PIENAAR ENERGY (PTY) LTD

# Technical indicators of waste lithium battery energy storage

## Overview

This review examines the status of development, process performance and life cycle environmental impact of the three major recycling routes for lithium ion batteries and considers the impact of changes in legislation in the European Union (EU). With the rise in electric vehicles, renewable energy storage, and consumer electronics, recycling lithium-ion bateries has become a critical solution to address resource scarcity and environmental challenges. This appendix outlines areas of research centered on the unique challenges of LIBs. This presents a daunting task for governments, companies, and academics when discussing and developing initiatives for the EoL of LIBs.

## Technical indicators of waste lithium battery energy storage


### DRAFT Appendix D: Lithium-Ion Batteries

Determine how to ensure LIBs are discarded, stored, and transported safely considering ignitability (D001) and reactivity (D003). Provide avenues to prevent mixing LIBs with other battery types when ...

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### Lithium-ion battery recycling report , CAS and Deloitte

Recognizing the need for a comprehensive analysis of this rapidly evolving industry, CAS and Deloite have worked together to develop this in-depth report covering both market and scientific perspectives.

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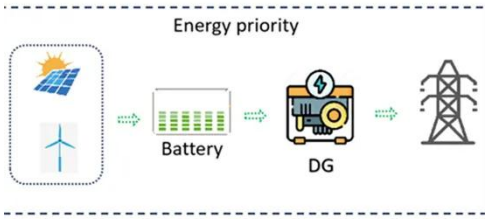


### Evaluation of optimal waste lithium-ion battery recycling technology

Herein, this paper evaluates different waste lithium-ion battery recycling technologies in a multi-criteria decision framework to determine the best technology.

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## Sustainable Lithium-Ion Battery Recycling: Challenges, Innovations, ...

Synopsis This review emphasizes the environmental and resource challenges of lithium-ion battery waste and highlights sustainable recycling strategies that alleviate resource scarcity and ...

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## Lithium-ion battery recycling: a perspective on key challenges and

It examines technical limitations, economic constraints, and regulatory fragmentation, while also identifying opportunities through emerging technologies such as direct recycling,

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## Challenges Faced by Lithium-Ion Batteries in Effective Waste

Due to the increasing number of EVs, EoL LIBs pose a significant challenge. This research proposes an approach to identifying these challenges, recommending measures to ...

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## Current status and outlook of

## recycling spent lithium-ion batteries

The establishment of battery recycling and re-utilization systems is important and requires collaborative innovation in legislation, storage and transportation, recycling technology, ...

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## Life Cycle Assessment of Lithium-Ion Battery Recycling: Evaluating ...

Lithium-ion battery (LIB) recycling technologies are advancing rapidly, with higher recovery efficiencies, lower energy demand, and more complex supply chains.

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## Recycling routes of lithium-ion batteries: A critical review of the

We evaluate 209 publications and compare three major recycling routes. An important aspect of this review is that we tackle the need for a critical evaluation of these recycling routes by introducing clear ...

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## A Circular Economy for Lithium-Ion Batteries Used in Mobile

## and ...

Federal and state policies could require or incentivize the collection and reuse/recycling of LiBs or restrict disposal. Clearly defined regulatory requirements could reduce uncertainty and risk ...

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