

## Brazil: An exciting and under-appreciated emerging hard rock lithium province

A few months back in the March issue of *Battery Materials Review* we wrote about Quebec’s emerging hard rock lithium province, particularly that around the Corvette project in the north of the province.

The news is very much out on lithium exploration in Quebec in general and Corvette in particular. But Brazil is a country that’s seeing a rapid turnaround in its lithium fortunes and we don’t think it’s on the radar screen for most investors at the current time.

In fact, many investors may be surprised to know that Brazil currently has three operating hard rock lithium mines and is second only to Australia and China in terms of hard rock lithium production.

It has good infrastructure, clean power, a mining-friendly population and boasts exceptional spodumene-rich pegmatite resources. On top of that it’s a region with low costs and it benefits from a faster permitting approach than most countries.

*Continued overleaf*

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## Focus...Brazil – an under-appreciated emerging hard rock lithium province

A few months back in the March issue of *Battery Materials Review* we wrote an article focusing on Quebec's emerging hard rock lithium province, particularly that around the Corvette project in the north of the province.

This time we're writing about Brazil, a country which now has three operating hard rock lithium mines and a number of development projects. Most readers may not know that Brazil will shortly be the second-largest producer of spodumene concentrate in the world, after Australia.

Brazil's fledgling lithium industry is focused on the state of Minas Gerais, previously known mostly for iron ore mines, but also well-known for other minerals. There is already a considerable mining infrastructure in place, including know-how and trained personnel. This is important when looking to develop lithium assets.

Another factor which could differentiate Brazil, and certainly has similarities with Quebec, is its hydroelectric power endowment. Brazil boasts the world's second-largest installed HEP base and has the largest endowment in Latin America.

### Minas Gerais: Hard rock project and port locations



Source: Lithium Ionic, BM Review

Unfortunately, Brazil has been suffering drought conditions for many years which has impacted its HEP production, but it can still generate c.60% of its power needs.

This will be very important if Brazil chooses to go downstream and we regard it as only a matter of time before there are indigenous Brazilian hydroxide refineries in place. Given Brazil's endowment in nickel/cobalt, manganese and phosphate rock, we would suggest that there is also potential to build cathode plants in the country and, with it also boasting natural graphite, we don't see why establishment of an entire downstream ecosystem for lithium-ion batteries should be off the table.

### Government support

The Brazilian government rolled out the red carpet for lithium developers in mid-2022 when it relaxed rules on lithium exports; prior to that lithium exports were deemed strategic and had to be approved by the Science and Technology Ministry's nuclear energy committee.

It's not a well-known fact, but lithium is also used in nuclear reactors and this

was the reason for the requirement which was first imposed in the 1970s.

This move lit the blue touch paper for junior exploration companies and we began to see a number of juniors start to target the country. They followed existing lithium producers,

CBL (private company) and AMG (AMS:AMG).

Now the government is looking to court even more junior exploration activity and hopes to attract up to US\$2bn of investment. Following the recent elections, the government is now looking at measures to encourage development of a lithium-based industry which could include tax breaks for both explorers and downstream developers.

### Major movers and shakers

Not well known is the fact that there are now three producing SpodCon mines in Brazil.

Companhia Brasileira de Litio (CBL) boasts small-scale underground mines in Minas Gerais and has been mining in one site or another since 1991. It produces c.30Ktpa of SpodCon and has a chemicals plant to upgrade material to lithium carbonate via acid digestion, and also converts a portion of its production onwards to lithium hydroxide.

AMG built the Mibra mine, also in Minas Gerais, which came into production in 2018-19. It has capacity to produce 90Ktpa of SpodCon but is being upgraded to 130Ktpa from 2023. Product from the mine is earmarked for AMG's LHM plant which is under development in Europe and is expected to start up in 2028, but it is also developing a technical-grade lithium precursor plant which it hopes to bring into production in Q2/26.

**Sigma Lithium** (TSXV/NASDAQ:SGML) is currently building the Grota do Cirilo project, also in Minas Gerais. Its plant is also due to fully come on in 2023 (it has started production) but it's on a much larger scale than the aforementioned projects, targeting

## Focus...Brazil – an under-appreciated emerging hard rock lithium province...

270Ktpa of SC in its first iteration, before increasing to 766Ktpa at its full run-rate, before dropping back again. Currently it boasts a 13-year mine life.

On the exploration side there are another three relatively-advanced explorers:

**Atlas Lithium** (NASDAQ:ATLX) boasts 304sq km of lithium exploration properties in Brazil and is currently drilling in Minas Gerais on five targets within the state. It has identified 20 pegmatite outcrops on the three mineral rights that it's drilling and has a 40,000m drilling campaign underway. It also has projects outside Minas Gerais and projects in other materials.

**Lithium Ionic** (TSXV:LTH) has tied up 14,182ha of land and has projects within 500m of CBL and 4km from Sigma's Grota do Cirilo mine. It has a 30,000m drill program underway at its Itinga project close to CBL and Sigma, and is targeting an initial mineral resource in H1/23. Its Salinas project is close to Latin Resources' Collina project and it is running a 20,000m drilling program.

**Latin Resources** (ASX:LRS) is exploring the Colina project in the north of Minas Gerais. It has already delineated a 13.3Mt resource @ 1.2% Li<sub>2</sub>O and has identified significant upside. It has a 65,000m drill program underway for 2023.

The following are early-stage explorers:

**Oceana Lithium** (ASX:OCN) is the only explorer which doesn't have a project in Minas Gerais. It's exploring the Solonópole project in Ceara state in the northeast of Brazil and is starting a 3,000m drill program this quarter. Lithium has been mined historically in the state but at a small scale.

**Gold Mountain** (ASX:GMN) acquired a 75% holding in a suite of exploration licences in Brazil last year. It has commenced early-stage exploration at the Salinas project.

**Solis Minerals** (ASX:SLM) has acquired 22 exploration licences in Minas Gerais, which it is calling the Borborema project. It is set to commence mapping and target definition later this year.

**Xplore Resources** (TSXV:XPLR) has two projects, one in Minas Gerais and one in Rio Grande do Norte. It is earnings interests in various Ontario projects which look like being its primary focus currently.

### Advantages for SpodCon developers in Brazil

There are substantial advantages for companies looking to develop spodcon production, or even integrated operations, in Brazil which may very well not be available in other key locations, in our view.

- **Mineralogy** is quite simple. The pegmatites seem to be spodumene-rich and seem to achieve pretty reasonable recoveries using simple Dense Media Separation techniques such as heavy liquid separation (HLS) which require a substantially less-fine grind size than we see for most Australian and Canadian projects.

This makes for more attractive concentrate for converters and also lower capex/operating costs (since grinding/flotation circuits are not required). It also makes the processing more simple and easier to optimise.

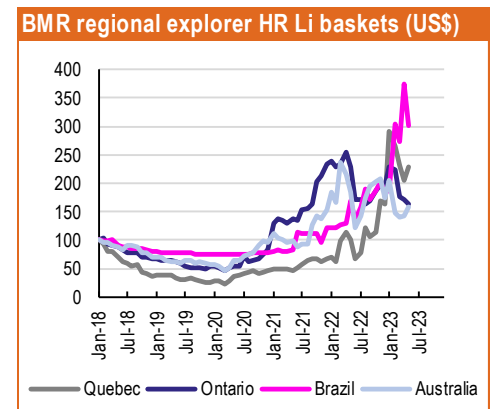
- It's a mining area with **strong infrastructure** – low-carbon HEP as already mentioned, good road network and existing ports, with

well-educated, mining-friendly workforce.

- The **approvals pathway** is substantially less time-consuming and cumbersome than Canada and much closer to Australia, which means that fast-track start-up is viable in a way that it will not be in Canada. Sigma went from discovery into production in five years and small-scale production is viable with an accelerated approvals (one year) process, so early-cashflow is viable.

All of these factors lead up to a substantial advantage for lithium project development in this under-researched region, in our view.

We recently introduced a **Brazil Hard Rock Exploration equity basket** and we note its strong outperformance vs other regions over the past six months, an outperformance we expect to continue in the near-term.



Source: BM Review

We note that Brazil also boasts nickel/cobalt, graphite and manganese endowments, as well as the aforementioned HEP. While Midstream plants do not currently seem to be on the drawing board, we would suggest that it would make a lot of sense to go Midstream, and potentially even Downstream, in Brazil. Watch this space!