



Global Geoscience (ASX: GSC)

# Global Geoscience: Lithium and Boron on Equal Terms

Global Geoscience (ASX: GSC) is developing a unique dual-streamed lithium-boron deposit, ideally located in the United States in proximity to a growing potential customer base.

GLOBAL GEOSCIENCE'S 100 PER CENT-owned Rhyolite Ridge lithium-boron project in the US state of Nevada is close to existing infrastructure and just 25 kilometres west of Albermarle's Silver Peak lithium mine and 340km from the Tesla Gigafactory near Reno.

Rhyolite Ridge is one of the largest lithium and boron deposits in North America and has the potential to become a strategic, long-life and low-cost source of lithium and boron.

Being a dual-stream lithium and boron deposit, neither being by-products as they are two co-products, Rhyolite Ridge has the potential of producing equal revenue streams for both commodities, which places the project within a category of its own.

The Rhyolite Ridge project has a total Indicated and Inferred Resource that currently stands at 460 million tonnes at 0.9 per cent lithium carbonate and 2.6 per cent boric acid, containing 4.1 million tonnes of lithium carbonate and 11.9 million tonnes of boric acid.

The high-grade lithium-boron component of the Resource is estimated at 137 million tonnes at 1800ppm lithium (equivalent to 0.9% lithium carbonate) and 1.26 per cent boron (equivalent to 7.2% boric acid), with 75 per cent of the Resource in the Indicated category.

Global Geoscience has already demonstrated lithium and boron can be readily extracted by simple heap leach processing with high recoveries.

The company carried out heap leach processing of Rhyolite Ridge lithium-boron mineralisation returning lithium and boron recoveries of 88 to 92 per cent.

Metallurgical and environmental studies are in progress as part of the overall Rhyolite Ridge Pre-Feasibility Study, which is scheduled for completion in the second half of the year.

Global Geoscience is looking at Rhyolite Ridge in terms of it supporting a long-life mining operation at rates of 2 million tonnes per annum to 4 million tonnes per annum.

At present, the company is considering two development paths: the first being a smaller 2 million tonnes per annum starter pit based on a 26 million tonnes resource, and the second, a larger, unconstrained pit based on an 87 million tonnes Resource able to support 4 million tonnes per annum.

The smaller starter pit is winning at this stage as it has the potential to be granted fast tracked permitting by the US Government.

Independent metallurgical testwork has shown that simple, low-cost heap leach processes can be used to extract lithium and boron at high recovery rates into a Pregnant Leach Solution (PLS), from which lithium and boron can be removed through crystallisation and purification steps to produce lithium carbonate and boric acid at the mine.

Being able to extract lithium and boron via heap leaching at modest acid consumption rates means the project can operate using lower capital and operating costs when compared to other forms of acid leaching such as agitation (tank) leaching that require crushing, grinding, filtration and leach tanks.

It also demands substantially lower capital and operating costs to

those involved with hard rock lithium deposits (spodumene, mica, clay) that require beneficiation and high-temperature conversion or roasting to liberate the lithium from the lithium-bearing minerals.

Assuming a processing rate of 2 million tonnes per annum of ore, the project would generate revenue of about US\$240 million per annum split equally between lithium carbonate (US\$8,000/t conservative long-term pricing) and boric acid (\$800/t).

The company believes operating margins of 100 per cent are achievable with Rhyolite Ridge producing lithium carbonate and boric acid at roughly half the long-term prices being used.

"It doesn't really matter how big a deposit is or where it is, if it isn't going to be economic then it will not be viable," Global Geoscience managing director Bernard Rowe told *The Resources Roadhouse*.

"Being a low-cost of production project due to its the unique mineralogy, Rhyolite Ridge allows us to consider heap-leach/vat-leach type options for the extraction of the lithium and the boron.

"Rhyolite Ridge is the only deposit in the world of lithium or boron, certainly of lithium, that has been demonstrated to be processable by heap-leach or vat-leach.

The advantage of either processing route means less preparation is needed before leaching the ore and that the company will basically just need to crush the ore then pour on the acid with no secondary crushing, grinding, or beneficiating required.

"It is a simple operation, we just dig it, crush it, then leach it," Rowe said.



“At Rhyolite Ridge the minerals containing the boron and the lithium are quite soluble in relatively dilute acid, which we demonstrated by reducing the feedstock crush size to minus 38 millimetres from the minus 150 millimetres in earlier tests.

“Once you put the acid on it you produce a solution, from which you crystallise the lithium and boron, it is a simple flowsheet.

“Realistically, there are no other lithium deposits in the world where utilising this sort of flowsheet is being contemplated.

“Clearly that can’t be done with a spodumene deposit and the other sedimentary types, like lithium clays, also require high-temperature roasting for other reasons, but essentially it is not suitable to try and leach clay deposits with the diluted acid we are talking about at Rhyolite Ridge.”

The United States is the ideal location for such a project with the country being the second-largest market for boric acid in the world, meaning Rhyolite Ridge’s production is likely to have a ready-made customer base in the domestic market.

Currently, there is very little in the way of advanced lithium projects in the United States, apart from one existing producer, which only produces about 4000 tonnes of lithium carbonate per annum.

President Trump has stated the country’s need to establish a supply of critical metals, indicating lithium is one of those metals and if, as many analysts predict, the US is going to embrace the uptake of electric vehicles and power storage, demand is set to grow.

From a boron perspective, the US is currently a major producer of borates, due mainly to a boron mine operated by Rio Tinto in California, however this is an old mine that is getting more expensive to mine as it approaches the end of its life.

Turkey is the country to presently host an abundance of boron with only a few known large boron deposits being either developed or mined elsewhere in the world.

These are Rhyolite Ridge, the Californian deposit mentioned above and the Jadar deposit in Serbia, also owned by Rio Tinto.

“Potential boron production outside of Turkey remains very limited and yet the US is a major consumer of borate products, as is China, which has limited supply of its own,” Rowe continued.

“Japan, Taiwan, and South Korea are all big boron consumers, so the situation exists where Pacific countries are the dominant consumers while future production, other than Rhyolite Ridge—as it currently

stands—has to come from Turkey and Serbia.”

Global Geoscience expects to have the PFS completed in mid-2018, which it anticipates will confirm the company’s view that it has an economic pathway to develop the Rhyolite Ridge deposit into a substantial, low-cost, near-term producer of lithium carbonate and boric acid. 📍

## The Short Story

GLOBAL GEOSCIENCE LIMITED (ASX: GSC)

### HEAD OFFICE

Suite 203, 161 Walker Street  
North Sydney, NSW, 2060

Phone: +61 2 9922 5800

Email: [rhowe@globalgeo.com.au](mailto:rhowe@globalgeo.com.au)

Web: [www.globalgeo.com.au](http://www.globalgeo.com.au)

### DIRECTORS

James D. Calaway, Bernard Rowe, Alan Davies,  
Patrick Elliott, John Hofmeister

w4w media

[resourcesroadhouse.com.au](http://resourcesroadhouse.com.au)

This article was commissioned by the featured company. Reliance should not be placed on this article when making a commercial or other decision. All persons are recommended to seek independent professional advice in this regard. Word4Word Media disclaims all liability or responsibility for any direct or indirect loss or damage suffered by any person or entity through relying on anything contained in, or omitted from, this publication.

© Copyright Word 4 Word Media May 2018