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US energy storage surge will reward market-savvy developers

By Mark Shenk

August 22, 2024 11:59 AM EDT · Updated August 22, 2024



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Summary

Falling costs and federal tax credits have improved the economics of large-scale battery storage but a busy market brings grid, permitting and supply chain risks.

August 22 - U.S. utility-scale battery deployment is surging as developers seek to secure tax credits introduced in the 2022 Inflation Reduction Act and capitalise on falling battery costs.

The U.S. installed 1 GW of grid scale battery storage in Q1 and is on track to install 11 GW by the end of the year, 45% higher than a year ago, Wood Mackenzie and the American Clean Power association (ACP) said in their latest quarterly market report.

The majority of large U.S. solar projects now incorporate energy storage as developers seek to maximise income in peak demand periods, particularly during the evening.

The inflation act offers a 30% tax credit for clean power projects as well as bonus credits for projects that source domestic content or are located either in areas of low income or regions impacted by the energy transition. For the first time, tax credits are also offered to stand-alone energy storage, fuelling a boom in separate utility-scale battery facilities.

Battery prices have fallen over the last year, fuelling further investment in [large-scale facilities](#) ¹ that can maximise economies of scale. Global battery costs averaged \$139/kWh in 2023, a fraction of the \$780/kWh cost seen 10 years ago, data from American Clean Power association (ACP) shows.

"We are seeing continued decline in both the cost of the batteries and the cost of the total energy storage system," John Zahurancik, president, Americas at battery-maker Fluence Energy, told Reuters Events.

"Battery cost reductions are being driven by lower materials cost, volume increases, and current over supply relative to soft [electric vehicle] demand," Zahurancik said.

MAP: Planned US power plant installations in 2024

Source: U.S. Energy Information Administration (EIA) [Purchase Licensing Rights](#) ¹

While battery prices have fallen, the cost of other equipment and labour continues to rise, industry sources warned.

Developers and utilities also face long grid connection queues and permitting challenges that delay installation and increase costs.

Many of these headwinds are getting worse, Vanessa Witte, Senior Analyst at Wood Mackenzie, told Reuters Events.

"The main issues are with the interconnection queue and early stage development," Witte said.

Gridlock

U.S. grid connection queues are continuing to rise as network operators grapple with a huge number of clean power applications and dwindling network capacity. Grid availability has become a crucial factor when selecting project sites.

Power capacity in grid connection queues rose by 27% in 2023 to 2,600 GW and solar (1,086 GW) and energy storage (1,028 GW) represent 81% of grid connection applications, the Lawrence Berkeley National Laboratory (Berkeley Lab) said in its annual "Queued Up" grid report. Much of this capacity will not be built but the high number of applications are delaying project approvals and pushing up costs.

Reforms to federal grid rules over the last year should help to ease the pressure on grid operators but it will take time, industry experts [told Reuters Events](#) ¹ in June.

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Without faster reforms to grid connection queue processes, the U.S. is unlikely to reach its goal to decarbonize the electric grid by 2035, the Massachusetts Institute of Technology's Center for Energy and Environmental Policy Research said in a report last month.

"Many interconnections across markets have been delayed, and delays are getting worse, not better," Xiaoyu Gu, managing director of investment group AB CarVal, told Reuters Events.

MAP: Power generation in grid connection queues at end of 2023

Source: Berkeley Lab, April 2024 [Purchase Licensing Rights](#) 

In some circumstances, companies opt for stand-alone battery storage to take advantage of existing grid infrastructure. Solar and wind farms require far larger land areas and sufficient solar or wind resources, as well as grid connection points.

One example is the Edgewater energy storage facility in Sheboygan, Wisconsin being developed by Midwest utility Alliant Energy. The 99 MW battery will be located adjacent to Alliance's 350 MW Edgewater coal-fired power station and will gain bonus "Energy Community" tax credits.

"The Edgewater Battery Project leverages existing infrastructure to provide necessary reliability to the grid while securing additional tax credits given its qualification in an Inflation Reduction Act Energy Community," Rick Zimmerman, manager of resource development at Alliant Energy, told Reuters Events.

Permitting of standalone storage can be challenging when close to population centres. Projects can face local opposition due to concerns over fire risk or other issues.

In one example, the city of San Juan Capistrano, California has temporarily prohibited new commercial battery energy storage systems, citing the risk of fire that could impact local neighbours and waterways. The action followed a proposal by Engie to build a 250MW/1,000MWh standalone battery energy storage system in the city and the company has responded by pursuing state approval via the California Energy Commission (CEC).

Following fires at several battery facilities last year, the New York state government has proposed enhanced safety standards at battery facilities.

Resource challenge

Some storage developers are facing shortages of power system components which are dragging out project timelines.

"We do see shortages and long lead times for main transformers, switchgear, and related equipment that is impacting many power projects," Zahurancik said.

Witte recommends developers stockpile transformers and other electrical equipment for projects yet to be fully approved, to avoid delays and higher costs further down the line.

Securing experienced installation teams is also a challenge for storage developers as they strive to meet their completion dates.

A general shortage of skilled workers is delaying projects and increasing wage demands, industry experts said.

Wage rates will continue to rise due to strong demand for skilled workers, Paul Lindsay, battery energy storage systems (BESS) EPC lead at engineering and construction group Black & Veatch, told Reuters Events.

Many companies are bolstering training regimes and working with local colleges and employment groups to ensure sufficient skills going forward.

"We've partnered closely with local union halls and technical colleges to support craft apprenticeships and worker training opportunities," Zimmerman said.

The multiple headwinds mean that many projects with less sound economics or development practices will fall by the wayside, Gu said.

Meanwhile, companies that execute well-developed utility-scale battery storage can end up with "extremely valuable assets," she said.

--Editing by Robin Sayles

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