REHVA Federation of European Heating, Ventilation and Air Conditioning Associations

REHVA feedback

Inception Impact Assessment: Revision of Energy Performance of Buildings Directive 2010/31/EU

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***Note**: the following document is a longer version of the public opinion submitted by REHVA. It includes explanations, evidence-based justifications as well as the sources referenced in the comments. REHVA experts are available for questions and contribution. Contact: Anita Derjanecz, ad@rehva.eu)*

REHVA supports the ambitious implementation of the Renovation Wave Strategy therefore prefers policy option 3, revising the EPBD to foster deep energy renovation that delivers healthy, and energy efficient buildings and to boost the digitalisation of the construction and building renovation sectors.

However, **more attention shall be paid to improved indoor air and environment quality (IEQ) resulting from deep energy renovation**. The COVID-19 pandemic shows the importance of indoor air quality (IAQ), and the public health impact and cost of buildings ill-suited to mitigate risks due to inadequate ventilation. The WHO Roadmap to improve and ensure good indoor ventilation in the context of COVID-19[1], should be considered. IEQ and ventilation requirements[2] should be integrated in renovation policies in the scope of EPBD, which is the only legislation tackling energy efficient ventilation systems and IEQ in buildings.

REHVA calls to consider the EP report on Maximising the energy efficiency potential of the EU building stock[3] that requests healthy buildings, improved IEQ and increased air quality standards in the context of the renovation wave. The massive investment in energy

[1] World Health Organization. (2021). Roadmap to improve and ensure good indoor ventilation in the context of COVID-19.

[2] Important guidelines/standards and other sources in IEQ and ventilation:

- Report on the impact of guideline implementation on health and energy (HealthVent project)
- JRC report on Promoting healthy and highly energy performing buildings in the European Union
- EN/ISO EN 16798-1 standard: Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting, and acoustics.
- Other REHVA resources

[3] (2020/2070(INI)) Maximising the energy efficiency potential of the EU building stock

renovation shall result in improved health and comfort. Outcomes of the study on inspection of ventilation systems[4] should be included in the revised directive.

REHVA calls for the revision of the EPBD with the aim to ensure improved indoor environmental quality with the renovation wave.

1. Mandatory minimum energy performance standards (MEPS)

- Minimum energy performance standards can be developed from existing requirements for major renovation NZEB that exist in national regulation but are very rarely used because many renovation projects avoid being classified as "major" renovation. To plan and successfully implement Long Term Renovation Strategies, MEPS shall define **clear energy performance targets for deep energy renovation and enable also step by step renovation**. Incentives should be linked to comprehensive IEQ and energy performance requirements.
- **MEPS** for different building categories **should consider IEQ and ventilation criteria** ensuring that indoor climate improvement is delivered by energy renovation. Stricter MEPS for non-residential and public buildings prioritized by the renovation wave is a good start, but MEPS should define ventilation criteria also for residential buildings where IEQ is often deteriorated after energy renovation if systems for adequate ventilation and thermal comfort are not installed.

2. Updating the EPC framework

Performance metrics and calculation

- Current EPCs are not consistent with actual energy use which decreased the trust on end users in the overall approach. EPCs should **provide relevant data for end users** who, when selling or renting, typically prefer energy-use information that relates to energy bills. Including measured energy use and cost data and connected user behaviour data (user patterns, occupancy schedules as in EN 16798-1) would make EPCs meaningful for end users and **strengthen credibility.** For example, the H2020 U-CERT project is currently working on a next generation EPC proposing improvements for renovation and new buildings.[5]
- The **EPBD review should keep the energy efficiency first principle for deep energy renovation** with primary energy as key metric. Primary energy is classified in total,

[4] Technical study on the possible introduction of inspection of stand-alone ventilation systems in buildings
[5] Case study on calculated and measured performance after renovation:
T Cholewa, CA Balaras, S Nižetić, A Siuta-Olcha, On calculated and actual energy savings from thermal building renovations–Long term field evaluation of multifamily buildings. Energy and Buildings 223, 110145.

non-renewable and renewable primary energy (see EN ISO 52000-1[6], EN 17423[7]). The EU energy and climate policy objectives are the reduction of non-renewable energy and the increase of renewables (to reduce CO_2 emissions). In line with this, we recommend specifying in the EPBD revision explicitly **that primary energy is the non-renewable primary energy**.

The **EU taxonomy** defines, beyond environmental objectives, **additional minimum safeguards** to avoid negative impacts of one indicator (e.g., leave energy efficiency potentials untapped). Minimum safeguards in the building energy performance may be related to the (a) building envelope, (b) to the efficiency of technical building systems, (c) to decarbonisation. Examples of minimum safeguards are provided in EN ISO 52000-1.

- More specifically, existing minimum requirements may lead to buildings with similar primary energy use causing very different power load to the grid. **Adding an HVAC and lighting electricity power indicator (W/m^2)** beside energy demand would suit the balancing of energy demand and supply, in line with SRI flexibility criteria.
- The H2020 U-CERT project also develops new EPC criteria analysing indicators beyond energy consumption to address relevant building performance aspects, such as IEQ, sustainability, productivity, and market value. It analysed case studies, including EPCs schemes and data availability in 11 EU MS and developed recommendations for **complementary indicators** for existing buildings and deep energy renovation that may be considered in the current revision.[8]
- **EPCs should contain an IEQ indicator** like in the EN/ISO EN 16798-1 standard[9] and a certificate of ventilation system performance[10]. We recommend the ALDREN-TAIL indicator[11] to rate IEQ of buildings undergoing deep energy renovation as good practice.

[6] (EN) ISO 52000-1 Energy performance of buildings — Overarching EPB assessment — Part 1: General framework and procedures
[7] EN 17423 Energy performance of buildings – Determination and reporting of Primary Energy Factors (PEF) and CO2 emission coefficient – General Principles, Module M1-7
[8] Võsa, K.V; Ferrantelli, A; Kurnitski, J; Dragomir T.; Simeonov, K.; Carnero, P.; Espigares, C.; Navarro Escudero, M.; Quiles, P.V.; Andrieu T.; Battezzati,F.; Cordeiro, K.; Allard, F.; Magyar, Z.; Turturiello, G.; Piterà .A.; d'Oca, S.; Willems, E.; Op 't Veld, P.; Liţiu, A.V.; Lungu, C.; Catalina, T.: Building performance indicators for the next generation of EPC-s. 2020
[9] EN 16798-1 Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics.
[10] See examples of existing national practice in the final report of the EPB19a study on Inspection of ventilation systems.
[11] Mandin, C.; Wargocki, P.; Wei, W.: Application of ALDREN-TAIL index for rating the indoor environmental quality of buildings undergoing deep energy renovation. REHVA Journal 4/2020, pp 22-26.

- More attention should be paid to building energy users and their influence on building energy efficiency, as underlined by the IEA EBC Annex 66 - Definition and Simulation of Occupant Behaviour in Buildings.

Energy Performance Certification

- The differences in national performance calculation methodologies and input data (e.g. primary energy factors, inclusion on non-EPBD uses) make it impossible to compare national EPC values across Europe. **The harmonization of energy calculation should be tackled by the EPBD revision**, linked with the harmonised application of EPB standards. The EPBD review should include a mandate for the EC to develop a **delegated regulation on common energy calculation framework** similarly to the cost optimality calculation methodology developed previously based on the similar mandate.
- REHVA supports the promotion and development of an **open-source software kernel** meeting the requirements of article 3 of EPBD[12], as well as **dynamic energy simulation software tools** to promote the harmonised application of EPB standards and the harmonisation of national EPC calculation methodologies. Hourly and dynamic simulation tools represent an important development step in energy calculations and are also suitable for flexibility, grid load and demand response analyses.
- REHVA supports **a common EU voluntary certification scheme, as in Article 11 (9) of the EPBD.** Such a scheme was developed and demonstrated by the H2020 ALDREN project. Such a voluntary EU scheme allows for increased transparency, creates EU added value and supports the common EU market, while keeping sufficient flexibility for adaptation to national and local conditions in Member States.
- The review should define measures to speed up the digitalisation of EPCs and building data enabling the integration of further aspects beside IEQ and moving towards a new generation, integrated EPC monitoring in-use performance.

3. Deep renovation standard

REHVA supports **a deep renovation standard** in the context of financing, no public money should be paid for investments that do not deliver in-use performance improvement. **Technical performance requirements shall be a prerequisite of finance**. National grant schemes that combine performance based and descriptive requirements for energy and

[12] DIRECTIVE 2010/31/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 19 May 2010 on the energy performance of buildings (recast) as amended by Directive 2018/844/EU

ventilation have demonstrated major energy and IEQ performance improvements. Such existing models, like the Estonian Fund KredEx programme[13] can be used in the preparation of a deep renovation standard conditions for financing.

Reporting **in-use performance by EPC after one full year** in operation should be included in financing conditions to monitor the effectiveness of finance.

Digital technical monitoring and quality management[14] during the renovation lifecycle should be also part of the standard technical requirements for public and non-residential buildings.

4. Stakeholder workshops

REHVA calls for a **public workshop on IEQ criteria and health aspects in deep renovation** with stakeholders from building engineering, occupational health, and other involved sectors.

***About REHVA**: The Federation of European HVAC Associations, founded 1963, joins European societies in the field of building engineering services representing more than 100.000 HVAC engineers and building professionals in Europe. REHVA is the leading independent professional HVAC organization in Europe, dedicated to the improvement of health, comfort and energy efficiency in all buildings and communities. It encourages the development and application of both energy efficiency and renewable energy technologies.*

[13] Kalamees, T.; Zelenski; M.; Meos, H.; Laas, M.; Kurnitski, J.; Kuusk, K.: Renovation of ventilation in apartment buildings – Estonian experience. REHVA Journal 06/2019, pp 20-26.
[14] Plesser,S; Teisen, O.; Ryan, C: Quality Management for Buildings, REHVA 2019