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Technical workshop: Practical aspects of sustainable energy development in Kyrgyzstan

Quality control of energy performance certificates

Bishkek, October 6, 2023

Importance of quality control for energy performance certificates - EU MSS and EC CPS best practice examples

Karolis Janusevicius Tokayev, expert in energy audits, SECCA

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

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IMPORTANCE OF QUALITY CONTROL FOR ENERGY PERFORMANCE CERTIFICATES – EU MSS AND EC CPS BEST PRACTICE EXAMPLES

Bishkek, Kyrgyzstan

2023-10-06

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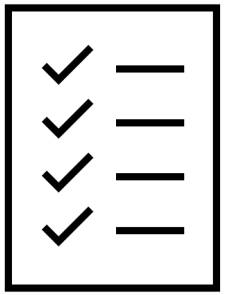
THE CONTENTS OF PRESENTATION



1. Historical development of Energy performance certification of buildings
2. How have the EU-level requirements for quality control evolved over the years?
3. What influences the willingness to use EPCs in Europe?
4. How are the EPCs stimulated in EU MS?
5. What role does this stimulation play in quality control?
6. Case studies from ***Lithuania*** and ***Georgia***
7. How do the reproducibility, accuracy, and assessor expertise interact with quality control?
8. How could quality control affect the pricing of EPC?
9. What is the role of public databases in the quality control process?
10. Faced challenges to maintain the good public image of EPC?

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THESE EARLY EFFORTS OF ENERGY LABELING SET THE STAGE FOR THE EU'S EPBD IN 2002.

1970s

Oil crises spark energy conservation interest globally

1979

Denmark introduces its first energy labeling scheme

It was a kick-start of the first generation of energy performance requirements. (Thermal properties of building envelope)

1990s

Several European countries (Sweden, UK, Netherlands) experiment with energy labeling and rating schemes

Sweden: Begins voluntary energy certification for buildings

Netherlands: Introduces the Energy Performance Norm

Germany: Started to promote energy efficient building at national level

UK: Initiates the National Home Energy Rating (NHER) scheme

2002

EU adopts the Energy Performance of Buildings Directive (EPBD)."

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THE ENERGY PERFORMANCE CERTIFICATION CONCEPT IS EVOLVING WITH EACH EPBD VERSION

2002 — 2010 — 2018 — 2023

Directive 2002/91/EC - EPBD 2002

- **Introduced EPCs for buildings when constructed, sold, or rented.**
- Emphasized improving energy performance of buildings.
- Mandated regular inspection of boilers and air-conditioning systems.

Directive 2010/31/EU - EPBD Recast

- Introduced "nearly zero-energy buildings" (NZEB) concept.
- All new buildings to be NZEB by end of 2020.
- **Enhanced user-friendliness of EPCs and promoted wider dissemination.**

Directive (EU) 2018/844 - EPBD Revision

- Aims to decarbonize building stock by 2050.
- Promotes smart technologies and e-mobility.
- Encourages use of financial tools for energy efficiency improvements
- **Stresses the use of EPC for Long-term renovation strategy**

The evolution of EU directives reflects a growing commitment to energy efficiency and environmental sustainability

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INDEPENDENT QUALITY CONTROL IN EU EPBD MAINTAINS ITS IMPORTANCE

2002

Directive 2002/91/EC (EPBD 2002):
- Introduced the concept of independent control for EPCs.
- Aimed to ensure accuracy and quality of issued EPCs.
- Set the foundation for future oversight mechanisms.

2010

Directive 2010/31/EU (EPBD Recast):
- Emphasized random selection of EPCs for verification.
- Mandated penalties for non-compliance.
- Reinforced the importance of unbiased and accurate EPCs.

2018

Directive (EU) 2018/844 (EPBD Revision):
- Advocated for centralized EPC databases.
- Highlighted the role of digital tools for efficient oversight.
- Stressed the continuous importance of independent control systems.

SPECIFICALLY, THE INDEPENDENT CONTROL SYSTEM'S PRIMARY OBJECTIVES ARE TO:
- Ensure that EPCs provide reliable and unbiased information.
- Verify that the data and calculations used in the EPC process are accurate and based on accepted standards.
- Confirm that EPCs are issued by qualified and accredited experts.
- Deter fraudulent practices or misrepresentations in the EPC process.

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Independent quality control: A cornerstone for the credibility and reliability of EPCs in the EU

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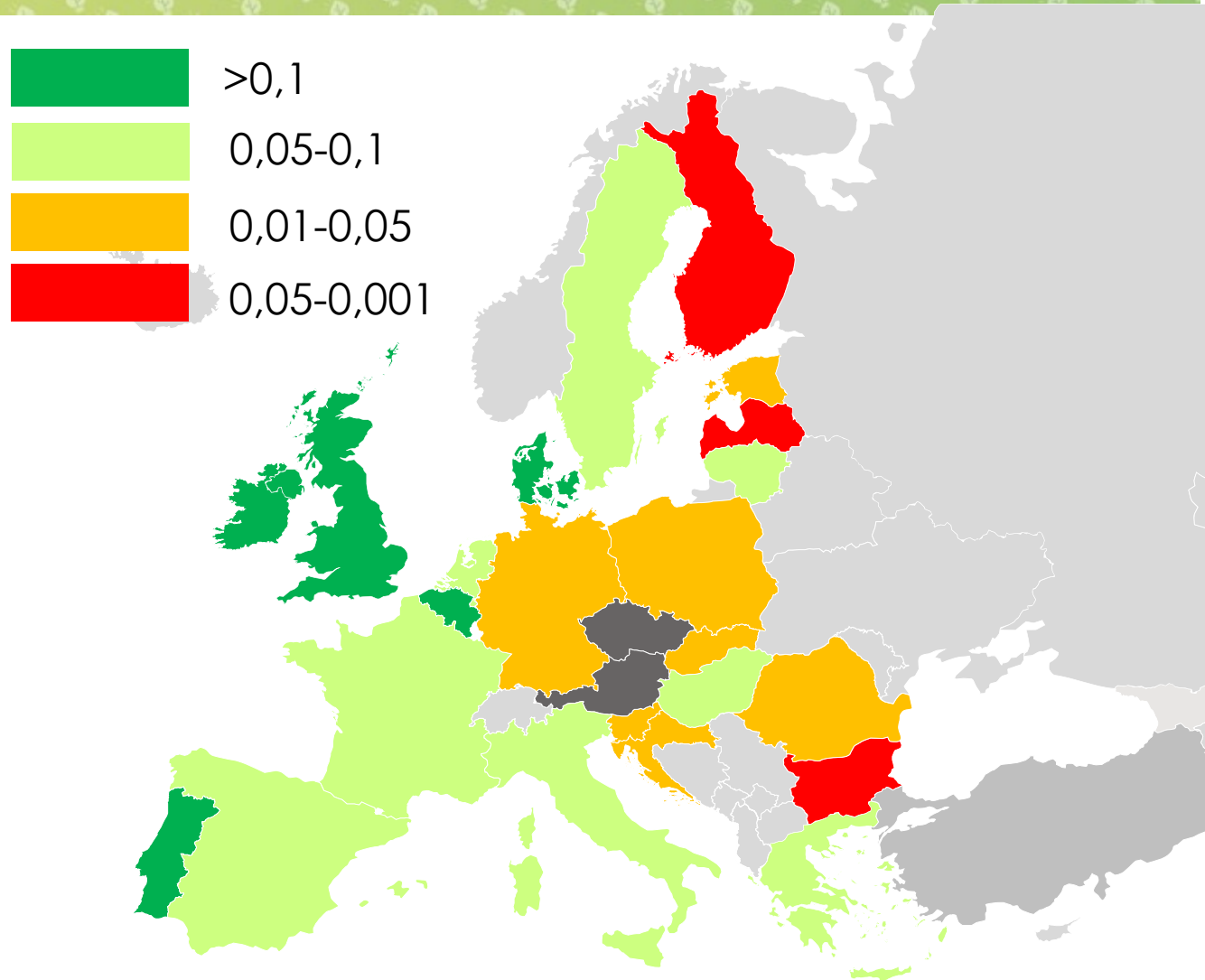
THE RELATIVE NUMBER OF EPCs IS UNEQUALLY DISTRIBUTED OVER THE EU MEMBER STATES

THE FOLLOWING REASONS MAY EXPLAIN THE DIFFERENCES:

- **The EPC database is rather new** and thus few EPCs have been registered (e.g. Finland).
- In some countries, the **compliance rate is still relatively low** for residential buildings, which hampers the uptake of EPCs (e.g. Latvia, Bulgaria).
- In Bulgaria, the **complex ownership structures** in multifamily buildings (the most common building type in the country) make it difficult to get an EPC. As a result, EPCs are mainly attained if the building owners plan to apply for a public renovation grant for which the EPC is a prerequisite.
- The **number of real estate transactions influences the number of issued EPCs**. The real estate market in the UK is one of the most liquid and has the highest number of transactions (as well as the shortest ownership period), which triggers many new EPCs.
- The **country is relatively small, with a low total number of buildings** (e.g. Malta and Estonia)



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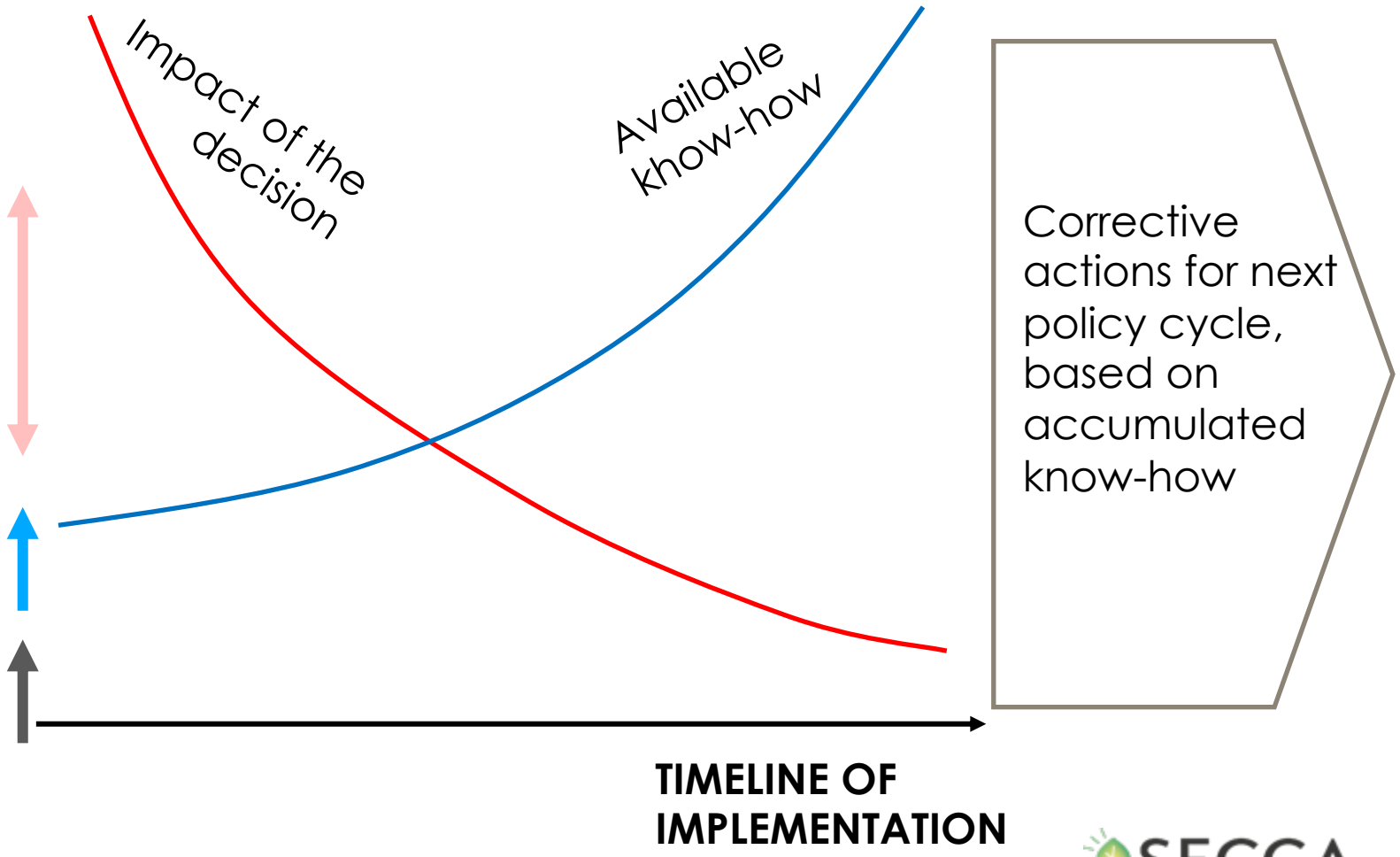
POLICY EVOLUTION IS BASED ON THE COLLECTION OF KNOWLEDGE AND UNCERTAINTY MANAGEMENT

- There is an understanding that policymakers do not know and do not understand all the aspects – **but have to make decision under uncertainty**
  - The gap of understanding and knowledge on market resistance or acceptance at specific economic conditions and time

(which could not be closed prior)

- Pilot projects and best practice cases
- There is investment in research and initial case studies



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FURTHER DEVELOPMENT FORESEEN IN ENERGY PERFORMANCE CERTIFICATION IN UPCOMING EPBD EDITION

Calculation of life-cycle global warming potential (GWP):

Zero-emission buildings become the new standard for new buildings, the level to be attained by a deep renovation as of 2030 and the vision for the building stock in 2050

Smart Readiness indicator:

assess the capacity of a building to use information and communication technologies and electronic systems to adapt its operation to the needs of the occupants and the grid and to improve its energy efficiency and overall performance

Harmonisation of scales

EPCs will have to be based on a harmonised scale of classes, with A representing zero emission buildings, and G equating to the 15% worst-performing buildings at national level.

More input data and more output information – meaning more workload for the quality control process

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The prepared draft of EPBD 2023 maintains the articles related to Quality control – so it will remain important for the upcoming period.

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WILLINGNESS TO USE EPC ARE INFLUENCED BY MULTIPLE FACTORS

TRUST IN PROMISED RESULTS

- REGULATORY COMPLIANCE
- COST OPTIMALITY
- MARKET DIFFERENTIATION
- ACCESS TO INCENTIVES AND FINANCING
- DATA-DRIVEN DECISION MAKING
- POSITIVE PUBLIC PERCEPTION

WILLINGNESS TO USE ENERGY PERFORMANCE CERTIFICATES

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The key enabler for willingness to use the EPC is the trust that promised results will be delivered.

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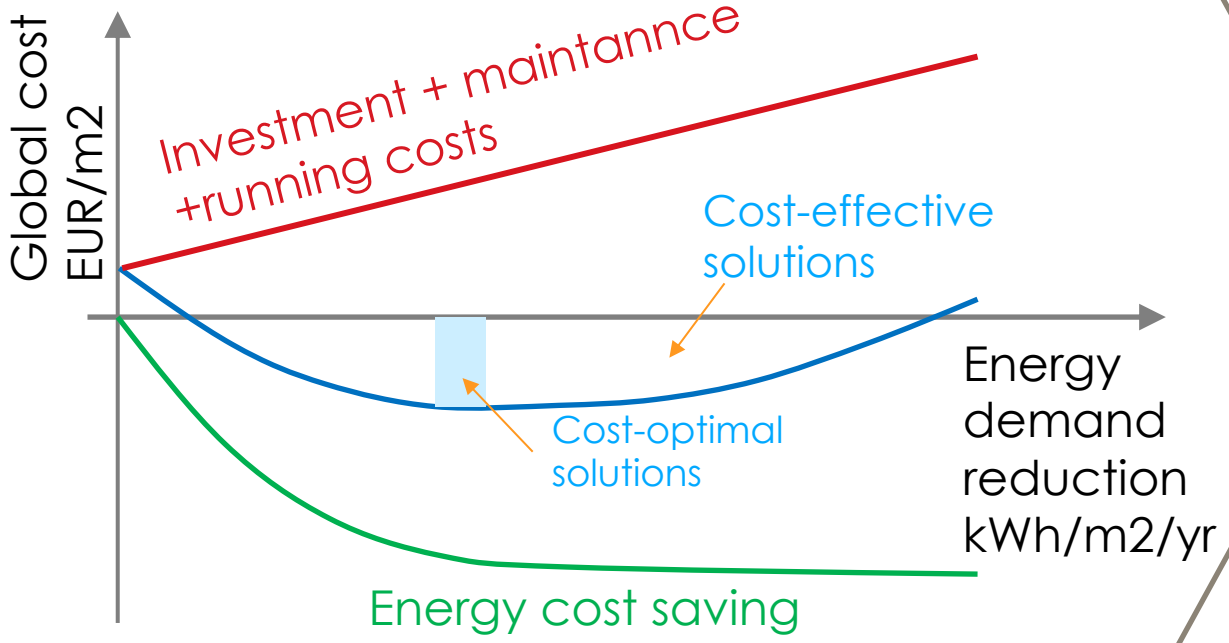
MAIN REASON OF EPC POPULARITY – ECONOMIC RATIONALE BASED ON COST OPTIMALITY

1. Cost-optimal calculations allow the identification of what should be minimum energy performance requirements:



2. Energy performance class and minimum energy performance requirements are aligned with cost-optimal calculation results

<u>It ensures that:</u>

1. Obligation to reach specific energy performance class when building new or renovating existing building delivers cost-effective result.
2. The recommendations given by EPC are also cost-effective

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THE EPC WAS BLENDED IN CONSTRUCTION AND REAL ESTATE SECTOR LEGISLATION IN EU AND EC COUNTRIES

TYPICAL REQUIREMENTS SET IN THE EU MS AND EC CP LEGISLATION:

PUBLIC BUILDINGS

The certificate has to be publicly showcased (initially for buildings >500m^2 later >250m^2)

SELLING, RENTING OR LEASING THE PROPERTY

The information must be provided in the advertisement. And EPC must be added to the agreement documents

BEFORE AND AFTER THE RENOVATION

The EPC calculation procedures are used as a basis for investment planning and as a proof of achieved result

FOR NEW CONSTRUCTION BUILDINGS

To complete the construction process building has to be certified to show the compliance with requirements

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IMPORTANCE OF QUALITY CONTROL ON STIMULATING EPC AND MAINTAINING ITS POPULARITY

Consumer Trust: Quality control guarantees accurate energy performance assessments, fostering trust and aligning with EU Consumer Rights Legislation.

Protection of Vulnerable Consumers: Quality control minimizes misinformation, promoting transparency and fairness in alignment with EU Vulnerable Consumers Protection legislation.

Legal Liability & Risk Mitigation: Quality control reduces risks associated with inaccuracies or misrepresentations in EPCs, mitigating legal liabilities for stakeholders.

Market Stimulation: Quality control ensures accurate and comparable energy performance certifications, fostering a competitive market environment.

Data Accuracy & Performance Monitoring: Quality control facilitates reliable data capture, essential for effective monitoring and continuous energy performance improvement.

Professional Development: Quality control standards encourage engagement with control systems, promoting knowledge sharing and the establishment of best practices in the sector

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As trust in energy performance certification is an important force to ensure market willingness to use it, Quality control serves as an important enabler of a successful EPC scheme.

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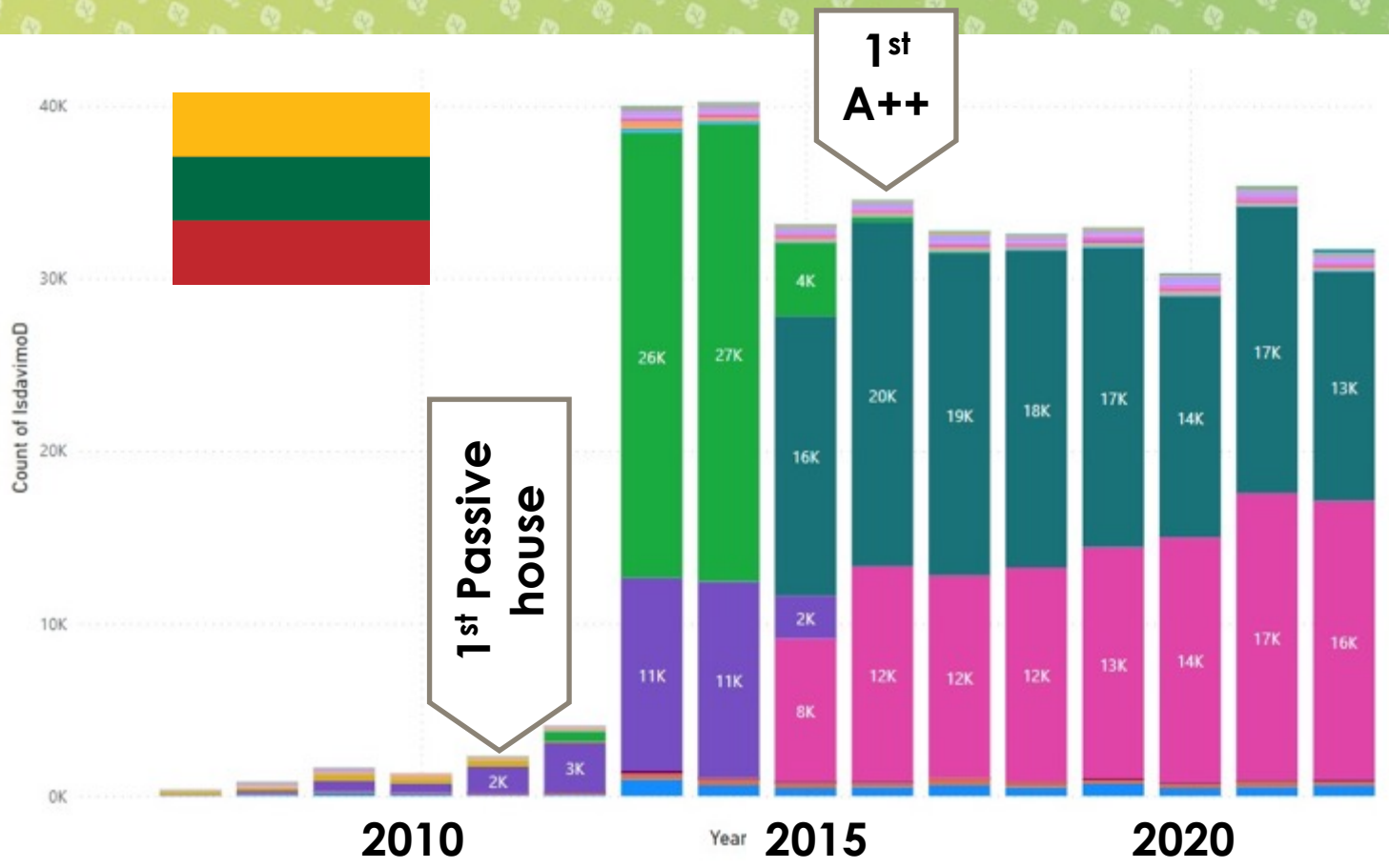
CASE OF LITHUANIA: CURRENT STATUS OF SYSTEM AND KEY ELEMENTS COVERED

- Requirements for building thermal properties since **1992**
- EU member state since **2004**
- The EPC system was introduced in **2007** and that resulted to **+354k of EPC in total.**

The aspects covered in the case study:

- *Legal framework*
- *Implementation Strategy*
- *Built-in quality in the process*
- *Quality control process*
- *Technical infrastructure*
- *Monitoring and Evaluation*



Lithuania is a good example of how EPC could be used for both new construction and renovation, and also how it helped to transform the construction sector and introduce Near Zero Energy Buildings way before 2020.

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LEGAL FRAMEWORK, IMPLEMENTATION STRATEGY AND WAYS HOW IT'S MONITORED

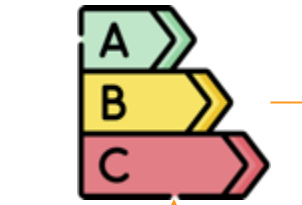
Legal framework

- Construction Law
- Bylaw on Energy performance experts
- Construction regulation providing methodology

Implementation Strategy

Ministry of Environment

- Rent, sell lease
- New construction
- Renovation



SSVA

R.Est DB

Monitoring and Evaluation

- Checking significant sample size calculated from total submitted EPC
- The feedback from Quality control is used to develop the training and continuous training
- The adjustments are made quality control due to identified issues

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QUALITY IS ASSURED BEFORE THE EPC IS ISSUED DUE TO "BUILT-IN" QUALITY

1. DATA COLLECTION
2. SITE VISIT
3. DATA APPROVAL

AUTOMATED

4. CALCULATION
5. RATING ASSIGNMENT
6. RECOMMENDATIONS

7. DOCUMENTATION
8. SUBMISSION

The input areas in software and requirements in methodology dictate what should be collected.
The methodology describes what kind of options are acceptable to be used as a reference for the thermal properties

The requirements for how input information has to be documented and what "attachments" have to be added

The action by single click

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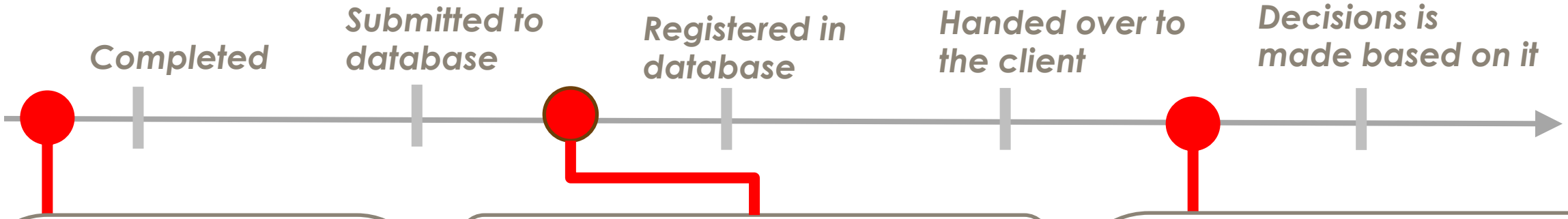
THREE-LEVEL QUALITY CONTROL INTEGRATED IN THE EPC SYSTEM IN LITHUANIA



Automated validation is present in the software and evaluates the inputs, missing information and expiration dates of measurement protocols

- Automated checking based on geometry and logical rules

- Expert review of provided information
- The communication between EPC assessor and evaluator happens inside the Software

- The certificates are selected randomly
- Full information set is requested from the EPC assessor
- The expert evaluator is visiting the site and redoing the EPC
- The feedback is given to EPC Assessor
- The actions are taken if needed

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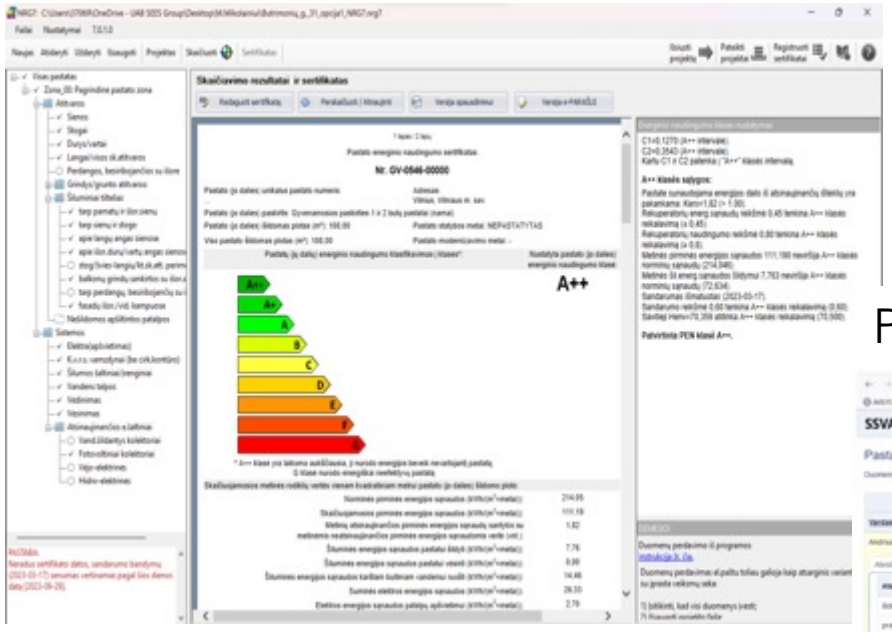
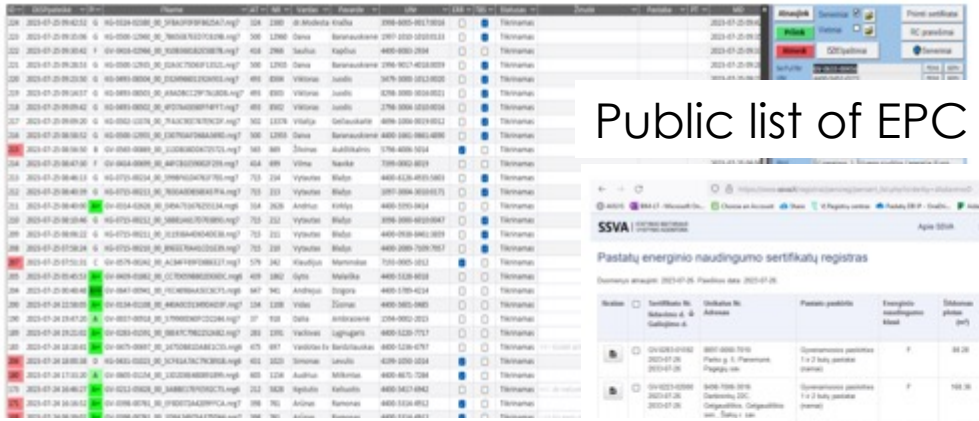
THE TECHNICAL INFRASTRUCTURE IN LITHUANIA ENSURING PROPPER OPERATION OF THE SYSTEM

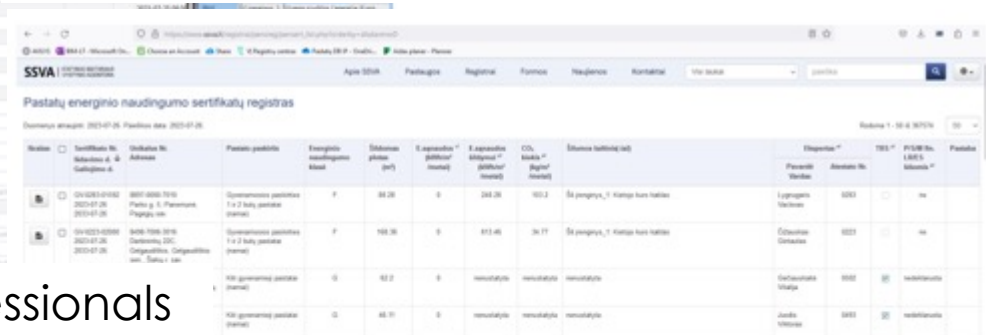
Internal interface of the data pipeline

Software to calculate and issue EPC

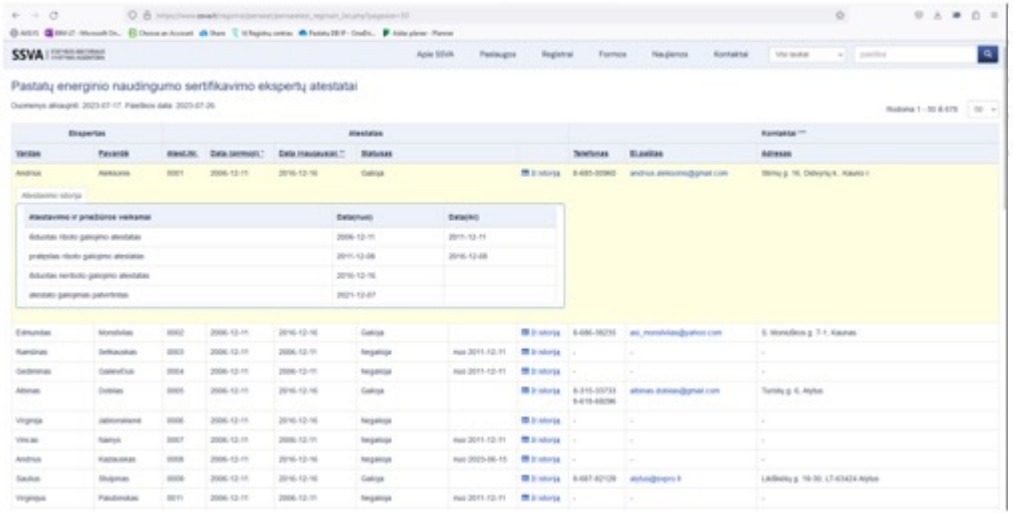




Public list of EPC



Public list of approved professionals



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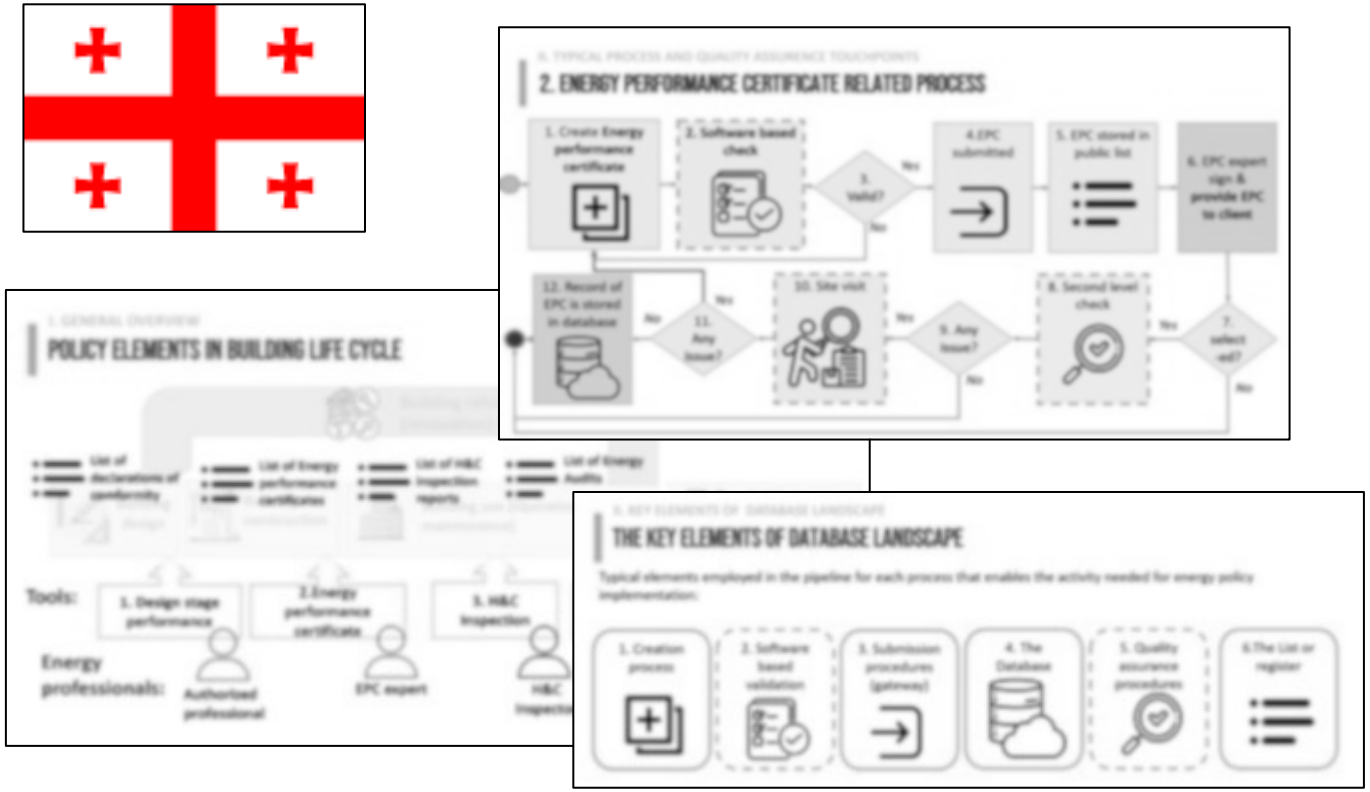
CASE OF GEORGIA: CURRENT STATUS OF SYSTEM AND KEY ELEMENTS COVERED

- Energy community contracting party since **2017**
- Minimum energy performance requirements introduced **2022**
- **The Energy performance certification system will be activated in 2024**

The aspects covered in the case study:

- *Legal framework*
- *Implementation Strategy*
- *Training and Certification of Assessors*
- *Built-in quality in the process*
- *Quality control process*
- *Technical infrastructure*
- *Monitoring and Evaluation*



Georgia is currently going through a transformation and adopting EU best practices with the help of Technical support projects. It gets support from experts bringing best practices from Germany, Italy, Lithuania, Latvia

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LEGAL FRAMEWORK, IMPLEMENTATION STRATEGY AND WAYS HOW IT'S MONITORED

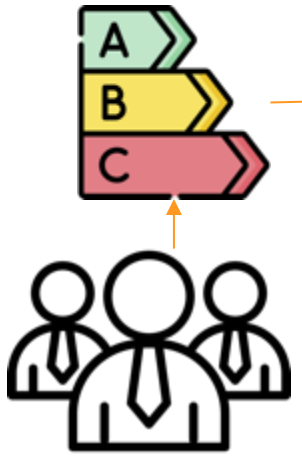
Legal framework

- Energy Efficiency in Buildings Law
- Bylaw of Independent energy professionals
- Bylaw on Energy performance certification
- National calculation methodology

Implementation Strategy

Ministry of Economy and Sustainable Development

- Rent, sell lease
- New construction
- Renovation



Imple-mentation body

Monitoring and Evaluation

- Checking is foreseen for a significant sample size calculated from the total submitted EPC
- *The mechanisms are currently under development*

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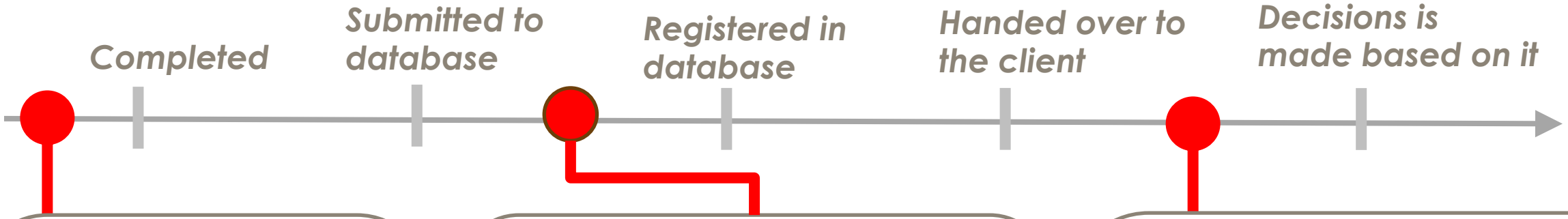
THREE-LEVEL QUALITY CONTROL INTEGRATED IN THE EPC SYSTEM IN GEORGIA



Automated validation is present in the software which evaluates the missing information

- Random stratified selection is foreseen
- Expert review of provided information
- The communication between EPC assessor and evaluator happens inside the Software

- The certificates are selected randomly
- Full information set is requested from the EPC assessor
- The expert evaluator is visiting the site and redoing the EPC
- The feedback is given to EPC Assessor
- The actions are taken if needed

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IMPORTANT OUTTAKES FROM EUROPEAN EXPERIENCE THAT INFLUENCES THE QUALITY CONTROL PROCESS

TO DESIGN AN EFFECTIVE ASSESSMENT APPROACH, IT IS IMPORTANT TO CONSIDER THE ISSUES OF REPRODUCIBILITY, ACCURACY, LEVEL OF EXPERTISE AND COSTS.

Key outtakes from European experience:

- Reproducibility of EPC should be achieved to be sure that different assessors would arrive at the same conclusion
- Accuracy of EPC should be ensured by providing options and not relying on assessors' capabilities or data availability about the situation
- Education, experience and training are important, but it is crucial to ensure continuous learning (capacity building) of EPC assessors,
- Prices of EPC are highly dependent on the certification approach, but it may also be affected by how hard the quality control is.

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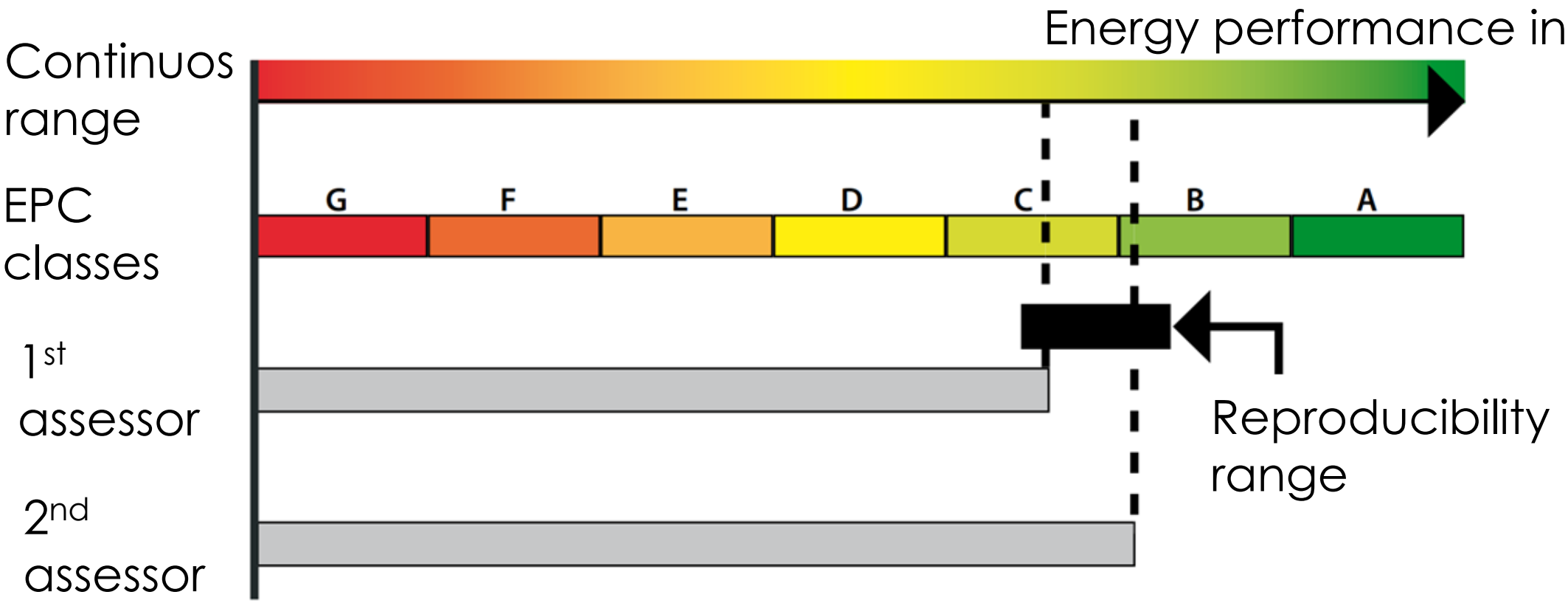
ENSURING REPRODUCIBILITY IS IMPORTANT IF THERE IS A NEED TO COMPARE WORK OF DIFFERENT ASSESSORS



More flexible methodology are (less standardized and professional knowledge dependent), more different results may be obtained by different assessors.

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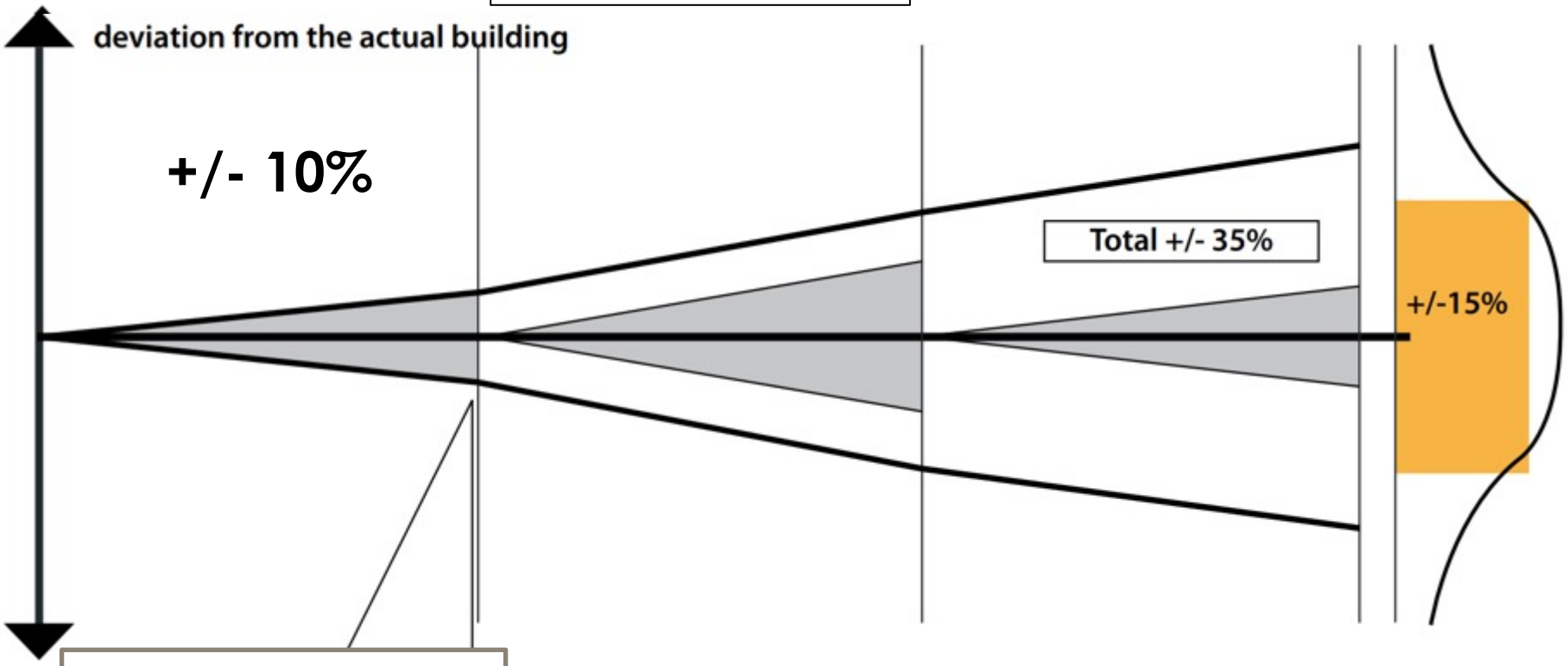
ACCURACY NEEDS TO BE DESIGNED BY STANDARDIZING DATA COLLECTION AND PROVIDING DEFAULT VALUES

The accuracy of the methodology, which refers to the deviation between the calculated and the actual value, is mainly associated with the accuracy level of three parts of the assessment procedure.

Data acquisition +/-

Application of default values +/-

Calculation +/-



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LEVEL OF EXPERTISE PLAYS IMPORTANT ROLE IN ENSURING THE QUALITY OF EPC

Member States can define EPC expert qualifications, with varying national requirements like specified education levels, professional experience, training, and/or mandatory exams.

	Austria	Denmark	Estonia	Lithuania	Belgium	Greece	Italy	Poland	Portugal	Romania	Scotland
University degree		X	X	X	X	X	X	X	X		
Professional experience	X		X	X	X	X		X	X		X
Exam		X	X	X	X		X		X	X	X
Mandatory continued professional development			X	X	X						
Voluntary continued professional development		X				X				X	

But as a conclusion from many projects, case studies and national reports, despite prior qualification requirements, continuous education and capacity building of EPC assessors are needed.

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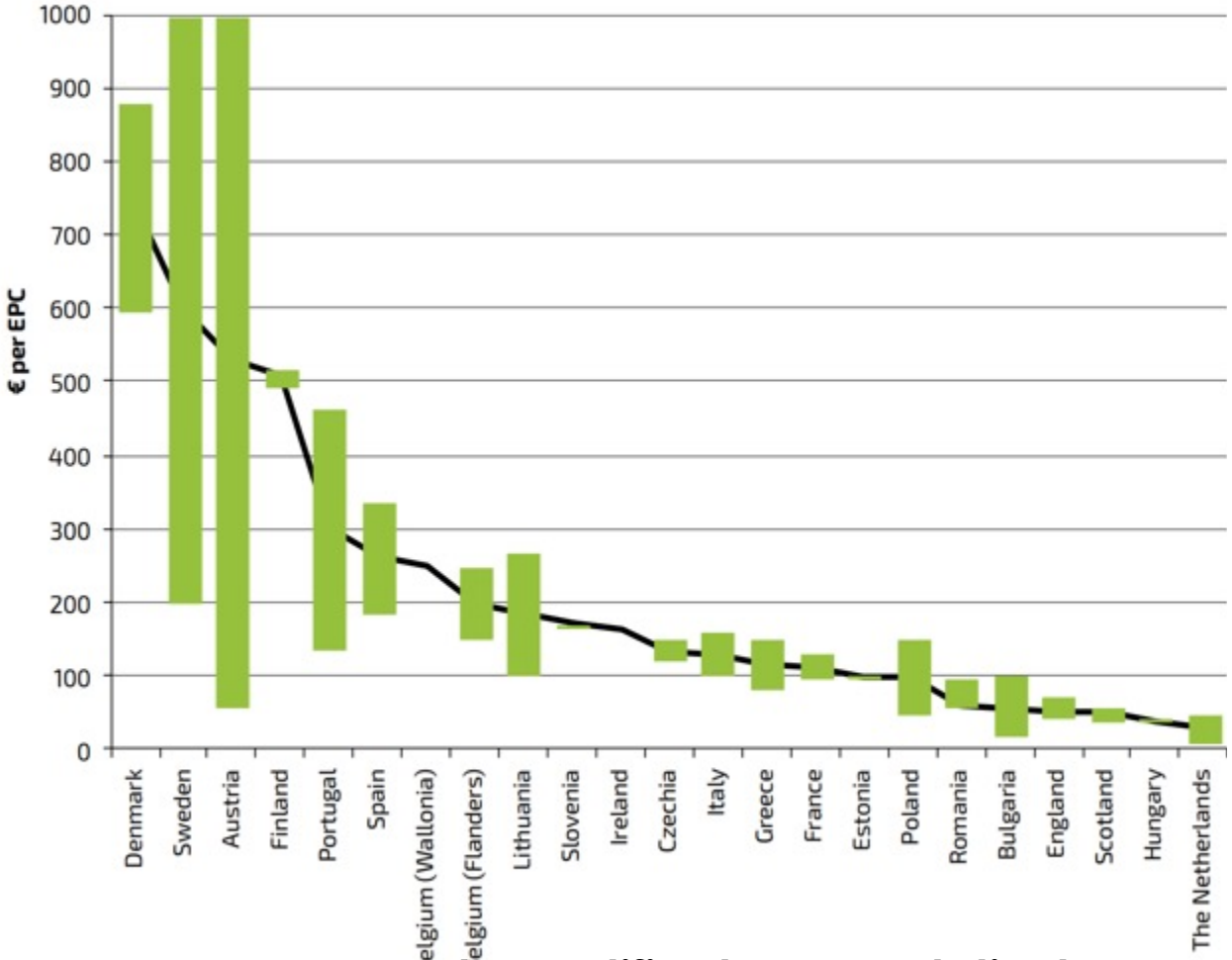
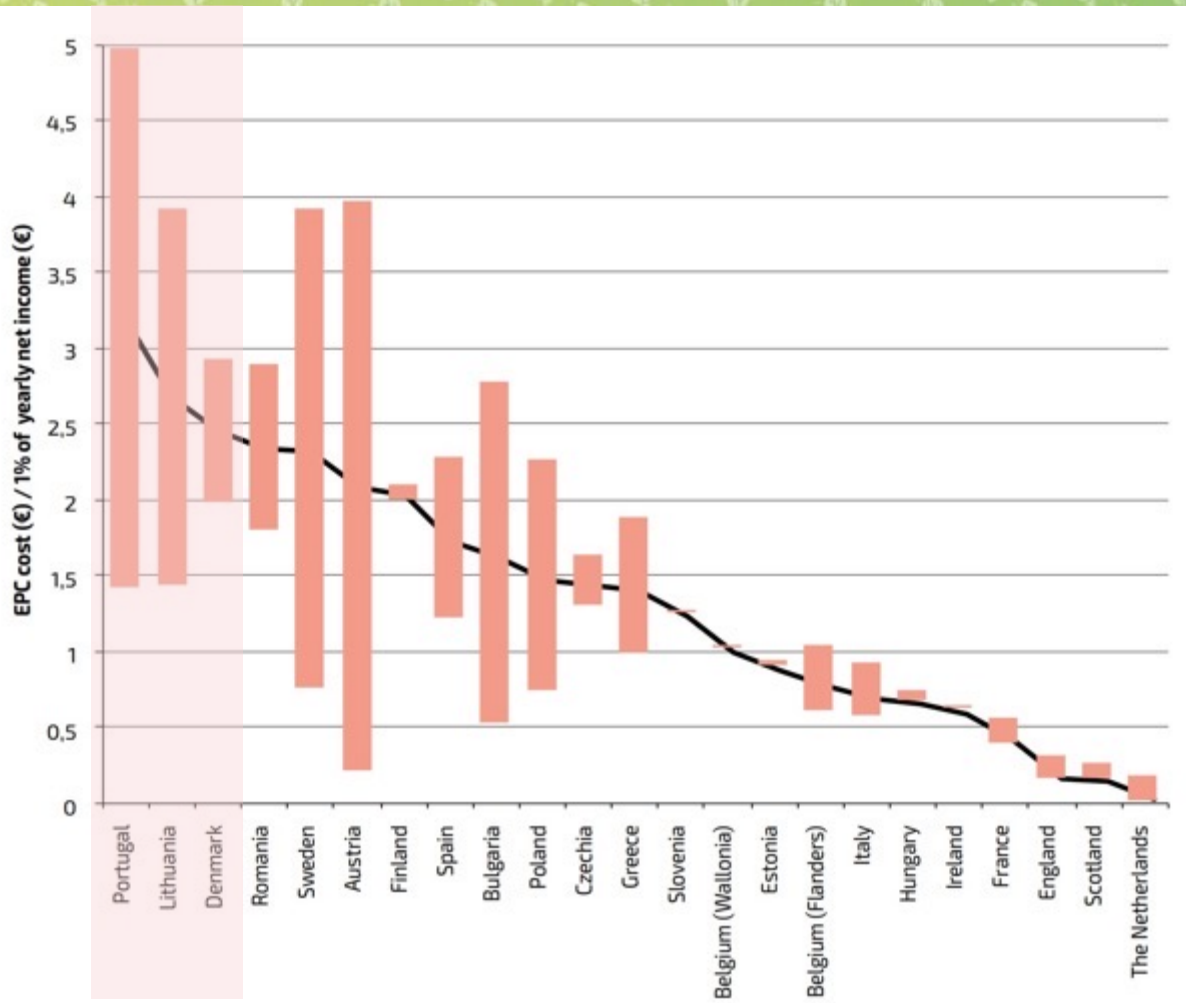
EPC PRICES VARY BUT ARE DEPENDENT ON THE ISSUING APPROACH AND HOW STRONG QUALITY IS CONTROLLED





The certificates are relatively more costly at countries where more strict quality control exists due to the higher amount to comply with requirements and ensure that all required documentation is provided

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THE PUBLIC DATABASES PLAYS IMPORTANT ROLE ON ENSURING THE TRANSPARENCY AND QUALITY

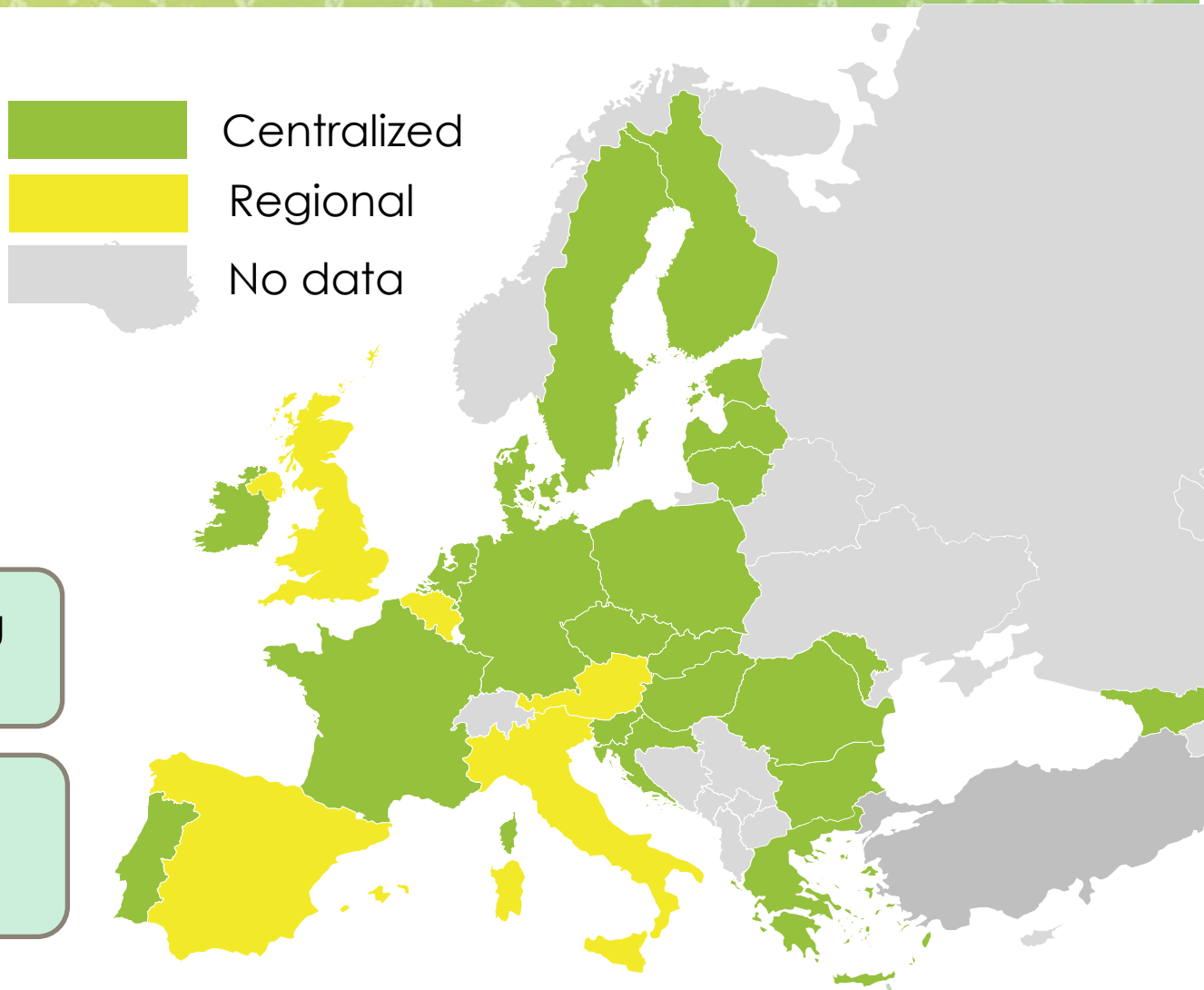
Typically, in EU and EC countries EPC are stored in the centralized databases, ensuring that the information is publicly available.

Information in the public database must be validated by passing through quality control.

The public databases also serve another important purposes for quality control:

Collected data allows to perform benchmarking and performance monitoring over time.

The data in the database could be used to identify outliners and select them for detailed review due to the higher risk of poor-quality



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THE LESSONS FROM THE EXPERIENCE IN THE LITHUANIAN EPC MARKET

The publicly known issues:

- Faulty evaluation of EPC assessor awarded first A class Multi-flat building in Lithuania
- The building was Faulty awarded higher energy performance class – that led to the increase in selling value. Buyer started a lawsuit
- The building certificate was issued for non-completed building
- The EPC rating was adjusted to get state support – the speculation was identified.
- The assessor have lost the right to work due issued multiple EPC without conducting site visit.

The counter measures taken:

- Improvements in training to address low qualification of assessors
- Improvements to quality control procedures:
  - ✓ Increased number of checks
  - ✓ Increased qualification of quality checkers
  - ✓ Increased amount of site inspections after
  - ✓ Risk-based selection for detailed evaluation

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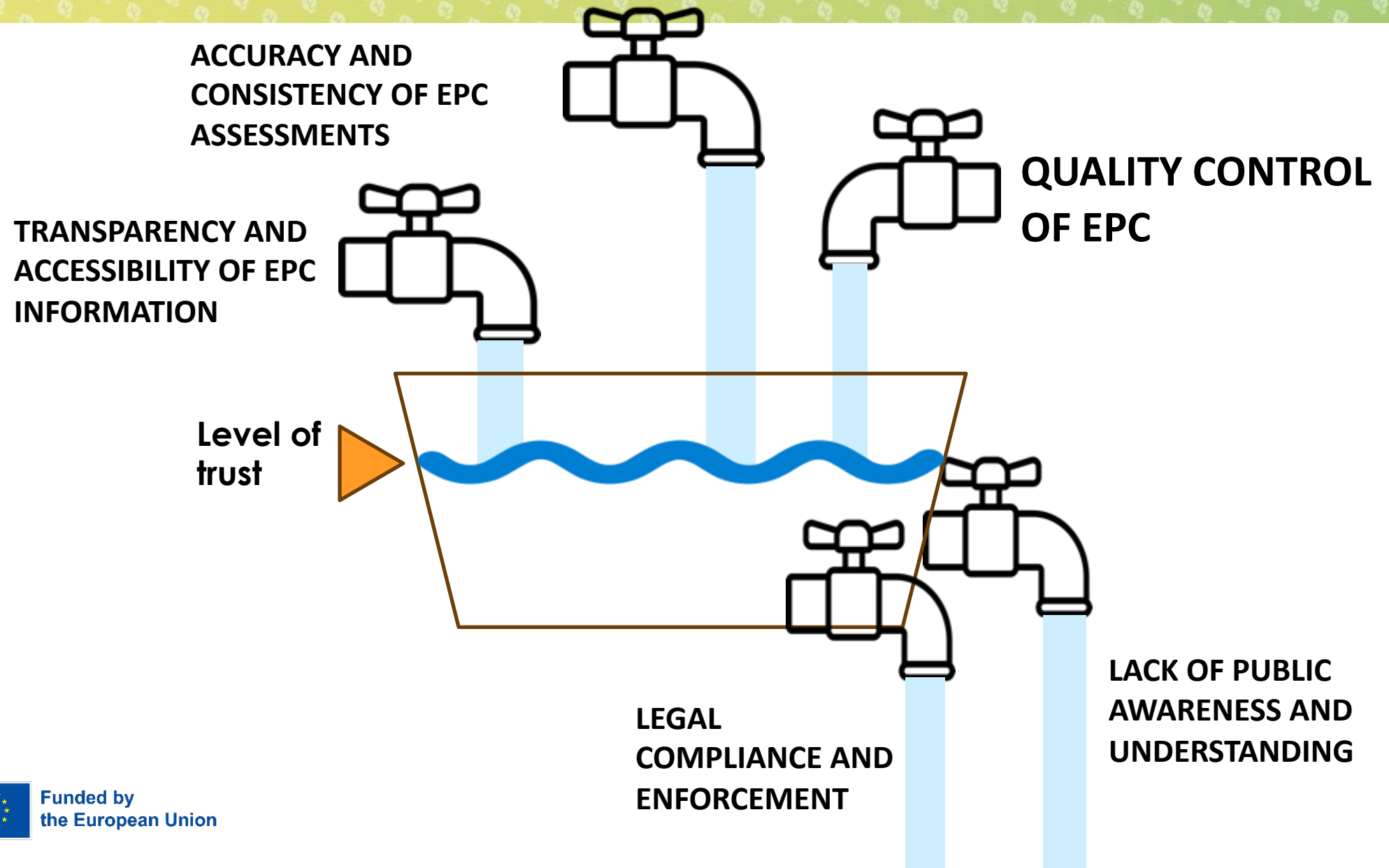
THE LEVEL OF TRUST IN EPC DEPENDS ON POSITIVE AND NEGATIVE ASPECTS



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SUMMARY: KEY TAKE AWAYS

1. *The evolution of Energy Performance Certification and its quality control measures within the EU, showcased through historical development, demonstrates a committed progression towards ensuring energy efficiency and building sustainability.*
2. The persistent emphasis on independent quality control in the EU's EPBD underscores its significance in maintaining the integrity and effectiveness of EPCs.
3. The economic rationale based on cost optimality is a primary driver for the willingness to use EPCs. Quality control further amplifies the economic benefits by ensuring accuracy and reliability in energy performance assessments.
4. Ensuring reproducibility, standardizing data collection, and enhancing assessor expertise are crucial elements for robust quality control, influencing the trust and utilization of EPCs.
5. Public databases play a vital role in promoting transparency, enabling a more rigorous quality control process, and fostering public trust in the EPC system.
6. The pricing of EPCs is closely tied to the issuing approach and the level of quality control employed, indicating a balance between cost-effectiveness and quality assurance.
7. Addressing threats to trust, learning from the experience in different markets like Lithuania, and implementing actions as seen in EU countries contribute to sustaining a positive public image of EPCs.

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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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