Energy Performance of Buildings Directive: a bottom-up approach for integrated system efficiency

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Preamble: Squaring security of supply and decarbonisation of buildings is not going to be straightforward. Buildings are the single largest source of energy consumption in the EU, representing 40% of final energy consumption and 36% of CO2 emissions[1]. Heating takes up the largest share of a building's total energy consumption, about 60%, and demand is concentrated over few months. In short, this sector is hard to abate, and requires a more comprehensive and pragmatic approach to ensure full decarbonisation by 2050.

We have learnt hard lessons around over-reliance on too few solutions. Risks include wasted energy (curtailment), expensive and/or slow grid expansions, stranded assets, and technology monopolies. There is also the problem of a lack of back-up capacity and consumer choice. Electrification will certainly play an important role, but without considering other energy vectors, systems will face serious challenges in matching supply and demand (as recently acknowledged by the European Networks Transmission System Operators for Electricity; ENTSO-E[2]).

For the revision of the Energy Performance of Buildings Directive (EPBD), we need to recognise the complementarity between renewable electrons and renewable molecules. A wide range of efficient solutions use green energy carriers, installed either on site or delivered through energy grids. These technologies include heat pumps, hybrid solutions, cogeneration, micro-CHP, residential fuel cells, and boilers ready to run on renewables.

Recommendations: The signatories of this statement call on policy makers to ensure ambitious and cost-efficient decarbonisation of European building stock. We need to strive for smart, integrated, and increasingly renewable-based energy systems where local circumstances and consumers' needs are fully considered. All renewable and efficient energy solutions, whether deployed on site via energy grids or off-grid, should play a role. We encourage policy makers to consider the following recommendations:

1. A bottom-up approach is key to ensuring cost-effective decarbonisation that takes local specificities into account and empowers local actors.

- When the reality of local and national circumstances is factored in, unexpected opportunities emerge to decarbonise in a cost-effective manner. In this way, the full potential of renewable energy, energy efficiency measures, and synergies across existing infrastructure can be leveraged[3].
- We want to empower local authorities, consumers, and energy communities, alongside suppliers and producers in their areas.

[1] European Commission, 2020. A Renovation Wave for Europe, p. 23.
[2] ENTSO-e, 20 October, 2022. Early insights of Winter Outlook Report 2022-2023.
[3] Fraunhofer IEE & Fraunhofer ISE, 24 June 2022. Interim report on the bottom-up study project on path options for efficient and socially responsible decarbonisation of the heating sector (in German).

- Such an approach can put equal focus on energy system efficiency, demand reduction, demand-side flexibility and energy diversification, as highlighted in the European Commission's *Energy Efficiency First Guidelines*[4].

2. Affordability of sustainable heating solutions should be the cornerstone of a Just Transition in the buildings sector.

- Consumers' ability to pay must be considered in the direct costs (energy bills, building systems, renovation) and indirect costs (infrastructure, storage, peak power capacities). The specific needs of groups, such as tenants, building owners, industrial customers, and SMEs, should be adequately considered.
- Reducing peak demand via demand-side solutions, including on-site thermally generated heat and/or power, will greatly reduce system costs. Such gains will directly benefit consumers by keeping the supply and infrastructure components of the energy bills under control. This will provide citizens with the possibility to rely flexibly on the most cost-effective and increasingly sustainable solutions available locally.
- The EPBD should therefore actively promote a "total cost approach", considering the direct and indirect investments, and operational costs. Savings from daily and seasonal demand management must be shared with the customers, through adapted tariffs and incentives.

3. Solutions that balance peaks and reward demand side management should be integrated into any strategy to decarbonise residential heating.

- New solutions, like hybrid heating technologies using growing shares of renewables, can be deployed today, and offer ways to balance peaks at limited costs for end users. The EPBD should promote such solutions. This in line with recent policy choices made in several EU Member States[5].
- Heat pumps are crucial. When complemented by hybrid heating solutions, the decarbonisation of heating becomes easier, cheaper, more flexible, and more socially acceptable. Some areas have a lot of variable renewable energy that needs to be stored. Incorporating hybrid solutions to overcome these challenges could save over EUR 520 bn between now and 2050.[6]
- Geothermal heat, solar thermal, thermally driven heat pumps, bioenergy, cogeneration including micro-CHP, residential fuel cells, and boilers are all ready to run on renewables. They should also be supported by the EPBD when viable and cost-effective.
- The Zero Emissions Buildings (ZEB) definition should support the use of all cost-effective renewable energy solutions including: on-site sources, nearby sources, grids, and off-grid renewable sources. In this way, peak demand can be managed cost-effectively and in a reliable manner.
- The ZEB definition should factor in reductions or the phase-out of greenhouse gas emissions associated with buildings, rather than excluding certain technologies. This is the most efficient way to incentivise demand response measures. Otherwise, buildings will continue contributing towards emissions at the point of power generation.
- Efficiency gains generated by seasonal demand flexibility should also be taken into account in the Energy Performance of Buildings Assessment, and the Energy Performance Certificate.

[4] European Commission, 2021. European Commission Recommendation and Guidelines on the Energy Efficiency First Principle.
[5] Bloomberg, 2022. Dutch Homes Will Have to Install Hybrid Heat Pumps From 2026.
[6] *Guidehouse*, 2022. Decarbonisation pathways for the European building sector.

4. All renewable-ready heating technologies should be allowed to contribute to the cost-efficient decarbonisation of the European building stock.

- REPowerEU set a 2030 objective of 35bcm of biomethane (380 TWh) and 66bcm of renewable hydrogen (780 TWh). This is more than the current household gas consumption, which will progressively be reduced through the Renovation Wave. According to *Guidehouse*[7], REPowerEU volumes will be enough to meet renewable gas demand in buildings because demand will be reduced to 400TWh through energy efficiency measures.
- The replacement of old and inefficient heating systems with heating appliances using a range of increasingly renewable energy sources should be supported in the EPBD when cost efficient. This would ensure the most optimal use of each technology according to building specificities and local circumstances.
- This approach will also reduce peak power demand at times of insufficient solar and wind power output and high heating demand ("*Dunkelflaute*"), saving billions of euros in costly infrastructure investments for consumers and businesses alike.[8]

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[7] *Guidehouse*, 2022. Decarbonisation pathways for the European building sector.
[8] *Guidehouse*, 2022. Decarbonisation pathways for the European building sector.