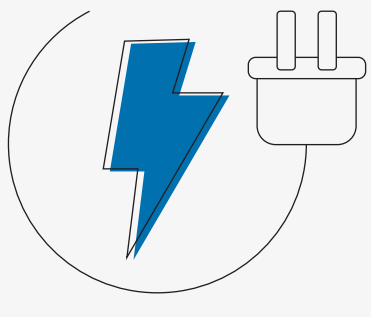
Sustainable EV production: The environmental effects of *mineral mining*

Electric vehicles (EVs) are driving a significant increase in demand for minerals such as graphite, copper, and lithium in the transport sector. However, mining minerals leads to land use changes, increased water usage, and waste generation.

40% Hardrock mines have contaminated 40 percent of the US Western watersheds that supply drinking water. (Source)

2,000 tons Processing one ton of rare earth metal generates 2,000 tons of toxic waste. (Source)

4,000% Demand for minerals used in EV production is expected to grow by 4,000 percent in the coming decades. (Source)



To address these challenges, the US Inflation Reduction Act incentivizes domestic mines and

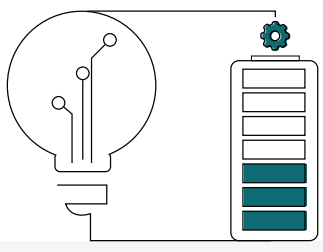
10% covers 10 percent of production costs through tax credits.

EV manufacturers, government regulators, and academic researchers must work together to create solutions for these upcoming challenges.

Alternative materials offer innovative battery technology

Efforts to develop alternative materials for electric vehicle (EV) batteries and motors aim to extend product lifespan and decrease reliance on critical minerals. Solid-state batteries represent a significant advancement in battery technology.

Success in this transition hinges on proactive investment by component and automotive manufacturers in new technologies that offer equivalent performance, competitive costs, and favorable regulatory support.



Sustainability in action

Northvolt, a Swedish battery developer and manufacturer, specializes in lithium-ion technology for electric vehicles –

with **100 percent** of its sodium-ion cells produced without critical metals. **100%**

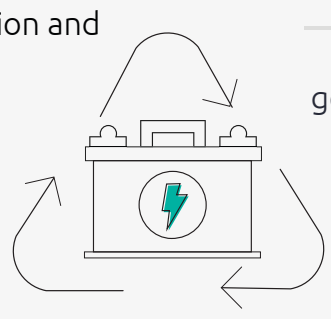
90% Northvolt expects to achieve a **90 percent reduction** in kilograms of CO_2 emitted per kilowatt-hour per cell by 2030.

Recycling batteries can reduce mineral demand

Battery recycling is a promising solution that curbs the need for new mining, conserves resources, and reduces environmental impact.

up to 55% Experts predict that battery recycling could cut global demand for new minerals by up to 55 percent by 2040.

Achieving this target relies on an efficient collection system and developing advanced separation and processing technologies.



Sustainability in action

Redwood Materials, a Nevada-based company that recycles and refines lithium-ion batteries, dismantles used EV batteries and readies the materials for reuse.

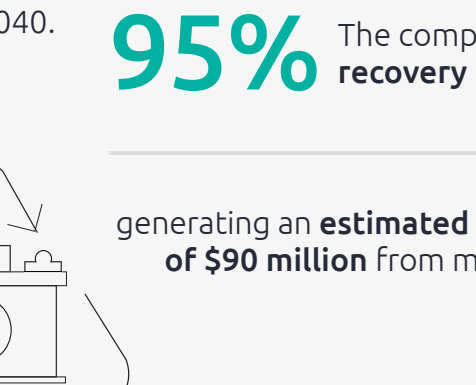
95% The company has achieved a **95 percent recovery rate** of elements from used batteries,

generating an **estimated annual revenue of $90 million** from material recovery. **$90 million**

Human impact of mining minerals is significant

Companies must enforce health safeguards and compensate communities affected by pollution and other mining activities. For example, Native Americans are often excluded from the benefits of the industry, and most sites containing nickel, copper, cobalt, and lithium are within 35 miles of Native American reservations. In the Democratic Republic of Congo (DRC), mines employ around 25,000 children to extract 70 percent of the world's cobalt.

Automotive manufacturers must enforce supply chain due diligence and source from conflict-free suppliers to ensure responsible and sustainable business practices. This approach aligns with government missions to accelerate the world's transition to sustainable energy and sets a high standard for other companies in the industry to follow.



Sustainability in action

Tesla has taken proactive steps by enforcing supply chain due diligence and sourcing only from conflict-free suppliers.

The company has trained **650 Tier 1 suppliers** in techniques to reduce health and safety risks, **615 Tier 1**

92% achieving a 92 percent response rate from suppliers.

Click here to learn about our ongoing partnership with Venture Lab (powered by the Wharton School), and our work on advancing sustainable technologies. Ready to achieve your sustainability goals? Contact us today.

Tyler Williams
Deputy Head, Americas Sustainability
tyler.c.williams@capgemini.com

Farah Abi Morshed
Senior Growth Strategy Manager, Americas
farah.morshed@capgemini.com

Sazia Nowshin
Lead Sustainability Consultant, Americas
sazia.nowshin@capgemini.com