



# EUROPEAN COMMISSION ELECTRICITY MARKET REFORM RECOMMENDATIONS

## Overview of Long Duration Energy Storage

The [Long Duration Energy Storage Council \(LDES Council\)](#) is a global, executive-led non-governmental organization striving to accelerate the decarbonization of the energy system at the lowest cost to society by driving innovation and deployment of long duration energy storage (LDES).

Long Duration Energy Storage is defined as any technology that can be deployed competitively to store energy for prolonged periods - for multiple hours, days, or even weeks - scaled up economically to sustain energy provision, and that has the potential to contribute significantly to the decarbonization of the economy. The LDES asset class encompasses a range of technologies that store energy in various forms including thermal, electrochemical, mechanical, and chemical.

Renewable energy plays a critical role in decarbonizing the power grid and increasing energy security, but this large-scale transition will require new sources of flexibility to ensure reliable energy supply, which long duration energy storage provides.

Globally, the energy transition increasingly has multiple narratives – climate change and resiliency, energy security, and energy affordability. As the global ecosystem moves from traditional fossil fuel sources of energy – and the dispatchability they provide – to a climate dependent system with flexibility at its core, the diversity of LDES can provide essential services.

In the LDES Council’s inaugural 2021 market analysis, the global need for LDES by 2040 was estimated at 1.5-2.5 TW of power capacity and 85-140 TWh of energy capacity. A subsequent study in 2022<sup>1</sup> explored the potential of thermal energy storage in delivering low-cost, reliable, clean heat and power. Factoring thermal energy storage combined with power could add 1-5 TW of additional capacity, growing the total LDES capacity to 2-8 TW. This would result in up to \$540 billion of annual system savings.

**Long Duration Energy Storage improves low-carbon dispatchability of the system at any given time and plays a central role in balancing the power system and making it more reliable and efficient.**

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<sup>1</sup> [https://ldescouncil.com/assets/pdf/221108\\_NZH\\_LDES%20brochure.pdf](https://ldescouncil.com/assets/pdf/221108_NZH_LDES%20brochure.pdf)



## The LDES Council presents the following policy recommendations for the EU Electricity Market:

- **Establish clear market signals** to help existing markets improve system needs and allow for grid reinforcements and flexibility to match climate dependent generation.
- Provide access and **availability to provide ancillary services that can participate in markets** and then LDES can turn renewable energy into profits.
- Create **24/7 Clean Power Purchase Agreements** to balance supply and demand for power as renewables grow in generation capacity.
- Continued improvements to **inclusive and long-term grid planning** acknowledging the dispatchability and flexibility of LDES.
- Support for island nations **auctions** with clear price signals and diverse bid options for capacity payments.
- Allowance for **storage as a transmission** asset providing another tool for congestion management.
- Allocate LDES benefits for **load management and interconnection**, especially for cross border reliability.
- Support for **diverse LDES** technology options.
- Ensure existing policies and rules are amended to include the benefits of LDES and promote **revenue support mechanisms** to ensure rapid deployment of LDES in the EU marketplace.

**Long Duration Energy Storage plays a key role in delivering a net-zero system by storing and providing energy in a flexible, low-carbon, and low-cost way.** These technologies can cost-optimally store power anywhere from half a day to a week or more in capacity, thereby filling a gap between today's batteries and seasonal storage. In the long-term, LDES provides insurance against prolonged periods with low or no renewable power output, while in the near-term, these assets can potentially act as insurance against elevated power prices such as those electricity consumers are experiencing in many parts of the world today. LDES can therefore contribute directly to the triple imperative of the energy transition, driving greater security, affordability, and lower emissions of power supply.