How much does ESS cost?

Regarding projected 2030 installed ESS costs, for 100 MW, 4 hour systems, LFP (\$291/kWh) and CAES (\$295/kWh) installed costs are nearly the same, whereas CAES is significantly lower at 10 hours due to low cavern cost. At durations greater than 10 hours, HESS installed cost is just below CAES for both 100 MW and 1,000 MW systems.

What is the price gap between ESS and batteries?

In March, the price disparity between ESS and batteries has continued to shrink. The average price of a 280Ah/0.5C storage battery hovered around 0.38 yuan/Wh in March 2024. According to our data, the average winning price for a 2-hour ESS is approximately 0.63 yuan/Wh, resulting in a price gap of around 0.25 yuan/Wh.

How much does a kilo kWh cost?

The average cost of \$6.9/kWhwas used as the single-point estimate, with low and high values of \$2.7/kWh and \$13.8/kWh, respectively.

Are ESS costs included in a cost estimate?

Some of the costs associated with these items may be partially included on the business process used in an ESS (e.g.,part of the cost of decommissioning may be embedded in a capital cost quoted by a developer),but the capability to estimate them separately is not available at this time.

What is the 2022 cost and performance assessment?

The 2022 Cost and Performance Assessment provides the levelized cost of storage(LCOS). The two metrics determine the average price that a unit of energy output would need to be sold at to cover all project costs inclusive of taxes, financing, operations and maintenance, and others.

What impact does EV pricing have on the ESS segment?

EVs represent around 80% of global lithium-ion battery demand, and the knock-onimpacts to the ESS segment in terms of raw material pricing are meaningful as DC container suppliers generally apply raw material index pricing to their proposals.



<image>

The ESS Price Forecasting Report provides an in-depth four-year forecast for LFP and NMC battery systems, shedding light on market dynamics, supply, and demand. With detailed "all-in" pricing breakdowns tailored for key markets like Western Europe and the U.S., the report offers invaluable insights for stakeholders.

The interactive figure below presents results on the total installed ESS cost ranges by technology, year, power capacity (MW), and duration (hr). Note that for gravitational and hydrogen systems, capital costs shown represent 2021 ???



5 ? Battery prices continue to tumble on the back of lower metal costs and increased scale, squeezing margins for manufacturers. Further price declines are expected over the next decade. On a regional basis, average battery pack prices were lowest in China, at \$94/kWh. Packs in the US and Europe were 31% and 48% higher, reflecting the relative





Price per kwh of the Energy Warehouse at present is around \$475 per kwh. This is taken from the latest earning call: Each unit costs \$190,000 and each unit is rated for 400 kwh of storage. ESS is targeting an end game of \$20 per kwh apparently.



As a start, CEA has found that pricing for an ESS direct current (DC) container ??? comprised of lithium iron phosphate (LFP) cells, 20ft, ~3.7MWh capacity, delivered with duties paid to the US from China ??? fell from peaks of ???



4 ? From ESS News. Battery prices saw their biggest annual drop since 2017, with lithium-ion battery pack prices down by 20% from 2023 to a record low of \$115/kWh, according to analysis by BloombergNEF (BNEF). 2024 LA ???





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4 ? From ESS News. Battery prices saw their biggest annual drop since 2017, with lithium-ion battery pack prices down by 20% from 2023 to a record low of \$115/kWh, according to analysis by BloombergNEF (BNEF). 2024 LA-based startup DartSolar said its electric vehicle roof rack attachment adds 10 to 20 miles of additional range per day.



5 ? Battery prices continue to tumble on the back of lower metal costs and increased scale, squeezing margins for manufacturers. Further price declines are expected over the next decade. On a regional basis, average battery pack ???





As of the end of March, the average low price for 280 Ah energy-storage cells dropped by 8.3% to RMB 0.36/Wh. By 2030, the average LCOS of li-ion BESS will reach below RMB 0.2/kWh, close to or even lower than that of hydro pump, becoming the cheapest energy storage technology.



In addition to ESS installed costs, a levelized cost of storage (LCOS) value for each technology is also provided to better compare the complete cost of each ESS over its project life, inclusive of any major overhauls and replacements required to maintain operation. The LCOS measures the price that a unit of



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INTEGRATED DESIGN

The interactive figure below presents results on the total installed ESS cost ranges by technology, year, power capacity (MW), and duration (hr). Note that for gravitational and hydrogen systems, capital costs shown represent 2021 estimates since these technologies were not updated as part of the 2024 effort.





By 2025, the cost of ESS iron-based batteries is projected to drop to as low as \$200 per kWh or less, according to industry insights. This reduction in cost is driven by the affordable price of iron electrolytes and innovations in battery design that enhance performance while lowering manufacturing expenses.