

ALDREN – A voluntary and modular European framework to support Deep Renovation in the Building sector



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ALDREN targets and supports investments in deep renovation, encouraging key Building stakeholders to contribute to the “Renovation wave” that has been recently announced in the European Green Deal. To be efficient, the Green Deal will have to be consistent from the political top level to the identification of relevant renovation actions by owners and consultants, investment decisions from the financial sector and application on the field by qualified building professionals. ALDREN proposes a transparent, consistent, common EU wide assessment framework to trigger more ambitious renovation projects through the inclusion of improved sustain-

ability metrics in certifications and the use of decision-support protocols and tools.

Why ALDREN? Working out a common language to increase energy renovation rates and quality

ALDREN - *Alliance for Deep RENovation in Buildings* - is a European project funded by the European Union in the scope of the Horizon 2020 Research and Innovation Program. Eight European partners [1] are working together to increase the rate and quality of building energy renovations (Figure 1).



Figure 1. The ALDREN Consortium.

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ALDREN has been built on the observation that **nobody can trigger deep renovation alone**, while there is a lack of building retrofits in the EU that incorporate significant and actual improvements in energy performance. The successful implementation of the ambitious European and national energy and environmental renovation objectives will require that the **whole implementation chain, from the legislative level** (the EU institutions), where the objectives are defined, **to the implementation on field by qualified professionals** becomes coherent, consistent, transparent.

ALDREN's overarching aim is therefore to raise confidence in deep energy renovation and prepare the ground for more investment, **answering the needs from key stakeholder groups involved in the renovation implementation chain**. Thereby, ALDREN seeks to overcome main market barriers:

- The lack of a holistic strategy to design, prioritize, finance and implement energy renovation actions over time while energy savings alone rarely trigger renovation projects
- The lack of a strong relationship between key stakeholder groups of the Building sector
- A limited confidence of building professionals and stakeholders in the actual performance and quality of energy-related renovation actions
- Difficulties ensuring a consistent integration of subsequent renovation actions over time

The identified barriers show there is a need for a **common language to be shared between the stakeholders of the implementation chain**. Therefore, the ALDREN approach has been defined and consolidated through a collaboration with main building stakeholders, as described in **Figure 2**.



Figure 2. The ALDREN Alliance.

An ALDREN Alliance has been set up to better specify their needs and reflect them in high quality protocols. Interactions between the ALDREN Consortium and the ALDREN Alliance have also allowed to raise awareness on the co-benefits related to deep energy renovation and to the use of harmonized, reliable and transparent European performance ratings and reporting tools.

The ALDREN Alliance has set up an efficient vehicle for future cooperation and communication of stakeholders beyond the project duration.

What is ALDREN? A modular and flexible methodological framework

ALDREN is a methodological framework to support **decision-making and investment in deep energy renovation of non-residential buildings**. It is voluntary and provides **consistent sustainability metrics** to improve certification of energy and IEQ performance. ALDREN could be used as a whole, but also in a modular approach by each stakeholder of the renovation implementation chain. It is built to ensure a consistent information sharing between stakeholders depending on their needs: common language.

ALDREN's framework is holistic, harmonized and modular (**Figure 3**): it is based on a **set of procedures (modules)** that consist in implementing **step-by-step operational protocols to assess the energy performance, Indoor Environmental Quality (IEQ, related to health & well-being) and financial value of buildings before and after energy renovation**. ALDREN protocols rely on simulations and measurements based on best practice and the **consistent use of CEN and ISO standards to ensure transparency and quality**. ALDREN is also the first integrated common framework for deep renovation that is based on these standards.

As seen in **Figure 3**, the ALDREN framework encompasses the following 4 standalone modules:

- A consistent, harmonized, unique European energy performance rating, based on ISO/CEN standards, offering comparability and transparency across the EU to provide a common metrics and highlight the quality for financial instruments connected with renovation. A rating scale with classes from A-G has been defined to compare and identify in priority the buildings fitting best for deep renovation and to evaluate the impact of renovation actions on energy performance.

- An energy Performance verification framework allowing actual (measured) performance to be compared with simulated (predicted) performance. It encompasses a “Design for Performance” protocol that sets out and tracks the actions required during the deep renovation process. It also includes a “Performance Verification Tool” (PVT) to compare predicted and actual performance at different levels of granularity.
- A health and well-being assessment protocol. It is based on an index called ALDREN-TAIL to rate the Indoor Environment Quality (IEQ) of buildings undergoing deep renovation, focusing on 4 key components: Thermal environment (T), Acoustic environment (A), Indoor air quality (I), Luminous environment (L). TAIL ratings can and should be evaluated before and after renovation.
- A protocol to evaluate impacts of energy and non-energy benefits associated with deep renovation on the financial value and risks of office and hotel buildings. The information and sustainability metrics provided by the 3 previous modules and the Renovation Roadmap of the ALDREN BRP (see below) is shared with financial valuation experts who compare the financial impacts – costs, risks and value – associated with different renovation scenarios.

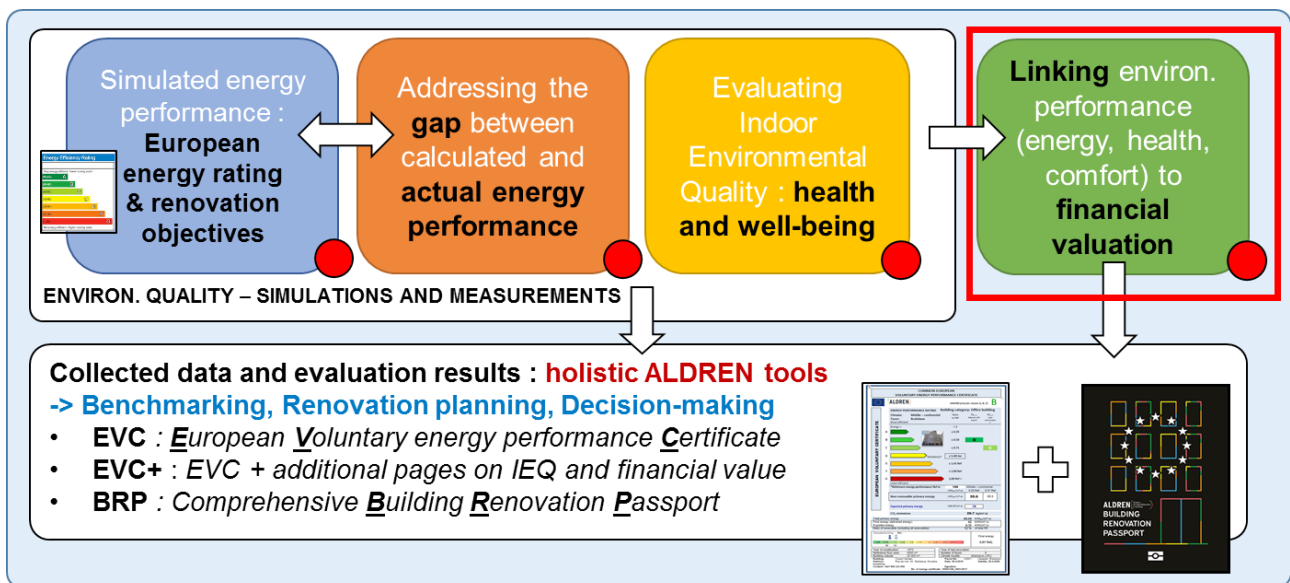
ALDREN standalone modules produce a set of indicators that form consistent, holistic sustainability metrics. Alongside additional information, they are reported in 2 + 1 dedicated and complimentary

reporting tools that support directly the EU policies through the implementation of measures defined in the EPBD:

- A European Voluntary Certificate (EVC): providing a synthesis of a building’s energy performance and a summary of the main renovation actions to be undertaken. **The EVC is ALDREN’s back-bone that supports the implementation of a European Voluntary Certification Scheme (EVCS) introduced in Article 11(9) of the EPBD.**[2]

NB: ALDREN provides the first step to the development of an EVCS with energy performance ratings and harmonized calculation methods to produce a certificate. The development of a certified training program of qualified experts should be the next step that started in H2020 CEN-CE project <https://www.cen-ce.eu/>.

- An extended version of ALDREN’s EVC which can be called ALDREN’s EVC+: it is the EVC with the addition of several sections to describe the actual (measured) energy performance, IEQ (TAIL-index about health & well-being) and to analyse the impacts of proposed energy renovation actions on financial value.
- Both the EVC and its EVC+ version provide a snapshot of the building’s performance, quality and renovation potential at a given time and gives recommendations for improvement of energy performance with potential reference to detailed Building Renovation Passport to be fully compliant with the require-



● STANDALONE MODULES : Indicators + Protocols

Figure 3. The ALDREN Framework – Standalone assessment modules and holistic reporting tools.

ments on energy performance certificate in EPBD. Their main targets are building owners, banks and investors, European and national political institutions who need to identify a building's performance and renovation potential within a given building stock. ALDREN's sustainability metrics reported in the EVC could be used as eligibility criteria to mobilise private and public financing for deep renovation projects.

- A Building Renovation Passport (BRP): offering a more detailed tool that is complimentary to the ALDREN EVC and EVC+. The BRP is a dynamic instrument to be used and updated over time along the renovation path to deep renovation. It includes: (a) a Logbook where comprehensive collected data better informs building owners and managers about the current technical energy, IEQ and financial performance status of their building and (b) a tailored Renovation Roadmap with one or multiple steps to reach high energy performance in the medium to long term. As with the EVC, the ALDREN BRP supports the implementation of EPBD for non-residential building where the concept has been introduced in Article 19a [3].

In addition, ALDREN allows voluntary certification scheme operators to integrate part of ALDREN standalone modules and metrics into their certifications. Testimonies from IVE Certification Entity and Certivea about the potential uptake of ALDREN elements in BES Oficina and HQE certifications are provided in the following pages.

What are the main outcomes of ALDREN for building renovation stakeholders?

ALDREN's flexible structure can fulfil the needs of different stakeholder groups allowing:

- To conduct a reliable assessment of the actual current energy performance and indoor environmental quality of a building and provide prediction of future energy performance after implementation of energy related investment
- To benchmark this performance and quality on a European scale, offering comparison with similar building assets within a given building stock or in other European countries.
- To ensure along the deep renovation process that energy and IEQ performance predictions are as realistic as possible, that the construction and commissioning process is true to the design intent, and

to allow the predicted performance to be verified through measurements.

- To identify and prioritize the most relevant renovation actions over time from both a technical and financial perspective, avoiding lock-in effects with a proper planning of main renovation steps.
- To translate the benefits of energy renovation actions on health & well-being and financial value – hence limiting obsolescence risks and increasing attractiveness of renovated building assets.
- To provide consistent and holistic sustainability metrics as eligibility criteria for investment.

To conclude

The ALDREN framework is a major contribution allowing the Energy performance (EP) assessment of buildings to:

1. Be **comparable** all over Europe,
2. Be **reliable** (expectation should be reach in reality),
3. **Improve health & wellbeing** (indoor air quality, climate change resilient buildings),
4. **Define roadmaps** to nearly Zero Energy Building (nZEB),
5. Favor communication between all involved stakeholders
6. **Provide indicators and common metrics for financial support and risks analysis** to achieve EU climate targets. ■

References

- [1] Public organizations and universities: CSTB (France), DTU (Denmark), Politecnico Milano (Italy) / Certification bodies: Certivea (France), IVE (Spain) / Building professionals: ENBEE (Slovakia), VERCO (UK), REHVA (Belgium and Europe)
- [2] Article 11(9) states that *"The Commission shall (...) adopt a voluntary common European Union certification scheme for the energy performance of non-residential buildings. (...) Member States are encouraged to recognize or use the scheme, or use part thereof by adapting it to national circumstances."*
- [3] Article 19a of the EPBD describes *"an optional building renovation passport that is complementary to the energy performance certificates, in order to provide a long-term, step-by-step renovation roadmap for a specific building based on quality criteria (...) outlining relevant measures and renovations that could improve the energy performance"*