Energy storage industry ngerulmud

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Another record-breaking year is expected for energy storage in the United States (US), with Wood Mackenzie forecasting 45% growth in 2024 after 100% growth from 2022 to 2023. Although seasonal fluctuations in project completions meant installations were low in first quarter of this year, robust pipeline growth supports this forecast and higher installations are expected later in the year, similar to 2023.

Annual storage installations are growing faster than wind and solar as the sector races to keep up with the growing need to balance renewables and support grid resiliency. The storage market is also supported by falling module costs and IRA tax incentives. There are some challenges the market has to contend with to achieve the massive growth predicted and needed by the system, but there are huge areas of opportunity as well.

The recently announced increase in section 301 tariffs for imported lithium-ion batteries from China, which come into force in 2026, will increase pricing and put a slight damper on growth expectations. However, the longer timeline of the changes and the speed with which Chinese manufacturing can move elsewhere in Asia, as well as some shift to domestic manufacturing, will mitigate the impact on total demand. There is risk of further impact if the tariffs are increased or additional trade barriers are put in place in the next presidential term, depending on the outcome of the election.

We are also seeing developers continue to struggle across markets to get interconnection for planned projects. Interconnection queues are bloated with many submissions that are no longer part of developer active pipelines and Independent System Operator (ISO) analysis has not kept pace with the growth of submissions.

Not only are the queues slow, there are unpredictable delays which make cost and timeline risk very difficult to manage for project developers. Although the new FERC interconnection rule (Order No. 2023) should reduce speculative projects entering the queues and speed up the processing, ISOs still need time to implement the changes and deal with current volume.

Grid-scale storage continues to dominate the US market, with ERCOT and CAISO making up nearly half of all grid-scale installations over the next five years. Both of these ISOs have increasing renewable penetration that is driving growing revenue opportunities in wholesale energy markets, even as their ancillary markets begin to saturate with the increased number of storage installations.

New contracting options and counter parties are developing as projects seek guaranteed revenues. In Texas, tolling agreements match up more risk-seeking players with the technical savvy to optimize operations in the real-time price volatility with more conservative players who want the steady revenue stream for financing the project. In California, the big Investor Owned Utilities (IOUs) are contracting for energy and resource adequacy, leaving the merchant upside as an opportunity for owner-operators.

Elsewhere, state policies supporting renewables and energy storage and utility long-term planning for balancing and reliability, are driving procurement of storage systems. With its large solar build-out, the desert southwest is forecasted to grow 14x in installed storage capacity by 2033 to nearly 30 GW. Other top markets such as New York and Massachusetts, where storage is getting built to meet states mandates, won"t always be completed in the original timing required by the state laws.

The vast majority of projects will be lithium ion throughout the next decade, but longer duration systems will start to play a critical role in smoothing out renewable generation across seasons and wind droughts. There are early pilots using iron air technology with 100 hours of duration, and others in the 8-12 hour range using compressed air and flow batteries, together making up nearly 10% the project pipeline by megawatt hour (although making up just 1% of the power).

Overall, there is an immense opportunity for energy storage to meet the needs of an evolving grid, and it is well-positioned to do so with the existing tax credits and its declining cost curve. The more the industry can do to accelerate interconnection processes and allow a mix of supply sources, the faster it can work towards ambitious carbon reduction goals.

I will be presenting at Wood Mackenzie"s Solar and Energy Storage Summit next week in San Francisco. Now in its seventeenth year, our Summit will drive the conversation forward to discuss how the sector can take advantage of the opportunities provided by the IRA, foster innovation in cell and battery technology, and evolve solar and storage business models for the ever-changing energy landscape.