Gap analyses report and recommendations

ROADMAP CONCEPT
Who is in control?

- Data collection and statistical analyses (based on all energy passports of new and existing buildings)
- Supervision of the quality of design projects, construction works, EPB assessments, energy audits, etc.
- Provision of trainings for the responsible experts
- Quality assurance of components and materials used in new and renovated buildings

Nominate a responsible body *(Anex II from EPBD 2010)*
Can you do it?

- Designers
- Construction workers
- Energy auditors
- Investors
- Supervisors

**Train them** (EPBD 2010, Article 20)
Do you want (need) it?

Communicate (EPBD 2010, Article 20)
Do you have the tools?

Develop a tool

Source: ZEPHIR Passivhaus Italia
How to make the changes?

A new set of standards

- Modular structure
- Comprehensive approach
How to determine EPB?

- Useful OR primary energy
- Energy for heating OR energy for heating, cooling, DHW, lighting and other technical building systems

Diagram:
- Primary energy (contained in energy carrier)
- Direct use
- Secondary energy (transformed)
- Final energy delivered to end use sector
- Useful energy
- Losses in equipment processes and behaviour
- Transmission and distribution losses
- Transformation losses
What about environment?

Emission factors are not officially regulated
Do we think about our health?

How to reach NZEB?

Consider:

• Thermal bridges
• Airtightness
• Optimal solar gains
What else can we do?

- Thermal resistance (R-value) or thermal transmittance (U-value) – $U = 1/R$

- Appliances not part of EPB characteristics – define fixed values
What is the level of ambition?

Smart readiness indicator, readiness to:

- adapt in response to the needs of the occupant
- facilitate maintenance and efficient operation;
- adapt in response to the situation of the energy grid.

Source: REHVA
How to improve energy auditing? (1)

Normalization (compensation for energy not used due to underheating and/or specific weather conditions)
How to improve energy auditing? (2)

Step-by-step renovation

- Building stock
- Insulation
- Windows + Airtightness + Ventilation
- Heating system + RES
- Building stock
- North side
- Windows + Airtightness + Ventilation
- Remaining sides + RES
How to improve energy auditing? (3)

Cost-optimal EE measures

Total expenses for 30 years

- Baseline
- Minimum requirements
- NZEB
- Cost-optimal

- Investments
- Electricity expenses
- Heat expenses
## The roadmap

<table>
<thead>
<tr>
<th>Year</th>
<th>Activity</th>
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<tbody>
<tr>
<td>2021</td>
<td>Define responsible body for monitoring and control of EPB assessment and calculation.</td>
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<td>2022</td>
<td>Start data collection and statistical analyses of the elaborated certificates.</td>
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<td>2023</td>
<td>Research and definition of minimum requirements for a software tool.</td>
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<td>2024</td>
<td>Upgrade of the software according to actual needs.</td>
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<td>2025</td>
<td>Define primary energy factor and emission factors.</td>
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<td>2026</td>
<td>EPB numeric indicator in kWh/(m².y) in primary energy including energy for heating, energy for cooling, DHW, lighting (preferably only for administrative and office buildings) and other technical building systems.</td>
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<td>2027</td>
<td>Implement requirements for indoor environmental parameters in the official building codes.</td>
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<td>2028</td>
<td>Implement blow-door tests as a requirement for commissioning of new buildings.</td>
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<td>2029</td>
<td>Rescaling energy certificates with numeric indicator in primary energy.</td>
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<td>2030</td>
<td>Development of a thermal bridges catalog based on most common thermal bridges in Armenian construction practices.</td>
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<td>Updating energy efficiency with information about SRI (Smart readiness indicator).</td>
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<td>Recognize U-value (thermal transmittance) as official characteristic of the building elements.</td>
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<td>Support deep renovation measures to be recommended in energy audits.</td>
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<td>Define fixed (referent) values for appliances in different types of buildings (residential, administrative, etc.).</td>
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<td>Revision of energy auditing methodology, implement compensation of energy due to specific climatic conditions.</td>
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<td>Open a training and demonstration center for designers, construction workers and other involved stakeholders.</td>
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<td>Start a Master degree program in University of Architecture and Construction.</td>
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<td>Implement energy efficiency topics in the educational process through elaboration of an MSc program.</td>
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<td>Provide short guidelines for low energy buildings design and execution.</td>
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<td>Support low energy projects with high public exposure.</td>
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<td>Capacity building.</td>
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<td>Information and awareness.</td>
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**EnEffect**

**EU4Energy**
Activities in 2021

• Define a responsible body for monitoring and control
• Define minimum requirements for software tool
• Start describing calculation methodology with ISO 52000
• Define primary energy factors and emission factors
• Start capacity building process
• Start information campaign
Activities in 2022

• Start data collection
• Procure the software tool
• Finish describing calculation methodology with ISO 52000
• EPB numeric indicator in primary energy
• Rescaling certificates, recognize U-values, appliances
• Compensation of energy due to climatic conditions
• Open training and demonstration center
• Elaborate guidelines for low energy buildings
Activities in 2023

• Continue data collection and analyses, building stock inventory
• Software tool ready
• Start a master degree program on EE in buildings
• Continue capacity building process
• Continue information campaign
Activities in 2024

- Continue data collection and analyses, building stock inventory
- Implement EE topic in educational process
- Continue capacity building process
- Continue information campaign
- Support best practices with high public exposure
Activities in 2025

- Continue data collection and analyses, building stock inventory
- Implement requirements for indoor environmental parameters
- Elaborate a thermal bridges catalog
- Support deep renovation measures in energy audits
- Continue capacity building process
- Continue information campaign
Possible improvements after 2025

- Assessment of smart readiness (SRI)
- Obligatory blow-door tests
Thank you, waiting for your feedback

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