



MANGROVE LITHIUM

SAAD DARA

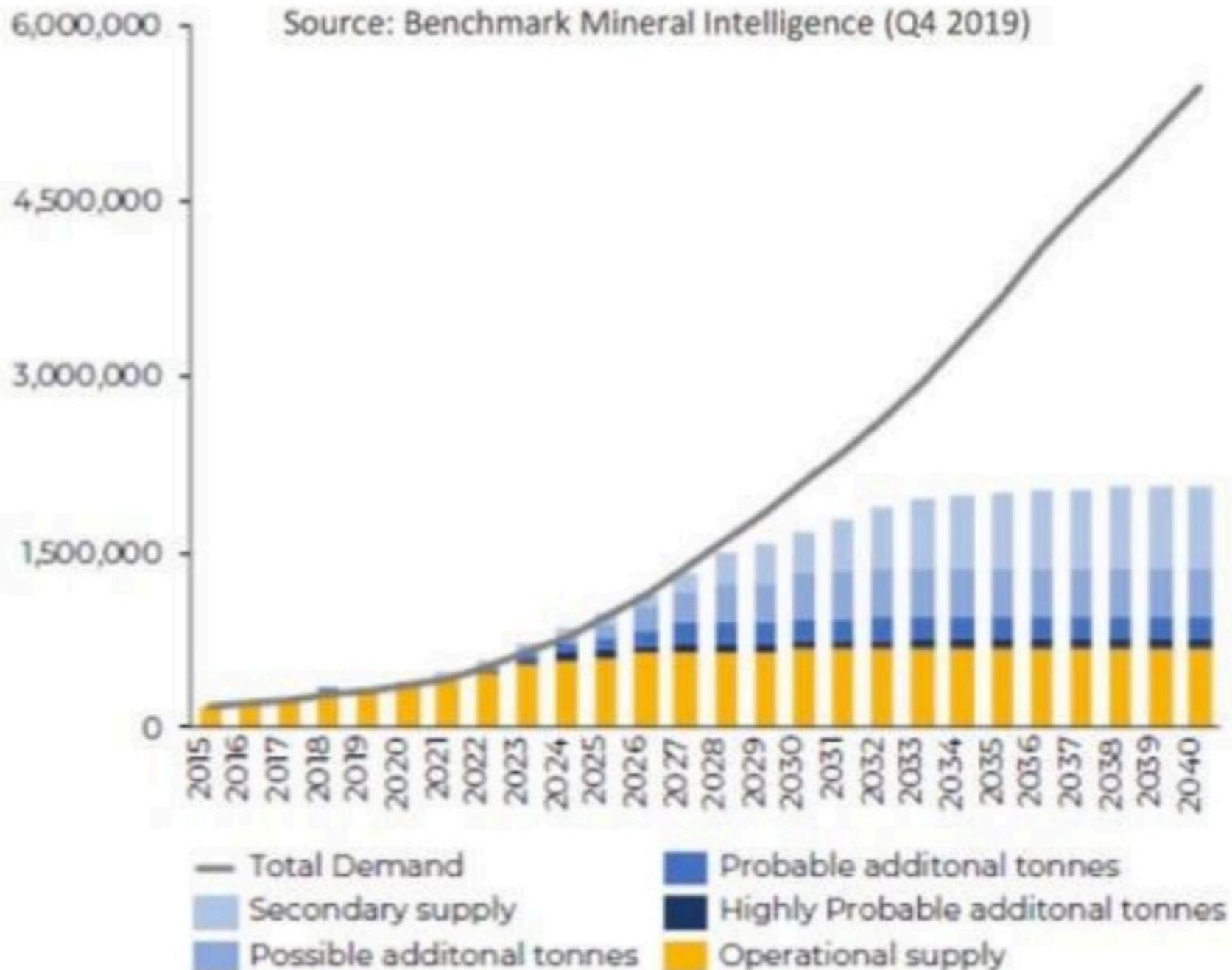


MANGROVE LITHIUM – INVESTMENT THESIS

- 1. Lithium hydroxide will be a key ingredient for batteries**
- 2. Lithium hydroxide supply is limited to higher cost hard-rock assets**
- 3. Mangrove allows lithium brines to produce high purity LiOH at the lowest cost**
- 4. This increases supply of LiOH faster and helps to close the demand-supply gap**

LITHIUM SUPPLY BOTTLE-NECKS WILL LIMIT EV ADOPTION BY >350M EVs

INVESTMENTS IN THE UPSTREAM & MIDSTREAM ARE CRITICAL NOW



Countries with the largest lithium resources in 2019

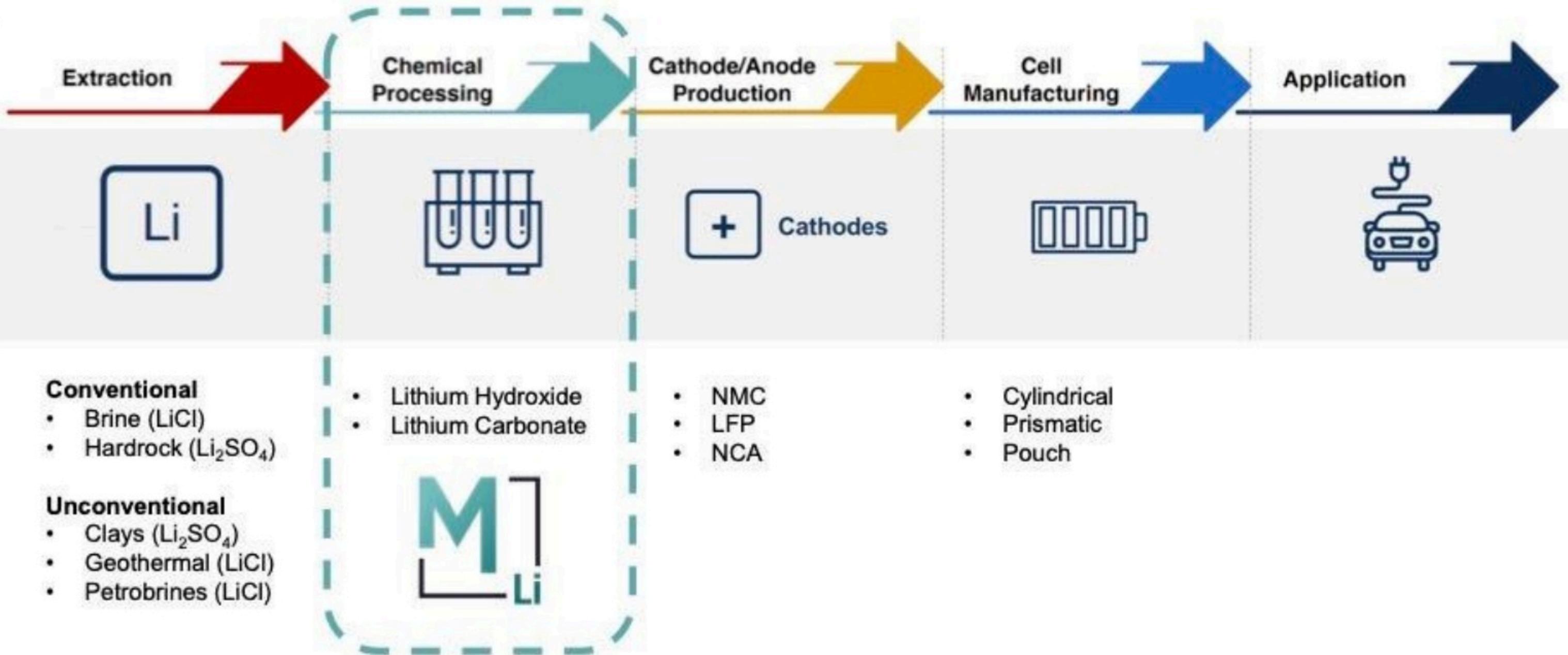
In millions of metric tons



Source: US Geological Survey, Mineral Commodity Summaries, Feb '19

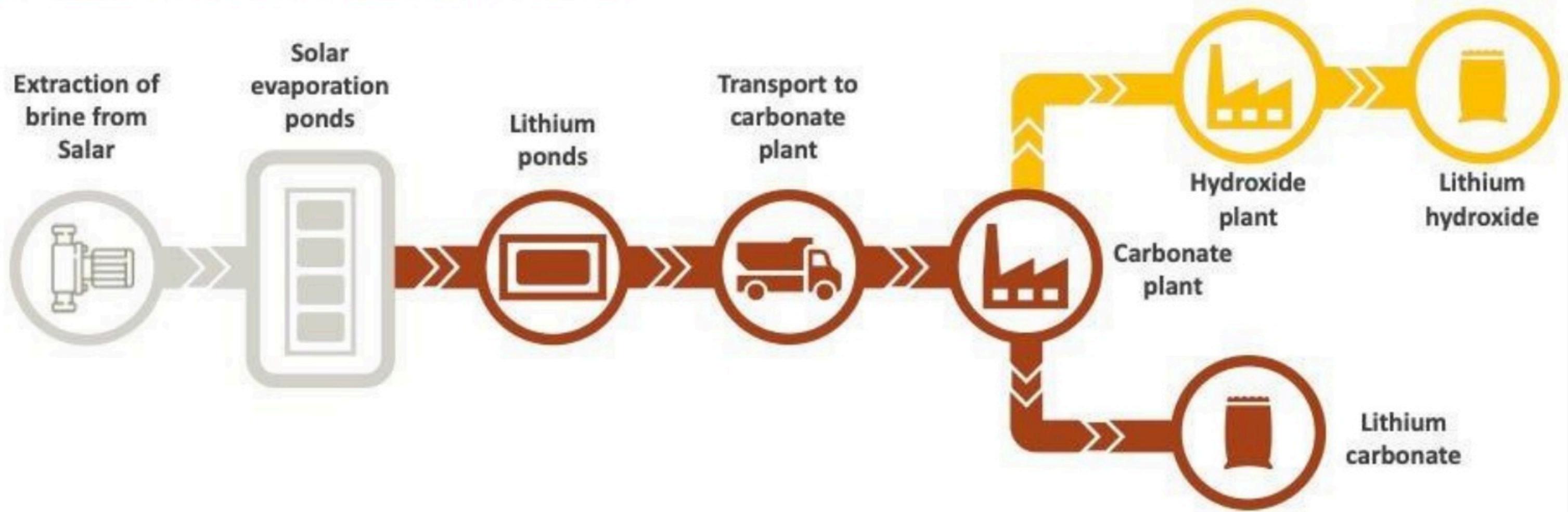
LITHIUM ION BATTERY SUPPLY CHAIN

INNOVATION WHITESPACE – CHEMICAL PROCESSING & REFINING



CONVENTIONAL LITHIUM BRINE PROCESS

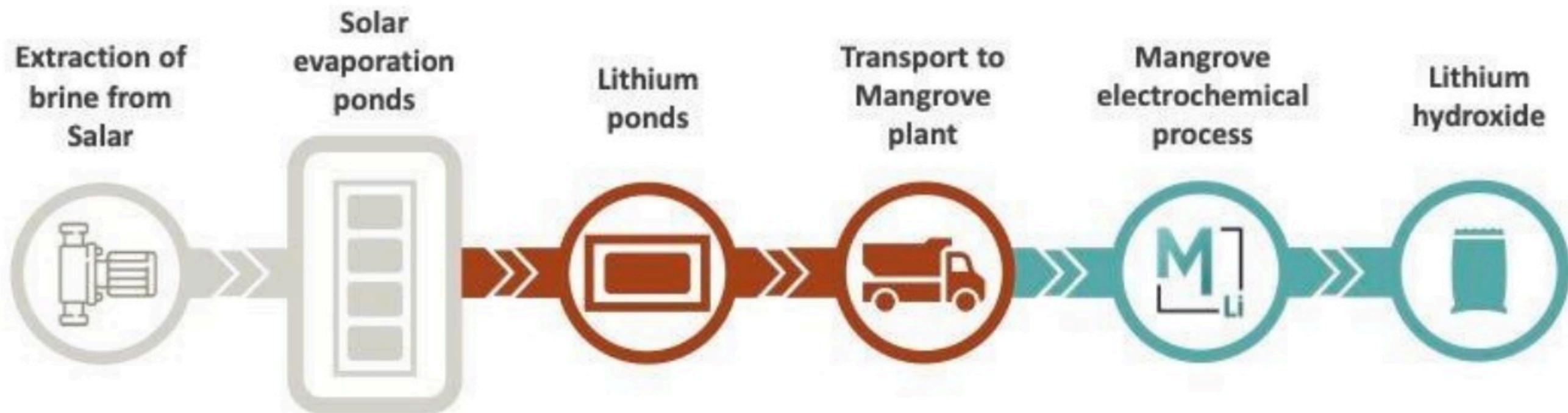
PROBLEM: COST, COMPLEXITY & IMPURITIES



- Salar brines can only produce lithium hydroxide by first producing lithium carbonate and then converting to lithium hydroxide
- This requires CAPEX and OPEX for both a lithium carbonate and a lithium hydroxide plant
- Chemical phase separation process introduces impurities making it difficult to achieve a battery grade product
- Poor quality product from Salars means that the biggest lithium reserves cannot supply LiOH to the battery market

MANGROVE SOLUTION – DIRECT CONVERSION OF LITHIUM CHLORIDE

LOW COST, SIMPLE & HIGH PURITY LiOH



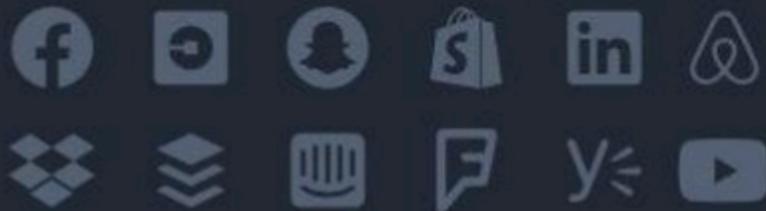
- Mangrove simplifies the production of lithium hydroxide by eliminating the need to produce lithium carbonate
- Mangrove's electrochemical process eliminates chemicals enabling battery grade lithium hydroxide from Salars
- Mangrove eliminates CAPEX and OPEX of a LiOH conversion plant enabling the lowest cost of B.G. lithium hydroxide

COMMERCIAL SCALE DEMONSTRATION PLANT

FULLY INTEGRATED OPERATION SINCE 2019



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