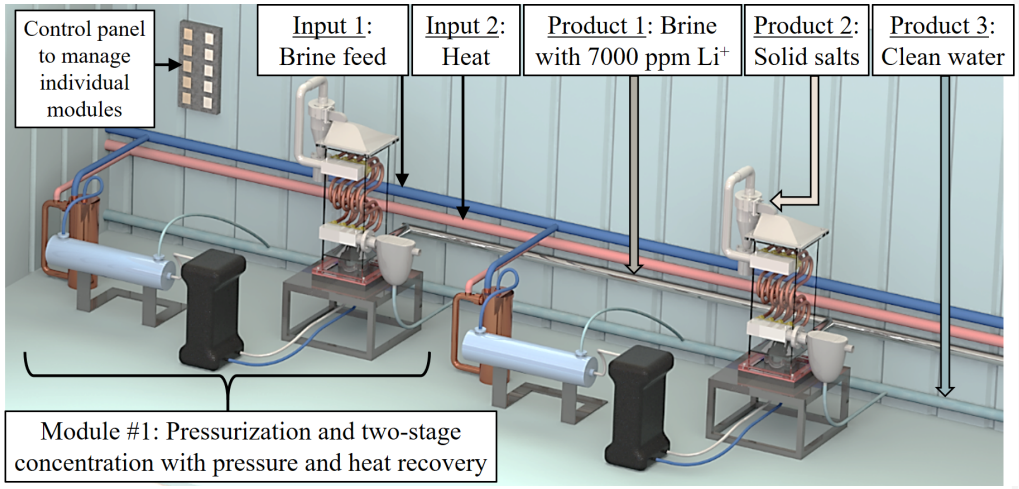
Production of Lithium Carbonate and Hydroxide for Batteries by Two-Stage Thermal and Cyclonic Desalination of Brine

Project Summary

Build and demonstrate a modular, portable, and scalable technology to produce Li carbonate (Li_2CO_3) and Li hydroxide (LiOH) for batteries from continental, geothermal, and other Li-containing brines. Despite the abundance the US greatly underutilizes the domestic Li resources producing less than 1% of the global output. That is mostly due to the cost and the environmental impact of extracting Li from domestic brines. Our system completely eliminates solar evaporation ponds and uses only solar-thermal energy, geothermal energy, or waste heat to concentrate the brine and precipitate commercial grade Li salts without any existing infrastructure and with no adverse environmental impact. For the final demonstration the team will design and fabricate a lab-scale portable module that produces 1 kg/day of $LiCO_3$ suitable for battery cathode production.



Schematic of a portable and modular Li_2CO_3 and LiOH production unit

Key Personnel/Organizations

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Key Derivable

- Net Li_2CO_3 production cost of $2,772/metric ton (mt) - compared with today's production *cost* of $5,580/mt and the current Chinese market price of $15,000/mt.
- Operate entirely on local solar or geothermal energy with no existing energy infrastructure
- Produce clean water and valuable solid salts in addition to Li_2CO_3 and LiOH.

Project Impact

Our direct production cost of Li_2CO_3 is projected to be 50% below the current production cost. However, our impact is not limited to major cost reduction. Our technology will help boost domestic production, prevent adverse environmental impact, and Li resource degradation. Our technology can alleviate the costs associated with destroying a valuable resource over time, which is difficult to calculate.