

Battery price forecast 2024: How EV demand in China affects battery costs for US stationary storage projects

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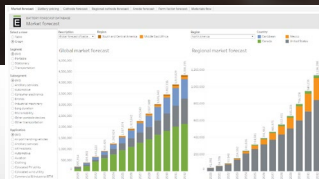
E Source Battery Next

A powerful forecasting and analytics service that will help you understand the evolving energy storage landscape



BATTERY COST MODEL

Improve your understanding of current battery costs, determine pricing sensitivity to key materials inputs such as lithium, and create your own battery price forecasts for the coming decade.



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Receive our forecasts of:

- Battery pricing
- Battery technology adoption
- Battery demand
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ESS ECONOMIC MODELS

Access our technoeconomic energy storage system (ESS) models, including:

- Levelized cost of storage (LCOS) model
- Behind-the-meter battery ROI calculator
- ESS project cost model

Q1 2023 battery forecast update

By Ben Campbell
July 13, 2023

Key Takeaways

- E Source expects global battery consumption will rise to 528 gigawatt-hours (GWh) in 2023—a 44% increase over 2022.
- Between 2023 and 2032, the world will add about 1 terawatt-hour (TWh) of demand every three

QUARTERLY REPORTS

Learn what's happening across the battery value chain and how it will impact the battery technologies and battery prices available to you.



Ask E Source

Got a question? Our experts can help—we'll do small custom research projects to get you answers related to any of the subject areas your company subscribes to.

[Ask a research question](#)

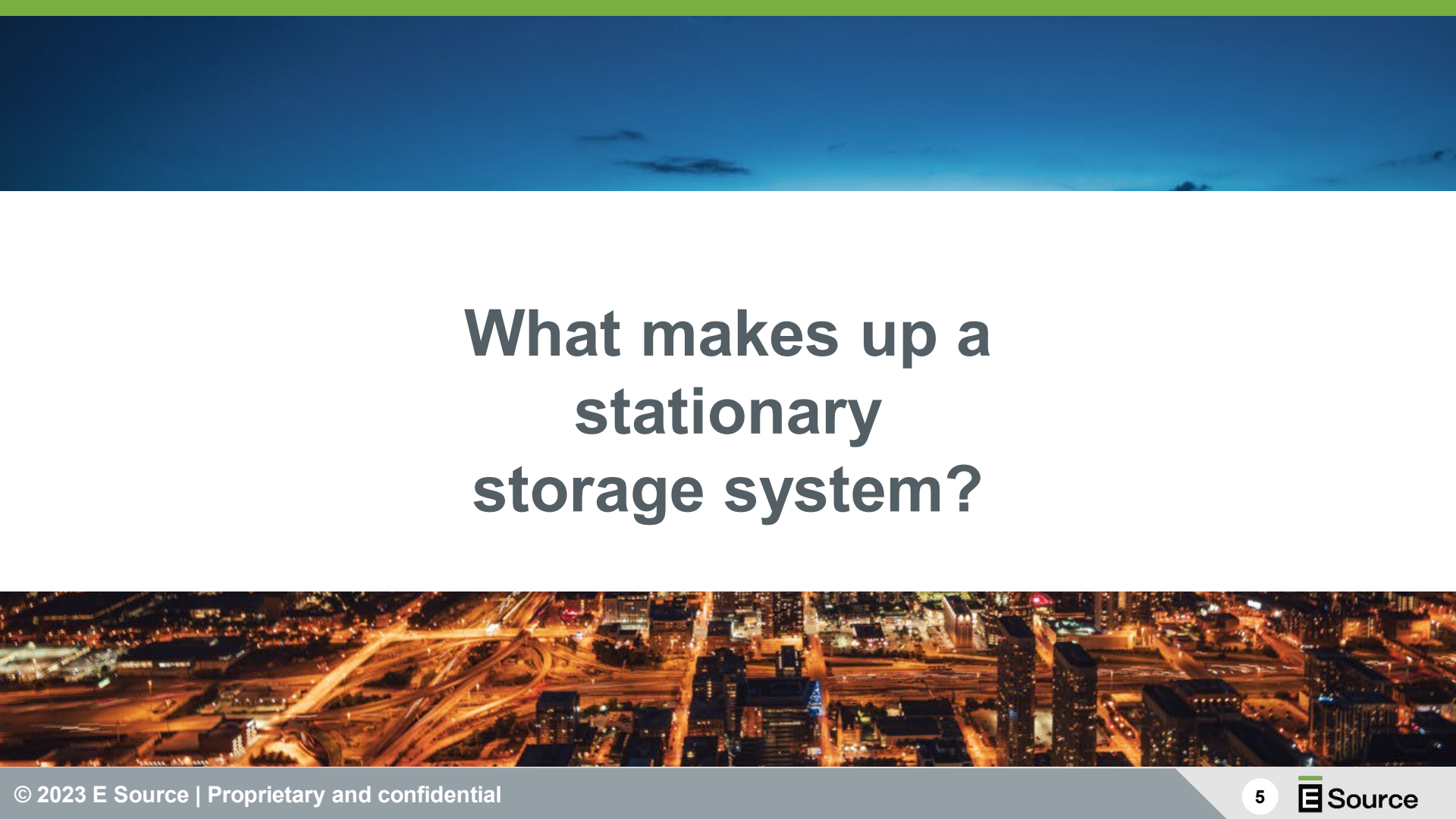
RESEARCH AND ADVISORY SUPPORT

Leverage E Source's battery industry experts by asking questions through the Ask E Source program and scheduling calls with our analysts to help answer your battery-related questions.

Agenda

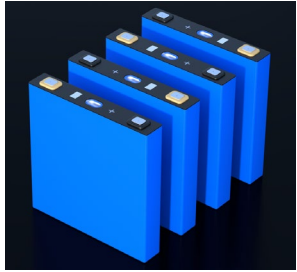
- What makes up a stationary storage system?
- How have battery supply and demand evolved?
- What's been happening with key material pricing?
- How does this impact our forecasts?



A nighttime cityscape with illuminated buildings and a complex highway interchange, serving as the background for the slide.

What makes up a stationary storage system?

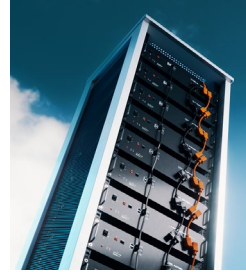
ESS components



Battery cells



Modules



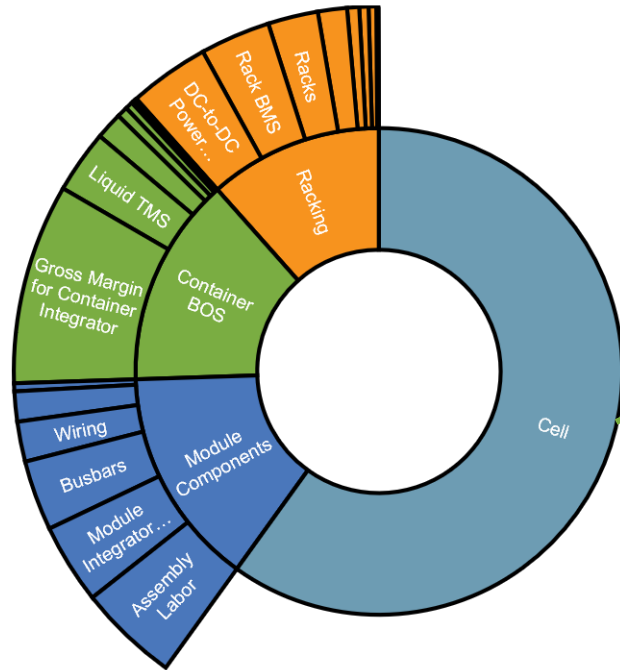
Racks



Container

Typically, over 60% of system costs have been attributed to cells, with 10% to 15% more value added at each downstream step of the system integration process.

DC container cost breakdown

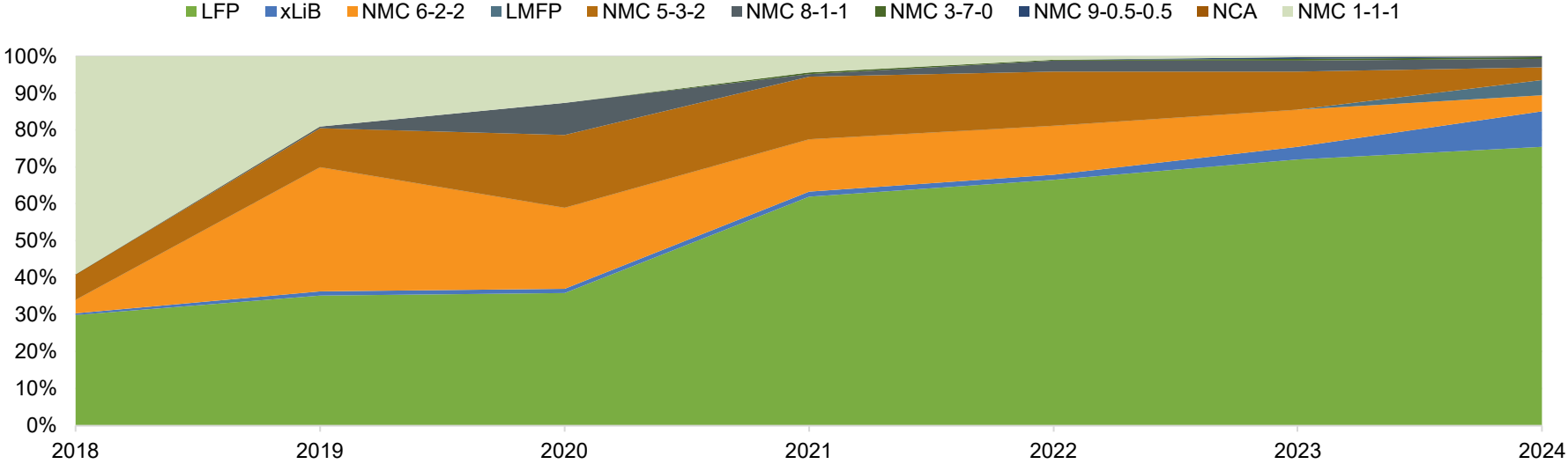


Cells typically accounted for 60% of the cost of a battery container in 2023

© E Source. **Note:** Global average for 4 megawatt-hour/1 megawatt systems.

What materials are used for stationary storage?

Global ESS cathode market share



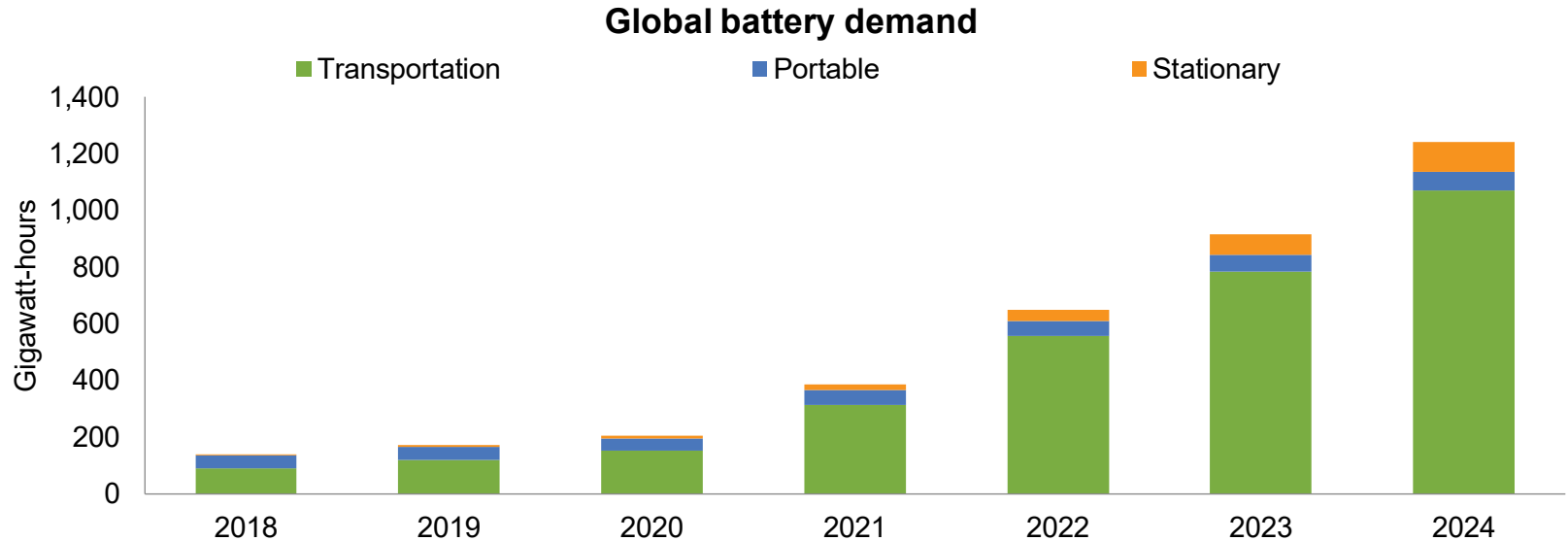
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LFP has become the dominant chemistry for ESS applications.

A nighttime aerial view of a city with illuminated buildings and a complex highway interchange. The top of the image is a dark blue gradient.

How have battery supply and demand evolved?

Battery demand is taking off



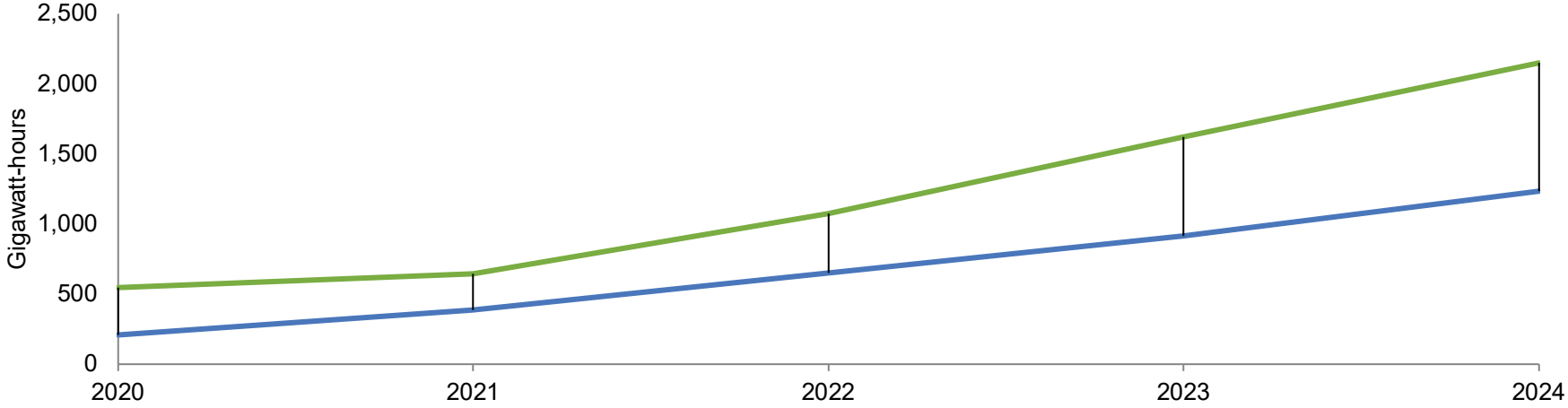
© E Source (Battery Forecast Database)

**Global battery demand has grown 5x in the last 5 years.
EVs are the main application driving demand.**

The supply chain is trying to match demand

Global battery demand versus manufacturing capacity

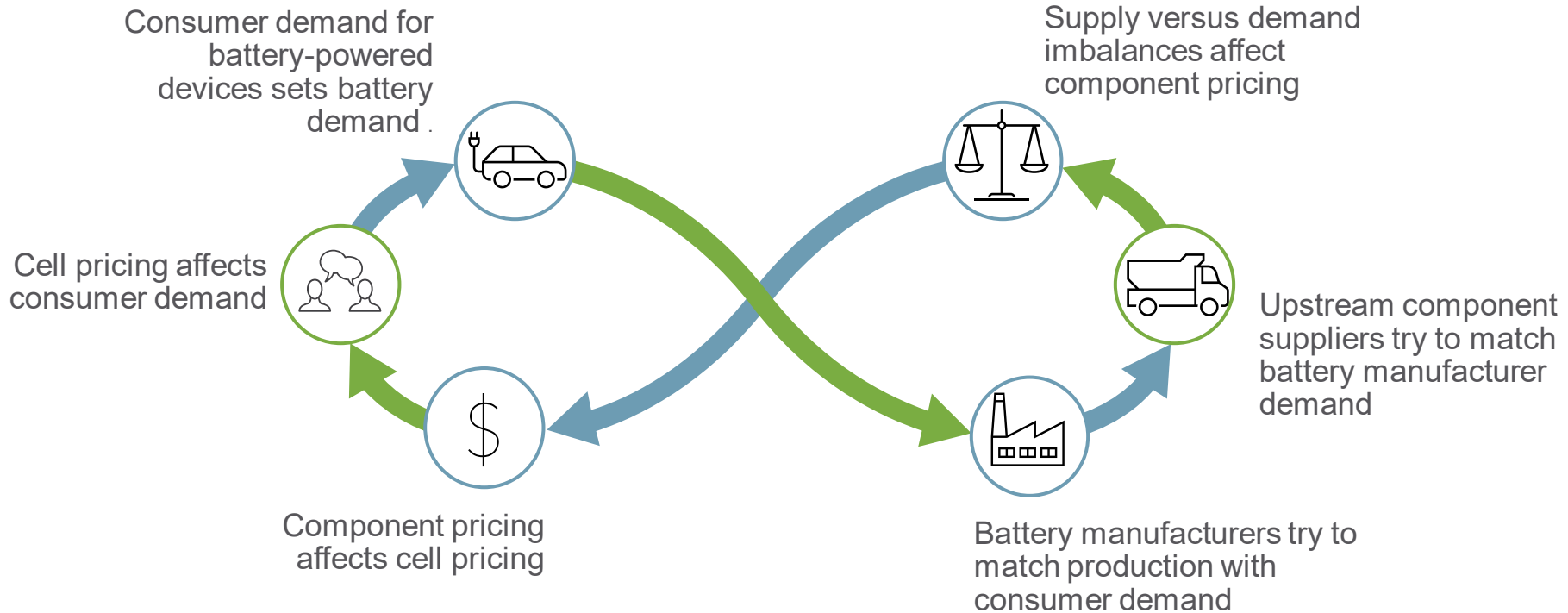
— Manufacturing capacity — Battery demand



© E Source (Battery Factory Database)

Global battery manufacturing capacity has grown 3x in the last 5 years.

Battery supply chain development cycle



Scaling each part of the supply chain at the same pace is nearly impossible.

But the battery supply chain is experiencing growing pains

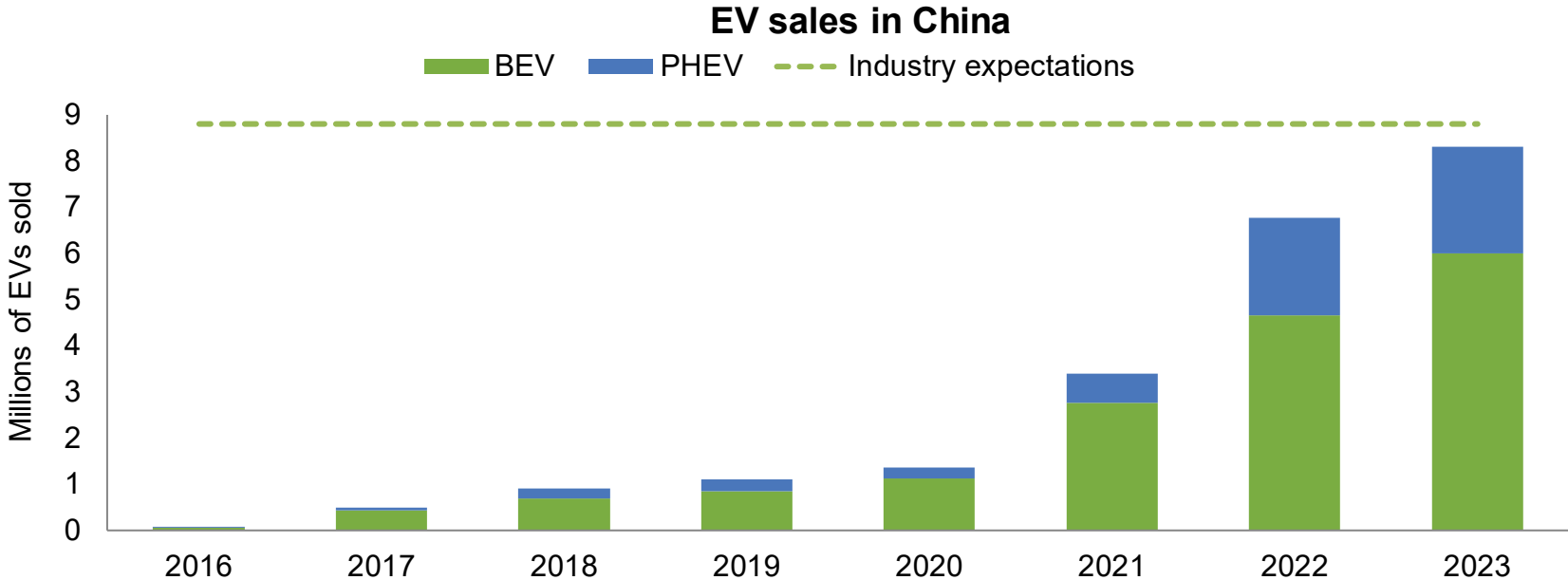


Source: Sydney Bailey



Some limbs grow faster than others, and we won't have a well-balanced supply chain anytime soon

What's happening in China? Does it matter?



© E Source (EV Forecast Database). **Note:** BEV = battery electric vehicle; PHEV = plug-in hybrid electric vehicle.

Chinese EV demand grew in 2023 but fell short of expectations held going into the year.



45% of all batteries produced in 2023
were installed in EVs in China

What's been driving down the price of lithium?



New mining and processing capacity are creating a surplus of lithium stock.



Demand for lithium fell short of expectations due to sluggish EV demand.

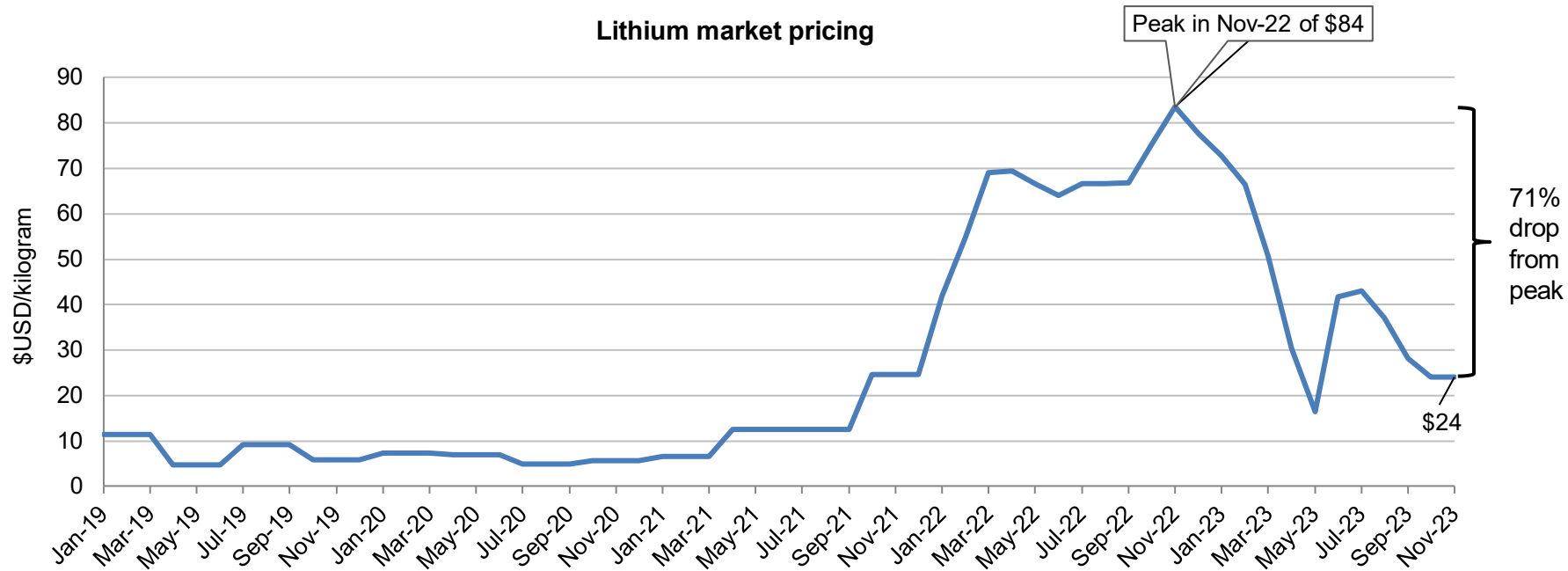


Supply will continue to outpace demand over the next year, keeping prices low.




Investors are betting against lithium in the short term, accelerating the drop in prices due to lower-than-expected demand in 2023.

How have lithium prices changed?



© E Source; data from Trading Economics. **Note:** Spot prices for lithium carbonate, 99.5% Li₂CO₃ min.

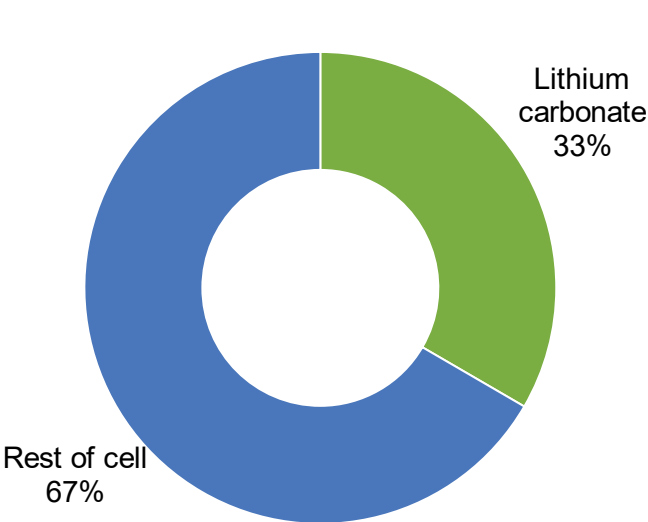
Reduced demand for lithium material brought the world out of the two-year price squeeze.

A nighttime aerial view of a city with illuminated buildings and a complex highway interchange. The sky is dark blue with some light clouds.

How does this impact our forecasts?

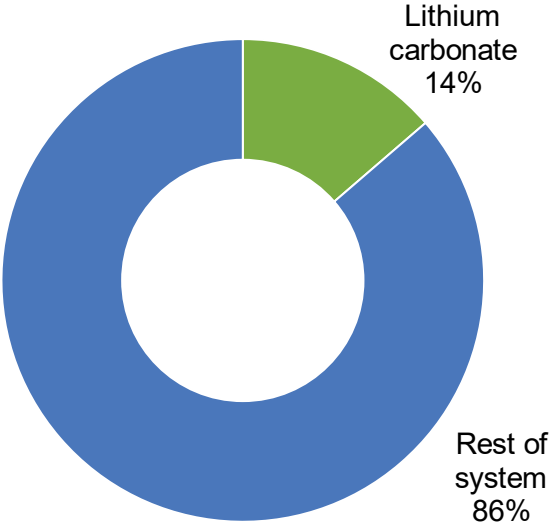
Isolating lithium costs during the squeeze

Lithium accounted for 33% of cell costs



© E Source. **Note:** Cost/kilowatt-hour of US LFP cell.

... and 14% of system costs

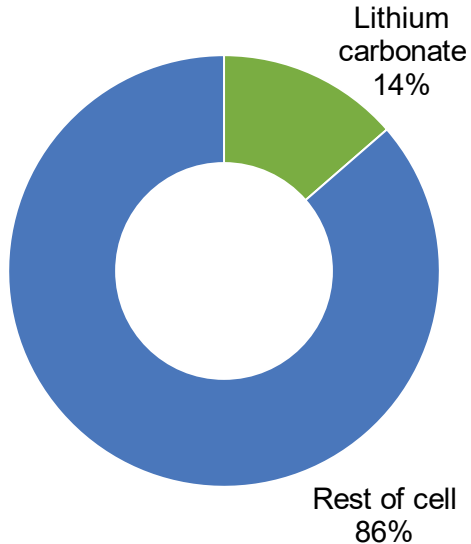


© E Source. **Note:** Cost/kilowatt-hour of US LFP cell price and US container price.

Minor changes in lithium pricing used to have a significant impact on cell and system costs.

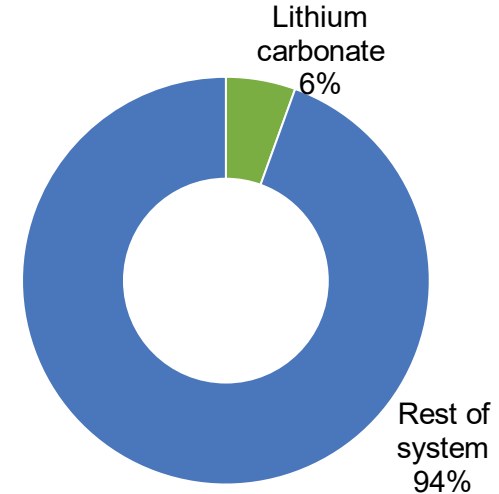
Isolating lithium costs today

Lithium accounts for 14% of cell costs...



© E Source. **Note:** Cost/kilowatt-hour of US LFP cell.

... but only 6% of system costs

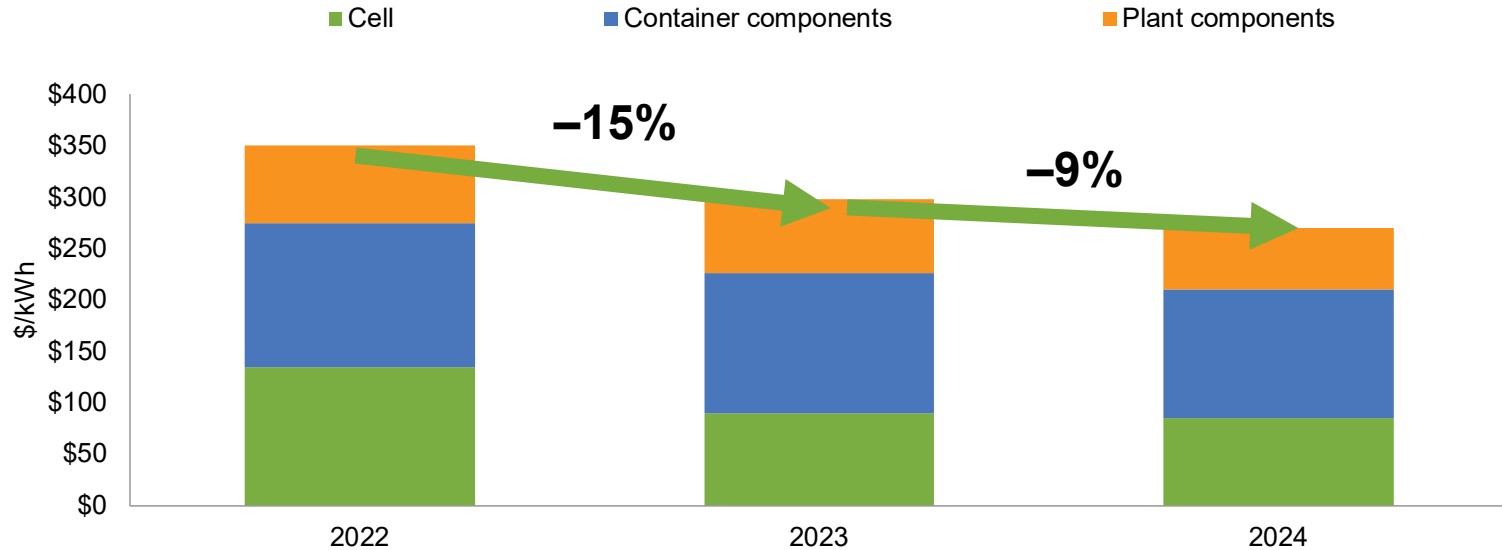


© E Source. **Note:** Cost/kilowatt-hour of US LFP cell price and US container price.

Major changes in lithium pricing are driving major changes in stationary storage costs.

ESS prices are coming down

Global average ESS price forecast

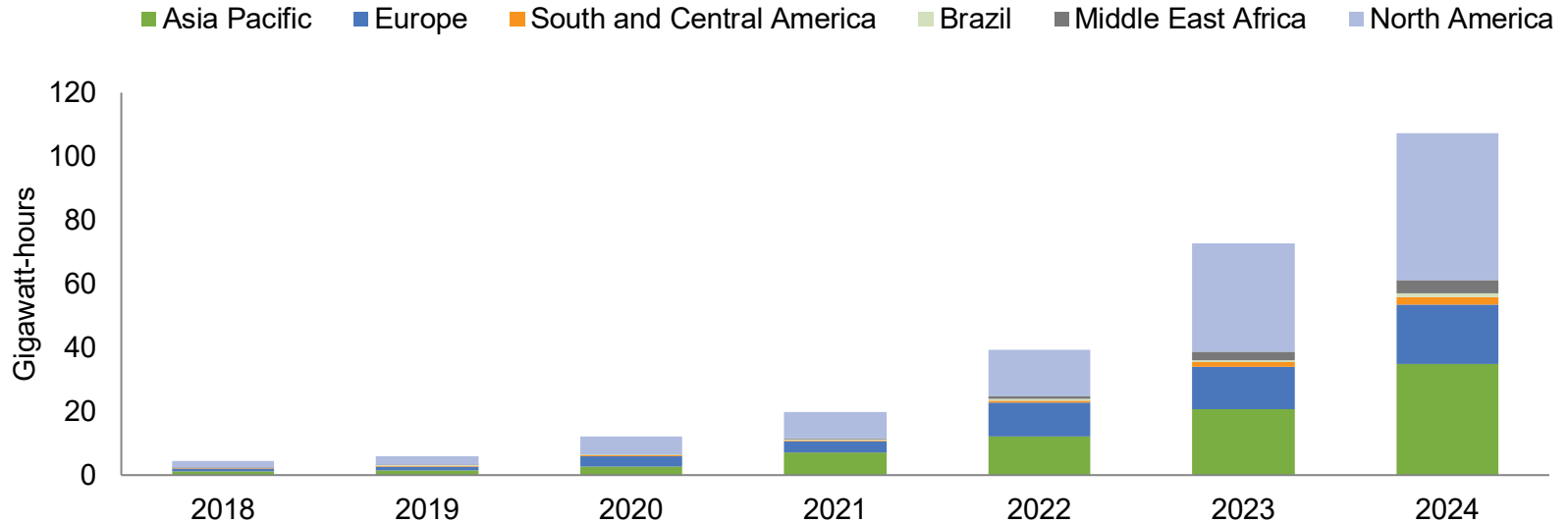


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Global average ESS pricing will be 23% lower in 2024 than in 2022.

Market response

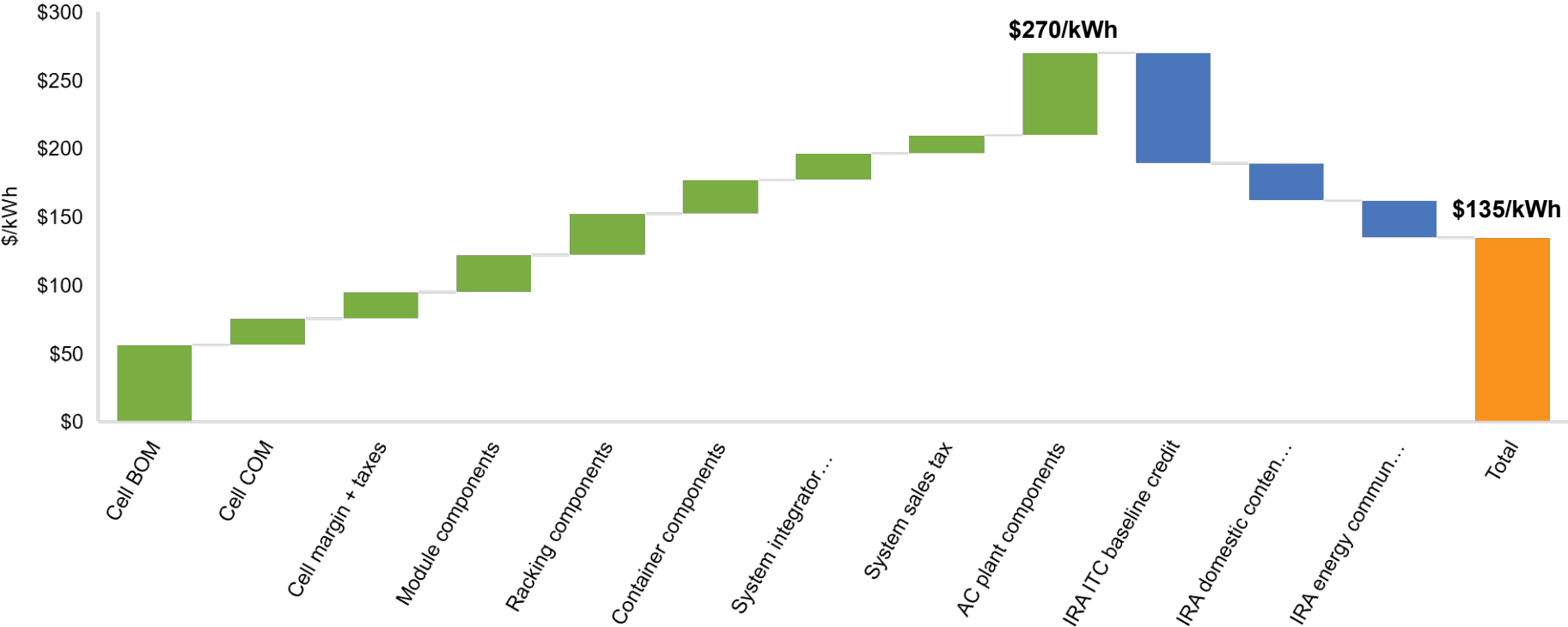
Global energy storage system installations



© E Source (Battery Forecast Database). **Note:** Annual installations

Global ESS battery demand will increase by 35% in 2024.

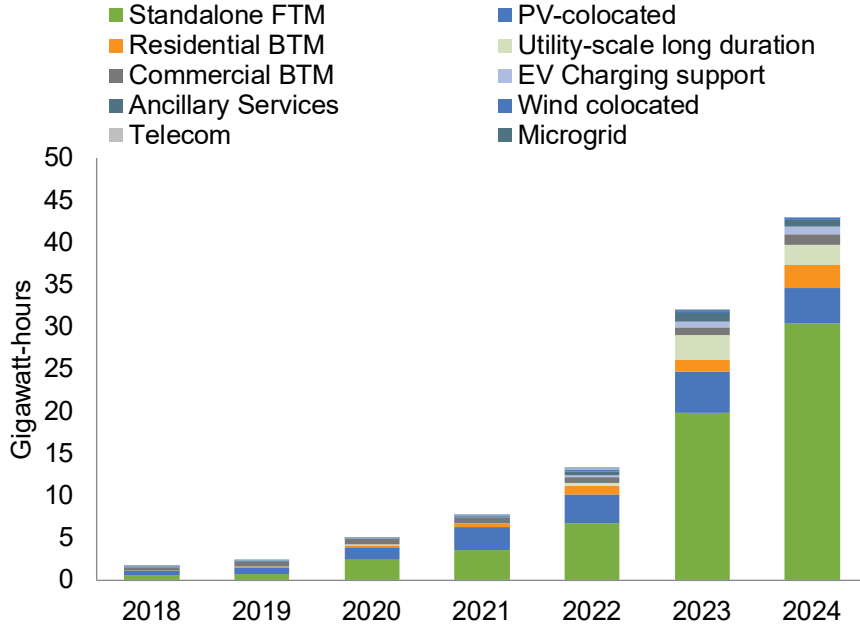
The effects of the Inflation Reduction Act (IRA) on energy storage



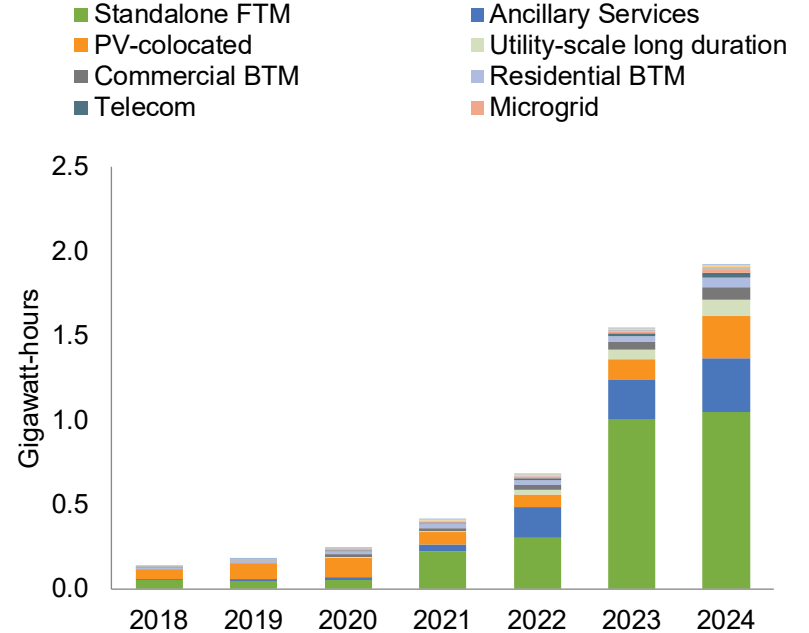
© E Source. **Note:** BOM = bill of materials; COM = cost of manufacturing; IRA = Inflation Reduction Act; ITC = Investment Tax Credit; kWh = kilowatt-hour.

ESS outlook for North America

US ESS annual installation forecast



Canada ESS annual installation forecast



© E Source (Battery Forecast Database). **Note:** BTM = behind the meter; FTM = front of meter; PV = photovoltaic.

ESS battery demand in North America will increase by 34% in 2024.

Interested in learning more?

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- [Battery Forecast Database](#)
- [EV Forecast Database](#)
- [Battery Cost Model H2 2023](#)
- [Winter 2023 tech roundup](#)
- [\\$250 per kWh: The battery price that will herald the terawatt-hour age](#)



Questions? Contact us



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