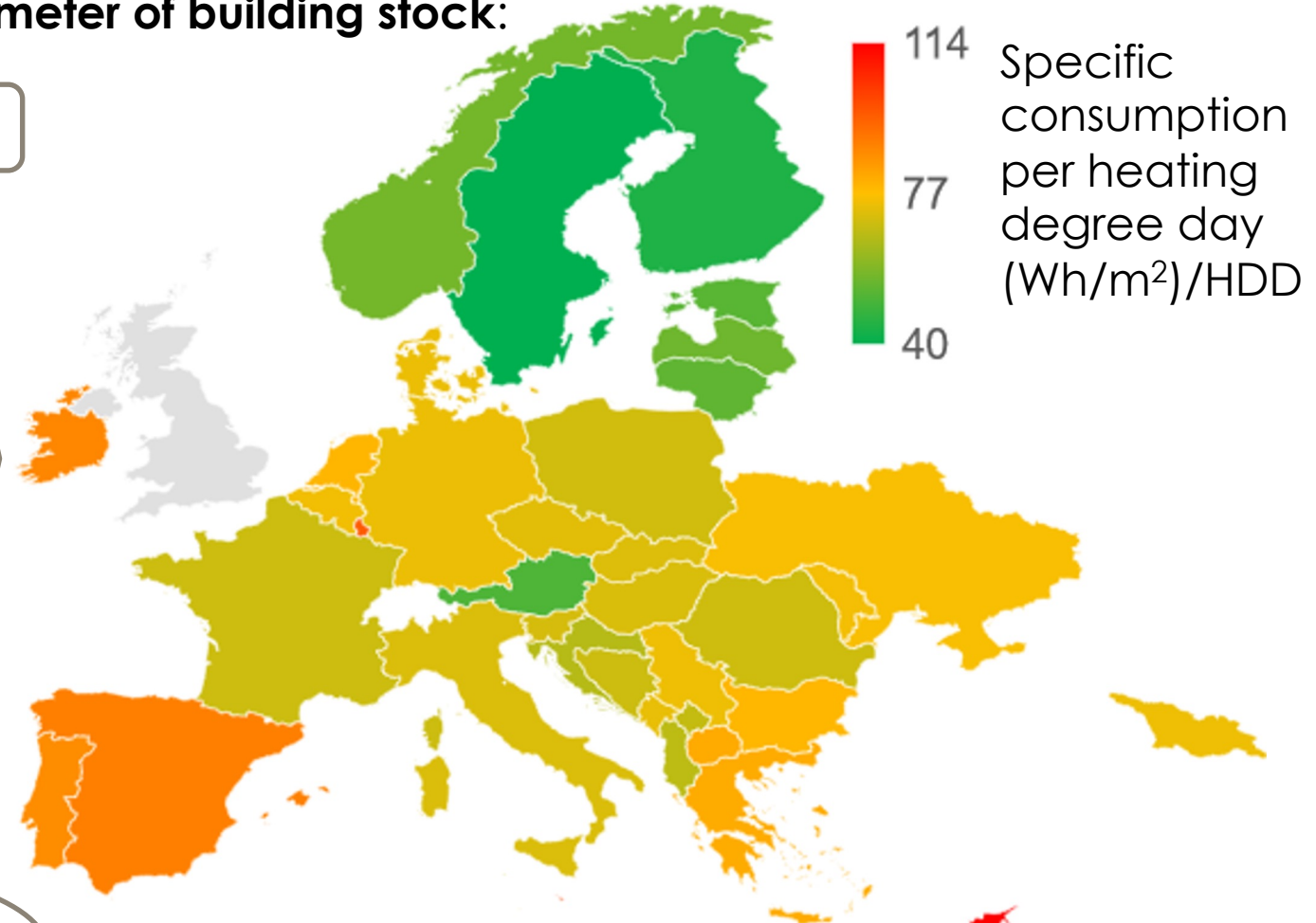
BUILDINGS ARE RESPONSIBLE FOR APPROXIMATELY 40% OF THE EU'S ENERGY CONSUMPTION.



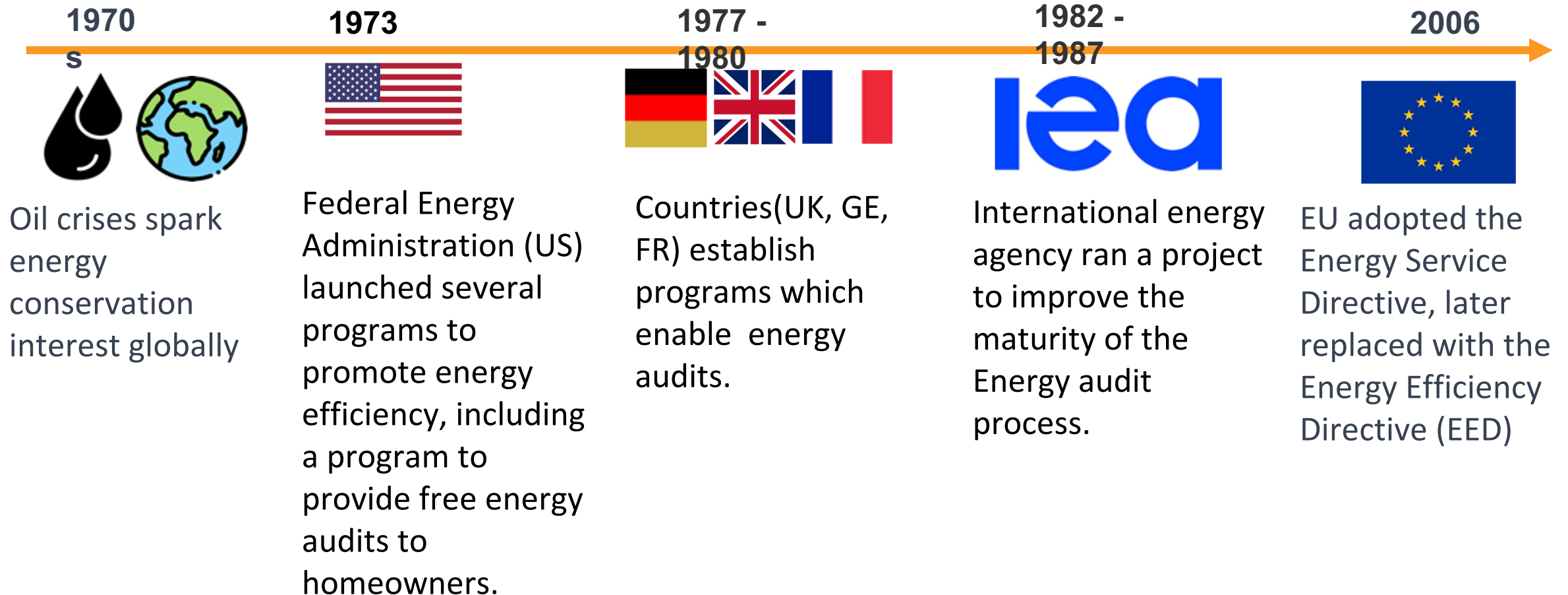
The following factors determine the energy consumption in building sector:



Climate-normalized energy consumption per square meter of building stock:



THE EARLY ENERGY AUDIT PRINCIPLES WERE LAID DOWN 50 YEARS AGO DUE TO AN UNDERSTANDING OF FINITE ENERGY RESOURCES



AN ENERGY AUDIT IS DEFINED AS A TOOL WHICH IS DESIGNED TO REDUCE ENERGY CONSUMPTION IN COST-EFFECTIVE WAY



ENERGY AUDIT means a **systematic procedure** with the purpose of obtaining adequate knowledge of the **energy consumption profile** of a building or group of buildings, (...), **identifying and quantifying opportunities for cost-effective energy savings**, identifying the potential for cost-effective use or production of renewable energy and reporting the findings;

Typical use cases of energy audits in buildings in EU member states:

For large enterprises
when the non-
industrial purpose
building is part of the
enterprise

For public buildings
owned by government
or municipalities

In the cases **when**
financial support
schemes require it (any
building)



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the European Union

IN THE EUROPEAN UNION ENERGY AUDITS WERE INTRODUCED AND ENFORCED VIA DIRECTIVES



2006

2012

2023

Energy service directive 2006

Did not mandate energy audits but introduced this concept to encouraged them to improve energy efficiency.

Energy efficiency directive 2012

- Foresees energy audits as a tool for energy efficiency in large enterprises
- Asks to ensure the qualification system for professionals

Energy efficiency directive 2023

- The updated requirements for large enterprises remain
- The qualification requirements remain

EUROPEAN UNION AND THE ENERGY COMMUNITY APPLIES THE SAME PRINCIPLES BUT AT DIFFERENT TIME FRAMES



Common Principles:

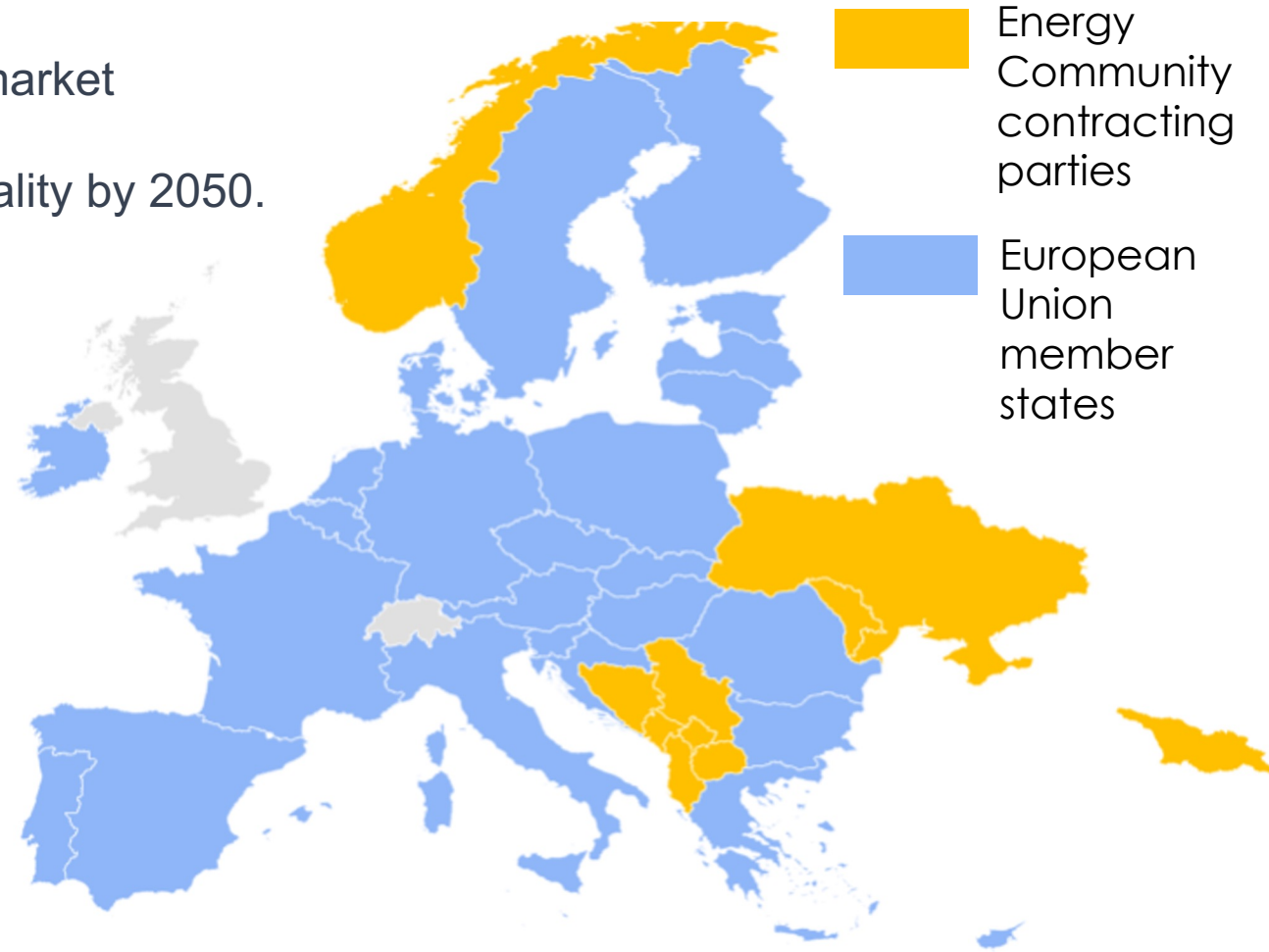
- Commitment to energy security, sustainability, and market integration.
- Transition towards cleaner energy and climate neutrality by 2050.

EU Energy Policy Framework:

Adoption of the "Clean Energy for All Europeans" package in 2019, with specific laws and directives aimed at decarbonizing the EU's energy system¹.

Energy Community Framework:

- A treaty was signed in 2005, where members agreed to follow EU laws on energy, environment, competition, and renewable resources².
- Adaptation of the EU Clean Energy package and 2030 energy and climate targets to the institutional framework of the Energy Community Treaty in 2021 and 2022².



THE PRINCIPLES FROM DIRECTIVES ARE TRANSPOSED TO NATIONAL LEGISLATION AND IMPLEMENTED BY DESIGNATED BODIES



- **Energy efficiency directive** (EED) recommends mandatory requirement for energy audits



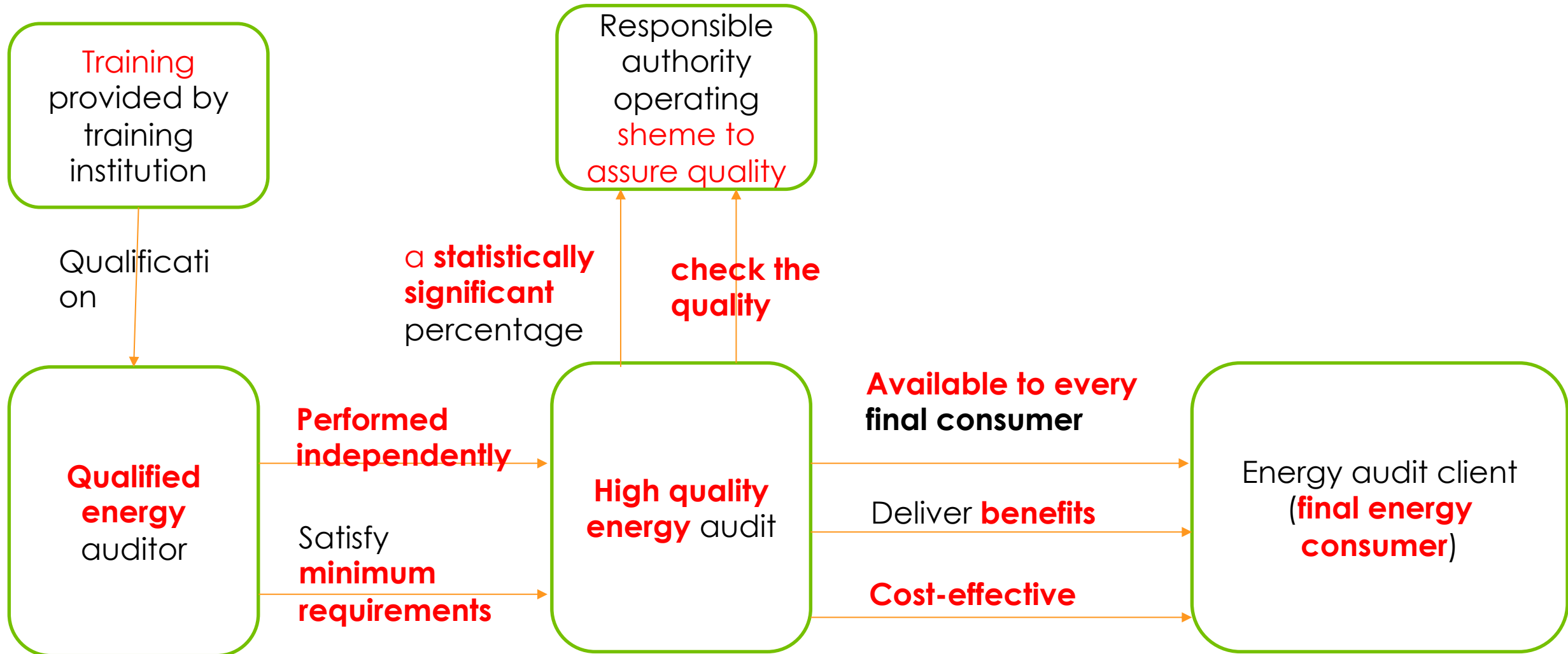
- **Member states** transpose EED recommendations to national legislation and foresee implementation mechanisms (responsible institutions, penalties, financial support mechanisms)



National implementation bodies (Agencies or other) implement the policy:

- Collect information about performed audits, together with foreseen and implemented policy measures
- Agregates and analyses the collected information
- Reports the status and achieved energy savings

THE KEY PRINCIPLES THAT DEFINES ENERGY AUDIT SYSTEM IN EACH EU OR EnC COUNTRY



THE BASIS FOR METHODOLOGY IS DESCRIBED BY EUROPEAN AND INTERNATIONAL STANDARDISATION ORGANISATIONS



The existing standard for energy audits:

- EN 16247-1 (2020) Energy audits - Part 1: General requirements
- EN 16247-2 (2020) Energy audits - Part 2: Buildings
- EN 16247-5 (2020) Energy audits - Part 5: Competence of energy auditors
- ISO 50002:2014 Energy audits — Requirements with guidance for use

Will be replaced by:

- ISO/DIS 50002-1 Energy audits — Requirements with guidance for use — Part 1: General requirements
- ISO/DIS 50002-2 Energy audits — Requirements with guidance for use — Part 2: Buildings

Defines the requirements for **qualification** of person performing an energy audit

Provides flexible **framework** for how energy audit should be shaped

Describes the **structure of the report** (provides basis for energy audit template)

THE PRINCIPLES FOR MINIMUM REQUIREMENTS OF ENERGY AUDITS ARE SET IN EACH EU MS



Data Utilization: Use current, measured, traceable energy data.

Proportionality and Representativeness: Ensure audits are representative for reliable performance analysis.

Comprehensive Review: Review energy consumption of buildings, industries, and transportation.

Detailed Calculations: Provide validated calculations for proposed savings measures.

Efficiency Measures: Identify ways to reduce energy consumption.

Life-Cycle Cost Analysis: Prefer life-cycle cost analysis over simple payback periods

Renewable Energy Potential: Find cost-effective renewable energy opportunities.

Data Storability: Store audit data for historical analysis and performance tracking.

ENERGY AUDITS CO-EXIST TOGETHER WITH ENERGY PERFORMANCE CERTIFICATION



The general trend:



All 27 countries in the European Union have energy audits in buildings in their legislation. This is due to the Energy Efficiency Directive (EED), which requires large enterprises, including those that own or occupy buildings, to carry out energy audits at least every four years.

Some examples:



- In **Austria**, all buildings must have an EPC, and energy audits are required for all new non-residential buildings and for all major renovations of non-residential buildings.



- In **Belgium**, all non-residential buildings with a total useful floor area of over 500 square meters must have an EPC, and energy audits are required for all new non-residential buildings and for all major renovations of non-residential buildings.



- In **Denmark**, all buildings must have an EPC, and energy audits are required for all new non-residential buildings and for all major renovations of non-residential buildings.



- In **Finland**, all buildings must have an EPC, and energy audits are required for all new non-residential buildings and for all major renovations of non-residential buildings.



- In **France**, all non-residential buildings with a total useful floor area of over 1,000 square meters must have an EPC, and energy audits are required for all new non-residential buildings and for all major renovations of non-residential buildings.



- In **Lithuania**, all government-owned buildings are audited to prepare renovation plan and gets EPC after renovation to showcase the improvement of efficiency for the general public.

MULTIPLE CHALLENGES WAS FACED IN MEMBER STATES ON PROMOTING ENERGY AUDITS IN BUILDINGS



1. Ensuring compliance with Legislation
2. Quality of audits
3. Compromise between reporting effort and monitoring
4. Measures implementation
5. Creation of support mechanisms
6. Limited available resources
7. Guiding stakeholders to participation
8. Raising awareness of opportunities
9. Non-energy benefits (NEB's) are not recognized

ADDITIONAL CHALLENGES WERE FACED DUE TO DIFFERENT HERITAGE OF EU MEMBER STATES



Western Europe countries

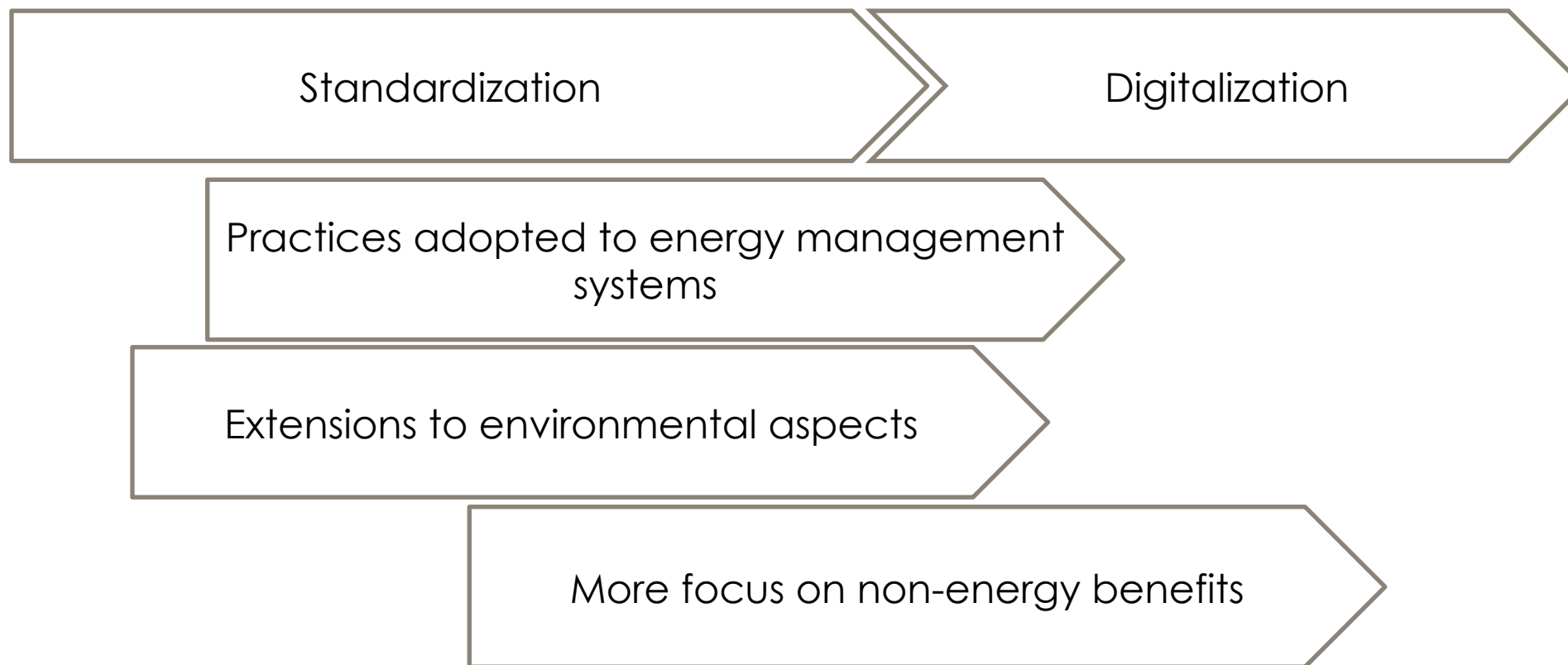
- Energy market was self sustaining
- Energy prices depends on actual running cost
- The activities of production and distribution were separated
- Profit driven efficiency improvement

Post-communist countries

- Low energy prices
- Energy production costs are higher than sold energy
- Government subsidise energy price
- Low energy literacy of citizens
- Cultural differences
- “Just give us money” perspective
- “Just a formal requirement”

Different challenges arise in new member state coming from post-communist block. The same measures did not work as it used to in western Europe. It took time to reform energy sectors and enable progressive tools, but “people factor” remains one of the barrier.

FUTURE DEVELOPMENT IS BASED ON LEARNINGS AND DEVELOPED INNOVATIONS



**New generation
energy audits in
buildings**



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SUMMARY: KEY TAKE AWAYS



- BUILDINGS ARE RESPONSIBLE FOR APPROXIMATELY 40% OF THE EU'S ENERGY CONSUMPTION
- THE EARLY ENERGY AUDIT PRINCIPLES WERE LAID DOWN 50 YEARS AGO DUE TO AN UNDERSTANDING OF FINITE ENERGY RESOURCES
- AN ENERGY AUDIT IS DEFINED AS A TOOL WHICH IS DESIGNED TO REDUCE ENERGY CONSUMPTION IN COST-EFFECTIVE WAY
- IN THE EUROPEAN UNION, ENERGY AUDITS WERE INTRODUCED AND ENFORCED VIA DIRECTIVES
- EUROPEAN UNION AND THE ENERGY COMMUNITY APPLY THE SAME PRINCIPLES BUT AT DIFFERENT TIME FRAMES
- THE PRINCIPLES FROM DIRECTIVES ARE TRANSPOSED TO NATIONAL LEGISLATION AND IMPLEMENTED BY DESIGNATED BODIES
- THE KEY PRINCIPLES THAT DEFINES ENERGY AUDIT SYSTEM IN EACH EU OR EnC COUNTRY
- THE BASIS FOR METHODOLOGY IS DESCRIBED BY EUROPEAN AND INTERNATIONAL STANDARDISATION ORGANISATIONS
- THE PRINCIPLES FOR MINIMUM REQUIREMENTS OF ENERGY AUDITS ARE SET IN EACH EU MS
- ENERGY AUDITS CO-EXIST TOGETHER WITH ENERGY PERFORMANCE CERTIFICATION
- MULTIPLE CHALLENGES WAS FACED IN MEMBER STATES ON PROMOTING ENERGY AUDITS IN BUILDINGS
- FUTURE DEVELOPMENT IS BASED ON LEARNINGS AND DEVELOPED INNOVATIONS



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