

Energy storage battery 35 kWh

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While lithium-ion has become the most publicised battery technology used in the emerging electric grid storage market, will that dominance continue in the coming years? The US Department of Energy (DOE) is suggesting other battery technologies could be attractive alternatives.

One of those alternative technologies is the historical workhorse lead battery, which is undergoing a comprehensive makeover in a partnership between the industry and national laboratories. A new generation of advanced lead batteries emerging from this makeover is coming at a critical time as the DOE's Office of Electricity (OE) looks for cost-effective storage technologies to help integrate wind and solar into the electric grid.

DOE and others in the energy storage research community say that if power from intermittent renewable sources like wind and solar is to replace fossil fuels as a primary generation resource, then batteries and other storage technologies will be needed. The cost of batteries will have to fall below \$35/kWh if they are to help renewables become economically competitive with natural gas-fired plants. The DOE says lithium-ion battery costs are unlikely to fall below \$100/kWh, while lead batteries have the potential to reach that target range.

The Federal Consortium for Advanced Batteries (FCAB), in a June 2021 report, said that while lithium-ion is likely to remain the battery of choice for the growing electric vehicle industry, it recognises a different situation for stationary applications:

"With greater duration requirements and less stringent density and weight constraints, non-lithium storage technologies may emerge as the most cost-effective long-term solutions for stationary storage."

The U.S. Congress has taken note of the need for more aggressive research into batteries and other energy storage technologies. Not surprisingly, Congress is moving to appropriate more funds in the fiscal year 2022 budget for batteries and other technologies used in EVs (a 38% increase to \$553m). Congress is also moving toward a larger 74% increase in OE's stationary energy storage budget to \$139m for the fiscal year 2022 to research energy storage technologies for electric grid and other stationary applications.

The recently enacted Infrastructure Investment and Jobs Act (IIJA) authorises even more funding for energy storage demonstration and pilot projects (\$355m) and long duration storage development (\$150m) through the fiscal year 2023-24.

This increase in grid storage research comes as the US Energy Information Administration (EIA) estimates the country's electric grid system will need to deploy at least 55 gigawatts of batteries by 2050. That would far exceed the current deployment by a factor of five.

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But the EIA goes further and says that if natural gas supply becomes constricted and if the cost of renewable power resources declines further to the point where the cost of renewables plus energy storage becomes more competitive, the need for batteries could far exceed its conservative projection of 55 gigawatts and possibly reach 175 gigawatts.

There are divided opinions on whether lithium-ion will continue to be the battery of choice for grid storage applications. Even some who predict lithium-ion will remain dominant acknowledge that other battery technologies may emerge as attractive alternatives.

Bloomberg New Energy Finance (BNEF) said in POWER Magazine on Nov 15, 2021: "We expect lithium-ion batteries to dominate the market at least until 2030 given their cost competitiveness and established supply chain."

But BNEF, in the same article, said it sees "new storage technologies and battery materials that are emerging and can potentially play a meaningful role over the long-term." It is important to note that renewable energy technologies and lithium-ion batteries are highly reliant on elements not abundant in the US and sourced from strategically sensitive regions.

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