

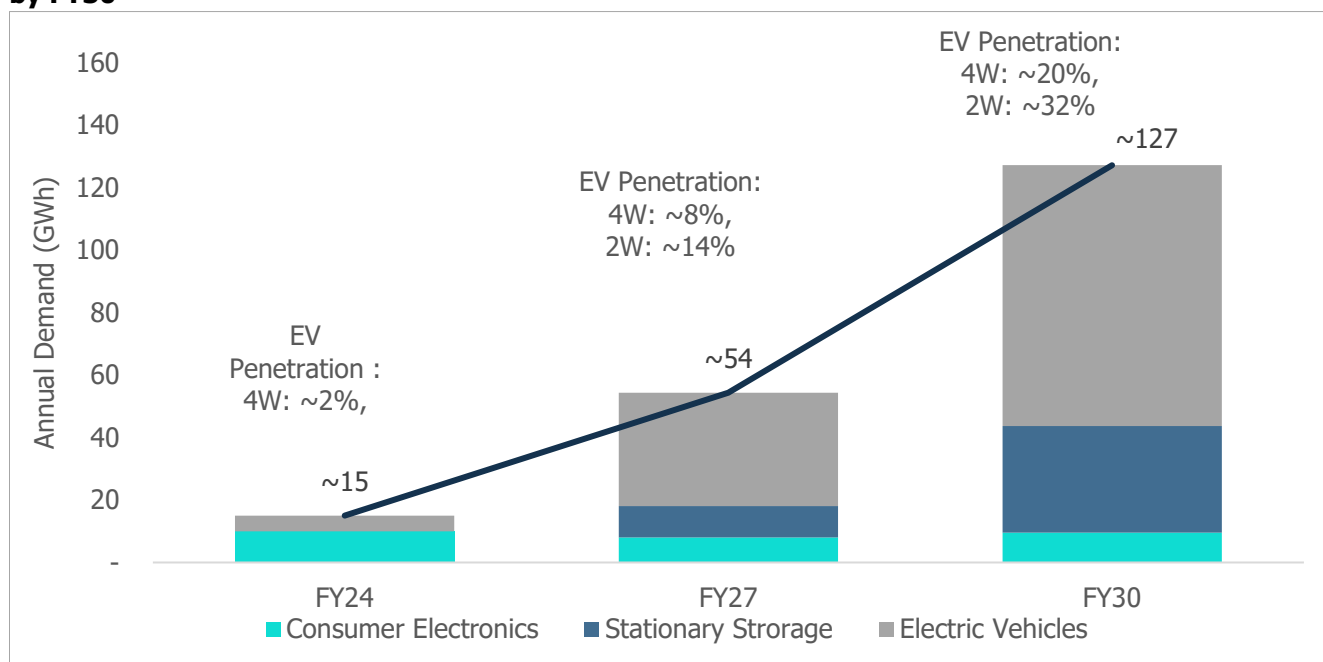
Lithium-ion Battery Storage: India's import dependency to decline to ~20% by FY27

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Synopsis

- India has set an ambitious target to meet 50% of its primary energy requirement from renewable energy by 2030. To achieve this, India needs significant penetration of Electric Vehicles (EVs) as well as grid level-energy storage capacity.
- This envisaged transition would significantly increase India's need for advanced chemistry batteries, particularly lithium-ion (Li-ion) batteries, due to the limitations of traditional batteries like lead-acid and nickel-metal hydride batteries. Li-ion battery chemistry offers better specific energy, power density, charging rate, and cycle life compared to traditional battery chemistries, making them suitable for new-age applications like EVs and grid energy storage.
- In FY24, India had a demand for ~15 GWh of Li-ion battery storage largely from EVs and consumer electronics. This demand is expected to reach ~54 GWh by FY27 and ~127 GWh by FY30.
- Earlier, the high cost of Li-ion batteries was a major hindrance for their large-scale adoption. However, the cost has significantly declined from 780 USD/kWh in CY13 to 139 USD/kWh in CY23, on the back of technological advancement and economies of scale, making Li-ion batteries the most dominant battery technology today.
- Currently, India imports almost its entire requirement of Li-ion batteries. However, CareEdge Ratings expects India's import dependency to decline to ~20% by FY27, despite significant growth in demand due to large-scale integrated capacities being built for Li-ion battery storage.

Annual demand for Lithium-ion battery storage expected to reach ~54 GWh by FY27 and ~127 GWh by FY30

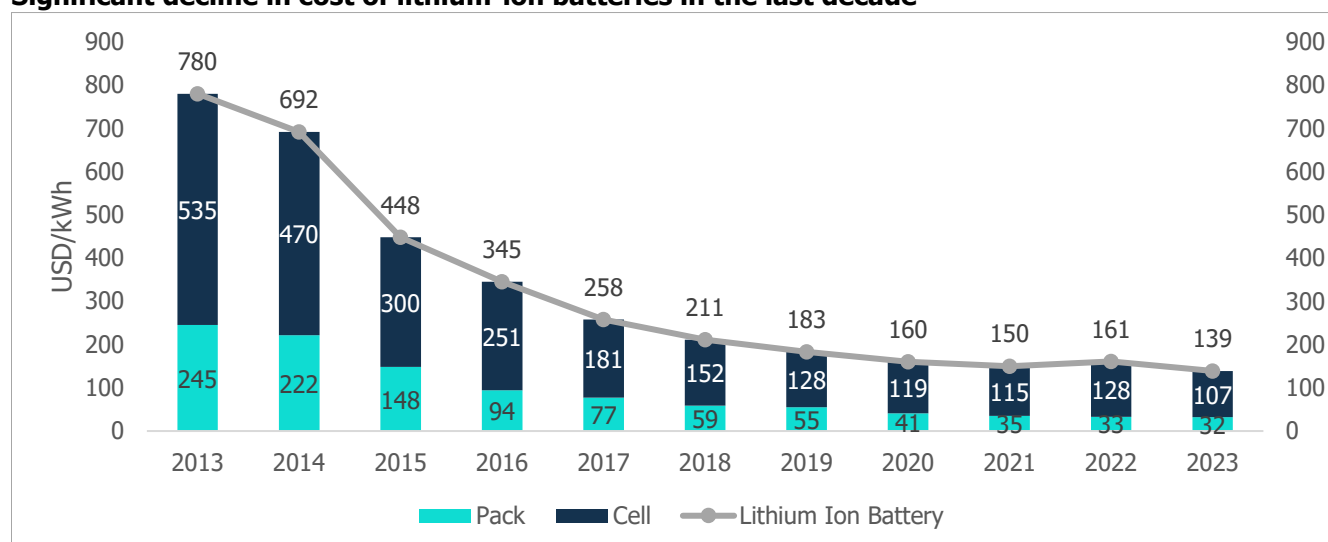


Currently, domestic lithium-ion battery storage demand of ~15 GWh is being almost entirely met through imports of lithium-ion cells/batteries. CareEdge Ratings expects Li-ion battery demand to grow exponentially to ~54 GWh by FY27 and later to ~127 GWh by FY30. The substantial growth in demand is primarily driven by expected increase in EV penetration and decarbonisation of electricity grids, supported by ambitious government targets and policies/incentives from both central as well as state governments.

The GoI has taken initiatives on several demand-side measures, such as Faster Adoption and Manufacturing of Electric Vehicles (FAME) scheme, Viability Gap Funding (VGF) scheme for Battery Energy Storage System (BESS), helping to bring down cost of EV and BESS, thereby stimulating demand.

The GoI has set the target of achieving 30% EV penetration by 2030 (as a % of annual sales). However, CareEdge Ratings has considered a 20% EV penetration by FY30, considering the slower-than-anticipated EV adoption in 4-wheeler segment, amidst consumer preference for hybrid 4W vehicles and the slow progress in EV charging infrastructure. In case of BESS, CareEdge Ratings expects cumulative grid level energy storage capacity to reach around 100 GWh by FY30.

Significant decline in cost of lithium-ion batteries in the last decade



Source: Bloomberg NEF battery price survey 2023; Volume weighted average price trend of lithium-ion batteries across applications

Cost of lithium-ion batteries has declined over the decade ended CY23 on the back of technology advancement along-with greater economies of scale which has supported its faster adoption by its end-use sectors resulting in significant growth in its demand.

Giga-scale integrated capacities to come onstream leading to decline in India's import dependency

Government policies and incentives are expected to support build-up of giga-scale lithium-ion battery capacities, aided by Advanced Chemistry Cell (ACC) Production Linked Incentive (PLI) scheme, along with various state government incentives such as capital subsidies, electricity tax and stamp duty exemptions and interest subvention. The GoI has already allocated 40 GWh of integrated battery capacities under the PLI scheme, with the remaining 10 GWh expected to be awarded shortly. Additionally, existing conventional battery manufacturers and few other companies in India are expected to set up battery capacities outside of the PLI scheme. A large portion of these

capacities is expected to come onstream gradually by FY27. CareEdge Ratings expects India's import dependency to decline to ~20% by FY27, thanks to these capacity additions.

CareEdge Ratings' View

"The demand for lithium-ion battery storage in India is expected to grow significantly driven predominantly by migration towards EVs and renewable energy storage requirements. Consequently, India's dependence on imports is expected to decline sharply to ~20% by FY27 from near-full dependence presently, due to giga-size integrated battery capacities coming onstream in India. Hitherto, there was slow progress on domestic capacity additions for manufacturing lithium-ion batteries due to continuously declining costs driven by evolving technology. However, domestic capacity for Li-ion battery manufacturing is now expected to pick up on the back of an understanding that the lithium-ion technology has now fairly matured. Also, Li-ion chemistries rely heavily on scarce minerals such as lithium, cobalt, nickel etc., wherein India has limited natural reserves. Therefore, domestic players need to secure long term supply sources from countries having sizable reserves along with focus on battery reuse and recycling, which shall provide environmental benefits and reduces price and supply risk associated with imports of these minerals. Furthermore, the relative cost-competitiveness of Indian manufacturers, in the context of capacity addition and pricing policy of large global integrated players especially Chinese manufacturers, will be a key factor to monitor" said Hardik Shah, Director at CareEdge Ratings.

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