

Revision of the Energy Performance of Buildings Directive (EPBD)

Ventilation systems in buildings to deliver on energy efficiency and Indoor Air Quality (IAQ)

Introduction

The European Ventilation Industry Association (EVIA) shares the European Commission's ambition laid out in the European Green Deal and the Renovation Wave to make buildings more energy-efficient and less carbon-intensive over their entire lifecycle. The kick-start of the revision process of the Energy Performance of Buildings Directive (EPBD) has coincided with the one-year anniversary of the [deadline for transposition](#) of the 2018 text. Today, many Member States have still not fully implemented this legislation¹ and some of Member States' Long-Term Renovation Strategies (LTRS) are out of sync with EU energy and climate objectives².

The revision of the EPBD, in the context of the 'Fit for 55' package, is a momentous opportunity to promote systems and technological solutions that result in lowering energy consumption and empowering consumers, but also in higher Indoor Air Quality (IAQ). The EPBD has been recognised as the centrepiece of the Renovation Wave initiative and of the EU's climate & energy arsenal of measures to ensure buildings contribute to meeting the GHG emissions reduction target of at least 55% by 2030 and ultimately, the climate neutrality goal by mid-century. Nevertheless, to achieve the stated goals, including that of more and deeper renovations, a more holistic approach is required. The full energy efficiency framework must be strengthened and synergies between the EPBD, the Energy Efficiency Directive (EED) and the Renewable Energy Directive (RED) must be truly exploited to provide the necessary boost in the direction of full decarbonisation, whilst improving health and safeguarding well-being in the indoor environment. In the same vein, the implementation of the "Energy Efficiency First" (EE1st) principle across multiple sectors, including buildings, must be effectively correlated with other equally important factors (i.e. health) to prevent negative trade-offs in the built environment.

EVIA welcomes the possibility to provide feedback on the Inception Impact Assessment and supports policy option 3 as the most appropriate way forward in the current context: amending the EPBD to translate the actions proposed in the Renovation Wave and to increase the ambition towards building decarbonisation. To this end, EVIA considers that improvements in the following two complementary areas are essential:

- 1. Ensuring all buildings benefit from a sufficient controlled air renewal through mechanical ventilation to deliver both on decreased energy consumption and adequate IAQ.**
- 2. Guaranteeing the performance of this equipment throughout time thanks to regular inspections.**

¹ eu.bac, 'Letter to Commissioner Simson', 2021, https://www.eubac.org/cms/upload/2021.03.10_eubac_letter_to_Commissioner_Simson_and_DG_Jorgensen_on_the_EPBD_transposition.pdf

² BPIE, 'The road to climate-neutrality: Are national long-term renovation strategies fit for 2050?', 2021, <https://www.bpie.eu/publication/the-road-to-climate-neutrality-are-national-long-term-renovation-strategies-fit-for-2050/>

Optimising energy efficiency in buildings

The use of state-of-the-art ventilation is a great enabler of buildings' energy efficiency optimisation. Indeed, buildings lacking such equipment and using window airing to renew indoor air have a considerably higher energy consumption to cover their heating and cooling needs. Demand-controlled ventilation limits thermal losses to the minimum, whilst guaranteeing an adequate air renewal. Ventilation systems, equipped with heat/cold recovery, passively re-use heat/cold that would otherwise be wasted. **Such processes allow to significantly lower the energy consumption of buildings. Those in which the latest demand-controlled or heat/cold recovery ventilation systems are implemented are thus much more energy efficient.** The use of a small amount of electricity to operate mechanical ventilation brings overall a significant benefit in terms of energy consumption. Typically, 1 kWh of consumed electricity results in savings of 4 to 10 kWh of thermal energy, depending on climate and use. **These elements have been acknowledged in the 2017 report³ by the Joint Research Centre on promoting healthy and highly energy performing buildings in the European Union**, whose purpose was to support the national implementation of the related requirements of the EPBD.

EVIA notes that the Renovation Wave builds on the “Energy Efficiency First” (EE1st) principle to achieve the decarbonisation of the EU building stock. Energy efficiency renovations primarily target insulation of the building envelope with a view to limiting thermal losses and thus improving the energy performance of the building. In new or refurbished buildings, which are well insulated, approximately 50% of the energy demand, and even a higher rate in non-residential buildings, can stem from thermal losses due to air renewal achieved through window airing, depending on the use of the building. **EVIA stresses that this energy waste can be significantly reduced thanks to the implementation of a dedicated well operating ventilation system.**

Ensuring healthy buildings and healthy occupants

People spend 90% of their time indoors⁴, with the WHO estimating that 120,000 Europeans die prematurely every year due to poor IAQ, translating into an annual cost to society of € 260 billion⁵. Poor IAQ is linked to negative health outcomes from irritation of the eyes, nose, and throat, through headaches, dizziness, and fatigue to respiratory diseases, heart disease, and cancer. In the context of the current COVID-19 outbreak, the proper use of ventilation is a particularly important contributor to maintaining an adequate level of IAQ and to limiting the potential for aerosolised transmission via mechanical air renewal. Ventilation can reduce the risk of airborne infection by the SARS-CoV-2 virus by a factor of ten⁶.

³ Joint Research Centre, ‘Promoting healthy and energy efficient buildings in the European Union: National implementation of related requirements of the Energy Performance Buildings Directive (2010/31/EU)’, 2017, p. 132, <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/promoting-healthy-and-energy-efficient-buildings-european-union-national-implementation>

⁴ WHO Regional Office, ‘Economic cost of the health impact of air pollution in Europe: Clean air, health, and wealth’, 2015, <https://www.euro.who.int/en/media-centre/events/events/2015/04/ehp-mid-term-review/publications/economic-cost-of-the-health-impact-of-air-pollution-in-europe>

⁵ WHO Regional Office, ‘Air pollution costs European economies US\$ 1.6 trillion a year in diseases and deaths, new WHO study says’, 2015, [https://www.euro.who.int/en/media-centre/sections/press-releases/2015/04/air-pollution-costs-european-economies-us\\$-1.6-trillion-a-year-in-diseases-and-deaths,-new-who-study-says](https://www.euro.who.int/en/media-centre/sections/press-releases/2015/04/air-pollution-costs-european-economies-us$-1.6-trillion-a-year-in-diseases-and-deaths,-new-who-study-says)

⁶ The Lancet, ‘Small droplet aerosols in poorly ventilated spaces and SARS-CoV-2 transmission’, 2020, [https://www.thelancet.com/journals/lanres/article/PIIS2213-2600\(20\)30245-9/fulltext](https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(20)30245-9/fulltext)

The same JRC report previously referenced also mentions that mechanical ventilation, if properly operated and maintained, leads to an increased removal of pollutants and thus to an overall improvement of IAQ, and the reduction of health-related problems⁷.

EVIA reiterates that ensuring the implementation of well-functioning mechanical ventilation systems in new and renovated buildings is essential to help guarantee an adequate IAQ for people living, working, or undertaking recreational activities more than ever in insulated and air-tight environments. However, ensuring an adequate ventilation rate providing necessary air renewal requires a minimum of electricity to ensure efficient operation of a mechanical ventilation system. As such, EVIA cautions that the proper operation of mechanical ventilation systems could suffer from the unrestricted implementation of EE1st, with unintended negative consequences for the health of building occupants, the building itself, as well as its energy efficiency.

Poor IAQ affects not just the health of occupants but also of the building itself, due to the effects of mould and damp, which reduce the lifespan of a building or increase the required rate of renovation for a building. **This in turn does not allow to optimise the investment budget allocated to building renovation, a must in view of the very large amounts involved**⁸. EVIA further cautions that the strict application of EE1st could also have negative trade-offs for resource efficiency and sustainability, as well as economically, in respect to buildings'/renovations' longevity, if IAQ is not addressed appropriately.

Setting Minimum Energy Performance Standards (MEPS) based on a robust calculation methodology

From the list of envisaged measures by the European Commission, EVIA would in principle be in favour of setting MEPS for different types of buildings. However, pursuing the “cost-optimality” approach to measure the energy performance of building stock in various Member States has proven rather ineffective as it leaves an inappropriately large degree of flexibility for Member States regarding the selection of input data for the calculation, the reference buildings selection, the energy costs, and other parameters.

Instead, MEPS must be set according to an energy performance calculation methodology that is simple, robust, harmonised, and mandatory. **From the perspective of health and well-being of building occupants, such a methodology to calculate the energy needs of technical building systems should also include parameters to optimise health, IAQ and comfort levels as required by Annex I 2 of the current EPBD.** Such needs should be defined by Member States at national or regional level, reflecting the geographic and climatic conditions. In addition, the methodology should naturally include the electricity needs of mechanical ventilation to ensure the required air renewal rate is achieved. Finally, such a methodology should also recognise the potential of waste energy from heating and cooling recovered from ventilation exhaust air.

Leveraging the benefits of ventilation systems in new and renovated buildings

In the context of the Renovation Wave, apart from doubling the number of renovations carried out, EVIA notes the European Commission’s ambition to maximise deep renovations. In light of the benefits

⁷ Joint Research Centre, ‘Promoting healthy and energy efficient buildings in the European Union: National implementation of related requirements of the Energy Performance Buildings Directive (2010/31/EU)’, p. 132

⁸ This is acknowledged in Doc 2. from the EE1 expert meeting on ‘EE1 assessment’; “Mould and dampness, generally resulting from the temperature level and the ventilation level of the building”.

brought by ventilation as described above, **it is essential that the definition of a deep renovation encompasses addressing the issue of an appropriate air renewal through mechanical ventilation.**

Even when surface renovations are being undertaken, it is important that a proper air renewal is ensured since, usually, limited renovations only address the insulation of the building. Consequently, the appropriate removal of stale air through mechanical ventilation becomes crucial in this particular context. As non-residential buildings typically need higher ventilation rates required by higher occupation density, this aspect is even more acute. In short, no building renovation should take place without the implementation of a properly functioning mechanical ventilation system, especially if minimum energy performance requirements are set for buildings. The room for improvement is substantial as it is estimated that 60% of the European building stock is not fitted with such an equipment and another 24% is equipped with systems which cannot guarantee a set air renewal rate.

EVIA therefore encourages the European Commission to consider the compulsory installation of a mechanical ventilation in new buildings, given that this is already a requirement under building regulations in many Member States.

Ensuring appropriate operation of Technical Buildings Systems (TBS) with a bearing on energy performance

Currently, Member States are required to establish measures for the regular inspection of heating and air-conditioning systems. Provision is also made for inspection reports, including recommendations for improving the energy performance of the inspected system. These recommendations are based on comparison to the best available feasible system. Inspection reports must be handed over to the owner or tenant. **EVIA deems that such obligations should also be extended to the stand-alone ventilation systems since, in the absence of regular maintenance obligations, the vast majority of those currently fitted in EU buildings are not operating up to the expected level of performance.** Thus, they are not delivering their added value regarding the optimisation of the heating and cooling needs of buildings, as well as their contribution to an appropriate IAQ.

This inspection obligation should be completed by a maintenance one since, in the case the inspection reveals that the ventilation system is not operating according to the expected level of performance, corrective measures should be implemented to ensure that the system delivers its full added value. Otherwise, the end goal of the inspection would not be attained.

Making information regarding installed technologies mandatory in an easy to read/easy to check format for interested parties to analyse is essential for decision-makers to define the appropriate regulatory measures to be implemented. If the data collection is not mandatory, some Member States will not collect the necessary data and the implementation will be fragmented. All the collected data should be centralised in an open database (such as the Building Stock Observatory) and the analysis/categorisation of the information should also be made possible.

Setting minimum Indoor Air Quality (IAQ) performance requirements

Due to the great health impact and economic cost of poor IAQ as mentioned above, as well as the close correlation and impact on energy efficiency, **EVIA would recommend that the revised EPBD requires Member States to define IAQ requirements in national legislation and measures to assess compliance with them.**

The European Parliament has in fact already recognised the importance of IAQ in energy efficient and healthy buildings. In its September 2020 resolution on “Maximising the energy efficiency potential of the EU building stock”⁹, the European Parliament stressed the need for an evaluation of factors influencing the level of IAQ, based on existing environmental tools and standards, and of consolidating this dataset along with other building information in a single digital tool. **More recently, the European Parliament’s Environment, Public Health and Food Safety Committee (ENVI) has called on the European Commission, in its report on the implementation of the Ambient Air Quality Directives¹⁰, to consider regulating IAQ independently or as a part of sustainable buildings legislation to reduce the fragmentation of existing EU legislation.** It has also encouraged local authorities to implement incentive schemes for building renovations and the replacement of old, inefficient, and polluting residential heating and cooling systems.

Updating the framework for Energy Performance Certificates (EPC) to increase their quality and availability

EVIA also welcomes the European Commission’s initiative to improve the framework for setting and awarding EPC. **EVIA highlights the importance of fostering greater harmonisation across Member States on EPC and of expanding the scope of information requirements to include elements on the obsolescence and performance of technical building systems so as to recommend their replacement, if necessary, and of making provisions on availability and accessibility of databases more stringent.** Additionally, the framework should be made futureproof. Currently, the validity of EPC should not exceed 10 years. However, given the pace of technological developments and the speed at which new technologies can become cost optimal, the validity period should be reduced. Conducting EPC assessments more regularly would allow recommendations on measures to improve the performance of the buildings’ technical systems in a timelier manner since products are constantly improving their energy efficiency thanks to the regular revision of Ecodesign regulations. EVIA also believes that every building, however small, should be required to display its EPC prominently. The EPC can be the founding block for Building Renovation Passports (BRP).

About EVIA:

The European Ventilation Industry Association (EVIA)’s mission is to represent the views and interests of the ventilation industry and serve as a platform between all the relevant European stakeholders involved in the ventilation sector, such as decision-makers at the EU level as well as our partners in EU Member States. Our membership is composed of more than 40 member companies and 6 national associations across Europe, realising an annual turnover of over 7 billion euros and employing more than 45,000 people in Europe.

EVIA aim to promote highly energy efficient ventilation applications across Europe, with high consideration for health and comfort aspects. Fresh and good indoor air quality is a critical element of comfort and contributes to keeping people healthy in buildings.

⁹ European Parliament, ‘Maximising the energy efficiency potential of the EU building stock’, 2020, https://www.europarl.europa.eu/doceo/document/TA-9-2020-0227_EN.html

¹⁰ European Parliament, ‘Air quality: Standards needed for all air pollutants with health impacts, say MEPs’, 2021, <https://www.europarl.europa.eu/news/en/press-room/20210301IPR98961/air-quality-standards-needed-for-all-air-pollutants-with-health-impacts-say-meps>