

Securing US electric vehicle battery supply requires domestic action and international sourcing

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Expanding domestic production and implementing demand-side strategies can substantially narrow material shortages for US electric vehicle batteries, but these efforts still fall short of meeting projected 2035 demand. To assure US battery supplies, the USA must support investments across all domestic supply chain stages, reduce and shift battery material demand, and continue to secure international supplies.

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The policy problem

US policy has emphasized expanding domestic production of electric vehicle (EV) batteries and associated materials, using policy tools such as tax credits and sourcing requirements to reduce import dependence and exposure to supply disruptions. However, it is unclear whether domestic expansion alone can supply sufficient materials across the supply chain. This is especially the case following the One Big Beautiful Bill Act of 2025, which repeals federal incentives for EV adoption and modifies support for battery supply chain investment. This research addresses whether domestic production, combined with demand-side strategies including improved vehicle efficiency and battery energy density, enhanced recycling, and battery chemistry shifts, can meet projected US EV battery material demand. This question is important because persistent material shortfalls can constrain EV deployment and leave the USA vulnerable to supply shocks.

The findings

We find that expanding US domestic production can meet projected 2035 demand for several key materials used in major EV batteries, including upstream lithium, midstream lithium carbonate and lithium hydroxide, and downstream components such as electrolytes and separators. However, even with strategies that reduce and shift battery material demand, shortfalls remain: -30–70% for upstream cobalt, nickel, graphite, and their midstream refined materials, and -15–75% for downstream cathode and anode active materials. Moreover,

for some upstream and midstream materials, such as cobalt sulfate and nickel sulfate, -30–100% of their projected domestic supplies rely on early-stage projects, adding uncertainty about future supply as these projects may not advance. Shortfalls intensify under higher EV adoption and larger vehicle sizes, exacerbating supply risks. Our findings show that meeting future US battery material demand will also require continued international sourcing alongside domestic expansion and demand-side strategies. This analysis uses announced project timelines and assumptions about battery technology development, and results should be reassessed as market and technological conditions evolve.

The study

We develop a modelling framework to estimate future material demand and supply across the US EV battery supply chain. On the demand side, we trace material needs from projected EV sales through downstream, midstream, and upstream stages. On the supply side, we account for existing production capacity, planned capacity by development stage, historical imports, and materials recovered from end-of-life battery recycling. We use the modelling framework

Messages for policy


- Expand domestic production capacity, implement demand-side strategies, and increase international sourcing to meet future US electric vehicle (EV) battery material demand.
- Complement US production capacity expansion with demand-side strategies, including vehicle efficiency and battery energy density improvements, recycling, and battery chemistry shifts, to reduce material supply pressure.
- Ensure timely delivery of planned mining and processing projects through policies such as streamlining permitting and providing financial support, as future domestic supply relies heavily on projects currently in the early stages of development.
- Provide policy certainty to support investment in midstream processing and downstream manufacturing alongside upstream mineral extraction, as material supply gaps persist across the supply chain stages.
- Align trade and industrial policies to maintain access to international supplies while scaling up the domestic EV battery supply chain.

to evaluate the effects of demand-side strategies, including improved vehicle efficiency and battery energy density, enhanced recycling, and battery chemistry shifts. We also develop an optimization model to estimate the maximum EV battery production achievable under US sourcing constraints and the resulting battery chemistry shares. Together, our approach identifies material shortages across the supply chain and captures how multiple materials must be simultaneously supplied for battery production.

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Further reading

1. Ku, A. Y. et al. Grand challenges in anticipating and responding to critical materials supply risks. *Joule* **8**, 1208–1223 (2024).
This perspective outlines key challenges in addressing critical material supply risks.

2. Link, S., Schneider, L., Stephan, A., Weymann, L. & Plötz, P. Feasibility of meeting future battery demand via domestic cell production in Europe. *Nat. Energy* **10**, 526–534 (2025).

This study shows that domestic cell production capacity is likely to fall short of demand in Europe by 2030, with 90% self-sufficiency possible but uncertain.

3. Busch, P., Chen, Y., Ogbonna, P. & Kendall, A. Effects of demand and recycling on the when and where of lithium extraction. *Nat. Sustain.* **8**, 773–783 (2025).

This study shows that moderating battery size and enhancing recycling at global scale can reduce new lithium deposit openings.

4. Noll, B., Steffen, B. & Schmidt, T. S. Domestic-first, climate second? Global consequences of the Inflation Reduction Act. *Joule* **8**, 1869–1873 (2024).

This article discusses the impact of US domestic-first approach on global trade and innovation.

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Competing interests

J.D.J. serves as a technical advisor to Energy Impact Partners and MUUS Climate Partners, which are investors in early-stage companies, including those in the critical materials and battery supply chains. The remaining authors declare no competing interests.