

ABSTRACT

The rapid growth of electric vehicle (EV) adoption has substantially increased global demand for lithium-ion batteries (LIBs), generating a growing volume of end-of-life batteries and raising urgent concerns about sustainable critical mineral supply chains. Battery recycling has emerged as a strategically important solution for recovering valuable materials including lithium, nickel, cobalt, manganese, and copper while supporting circular economy objectives. However, the financial feasibility of LIB recycling facilities varies considerably across countries due to differences in industrial maturity, cost structures, financing conditions, and market dynamics.

This study compares the financial feasibility of hypothetical LIB recycling facilities each with an annual processing capacity of 5,000 tonnes in the Netherlands, Japan, and Indonesia. Benchmark financial and operational data are drawn from Umicore (Netherlands) and DOWA Holdings (Japan), while assumptions for Indonesia are calibrated using percentage proxies derived from Huayou to reflect regional industrial conditions. Investment appraisal methods Net Present Value (NPV), Internal Rate of Return (IRR), and Weighted Average Cost of Capital (WACC) are applied across conservative, base case, and optimistic scenarios. Sensitivity analysis is conducted to identify the variables with the greatest impact on project feasibility.

Keywords: *Lithium-ion battery recycling, financial feasibility analysis, Net present value (NPV), Circular economy*

