ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE REVISION

Energy efficient and low-CO2 buildings with concrete

Using concrete in buildings contributes to energy efficiency thanks to concrete's high thermal mass. When it is warm, concrete elements absorb excess heat, slowing the rise in temperature in indoor rooms. When temperatures fall in the evening, the concrete releases this heat, keeping indoor rooms at a comfortable temperature. This leads to energy savings and produces a better indoor climate for building occupants. In modern buildings, "thermally activated" building systems, where hot or cold water or air flows through pipes embedded in the concrete, can further boost the effect. Thanks to its energy-storage effect, thermal mass can also contribute to greater uptake of renewable energy in buildings. Furthermore, thanks to their air-tightness and durability, the energy consumption of concrete buildings is greatly reduced over their whole life.

Key points for the revision of the EPBD

The review of the Energy Performance of Buildings Directive (EPBD) is an opportunity to raise Europe's ambitions with regard to reducing the impact of buildings. The Concrete Initiative recommends the following priorities for the revision of the Directive.

1

Improve the recognition of the benefits of thermal capacity by taking the "effective thermal mass" into account in the Directive

Thermal capacity is presently recognised in the Directive as contributing to the energy efficiency of buildings at the same level as other solutions (insulation, heating and cooling systems, renewable energy). However, the effective thermal mass provided by the fabric of a building, which can be used beneficially to store and release heat gains, is determined not only by thermal capacity but also by thermal conductivity and density. Therefore considering thermal capacity alone is not sufficient: the relevant property is effective thermal mass.

2

Take advantage of the building fabric to support increased uptake of renewable energy.

Thermal energy storage in the building fabric allows for shifting the time of highest demand for electricity for heating and cooling in buildings, thereby drawing power at times when a higher share of renewable sources are used in the electricity mix. Fabric energy storage also allows for greater uptake of own renewable sources such as heat pumps, avoiding the need for conversion to electricity altogether, as well as own solar or wind power.

3

Prioritise not only reducing primary energy but also reducing absolute energy use

A switch from primary energy to renewable energy should not lead to less energy efficiency buildings. The goal should always be to reduce energy demand first, followed by use of sustainable energy, and finally efficient use of fossil fuels if strictly necessary: this is known as the “Trias Energetica” principle.

4

Ensure that energy efficiency does not come at the expense of indoor comfort

Energy efficiency measures should keep occupant comfort in mind, and avoid draughts and large temperature differentials within rooms. One way to achieve this is to prioritise the use of *operative temperature* rather than air temperature in building design, in order to achieve thermal comfort while saving energy.

5

Energy performance calculation methodologies must be sophisticated enough to take dynamic effects, like thermal mass, into account

Energy performance calculation methodologies based on a steady-state analysis will not capture dynamic (time-related) effects, such as the natural storage and release of thermal energy which occurs with heavyweight building elements (thermal mass). Dynamic calculation methods should be preferred in order to allow designers to avail of such properties in their energy performance strategy, which come at no additional cost, and to avoid a gap between designed performance and real performance.

6

When deep renovation is mentioned, also make reference to the possibility of rebuilding.

When deep renovation is envisaged, a life cycle analysis should be carried out to assess the best option with a medium to long term perspective: renovation or rebuilding. Provided that this analysis is performed, both scenarios should receive the same financial and fiscal benefits.

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