EERA Feedback – Energy Efficiency Framework

The European Energy Research Alliance (EERA) is the largest low-carbon energy research community in Europe and beyond, comprising over 250 leading organisations from more than 30 countries, with the mission of catalysing European energy research to shape science-based policies and advance world-class innovation. EERA welcomes the European Commission's upcoming update of the Energy Efficiency Framework and proposes the following recommendations for consideration, building on its 2023 Flagship report on "Energy Demand Reduction as part of the Clean Energy Transition in Europe".

1) Strengthening the ambition of energy efficiency legislation

Energy efficiency is a **key tool to decrease dependence on fossil fuels, address the current energy crisis**, and **related price spikes**, **accomplish the clean energy transition** and **reach climate neutrality goals.** In this context, updating the framework beyond 2030 and adapting it to the changing circumstances is of primary importance. Energy efficiency can, in fact, play a key role in **answering issues posed by large scale electrification**, including of industrial processes, such as **limited renewable electricity availability** and **grid constraints.**

As such, **the "energy efficiency first" principle should remain a cornerstone of the EU's energy, climate and transition strategies.** In addition, energy efficiency strategies should harmonise technical and economic innovations with social considerations and ensure a balanced focus on short, medium, and long-term impact measures, preventing overemphasis on immediate effects.

2) Integrating the concept of energy sufficiency

It is important to consider that **energy efficiency measures per se do not guarantee an absolute reduction in energy use**: the well-known rebound phenomenon suggests that gains in energy efficiency might lead to a potential increase in total energy use. Currently, **despite efficiency improvements in all end-use sectors,** final energy consumption has largely remained stable since 2000.

This limitation is addressed in particular by the notion of energy sufficiency, which emphasises reducing the quantity of energy output to be produced and consumed, through a set of measures and daily practices that avoid demand for energy from households and industry alike. **Such a concept has the potential to bring about long-term behavioural change and energy savings by targeting solutions which bring about transformative changes** across existing systems and offer alternative ways of achieving a similar level of comfort and services with minimal energy consumed. Energy sufficiency should, therefore, be supported by complementing and reinforcing the "energy efficiency first" principle, in order to ensure an absolute reduction in energy use **by ensuring citizen actively shape energy demand reduction measures** and by enabling focus on the final uses of energy.

At the same time, the implications of energy sufficiency for industry remain less explored and deserve further consideration, in particular in terms of how demand reduction and alternative production models could contribute to decarbonisation while maintaining competitiveness, alongside continued improvements in energy efficiency through process optimisation and technological innovation.

3) Better recognising the importance of R&I in advancing energy efficiency

R&I constitutes a key tool in advancing energy efficiency. However, researchers have consistently highlighted gaps in European policies and research agendas in several sectors, which hinder the acceleration of energy efficiency and decarbonisation. For example, **gaps in industrial heating and cooling technology research slow progress in improving energy efficiency and reducing emissions in industry**. R&I must be encouraged to develop technologies that reduce specific energy consumption, including energy-efficient separation processes, process intensification, energy-efficient drying solutions, and heat-to-power technologies.

4) Addressing barriers to energy efficiency across sectors

Overall, updated legislation must address **stakeholders' lack of awareness** in implementing energy efficiency measures, including in industry, as well as address the **upfront costs of efficient technologies and renewable solutions**, which particularly affects SMEs. **Access to adequate funding** remains one of the main barriers to capital-intensive energy efficiency improvements.

The Energy Efficiency Directive (EED) currently **falls short of addressing how to make industrial processes more energy efficient and mainly focuses on the insulation of buildings and heating and cooling technologies**. In addition, energy efficiency measures and enabling technologies in Europe remain **underinvested**. With increased investments in energy efficiency in the industrial sector in Europe, the EU could target a **15% reduction in global energy demand by 2040 by unlocking existing efficiency opportunities**.

Specifically, legislation should **stimulate investment in industrial energy efficiency, promote R&I efforts targeting technologies that reduce specific energy consumption in industrial processes,** and **create greater demand for energy efficiency solutions**, **including through lighthouse projects showcasing industry demonstrations,** and **energy efficiency partnerships** across different industries and locations. Legislation should also foresee **sectoral plans for energy reduction towards 2050** and support the **deployment of energy flexibility solutions,** such as microgrids and smart energy tariffs**.** In parallel, **energy use should be better monitored**, and audit recommendations more systematically implemented, while **best available practices** on energy efficiency should be regularly updated, shared and applied. Overall, the **implementation of innovative solutions — including energy-efficient feedstock, improved processing and waste heat reuse or reduction — should be supported through appropriate regulatory and financial incentives**. Ensuring a **level playing field for low-emission industries** will also be essential, alongside stronger support for the development of new energy-efficient technologies and the alignment of long-term decarbonisation plans among policymakers, energy network companies and industry.

On **heating and cooling**, further action is needed as well, including promoting **collaboration between energy-intensive industries and power companies to utilise surplus heat; prioritising thermal energy storage (TES)** solutions to stabilise waste heat supply; **enhancing the integration of heat pumps** in industrial processes; advancing digitalisation; promote projects and collaboration on **TES**. The absence of accessible materials databases and standard metrics and a lack of awareness and knowledge-sharing are particularly detrimental to the uptake of TES (see EERA Joint Programme Energy Efficiency in Industrial Processes' Policy Brief on Policy brief Industrial Thermal Energy Storage).

When it comes to **energy efficiency in buildings**, several initiatives should be supported and implemented such as: **establishing clear targets for nearly zero-energy building (NZEB) and simplified guidelines and recommendations for households** to address complexity; encouraging **retrofitting and upgrading**; maximising the capabilities of building energy management systems (BEMS) and smart appliances within the Internet of Things (IoT), as well as promoting advanced modelling and simulation tools. In this context**, specific guidance is needed to ensure that efficiency improvements do not lead to an overreliance on a single energy source. Hybridisation pathways, combining different energy carriers, can contribute both to efficiency and to the diversification and security of renewable energy use, while TES represents a mature, affordable and effective solution for residential**

applications and should be more widely deployed. Overall, a **holistic approach, from design to operation**, is crucial for optimal energy efficiency, particularly in buildings. The Energy Efficiency Framework must ensure the enforcement of a **standardised energy performance certification system** with consistent benchmarks.

5) **Fostering alignment with other legislations in a global perspective**

It is important to **address the fact that the progressive reduction in the EU's domestic energy consumption has largely been due to the shift away from heavy industrial production in Europe**: this does not mean that less energy was consumed by industry, or more efficiently, but rather that it was consumed in countries from which the EU imports heavy-industry products. As such, the **CBAM** constitutes a key tool complementing energy efficiency legislation which must be enforced, maintained and protected. Similarly, the **ETS'** carbon pricing mechanism remains an important incentive to propel energy efficiency measures. In parallel, emerging trends such as the rapid development of data centres should also be taken into account, as they represent both a growing source of energy demand and an opportunity to deploy energy efficiency measures, for instance through the recovery and use of waste heat.

Lastly, **the revision of the Energy Efficiency Framework must crucially align with several other pieces of legislation which can affect energy efficiency**. Indeed, encouraging **green procurement** practices, as seen in the **IAA**, or adopting adequate **energy poverty policies** and protecting vulnerable groups in the population, as set out in the **Affordable Energy Action Plan,** are also important levers to boost the adoption of energy efficient technologies and practices. In addition, energy efficiency policies must take into account specific regional characteristics and their impact. In this context, energy efficiency research plays an important role in making different renewable energy technologies more accessible despite local constraints, thereby expanding the range of viable options available across diverse geographical contexts.