

Study E

Control the water cost of mineral washing

Does an impurity- and inventory-aware wash/purge rule reduce total external freshwater use on real concentrate beyond optimized conventional recycled or countercurrent washing?

Candidate operating-rule contribution; novelty unresolved. This is a proposed study; no result or novelty is established.

What earlier work establishes

Displacement, recycled-brine and countercurrent washing already exist, including lithium-rich brine patents and industrial practice. Two wash stages alone are not a contribution.

The proposed difference

On a common wash topology, a frozen inventory/impurity rule selects reuse, fresh makeup or purge while meeting the same product and residual limits.

A fair comparison

B0: strongest optimized conventional wash and purge policy

T: same selected topology with the proposed inventory/impurity decision rule

The decision

Total external freshwater makeup, product qualification, native lithium retention and downstream scale burden.

Planned scope

Up to 42 development runs; 24 confirmation campaigns of ten cycles; 2,820 principal panels.

Before confirmation

A real concentrate/product need, measurable native lithium and complete compatible-fraction balances are required.

Funding basis

12 funded months. Preliminary standalone estimate: lower \$2,221,791, base \$2,632,286, higher \$3,607,925. All studies use the same rates and cost rules, including founder coordination, scientific staff, analyses, equipment, institutional costs and reserve. These are unquoted planning estimates; shared execution requires an itemized combined scope.

Methods and source review

[Complete methods and reading limits](#) · [Editable unified budget](#)

N18: [Ventimiglia et al., Pilot scale production of Mg\(OH\)₂ compounds from a real industrial reverse osmosis desalination brine](#)

N19: [US6143260A: Method for removing magnesium from brine to yield lithium carbonate](#)

N20: [SQM, Salar de Atacama Technical Report Summary](#)

N29: [European Commission, SEA4VALUE results and public deliverables, grant 869703](#)

N30: European Commission, ZERO BRINE results and public deliverables, grant 730390

S23: Boron extraction using selective ion exchange resins enables effective magnesium recovery from lithium rich brines with minimal lithium loss

S10: The CARMEn project: A sustainable and circular brine treatment chain

S11: Pilot scale production of $\text{Mg}(\text{OH})_2$ compounds from a real industrial reverse osmosis desalination brine

S14: Li-air chemistry inspired electrodialysis for direct lithium carbonate production from seawater