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Lead-acid batteries replace lithium batteries for energy storage





Overview

Lithium-ion battery technology is one of the innovations gaining interest in utility-scale energy storage. However, there is a lack of scientific studies about its environmental performance. This study aims to e.

Do lithium-ion batteries have fewer environmental impacts than lead-acid batteries?

The lithium-ion batteries have fewer environmental impacts than lead-acid batteries for the observed environmental impact categories. The study can be used as a reference to decide how to substitute lead-acid batteries with lithium-ion batteries for grid energy storage applications.

1. Introduction.

Which battery chemistries are best for lithium-ion and lead-acid batteries?

Life cycle assessment of lithium-ion and lead-acid batteries is performed. Three lithium-ion battery chemistries (NCA, NMC, and LFP) are analysed. NCA battery performs better for climate change and resource utilisation. NMC battery is good in terms of acidification potential and particular matter.

Why do lithium ion batteries outperform lead-acid batteries?

The LIB outperform the lead-acid batteries. Specifically, the NCA battery chemistry has the lowest climate change potential. The main reasons for this are that the LIB has a higher energy density and a longer lifetime, which means that fewer battery cells are required for the same energy demand as lead-acid batteries. Fig. 4.

What is a lithium ion battery (LIB)?

Lithium-ion Batteries (LIB) and their Life Cycle Assessment (LCA) A typical LIB cell consists of five main components: cathode, anode, electrolyte, separator, and cell casing. Then, a LIB pack contains several LIB cells to store and deliver electric energy, connected to a battery management system (BMS) module and packaged in a casing.



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