The harm of insufficient raw materials for new energy batteries

Do battery production and raw material extraction affect EV sustainability?
Indeed, the energy expenditure associated with battery production and raw material extraction is a crucial factor in determining the overall environmental impact and reserve efficiency of EVs. We acknowledge the necessity of incorporating these energy costs into our analysis to provide a more holistic evaluation of EV sustainability.

Why is it important to understand the raw battery material supply chain?
Understanding constraints within the raw battery material supply chain is essential for making informed decisions that will ensure the battery industry's future success. The primary limiting factor for long-term mass production of batteries is mineral extraction constraints.

Are battery raw material supply chain challenges based on mineral extraction?
This paper emphasises the battery raw material supply chain challenges from a mineral extraction perspective. Available mineral resources,constraints in production capacities,and timelines for extraction rate ramp-up to meet growing metal demand will be explored from a bottom-up approach.

Why is the demand for battery raw materials growing?
The global commitment to decarbonizing the transport sectorhas resulted in an unabated growth in the markets for electric vehicles and their batteries. Consequently,the demand for battery raw materials is continuously growing.

Why do battery minerals need to be extracted from primary resources?
Environmental, social, and governance challenges The supply of battery minerals is highly dependent on the extraction of minerals from primary resources due to the insufficient pace of technological improvements in the field of mineral and metal recycling from secondary sources.

How battery supply chains are affecting road transport decarbonization?
Consequently, suppliers around the world are striving to keep up with the rapid pace of demand growth in battery raw materials. Various factors have disrupted the supply chains of battery materials creating a serious mix of risks for secure and rapid road transport decarbonization.

The net-zero transition will require vast amounts of raw materials to support the development and rollout of low-carbon technologies. Battery electric vehicles (BEVs) will play a central role in the pathway to net zero; McKinsey estimates that worldwide demand for passenger cars in the BEV segment will grow sixfold from 2021 through 2030, with annual unit sales ...

Although deployments of grid-scale stationary lithium ion battery energy storage systems are accelerating, the

environmental impacts of this new infrastructure class are not well studied.

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This special report by the International Energy Agency that examines EV battery supply chains from raw materials all the way to the finished product, spanning different segments of manufacturing steps: materials, components, cells and electric vehicles.

In the IEA [88] report, it is stated that by 2030, almost 31 million tons of raw materials used in green energy technologies will be needed to reach the goal of limiting global warming to 1.5° by 2050, while EVs and storage technologies account for almost 12 million tons of this huge demand.

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Firstly, producing an electric vehicle contributes, on average, twice as much to global warming potential and uses double the amount of energy than producing a combustion engine car. This is mainly because of its battery. ...

This report analyses the emissions related to batteries throughout the supply chain and over the full battery lifetime and highlights priorities for reducing emissions. Life ...

Compared with lithium-ion batteries, the raw materials of sodium-ion batteries are abundant, low-cost, and highly safe. Furthermore, their costs are expected to be further reduced as large-scale applications take off, making them viable for energy storage applications. The primary anode material for sodium-ion batteries is hard carbon, which has a high sodium-ion ...

The past two decades have witnessed the wide applications of lithium-ion batteries (LIBs) in portable electronic devices, energy-storage grids, and electric vehicles (EVs) due to their unique advantages, such as high energy density, superior cycling durability, and low self-discharge [1,2,3].As shown in Fig. 1a, the global LIB shipment volume and market size ...

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Our review shows that the increase in demand for raw materials exceeds planetary boundaries, battery production relies on fossil energy, and the mining of raw materials may cause significant local environmental

harm. Irresponsible mining may feed conflicts and endorse poor working conditions, particularly in the global South. The negative ...

The net-zero transition will require vast amounts of raw materials to support the development and rollout of low-carbon technologies. Battery electric vehicles (BEVs) will play ...

Bloomberg New Energy Finance (BNEF) projections suggest a 27.7% EV share in passenger car sales in 2030, comprising 19 million battery electric vehicles and 6.8 million hybrid electric vehicles. This is a conservative estimate, as 2021 sales exceed this trajectory. More recent estimates suggest nearly 40 million BEV and plug-in hybrid sales by 2030. In this projection, ...

Geopolitical turbulence and the fragile and volatile nature of the critical raw-material supply chain could curtail planned expansion in battery production--slowing mainstream electric-vehicle (EV) adoption and the transition to an electrified future.

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