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The price of lithium-ion battery packs has dropped 14% to a record low of $139/kWh, according to analysis by research provider BloombergNEF (BNEF). This was driven by raw material and component prices falling as production capacity increased across all parts of the battery value chain, while demand growth fell short of some industry expectations.

Battery storage costs have changed rapidly over the past decade. In 2016, the National Renewable Energy Laboratory (NREL) published a set of cost projections for utility-scale lithium-ion batteries (Cole et al. 2016). Those 2016 projections relied heavily on electric vehicle

This work incorporates base year battery costs and breakdowns from (Ramasamy et al., 2022), which works from a bottom-up cost model. The bottom-up battery energy storage systems (BESS) model accounts for major components, including the LIB pack, inverter, and the balance of system (BOS) needed for the installation.

Battery demand across electric vehicles and stationary energy storage is still seen to expand 53% year-on-year to 950 GWh in 2023, the research firm said. China had the lowest average battery pack prices, at USD 126 per kWh, while in the US and Europe they were 11% and 20% higher, respectively.

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To calculate this average price, BNEF conducted more than 300 surveys among buyers and sellers of lithium-ion batteries for electric passenger vehicles, commercial vehicles, buses, two- and three-wheeled vehicles, and energy storage applications.

Prices vary by sector: Chinese electric buses and commercial vehicles have the lowest prices at $100/kWh. The average price of packs for fully electric passenger cars was $128/kWh.

"However, the story behind this price decrease is somewhat different from previous years," the analysts said. While the main cause of falling battery prices has historically been technological innovation, this year the price drop is mainly attributed to reduced raw material costs.

Prices for key battery metals, especially lithium, have fallen sharply since January, due to significant growth in production capacity in all parts of the battery value chain, from raw materials and components to cells and

battery packs.

Although demand continued to increase year on year, the pace of growth in some electric vehicle markets slowed in the second half of the year, mainly due to increased financing costs and economic uncertainty. On the other hand, battery production in China alone exceeded global demand.

As for the future, BNEF"s energy storage team expects prices to closely follow the trajectory of raw material prices. "We project that pack costs will fall to $133/kWh next year in real terms in 2023,” said BNEF. “In the long term, if the learning pace of the previous year is maintained, battery prices will fall below $100 /kWh in 2027.”

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Web: https://hollanddutchtours.nl/contact-us/
Email: energystorage2000@gmail.com
WhatsApp: 8613816583346