Long Duration Storage Shot: An Overview

The U.S. Department of Energy's (DOE's) Energy Earthshots™ Initiative aims to accelerate breakthroughs of more abundant, affordable, and reliable clean energy solutions by 2030.

Achieving the Energy Earthshots™ will help America tackle the toughest remaining barriers to addressing the climate crisis, and more quickly reach the current goal of net-zero carbon emissions by 2050 while creating good-paying union jobs and growing the clean energy economy.

The Long Duration Storage Energy Earthshot™ establishes a target to reduce the cost of grid-scale energy storage by 90% for systems that deliver 10+ hours of duration within this decade. Energy storage has the potential to accelerate full decarbonization of the electric grid. While shorter duration storage is currently being installed to support today's level of renewable energy generation, longer duration storage technologies are needed as more renewables are deployed on the grid. Cheaper and more efficient storage will make it easier to capture and store renewable clean energy for use when energy generation is unavailable or lower than demand – for instance, so renewable sources generated during the daytime like solar-generated power can be used at night or nuclear energy generated during times of low demand can be used when demand increases. The Long Duration Storage Shot considers all types of technologies – whether electrochemical, mechanical, thermal, chemical carriers, or any combination – that has the potential to meet the necessary duration and cost targets for grid flexibility and will provide similar dramatic benefits for entire buildings, neighborhoods, or regions.

Impact

Variable renewable generation is critical to a decarbonized grid, but on its own, it cannot cost-effectively serve 100% of electricity demand at all periods. Therefore, the future decarbonized grid will need innovative solutions to ensure flexibility and reliability. Grid-scale long duration storage is a key option to provide vital grid services to enable renewable generation while also increasing local control of the power system and building resilience for communities who are frequently disconnected from or may not have access to the grid. Developing the technology and manufacturing processes to reach the Long Duration Storage Shot cost targets will also establish a new, U.S.-based manufacturing industry for storage products.

Stakeholder Engagement

DOE continues to hold a series of events to engage communities, industry and other stakeholders, including the annual Long Duration Storage Shot Summit. Check for event updates available on the Energy Storage Grand Challenge website.

Funding

Several DOE offices conduct energy storage activities, and the President's Fiscal Year 2025 Budget Request included a total of $695.3 million for these activities, tracked through the Energy Storage Grand Challenge crosscut. Pending appropriations, DOE anticipates funding opportunities and other activities to help advance progress toward meeting Long Duration Storage Shot goals, which align with DOE's Energy Storage Grand Challenge Roadmap.

Long Duration Storage Shot seeks to achieve affordable long duration grid storage—for clean power anytime, anywhere.

Reduce storage costs by **90%** from a 2020 Li-ion baseline…

…in storage systems that deliver **10+** hours of duration

…in **1** decade