The European Union is striving to be the first climate-neutral continent. As the building sector is one of the largest energy consumers in Europe, the European Union’s recent policy developments, most notably the Renovation Wave strategy [1] as integral component of the EU’s Green Deal [2] and topic related recently ended and ongoing Horizon 2020 coordination and support, and innovation actions. Readers are empowered via the references to attain more in-depth insights as deemed useful and needed.

**Keywords:** building, performance, assessment, certification, evolution, renovation, financing, people-centred, energy, indoor environmental quality, health, well-being, CO₂ emissions, costs, smart readiness indicator, digitalization, digital transformation

The European Union is striving to be the first climate-neutral continent. As the building sector is one of the largest energy consumers in Europe...
and is responsible for more than one third of the EU’s emissions, effective action on the existing building stock is crucial (roughly 75% of the building stock is energy inefficient, yet almost 85 – 95% of today’s buildings will still be in use in 2050). Renovation of both public and private buildings is an essential measure in this context and given the labour-intensive nature of the building sector, which is largely dominated by local businesses, renovations of buildings also play a crucial role in the European recovery of the COVID-19 pandemic.


Energy performance certificates are instrumental in the EU renovation wave

With the Renovation Wave Strategy, the European Commission aims to at least double renovation rates in the next ten years and make sure renovations lead to higher energy and resource efficiency. This will enhance the quality of life for people living in and using the buildings, reduce Europe’s greenhouse gas emissions, foster digitalisation and improve the reuse and recycling of materials.

For supporting this overarching aim the European Commission plans to further improve the EU Energy Performance of Buildings Directive (EPBD) having foreseen in its 2021 work programme [8] a legislative proposal to revise the EPBD, together with an accompanying impact assessment, to be adopted in Q4 2021.

What’s at stake for Energy Performance Certificates?

According to Building Performance Institute Europe [9], these are the most salient aspects in the EU Renovation Wave Strategy reinforcing the role of Energy Performance Certificates:

- Introducing mandatory minimum energy performance requirements (MEPS): When gradually phased in, enabled by well-functioning energy performance certificates (EPCs) and financing, MEPS can successfully tackle the worst performing buildings.
- More effective EPCs, integrated with a digital building logbook, building renovation passport, smart readiness indicator, Level(s): As quality and increased availability of EPCs are necessary to guide occupants’ choices, the Renovation Wave suggests reinforcing and strengthening existing EPCs, introducing a more standardised format for digital use and improved accessibility, supported by smart technologies.
- Better data for buildings: Effective building policies and measures can only be designed and implemented with consistent and reliable data, for example on energy consumption or environmental performance. The Renovation Wave proposes the introduction of a digital building logbook as a common repository for all relevant data over the entire lifecycle of the building, and to strengthen data collection through an updated EPC framework, with stringent rules on availability and accessibility of databases. The European Commission will also explore if and how the European Building Stock Observatory can become more reliable and robust.

An additional noteworthy development is the soon to become intrinsic link between Energy Performance Certificates and financing dealt with also via the Platform on Sustainable Finance [10] assisting the European Commission in developing its sustainable finance policies, notably the further development of the EU taxonomy [11] (classification system, establishing a list of environmentally sustainable economic activities). The renovation wave is considered as an opportunity to spur the development of green loan and mortgage financing. An upgraded system of Energy Performance Certificates demonstrating efficiency gains will allow banks and other financial institutions to offer credit and mortgage financing to green their portfolios and to pool buildings as a collateral for the issuance of covered bonds. A number of market-led initiatives are already piloting innovative schemes for energy efficiency loan and mortgage financing. In a next step, whole life-cycle carbon can be included in this assessment and linked to financing for circular solutions. [12]
Breeding ground for the evolution of Energy Performance Certificates

At the beginning of 2021 there are 7 ongoing Horizon 2020 projects contributing to the evolution of the existing energy performance assessment and certification process (at national level in EU’s Member States). Additional 3 to 4 Horizon 2020 projects will be funded and commence later this year.


• X-tendo [14] eXTENDing the energy performance assessment and certification schemes via a mOdular approach (project website [15]).
• U-CERT [16] Towards a new generation of user-centred Energy Performance Assessment and Certification; facilitated and empowered by the EPB Center (project website [17]) – REHVA and several of its Member Associations are partners.
• QualDeEPC [18] High-quality Energy Performance Assessment and Certification in Europe Accelerating Deep Energy (project website [19]).

These projects are geared to:

• Involve relevant stakeholders (including national and regional certification bodies) to stimulate and enable the roll-out of next-generation of energy performance assessment and certification, with a view to achieve enhanced reliability, cost-effectiveness and compliance with the set of EPB standards [20] and the Energy Performance of Buildings Directive.
• Develop strategies to encourage convergence of EPC practices and tools across the EU so as to ensure a comparable level of high quality, independent control and verification.
• Assess applicability through a broad set of well-targeted and realistic cases, featuring various locations, building types, climatic conditions and field practices including existing national EPC schemes.
• Embed the EPCs and their recommendations in broader concepts such as energy audits, wider-buildings related databases (e.g. national EPC databases, national housing surveys, EU Building Stock Observatory) and one-stop-shops including administrative, financial and supply side information.
• Link EPCs to related concepts such as buildings renovation passports, individual buildings renovation roadmaps or building logbooks should also be considered.

Innovation Actions (IA) started in 2020 (H2020_LC-SC3-EE-5-2018-2019 [21])

• D2EPC [22] Dynamic Digital EPCs for Enhanced Quality and User Awareness (project website [23])
• E-DYCE [24] Energy flexible DYnamic building Certification (project website [25])
• EPC RECAST [26] Energy Performance Certificate Recast (project website [27]) – REHVA is partner
• ePANACEA [28] Smart European Energy Performance AssessmeNt And CErtificAtion (project website [29])

These projects are geared to:

• Address the definition and demonstration of innovative approaches for the assessment of building energy performance – be more reliable, user-friendly as well as cost-effective and compliant with the set of EPB standards [30] (technology neutral and transparently presented) and rely on the combination of existing and proven technology components.
• Consider implications when using EPCs in building passports and renovation roadmaps.
• Involve relevant stakeholders (including national and regional certification bodies).
• Value buildings in a holistic and cost-effective manner across several complimentary dimensions: envelope performances, system performances and smart readiness (i.e. the ability of buildings to be smartly monitored and controlled and, to get involved in demand-side management strategies).
• Take into account output measures of performance (actual measured data) making use of available and increasing number of building energy related data from sensors, smart meters, connected devices etc.
• Demonstrate how these could be strengthened, modernised and best linked to integrated national/regional certification schemes within a framework that aids compliance checking and effectiveness of financial support.
Support from underlying activities

In addition to being partner in U-CERT and EPC RECAST consortia, REHVA is part of the following underlying activities:

- **ALDREN** [31] (ALliance for Deep RENovation in buildings) Horizon 2020 project (recently closed, project website [32]) acting as precursor: support the holistic approach of the EPBD building assessment by providing practical common methods and tools to help the Member States to implement the new requirements of the amended EPBD (2018). The backbone of ALDREN is the European Voluntary Energy Performance Certificate (ALDREN-EPC). The ALDREN EPC is completed by the ALDREN-BRP (Building Renovation Passport) which contains a Building data repository (the building logbook) and a Building Renovation Roadmap. The ALDREN EPC has a modular structure that allows Member States to adopt specific modules to complete the official certification scheme and comply with other duties of MSs coming from EU commitments, such as the reporting for SRI.

- **EPB Center** [33] service contract with EC DG ENER [34]: Support Member States and National Standardization Bodies (NSB) to complete the national annexes of the overarching EPB standards mentioned in the EPBD, disseminate and promote the use of the overarching and other EPB standards, information services for all involved stakeholders, such as industry, researchers, engineers building professionals, financial institutions

- **Smart Readiness Indicator (SRI) Topical Group C**: The scope of this self-managed (volunteer based) working group is to discuss and identify future pathways of updating the existing methodology and furthermore implementing the assessment method C of SRI, which is based on measured data of the actual performance of buildings. Within the scope the SRI Topical Group C experts also analyse how to make the transition to an in-use/performance-based SRI exploring the most effective means on one hand for automating the checklist evaluation process and on the other hand for leveraging measured data and define an additional in-use SRI methodology. The main outcome of the SRI Topical Group C activities in 2020 is the 1st recommendations report prepared with the support of REHVA Technology and Research Committee members and involved stakeholders [35] (published in June 2020, however kept under embargo till the publication of the final report). Many of these recommendations have also been inserted as copy-paste in the final report by the SRI study team [36].

**STAY informed!**

Keep an eye out for the next issues of REHVA Journal which will feature further dedicated articles encompassing the activities of the Horizon 2020 cluster of projects on the topic of next generation energy performance certificates delving into selected specific (more technical) aspects uncovering each project’s particularities and thus creating additional insights while still maintaining an overview.

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**References**

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Air Filtration in HVAC Systems

REHVA EUROPEAN GUIDEBOOK No.11

This Guidebook presents the theory of air filtration with some basic principles of the physics of pollutants and their effects on indoor air quality while keeping the focus on the practical design, installation and operation of filters in air handling systems. It is intended for designers, manufacturers, installers, and building owners. With its theory, practical solutions and illustrations, this guide is also an excellent textbook for higher vocational education and training of technicians and specialists in building services engineering.

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