

LI-ION RECYCLING ECONOMICS – IS PUBLIC POLICY NEEDED FOR ROBUST RESOURCE RECOVERY?

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ABSTRACT

In a new technoeconomic study, NexantECA examined the profitability of lithium-ion battery recycling, examining profitability depending not only on region, technology and the prices of inputs and outputs, but also with broad sensitivities to the battery input mixture.

A major open question in the literature is the question of whether lithium-ion battery recycling can be profitable as metals recovery businesses without government support. This question has become more urgent with the anticipated wave of battery-electric vehicles expected to enter the market and the associated expanded end-of-life battery supply in conjunction with existing metals supply difficulties. The recovery of valuable metals from degraded lithium-ion batteries, notably lithium, nickel and cobalt, is hoped to provide an important part of global supply in the near future.

Current field evidence from the existing developed battery recycling sector in China and the regulatory-driven recycling sector in the EU do not provide definitive conclusions on profitability. In order to investigate this question and the economic conditions for market entry into the battery recycling sector, NexantECA developed a set of economic models for hydrometallurgic and pyro-hydrometallurgic recycling technologies and investigated them using a Monte Carlo simulation to derive emergent trends from inputs of differing battery chemistries.

The results have major implications for the question of whether a privately driven lithium-ion recycling industry is viable and to what degree public policy is needed to ensure lithium-ion batteries are recycled and their critical materials recovered for re-use.

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