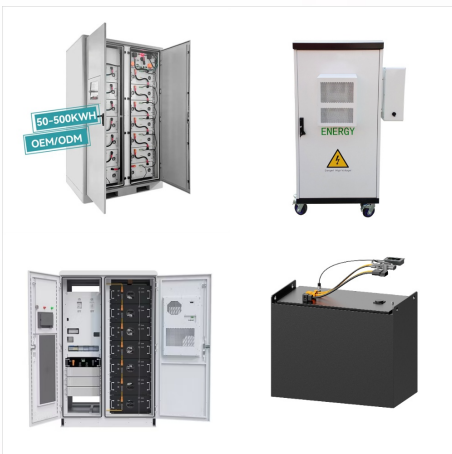




Batteries have considerable potential for application to grid-level energy storage systems because of their rapid response, modularization, and flexible installation. Among several battery technologies, lithium-ion batteries (LIBs) exhibit high energy efficiency, long cycle life, and relatively high energy density.



Lithium-ion batteries dominate both EV and storage applications, and chemistries can be adapted to mineral availability and price, demonstrated by the market share for lithium iron phosphate (LFP) batteries rising to 40% of EV sales and 80% of new battery storage in 2023.



This document outlines a U.S. national blueprint for lithium-based batteries, developed by FCAB to guide federal investments in the domestic lithium-battery manufacturing value chain that will decarbonize the transportation sector and bring clean-energy manufacturing jobs to America.

LITHIUM ION BATTERY FOR RENEWABLE ENERGY STORAGE



Not only are lithium-ion batteries widely used for consumer electronics and electric vehicles, but they also account for over 80% of the more than 190 gigawatt-hours (GWh) of battery energy storage deployed globally through 2023. However, energy storage for a 100% renewable grid brings in many new challenges that cannot be met by existing

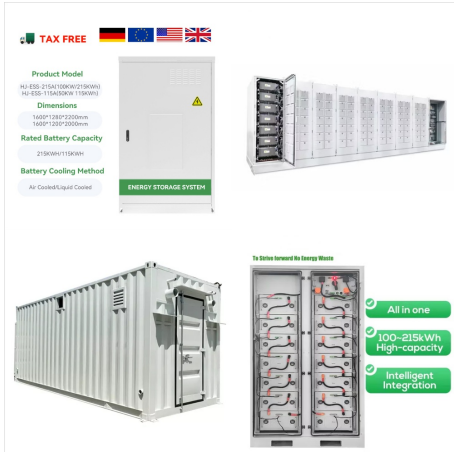


Lithium-ion battery costs for stationary applications could fall to below USD 200 per kilowatt-hour by 2030 for installed systems. Battery storage in stationary applications looks set to grow from only 2 gigawatts (GW) worldwide in 2017 to around 175 GW, rivalling pumped-hydro storage, projected to reach 235 GW in 2030.

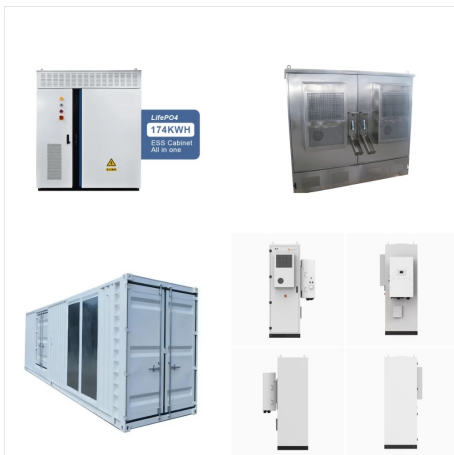


There is strong and growing interest in deploying energy storage with greater than 4 hours of capacity, which has been identified as potentially playing an important role in helping integrate larger amounts of renewable energy and achieving heavily decarbonized grids. Analysis in the

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Cost and Performance Assessment provided installed costs for six energy storage technologies: lithium-ion (Li-ion) batteries, lead-acid batteries, vanadium redox flow batteries, pumped storage hydro, compressed-air energy storage, and hydrogen energy storage.



The potential of lithium ion (Li-ion) batteries to be the major energy storage in off-grid renewable energy is presented. Longer lifespan than other technologies along with higher energy and power densities are the most favorable attributes of Li-ion batteries.



In addition to replacing lead-acid batteries, lithium-ion BESS products can also be used to reduce reliance on less environmentally friendly diesel generators and can be integrated with renewable sources such as rooftop solar.