Aqueous Resources LLC

Aqueous Resources' patent-pending selective pre-treatment processing and electrochemical concentration technology will enable lithium brine resource companies to extract Li through DLE (Direct Lithium Extraction) technologies with significantly lower chemical, water and CO2 intensity, higher recovery rates, less waste, reduced costs and higher end-product purity. The improvements in process efficiency will enable AR to become a sector leader in North- and South American sustainable lithium production whilst eliminating the use of evaporation ponds.

Company Overview

Our principal tactical business objective is to demonstrate the successful transfer and adaption of proven, patented oilfield waste water treatment and recycling technology (US Patent 10899646B2) for lithium brine processing, concentration and eventually extraction in multiple controlled lab tests. Aqueous Resources is a field proven, technology driven, service company deploying advanced selective membrane and electrochemistry technologies and processes that are adapted to novel DLE processing applications. We need financial- and human resources to take a minimum of three lithium formation brine samples and deliver quantitative techno-economic data analysis together with complete processing flowsheet design. Each lithium-enriched brine will have unique characteristics and will require bespoke pre-treatment and processing. This is a relatively high risk stage for our potential lithium resource clients and they are typically reluctant or unwilling to provide any working capital to fund these lab scale tests.

Problem

Direct Lithium Extraction (DLE) is an processing approach based on selectively isolating lithium from solution without the need for traditional evaporation methods which for an average 45,000 mt/yr LCE production facility consume 10 billion gallons of water per year and emit over 250,000 mt of CO2/ year whilst destroying 2,500 acres of land. The end-product of a DLE process is a high-purity lithium concentrate (usually either Li-sulphate or Li-chloride), which can then be further refined using conventional methods (polishing/electrolysis) into lithium chemicals (carbonate or hydroxide). The deployment of DLE technologies, of which there are many under development, is hampered by the cost of conditioning feedstock to remove impurities by conventional means and the concentration of the extracted lithium chloride for conversion. These processes are highly dependent on chemicals. The patented electro-pressure membrane driven process being developed by Aqueous Resources fractionates and concentrates a lithium hydroxide product from suitable Lithium containing brines. The use of this process will greatly reduce chemical reagent consumption and waste generation associated with impurity removal compared to presently used methods of extraction. Included is a post-extraction, non-thermal, lithium chloride concentration step that will produce desalted water for potential reuse in the direct extraction process.

Highlights

- Aqueous Resources LLC (AR) incorporated May 18th, 2022

- Signed office / lab lease agreement in November 2022 - 8200 E Pacific Place, Unit 103, Denver

Location
Denver, CO, USA

Business Stage
Mvp Built

Business Type
CleanTech , Energy

Meet the Team

Scott Taylor
COO

Fredrik Klaveness
CEO

- Signed agreement with Dr. Christopher A Green as CTO in December 2022

- Secured strategic investment agreement with Lithos Technology LLC in December 2022

- Patent US-2023-0014044-A1 published by USPTO January 19, 2023

- Met with CEO of Lithium Americas, CTO of Abermarle and COO of Lake Resources in February 2023

- Engaged with first 7 target customers: Galvanic, 3PL, Lithium Americas, Mission Creek, SQM, Abermarle, Lake Resources

- Commissioned pilot processing facility in May 2023 - ready to receive sample brines for processing and testing in June

- Scheduled on premises visits for SQM, Galvanic, Mission Creek in June and July

- Scheduled meetings with support of US trade commission with the CFO's of Abermarle and SQM in August

- Scheduled keynote address at global lithium congress in Salta, Argentina in August

Key focus for AR this summer is to start processing lithium enriched brines from three target customers in our Denver facility, and to demonstrate quantitative results superior to existing DLE processes and technologies. AR will be expanding its core technical team, and plan to recruit a top-notch Process Engineer with membrane and electrochemistry experience over the next two months.

Go-To-Market Strategy

We have done a robust market analysis and as a result we have focused on 3 private pre-production continental brine resource owners: Mission Creek and Galvanic Energy in the Smackover, AK; and 3 Proton Lithium ("3PL") located in Railroad Valley NV. 3PL's asset alone will boost American production of lithium by 300%. We are actively processing 3PL's brines now. Mission Creek and Galvanic are scheduled to tour our Denver based facility in June. This will drive towards lab processing with those two. The largest external markets are located in Argentina and Chile. We met with SQM and Abermarle in Chile 2 weeks ago and are in the process of getting lab demonstration projects funded and kicked off. During that visit we set up the Gold Key US trade advocacy service and in August we fly back to Chile to meet the CFO's of both Abermarle and SQM with the support of the US trade commission. Further, in August we will be a key note speaker at the international lithium conference in Salta, Argentina again supported by the US trade commission and have a multiplicity of prospective client meetings established. The key targets in Argentina are: PlusPetrol / Litica, Lithium Americas, and Allkem-Livant.

What Makes Us Special

Our Advantage – Industrial Pre-Treatment & DLE - **INDUSTRIAL SCALE PRE-TREATMENT CONTROLS PRODUCTION FULFILLMENT & ELIMINATES THE EVAPORATION PONDS:**

Economics: This is the primary step which can substantially improve both CAPEX and OPEX.
Volume of Deliverability: How much brine fluid can be extracted and run through the production facility.

Efficiency of Deliverability: Pre-treatment is where 60% of the resource is lost & where massive water consumption occurs.
Simplicity of DLE: The ‘cleaner’ the input brine, the simpler the solution: less chemicals - better recovery.