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HOW TO INTEGRATE INDOOR ENVIRONMENTAL QUALITY WITHIN NATIONAL LONG-TERM RENOVATION STRATEGIES

Briefing

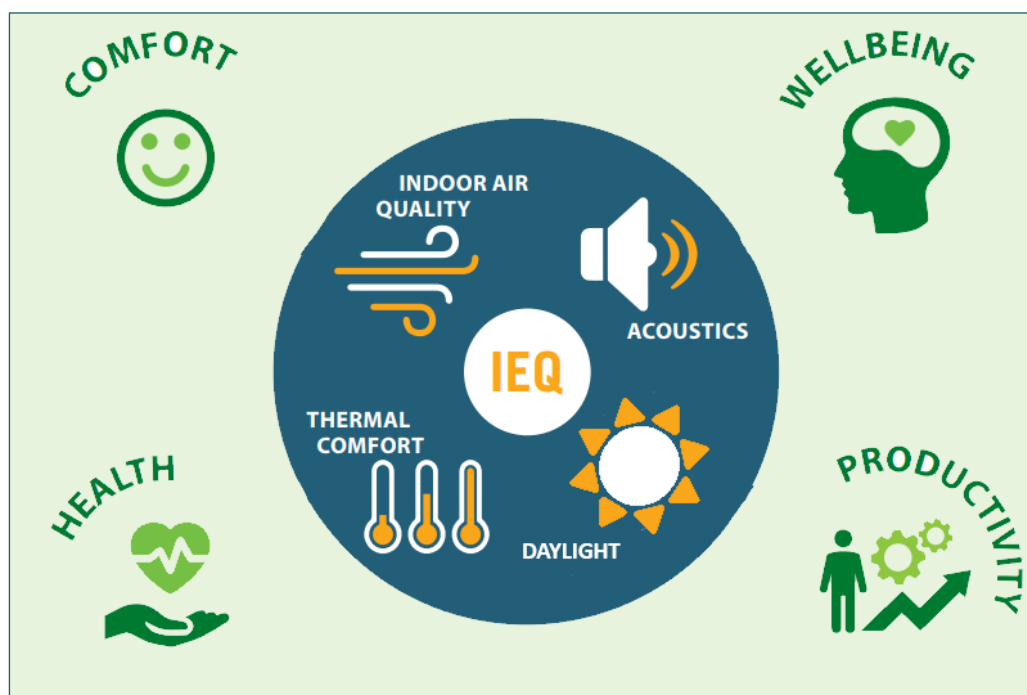
Indoor environmental quality (IEQ) has a direct effect on our health, comfort, wellbeing and productivity. It is therefore an important parameter to include in long-term renovation strategies. The major determinants of IEQ are indoor air quality, thermal comfort, daylight and acoustic comfort and they all play an important role in ensuring the quality of life and general wellbeing of building occupants (Figure 1).

About 2.2 million Europeans have asthma because of their living conditions and 110 million live in buildings with high concentrations of hazardous pollutants due to inadequate levels of ventilation. Increasing indoor comfort and air quality can

reduce illnesses and premature deaths associated with living in cold and damp homes. This in turn reduces pressure on healthcare and social services, with related benefits including fewer days of work missed, shorter hospital stays and improved educational performance.

Since we spend about 90% of our time indoors, it is crucial to ensure suitable levels of IEQ to promote healthy and comfortable indoor environments. Building legislation, and in particular the upcoming long-term renovation strategies, is an obvious starting point.

Figure 1 - Elements and impact of IEQ



EPBD IS AN OPPORTUNITY TO PROMOTE HEALTHY COMFORTABLE INDOOR ENVIRONMENTS

The EU's main legislation in this area, the amended Energy Performance of Buildings Directive (EPBD, 2018/844), mentions that energy performance requirements defined by governments in all EU countries should optimise health, indoor air quality and comfort levels. The directive doesn't specify how to achieve satisfactory IEQ and harmonise indoor comfort requirements

across Member States, but it provides a great opportunity to integrate IEQ and energy performance.

Now that the directive must be transposed into national legislation (by March 2020), there are great opportunities to increase the importance of IEQ. EU Member States should ensure they:



INCLUDE MEASURES PROMOTING IEQ IN LONG-TERM RENOVATION STRATEGIES



INTEGRATE IEQ IN ENERGY PERFORMANCE CERTIFICATES (EPCs)



ENSURE COMPLIANCE AND QUALITY CONTROL MEASURES TO HELP ACHIEVE SATISFACTORY IEQ



REFORM THE COST-OPTIMAL METHODOLOGY & INCLUDE PARAMETERS TO EVALUATE THE IMPACTS ON IEQ



PROMOTE IEQ IN LONG-TERM RENOVATION STRATEGIES - ARTICLE 2A

Ensure that measures improving indoor environmental quality are included in energy-efficiency retrofits, as a trigger to drive renovation and achieve significant health benefits.

Member States are required to prepare a new long-term renovation strategy to support the transition into an energy-efficient and decarbonised building stock by 2050. Governments should facilitate the cost-effective transformation of existing buildings into nZEBs and include in their strategy an estimate of expected energy savings and wider benefits, such as those related to health and air quality. Long-term renovation strategies give Member States the flexibility to decide which segment of the building sector they want to tackle first and how. This is an opportunity to also raise awareness about the importance and benefits of good IEQ and use it as a trigger for renovation.

How can health and IEQ be integrated in national renovation strategies?

- Renovation strategies should report on issues beyond energy efficiency, such as IEQ – few currently do so.
- Strategies should recognise increased comfort, health and productivity as drivers for energy renovation. Policies and measures should ensure adequate levels of daylight, acoustics, ventilation, thermal comfort and indoor air quality.
- Incentives for renovation should include IEQ parameters as well as energy savings to promote projects that also aim to improve health and wellbeing.
- Supporting instruments like the Building Renovation Passports and one-stop-shops should also promote IEQ. A

Building Renovation Passport is a step-by-step renovation roadmap that guides a building owner. They provide information on relevant indicators such as energy performance and CO₂ emissions and recommend improvements. This can stimulate deep or staged deep renovations. IEQ aspects should be incorporated among the indicators, and comfort and wellbeing should be included in the information delivered to the building owner.

- Policies and measures should promote deep renovation that ensures good IEQ and generates benefits for society in terms of local jobs, economic growth, lower health bills and overall better living standards. Deep renovation can increase indoor comfort, wellbeing and productivity, and lead to a reduction in absenteeism from work and healthcare costs. This in turn reduces pressure on healthcare. These cost savings should be considered in the estimation of wider benefits (as mentioned in Article 2a 1 (g)) and when designing policies for the building stock.
- Renovation policies should integrate cost-effective solutions to deliver good IEQ and properly consider all benefits and measures of renovation, like thermal performance improvements.
- Training, education and experience of professionals issuing certification documents, installers and commissioners should be expanded beyond energy efficiency matters and cover IEQ, health, comfort and wellbeing.



INTEGRATE IEQ IN ENERGY PERFORMANCE CERTIFICATES (EPCs) – ARTICLES 11, 19, 19A AND 20 (2)

EPCs should be revised and further expanded into reliable, compliant and user-friendly ‘next-generation EPCs’ by also including non-energy aspects such as IEQ.

Energy efficiency and IEQ improvements are inter-related and can be achieved simultaneously. Currently most EPCs don't cover IEQ.

How can health and IEQ be integrated in EPCs?

- Member States can adjust EPCs to ensure IEQ is considered. New measures to adapt EPCs and incorporate IEQ can also be included in national long-term renovation strategies.
- EPCs have the potential to become effective instruments to track not only a building's energy performance but also its overall IEQ by providing evidence-based information (e.g. measurements, building occupant surveys, dynamic computer simulations with or without IEQ metric).

- To support deep renovation, EPCs should be complemented by Building Renovation Passports including aspects of health, indoor climate and comfort (art. 19a).
- The behaviour of the building occupants is a crucial aspect of maintaining good IEQ. Article 20 (2) of the EPBD says Member States shall provide information to owners and tenants through accessible and transparent tools, including EPCs.
- Campaigns to raise the awareness of building occupants of the importance of IEQ and its effects on health, comfort and wellbeing should be also considered. For example, gathering occupants' perceptions of the indoor environment through structured surveys would build their participatory involvement and have positive effects on their behaviour.



ENSURE COMPREHENSIVE COMPLIANCE AND QUALITY CONTROL – ARTICLES 14 AND 15

Compliance and quality control checks of heating, cooling and ventilation systems should be regularly carried out to ensure the long-term operating performance of buildings in relation to IEQ requirements.

Heating, cooling and ventilation systems are critical to providing a healthy indoor environment and are also significant energy users. Optimising their operating performance increases both energy efficiency and IEQ.

How can Member States integrate health and IEQ in mandatory inspections, commissioning and performance assessments?

- Compliance should be regularly assessed during the design

stage, pre- and post-occupancy and pre- and post-renovation, while regular quality control checks of the heating, cooling and ventilation systems should take place to ensure the long-term operating performance of buildings in relation to IEQ requirements.

- Post-occupancy evaluations, post-installation/construction commissioning (e.g. for ventilation systems), user's behaviour verification, audits and inspections should also be regularly performed to ensure effective operation of buildings.



REFORM THE COST-OPTIMAL METHODOLOGY IN THE EPBD AND INCLUDE PARAMETERS TO EVALUATE THE IMPACTS ON IEQ – ARTICLES 4 AND 5

Update the cost-optimal methodology to integrate societal gains, promote the transition toward healthy, comfortable and nearly Zero-Energy Buildings and boost the renovation rate.

The amended EPBD has left the cost-optimal methodology untouched. The current methodology overlooks many of the societal gains of getting healthier nearly Zero-Energy Buildings.

How can the cost-optimal methodology be updated?

- In addition to cost savings from the application of energy

efficiency technologies, a revised methodology should include benefits like reduced costs in the healthcare sector, increased productivity and wellbeing, and lower absenteeism.

- Failing to include benefits linked to increased IEQ could distort investment decisions and result in lower rates and quality of renovation.

HARMONISING EUROPEAN POLICIES AND EU AND NATIONAL IEQ REQUIREMENTS

Beyond ensuring that IEQ is properly addressed when transposing the EPBD, there is a need to harmonise calculation methodologies and IEQ requirements across the EU.

Several Member States have introduced national requirements on IEQ, but they're often expressed in different units, not legally binding and below comfort levels. This non-homogenised approach exists even when European standards are available (e.g. EN 16798-1)¹ and makes comparing different regulations very difficult. Where available, existing EU standards should be used in all Member States to allow a transparent comparison and evaluation, which could help further improve IEQ across the EU.

Harmonise IEQ requirements across EU policies to address inconsistencies and promote equal quality of living.

Harmonising requirements and methodologies would address inconsistencies between different calculation methodologies,

IEQ requirements and design criteria, and avoid unequal protection of building occupants across Europe. Combined with a continuous assessment and regular review, harmonisation would ensure that good, reliable and comparable data is collected. It would allow a systematic approach for defining indices and metrics to compare outcomes across all Member States.

Long-term renovation strategies should include measures applying EU standards and promote their harmonisation. Member States should also envisage synergies between building and health policies to ensure that all citizens have access to equal levels of IEQ. The same approach should be adopted across EU policies: the European Commission should encourage synergies between working groups on public health, construction and EPBD to ensure that all relevant legislation promotes a healthy indoor environment.

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¹ EN 16798-1: Energy Performance of Buildings – Part 1: Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics



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