

Water, Water Everywhere But Not A Drop To Drink!

Lithium-Rich Brine Potential in Southeastern Saskatchewan

¹Mark Caplan, ^{1,2}Ben Rostron, ¹Chelsey Hillier, ¹Zach Maurer

¹Prairie Lithium Corporation; ²Isobrine Solutions Inc

Summary

The insatiable global demand for lithium continues at an extraordinary growth rate to meet lithium consumption demands. Much of this lithium growth stems from the demand for electric vehicles. Global volumes of lithium supply almost matched volume demand for lithium in 2021. Global lithium production (excluding USA) increased from 82,500 tonnes in 2020 to 100,000 tonnes in 2021, an increase of 21% (Jaskula, 2022). Global lithium demand rose by 33% from 70,000 tonnes in 2020 to 93,000 tonnes in 2021. The supply of lithium however will likely not keep pace with growing demand resulting in elevated prices for the various products of lithium, including lithium carbonate, lithium hydroxide, lithium chloride and raw lithium. It takes several years to develop a new mine and bring it on production. Capital investment in lithium mines is increasing but will result in a large supply gap as demand continues to grow ever faster.

Lithium can be found in both hard-rock and soft-rock systems. It can be extracted by surface mining of pegmatite veins, concentrated in evaporative lakes or produced via wellbores from deep basin brines. The vast majority of lithium production (up to 68%) is derived from surface mining activity. In fact, 55% of global lithium supply came from just one country, Australia, in 2021 (Bowell, *et al.*, 2020; Jaskula, 2022). The only other major source of lithium production (comprising up to 32% of global supply) from the man-made evaporitic salar ponds of Argentina and Chile in South America (Bowell, *et al.*, 2020; Jaskula, 2022).

Both surface mining and salars are increasingly being scrutinized by consumers and investors alike. The principle issues with surface mining and salars are associated with the large surface environmental footprint, consumption of large amounts of freshwater and generation of waste products. In contrast, there has recently been growing interest in exploring for lithium-rich brines within depleted oil and gas fields. Suspended or abandoned oil and gas wellbores can be used as production conduits between the aquifer and surface facilities. Once the brine has been pumped to surface and passed through the processing facility and the lithium extracted, the lithium-deplete brine is returned to a deep formation via a disposal well. This area of lithium production is still in its infancy, and there are very few projects globally utilizing this technology to extract elevated levels of lithium from formation brines. Concurrently, there has been increased interest and success in discovering and improving Direct Lithium Extraction (DLE) processes. The

DLE processes remove lithium from brine to form a high purity lithium concentrate which can then be processed to form battery products. Sustained commodity prices at current levels are promoting increased interest in DLE technology in concert with deep basin brine production projects.

Recently, there has been increasing interest in lithium exploitation from the Western Canada Sedimentary Basin and Williston Basin. Lithium companies have appeared over the past 7 years in Alberta and more recently in Saskatchewan to explore for elevated levels of lithium in deep formation brines. These elevated levels of lithium occur in deeper stratigraphic units across the basins, and appear to be particularly concentrated in Mississippian and deeper stratigraphic intervals.

Interest in lithium within Saskatchewan has grown considerably in recent years as is evidenced by the increased acquisition activity for subsurface mineral permits during 2021 in southeastern Saskatchewan. The provincial government saw the largest ever financial inflow from the sale of Crown mineral dispositions, raising a staggering \$7.5 million in 2021 alone.

Prairie Lithium has secured a large tract of subsurface mineral permits in southeastern Saskatchewan in recent Crown public offerings and has been busily assessing and quantifying the lithium resource. Lithium distribution and concentrations have been confirmed through drilling of one of the first ever lithium-dedicated exploration wells in Canada. Moreover, Prairie Lithium is developing its own DLE technology to extract lithium from brines. This presentation will highlight some of the recent developments of Prairie Lithium Corporation, a junior start-up lithium exploration and production company based in Regina, Saskatchewan. The talk will illustrate the location of and quality of the company's assets, describe the recent drilling program and summarize some of its business activities. These activities are positioning Prairie Lithium to be a leading lithium producer in the province, and help to supply lithium to the global market.

Theory / Method / Workflow

Results, Observations, Conclusions

Novel/Additive Information

Acknowledgements

References

Bowell, R.J., Lagos, L., de los Hoyos, C.R. and Declercq, J., 2020. Classification and characteristics of natural lithium resources. *Elements*, v. 16, p. 259-264.

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