FACT SHEET CHILE

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Expanding the lithium value chain in Chile: Mining, batteries, and recycling

Chile's lithium mining industry has grown to supply over a quarter of the world's lithium demand while providing a less greenhouse gas (GHG)-intensive material than lithium mined from hard-rock sources in other regions. The trajectory of Chile's lithium mining industry is important for both the country's sustainable economic development ambitions and the global battery electric vehicle (BEV) transition.

A new ICCT study, co-produced with Centro de Movilidad Sostenible (CMS), explores the economic potential of lithium mining and estimates the additional revenue and job potential if Chile were to onshore additional parts of the battery production supply chain. The analysis also assesses the GHG emissions intensity, water consumption, and social impacts of lithium mining and battery production in Chile, in addition to opportunities for battery recycling.

Results of this analysis include the following:

Lithium-ion battery demand from BEVs is projected to rise rapidly in Chile. Total battery demand from battery and plug-in hybrid electric vehicles in Chile is estimated to rise from 0.5 GWh in 2024 to 13.0–17.8 GWh in 2030 and to 27.7–38.0 GWh in 2035, depending on the development of average battery sizes of light-duty vehicles. This corresponds to an increase in Chilean lithium demand from vehicles from 44 t in 2024 to 1.1–1.5 kt in 2030 and to 2.3–3.2 kt in 2035.

Lithium production capacity in Chile is expected to increase markedly by the end of the decade. The total announced lithium production capacity in Chile is projected to rise from 42 kt in 2024 to 64 kt in 2030 and 79 kt in 2035. In 2030, 91% of this capacity is projected to correspond to mines already in operation today. In 2024, the gross revenue from Chile's lithium industry was about $2.7 billion. Depending on commodity prices and the realization of announced mining projects, Chile's lithium export revenue is projected to amount to $7.3 billion in 2030 and $8.9 billion in 2035, which correspond to 2.2% and 2.7% of the country's 2024 GDP, respectively.

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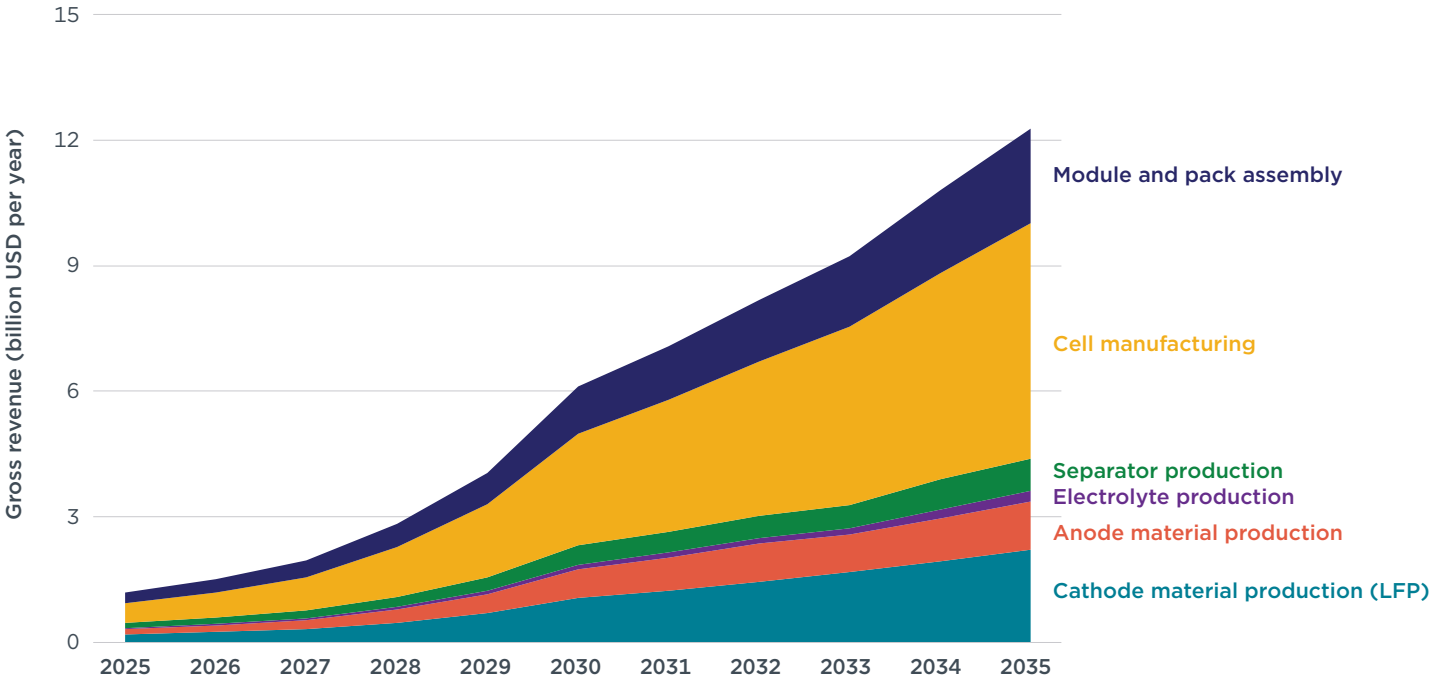
Expanding Chile's current lithium mining and refining capacities to cathode production can provide considerable revenue and job potential. In 2025, nearly all of the lithium mined in Chile is expected to be refined domestically. The production of cathode material alone could generate up to $1.1 billion in annual revenue in 2030 and $2.2 billion in annual revenue in 2035 when meeting the lithium-iron phosphate (LFP) demand from vehicle batteries in the Latin American market. This would generate about 1.9 times the annual revenue of simply exporting the equivalent amount of lithium carbonate in both years. Furthermore, the onshoring of LFP cathode material production could create 900–1700 jobs in 2030 and 2100–3700 jobs in 2035.

Onshoring battery cell production can provide additional revenue and job potential. As shown in Figure 1, developing each stage of the value chain needed to meet the projected demand for vehicular LFP batteries in Latin America could generate an annual gross product of up to $6.1 billion by 2030 and $12.3 billion by 2035, which correspond to 1.8% and 3.7% of Chile's 2024 GDP, respectively. This could also lead to the creation of 8,600–15,000 direct jobs in the battery value chain in 2030 and 19,000–32,600 jobs in 2035**.**

Figure 1

Projected gross revenue from the development of battery supply chain industries to meet the demand for LFP batteries in Latin America



Notes: Cathode material production includes non-lithium material costs. Costs are estimated in 2025 U.S. dollars, unadjusted for inflation.

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Batteries produced in Chile would have a lower life-cycle GHG emission intensity compared with other battery producing regions around the world today. The GHG emission intensity of lithium carbonate from Chilean brine is estimated to be 86% lower than that produced from Australian ore, the other major source of lithium production today, and 67% lower than lithium carbonate produced in the United States. Due

to the low GHG emission intensity of sourcing lithium from Chilean brine and the comparatively high share of renewables in the country's electricity mix, the average emission intensity of LFP battery pack production in Chile is estimated to be 35% lower than the average emissions intensity of LFP batteries in China, 16% lower than in the United States, and 9% lower than in Europe.

The lithium mining industry has disrupted communities and raised the cost of living in mining regions, and expanded mining activity could pose environmental risks for local ecosystems. The water consumption of lithium mining from brine in Chile is similar to that of hard rock mining in other regions but is of higher concern given the aridity of the desert ecosystems where salt flats are located. However, the interconnection between brine extraction and freshwater depletion is not well understood, and further study is needed to understand the long-term impact of lithium production on local ecosystems. Freshwater consumption could be partially mitigated by technological improvements in lithium mining. Furthermore, the government so far has not consistently engaged local communities early in mine consultation processes. International best practices for due diligence requirements and community engagement could provide governance models for the Chilean government to mitigate the social and economic impacts of the lithium mining industry.

Setting up an efficient battery collection and recycling ecosystem in Chile would allow the recovery of valuable minerals and create new jobs. Between 0.5 and 1.2 GWh of vehicle batteries are expected to be retired in Chile in 2040, rising to 6.0–15.1 GWh in 2050. To process this volume of batteries in 2050, between 114 and 317 jobs could be created in a battery recycling industry.

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