

Building a Secure Domestic Supply Chain for Energy Storage



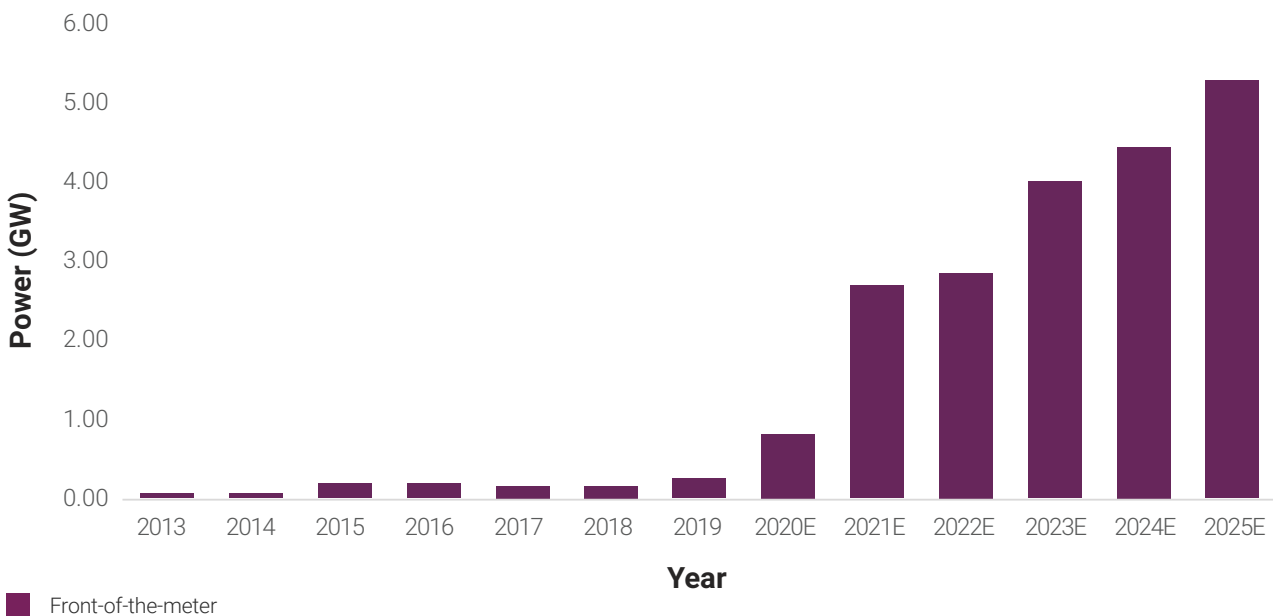
Wood Mackenzie projects U.S. front-of-the-meter energy storage will grow to more than **5 gigawatts** by **2025**.

Introduction

Despite the headwinds of a global pandemic, the booming U.S. energy storage market is leading the global transition to grid-scale battery systems. Front-of-the-meter system costs have declined by more than 25 percent since 2015, enabling the U.S. to install nearly 1 gigawatt of grid-scale storage over the past five years, according to Wood Mackenzie.

With recent policy steps such as FERC Order 841 and the Massachusetts Clean Peak Standard set to accelerate the trend, Wood Mackenzie projects this market segment will grow to more than 5 gigawatts and \$4.3 billion annually by 2025.

Annual Power Capacity Additions by Segment (GW)



Source: Wood Mackenzie



The U.S. has lagged in the race to become a global leader in energy storage manufacturing.

The growth of the energy storage market is no longer linked to just a few states. The majority of U.S. states have energy storage projects in construction or already in operation. California leads the pack, but the momentum is also being carried forward by Texas, Colorado, Nevada and Arizona, all of which have multiple gigawatts' worth of front-of-the-meter storage installations under development, in addition to New York, New Jersey, Pennsylvania and Massachusetts. Battery storage has cemented its role as an essential technology for cost-effectively operating an efficient, modern electricity grid, regardless of the generation mix.

Despite leading the world in grid-scale energy storage deployment, the U.S. has lagged in the race to become a global leader in energy storage manufacturing. While U.S. national laboratories maintain world-class R&D capabilities, the cells that form the core of these batteries are nearly all imported from manufacturers in China, South Korea and Japan.

In some ways, it is a familiar story, similar to how the U.S. effectively ceded the job creation and economic benefits of solar manufacturing to the Asian countries that aggressively backed that

industry more than a decade ago. As battery storage becomes more essential to modern electricity systems at every scale, dependence on imported cells constitute a real risk to U.S. energy security.

This vulnerability was recognized **by the Department of Defense** in a 2018 report on the U.S. industrial base, which stated: "Most domestic lithium-ion cell packagers rely on foreign commercial lithium-ion cell suppliers from countries such as South Korea, China, and Taiwan. Cell availability for military battery packaging is a risk across the board for rechargeable batteries."

The lack of a domestic rechargeable battery cell supply chain is not a risk only for the military. The early months of the COVID-19 pandemic saw **disruptions to battery shipments** for private-sector storage developers, illustrating the potential impacts of future global instability.

Despite domestic battery cell manufacturing lagging to date, KORE Power's decision to build a \$750 million manufacturing plant in the U.S., combined with the U.S. government's significantly heightened focus on batteries and battery cells, suggests that falling behind on battery production is not inevitable.



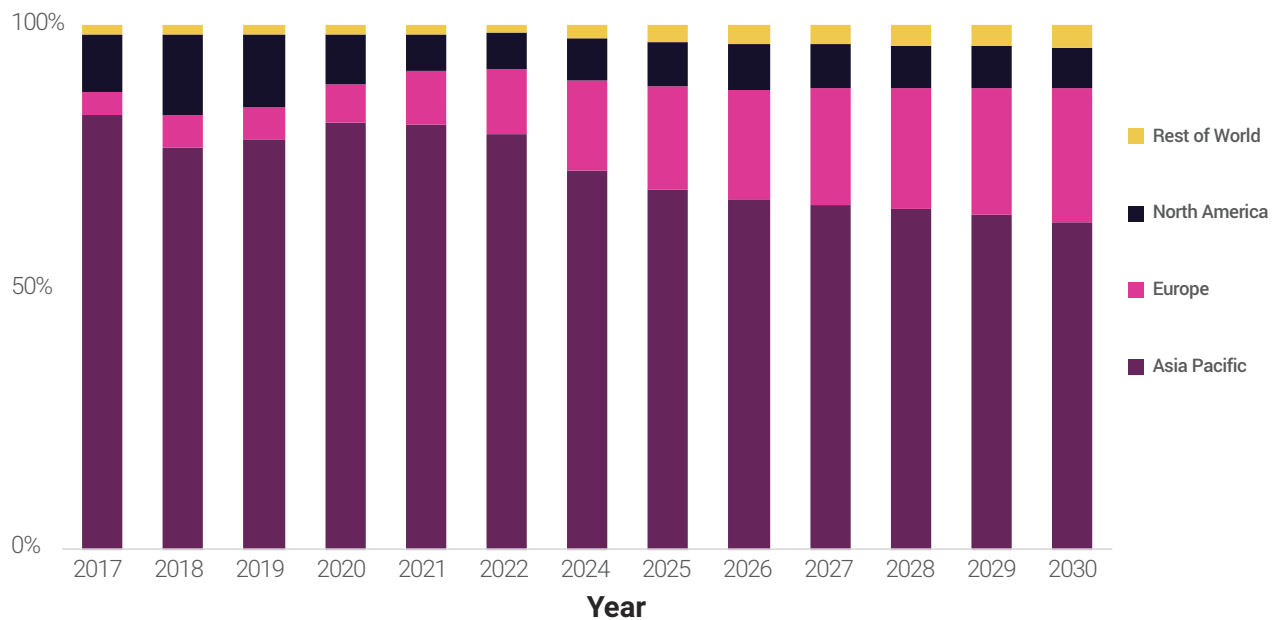
Why Build in the U.S.?

Given the historic lack of policy support for domestic battery manufacturing, KORE’s decision to build out its U.S. manufacturing capacity was purely economic and market based. For a start, advances in robotics and automation have eroded the labor-cost advantages long held by Asian countries, making high-tech manufacturing more competitive in the U.S. than in decades past.

The main driver, however, was geographic proximity to the booming U.S. front-of-the-meter storage market. Batteries are heavy, and transportation can make up a significant portion of final installation costs. Shipping batteries on trucks instead of via overseas cargo ships can save \$5,000 to \$6,000 per container while greatly reducing delivery times.

There are also potentially large markets governed by domestic manufacturing preferences and mandates. In an October 2019 **testimony to the U.S. House of Representatives**, Assistant Secretary of the Army Alex Beehler asserted that “the Army seeks to develop energy resilience projects with on-site energy generation, energy storage and energy controls to create ‘islandable’ capabilities to provide the energy necessary to sustain critical missions in the event of a major disruption in supply.” The Department of Defense and other agencies would prefer to purchase batteries from U.S.-based manufacturers – if they were available.

Cell manufacturing capacity share by region



Source: Wood Mackenzie Energy Storage Data Hub





75%

Percentage of value of “core parts” of passenger vehicles that must be made in North America to avoid tariffs.



There are other markets beyond grid-scale storage that make domestic manufacturing an attractive opportunity. Electric vehicles are also a huge potential market for U.S. battery manufacturers, thanks to requirements set forth in the U.S.-Mexico-Canada Agreement stating that 75 percent of the value of “core parts” of passenger vehicles – including lithium-ion batteries for EVs – must be produced in North America in order to avoid the imposition of tariffs.

Front-of-Meter Storage Boom Driving U.S. Investment

To capture this opportunity, Idaho-based KORE Power has announced that it will build a large-scale battery cell manufacturing facility in the U.S. The 1-million-square-foot manufacturing plant will have an annual production capacity of 12 gigawatt-hours and will be powered entirely by a 118-megawatt on-site solar co-generation plant. The facility will create up to 1,000 jobs during the construction phase, employ 3,000 permanent workers at full capacity when production begins in 2022, and will lead to an additional 12,000 to 15,000 indirect jobs in the local area and surrounding region. In contrast to cell manufacturing plants overseas built to serve the electric vehicle market, KORE’s initial focus will be on America’s fast-growing grid-scale storage market.

Its first product offering was engineered from cell to module to rack for a high degree of safety and charging performance geared toward 1,500-volt class installations. In addition to advanced lithium-ion cell chemistry, the modules and rack include multiple features designed for the front-of-meter market, ranging from ergonomic module handles to the battery management system.



Policy Opportunities for a Battery Manufacturing Stimulus

The energy storage paradigm has evolved in the U.S. The technology is now regarded as both a domestic economic opportunity and a national and energy security priority. Accordingly, lawmakers are looking for ways to support the industry. In proposed FY2021 legislation, the U.S. Senate Committee on Energy and Natural Resources, including Chair Lisa Murkowski (R-AK) and Ranking Member Joe Manchin (D-WV), have included measures to support the development of energy storage technologies. The U.S. House of Representatives has similarly seen bipartisan support, with Reps. Takano (D-CA) and McMorris-Rodgers (R-WA) teaming up on various FY2021 measures that have garnered support from both sides of the aisle.

Providing the impetus for U.S. battery companies to invest at home does not require creating new programs from scratch – or even, in some cases, authorizing new spending.

The Department of Energy's Loan Program Office already has \$17.7 billion in lending authority available for direct loans and loan guarantees through the Advanced Technology Vehicle Manufacturing loan program. However, this compelling and fully funded program has not issued a loan since 2011 as a result of lengthy application process and highly risk-averse assessment criteria, which has discouraged early-stage companies from seeking this support. Reducing red tape and costs for applicants could encourage a new generation of battery manufacturers to apply without endangering the overall financial performance of the government portfolio.

The Section 48C Advanced Manufacturing Tax Credit is another existing federal policy that could offer a path for encouraging domestic battery manufacturing investments. Originally passed as part of the American Recovery and Reinvestment

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Act of 2009, this policy provided a 30 percent tax credit for investments in manufacturing for a wide range of technologies, including batteries. However, the tax credit structure made it useful only for established companies with significant revenue, such as, for example, Tesla. Creating a carveout that would make these credits refundable for pre-revenue battery companies could boost support for innovative new entrants.

Efforts are also underway to include funding for battery manufacturing in the annual spending bills. **The FY2021 Energy and Water Appropriation** passed by the House includes \$770.5 million in grants for manufacturing of advanced batteries and components, as well as \$500 million for energy storage demonstration projects. If the bill is passed, this level of funding would be the largest government investment in the industry's development since the \$2 billion advanced battery manufacturing grant program in the American Recovery and Reinvestment Act of 2009.



Making the U.S. a Global Energy Storage Leader

The economic impacts of the COVID-19 pandemic have intensified the importance of support for job-creating domestic industries. As KORE Power saw during its site selection process, state and local governments are eager to attract these investments. Along with thousands of new manufacturing jobs in a fast-growing industry that is here to stay for the long term, the growth of a domestic battery supply chain could also provide impetus for new investments in mining, particularly in light of America's rich mineral resources including lithium, graphite, manganese, cobalt and others that the government defines as critical minerals.

Additionally, energy security remains a paramount concern to the U.S. government and military, as highlighted by the recent executive order by President Trump seeking to protect U.S. bulk power systems.

Other factors also impact energy security. The ongoing COVID-19 pandemic brought about major disruptions in overseas supply chains, highlighting U.S. reliance on foreign imports. Finally, with the electric grid growing in sophistication and increasing automation, cyber-attacks on core systems have become an ever-growing threat, further underscoring the need for improved domestic production of electric and battery storage systems. From households and

utilities concerned about grid outages, to military leadership concerned about mission-critical facilities, battery storage is now recognized as an essential component of micro and macro electric grids as well as a national security necessity to protect the increasingly interlinked national electrical grid and its associated subsystems.

Between the size of the U.S. market, its skilled manufacturing workforce and the unsurpassed R&D resources of its national labs and tech companies, the U.S. has all the ingredients necessary to support a thriving battery industry on par with those of China, Japan or South Korea – with the one significant exception of policy support. If U.S. policymakers want to build a more prosperous and energy-secure future, it is imperative to understand that U.S. manufacturers are competing against government-funded foreign companies that currently dominate the market. In order to compete on this scale, it is up to the U.S. government to match the commitments to this industry that have been made throughout the rest of the world and ensure that U.S. dominance in research and development in energy storage does not simply lead to foreign dominance in its manufacturing.

For more information on **KORE Power**, [click here](#).



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