Economic value analysis of lithium batteries

Why are lithium-ion batteries a growing industry?
Battery needs are increasing due to the exponential growth in demand for electric vehicles and renewable energy generation. These factors lead to the growing waste management of lithium-ion batteries (LIBs). Thus,recycling or finding a second life for LIBs is a growing industry due to its environmental and economic benefits.

What is the global market for lithium-ion batteries?
The global market for Lithium-ion batteries is expanding rapidly. We take a closer look at new value chain solutions that can help meet the growing demand.

How big will lithium-ion batteries be in 2022?
But a 2022 analysis by the McKinsey Battery Insights team projects that the entire lithium-ion (Li-ion) battery chain,from mining through recycling,could grow by over 30 percent annually from 2022 to 2030,when it would reach a value of more than $400 billion and a market size of 4.7 TWh. 1

Are lithium-ion batteries the future of electric vehicles?
Lithium-ion batteries (LiBs) are pivotal in the shift towards electric mobility,having seen an 85 % reduction in production costs over the past decade. However,achieving even more significant cost reductions is vital to making battery electric vehicles (BEVs) widespread and competitive with internal combustion engine vehicles (ICEVs).

What is the production cost of lithium-ion batteries in the NCX market?
Under the medium metal prices scenario,the production cost of lithium-ion batteries in the NCX market is projected to increase by +8 % and +1 % for production volumes of 5 and 7.5 TWh,resulting in costs of 110 and 102 US$/kWh cell,respectively.

Do cost levels impede the adoption of lithium-ion batteries?
The implications of these findings suggest that for the NCX market,the cost levels may impedethe widespread adoption of lithium-ion batteries,leading to a significant increase in cumulative carbon emissions.

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Richa K, Babbitt CW, Gaustad G (2017) Eco-efficiency analysis of a lithium-ion battery waste hierarchy inspired by circular economy. J Ind Ecol 21: 715-730. doi: 10.1111/jiec.12607 [89] Jin H, Frost K, Sousa I, et al. (2020) Life cycle assessment of emerging technologies on value recovery from hard disk drives.

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Economic and technical analysis of batteries were also performed by using HOMER-Pro, with consideration of nearly equivalent ampere-hour capacity of batteries as the input used for simplified electric circuit model simulation. Accordingly, the simulation result of HOMER-Pro-shows that the PVGCS having a lead-acid battery as energy storage requires 10 ...

The economic analysis of the BESS is carried out in three techno-economic statuses of optimism, business, and research, which is based on two interest-subjects of grid company and non-grid company. Furthermore, both battery purchasing cost (BPC) and government subsidy are performed to sensitivity analysis. The results show that the BESS with ...

Cost-savings in lithium-ion battery production are crucial for promoting widespread adoption of Battery Electric Vehicles and achieving cost-parity with internal combustion engines. This study presents a comprehensive analysis of projected production costs for lithium-ion batteries by 2030, focusing on essential metals.

Different reports and case studies are analyzed to define the materials that may be recovered and the efficiency of the recycling process. To understand the economics of using recycled, second use, or new LIBs, this ...

We show that recycling can be economically viable, with cost/profit ranging from (-21.43 - +21.91) $·kWh?¹ but strongly depends on transport distances, wages, pack design and recycling method....

Lithium-ion batteries are becoming critical flexibility assets in future electric power systems. Batteries can arbitrage price differences in wholesale electricity markets to make a profit while at the same time reducing total system operating costs and improving renewable energy integration. However, lithium-ion batteries have a limited lifetime due to capacity degradation, and one ...

However, an up-to-date analysis of this value chain is beneficial to spotlight the main current bottlenecks. This perspective article aims to make a worthwhile contribution in two respects: first, to encourage further research in the techno-economic aspects of lithium-ion and beyond battery chemistries; second, to aid investors and policymakers ...

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While disposal bans of lithium-ion batteries are gaining in popularity, the infrastructure required to recycle these batteries has not yet fully emerged and the economic motivation for this type of recycling system has not yet been quantified comprehensively. This study combines economic modeling and fundamental material characterization methods to ...

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Therefore, this work aims to quantify the economic impact of recovering raw materials from lithium batteries used in the electric vehicles sector. Based on the chemical composition of the...

Life-cycle carbon emissions are integrated into future battery price projections. Direct cathode recycling provides the greatest potential for carbon reduction. LFP might be the only lithium-ion battery to achieve the $80/kWh price target. Cost reductions from learning effects can hardly offset rising carbon prices.

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