Ev battery cost per kw

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Technology advances that have allowed electric vehicle battery makers to increase energy density, combined with a drop in green metal prices, will push battery prices lower than previously expected, according to Goldman Sachs Research.

Global average battery prices declined from $153 per kilowatt-hour (kWh) in 2022 to $149 in 2023, and they"re projected by Goldman Sachs Research to fall to $111 by the close of this year. Our researchers forecast that average battery prices could fall towards $80/kWh by 2026, amounting to a drop of almost 50% from 2023, a level at which battery electric vehicles would achieve ownership cost parity with gasoline-fueled cars in the US on an unsubsidized basis.

We spoke with Nikhil Bhandari, co-head of Goldman Sachs Research"s Asia-Pacific Natural Resources and Clean Energy Research, to better understand what"s driving the decline in battery prices and what it means for EV demand and adoption.

Why are EV battery prices coming down faster than expected?

There are two main drivers. One is technological innovation. We"re seeing multiple new battery products that have been launched that feature about 30% higher energy density and lower cost.

What"s enabling battery makers to increase energy density so dramatically?

The innovation is related to the structure of the batteries. The cells are getting bigger. You normally pack lots of cells into smaller modules, and then lots of modules into a big battery pack. Now they"re trying to eliminate modules and directly doing cell-to-pack. That helps you save a bit of space inside. So you"re cutting costs with more simplified structures and increasing the energy of the battery at the same time.

Both the leading battery types are lithium-based. One is based on nickel chemistry, which dominates nearly 60% of the market for different types of nickel batteries. And the other leading type - LFP (lithium ferrophosphate) - is iron-based. They"re capturing about 35-40% of the market. Then there is a very small share coming from another technology called sodium ion. It"s the only non-lithium battery, but a very small quantity of such batteries are being produced today, and it"s not scaled up yet.

Do you expect the leading battery types to stave off the competition?

In the future, we"ll be talking about solid state batteries, which could be a real game changer, because the

technology can increase your energy density more materially and is slightly safer because there is no flammable liquid electrolyte. We were assuming that newer batteries like solid state would capture about 5-10% of the market along with sodium ion batteries, but that hasn"t happened. Solid state was initially supposed to come out by now, and it"s been pushed out to the later part of this decade because of challenges in moving from lab scale to mass production.

In the meantime, the existing lithium-based chemistries are going to get stronger and stronger, and that"s going to make it difficult for solid state batteries to eventually replace the existing technology. We have actually raised our expectation for LFP batteries to increase their market share from 41% of the market to 45% in 2025, with advanced nickel batteries continuing to dominate the higher energy competition.

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