



## Lithium

### What does the new year hold for lithium companies and is the metal set for a rally?



#### A looming discrepancy?

As seasoned market observers know, one of the rarest phenomena in mining is when the price of a metal (or mineral) moves in one direction

and the share prices of companies that mine or explore for that metal move in the other. Nevertheless, this is precisely what has happened in the lithium sector in recent months. Such a discrepancy is almost invariably an investment opportunity.

The spot price of lithium carbonate in China (a benchmark – note that contract prices and higher-quality carbonate prices are significantly higher) has fallen to up to US\$6,000 per tonne – less than half its peak. Meanwhile, the share price of major lithium producer SQM, to take just one example, has rallied from US\$22 to US\$31 per share (having fallen from a high of as much as US\$59 in January 2018).

#### Why have company and commodity prices moved out of step?

The key to understanding this discrepancy lies in lithium's relatively long supply chain. Whereas most metals are rapidly processed into something close to their final form, lithium has a relatively long supply chain. In crude terms, this comprises five distinct steps: mining, chemical production, cathode production, lithium battery cell manufacture and application.

As such, the lithium supply chain resembles something closer to oil than a traditional metal, with each distinct stage of the supply chain having its own supply and demand dynamics. In the same way that oil has upstream and downstream products and derivatives, so does lithium.

Currently, therefore, while the upstream (mining) end of the supply chain is still relatively well supplied, the downstream (battery application) end is tightening sharply. As with oil, however, what happens downstream usually has a way of filtering back upstream.

#### What is the origin of the current supply/demand mismatch?

The origin of the current mismatch between the two ends of the supply chain can be traced to last year, when (after a long positive run) automotive demand softened and the lithium market tipped into over-supply.

China, which accounts for as much as 60% of electric vehicle (EV) sales worldwide, continued to lower subsidies. As a result, the growth rate of EV sales halved, relative to 2018, as did the lithium hydroxide price (the form of lithium increasingly favoured by battery manufacturers for its chemical stability in cathodes with higher nickel contents and therefore longer lives).

#### What has been the supply-side reaction?

Lithium salts are typically, although not exclusively, produced via one of two methods – either from brines (typically in South America) or hard-rock spodumene (typically in Australia and, increasingly, Canada).

While both methods can be used to produce both lithium carbonate and lithium hydroxide, spodumene is increasingly recognised as having advantages for the production of lithium hydroxide. In the case of spodumene, lithium hydroxide can be produced directly, whereas brines require lithium carbonate to be produced initially, with a subsequent step required to convert it into lithium hydroxide.

The initial result of the slowdown in EV sales, therefore, was to cause a backlog in spodumene production in particular. Since then there have been a number of developments on the supply side that have curtailed production. Firstly, in response to the glut, Galaxy (another producer) scaled back production at its Mt Cattlin mine in Australia by as much as 60%.

Secondly, SQM had its production plans frustrated by an unfavourable court ruling on environmental considerations.

Together with other closures, curtailments, delays and deferrals, Canaccord has estimated that as much as 450kt of lithium carbonate equivalent has been removed from the future supply pipeline since August 2019. This is approximately the same as the estimated

#### Edison Insight

'One of the rarest things in equity markets is when the price of a metal moves in one direction and the price of the equities that either mine or explore for that metal move in the other. If this happens, the first thing to do is to understand why.

The second is to make money.' Charles Gibson, Edison head of mining

size of the global market in 2021.

### **Will the demand side return to trend?**

While growth slowed in 2019 relative to 2018, there was still growth. What's more, that growth appears to be returning to trend, in part helped by governments and politicians (depending on one's level of cynicism) variously committed either to improving environmental standards or winning market share.

China, for example, which had previously stated that it intends to eliminate subsidies on EVs by 2021, has now said that it will not cut subsidies this July, while the US has committed to halving tariffs, from 15% to 7.5%.

At the same time, the EU has approved €3.2bn in funding for battery projects in the form of two 32GWh battery mega-factories. Concurrently, Germany has committed to phasing out coal power by 2038, while the UK government is to fund 15GWh of capacity within two years at a cost of US\$1.2–1.5bn, with a target of achieving 150GWh of capacity by 2030.

The UK government has also brought forward the date for a proposed ban on the sale of all new petrol, diesel and hybrid cars to 2035. In addition, the government-funded Faraday Battery Challenge recognises the need to develop a domestic lithium supply chain. All told, 115 mega-factories were in the pipeline, globally, at the last count, with the largest single portion attributed to China and the most rapid growth in Europe.

However, activity hasn't been limited to governments. Corporations have also been similarly keen to claim their share of the action. As acceptance of battery technology has been growing among consumers, LG Chem and General Motors have agreed to invest more than US\$2bn in a battery factory in Ohio. Elsewhere, Tesla has been looking at a US\$2bn factory in China to support the production of 250,000 EVs a year in the plant's first phase.

In Europe, Volkswagen is targeting 1.5m new EVs pa by 2025 (including hybrids). It plans to build a US\$2.5bn EV plant with its partner, SAIC Motor, with the capacity to produce 300,000 EVs pa and the option to build its own plants in China. In fact, Volkswagen is so confident in the new technology, that it has cut work on alternatives, such as fuel cells, to support its focus on battery-powered EVs.

### **Why has the supply side been unable to meet demand?**

While the demand side has returned to trend, or even accelerated, the supply side has been unable to react as quickly, threatening to tip the market back into fundamental deficit as early as Q320.

In the first instance, the investment required to support demand into 2024 needed to be made in 2019, when the industry was, in fact, cutting back. Moreover, not all investment that has been made is guaranteed to translate

into future production, as demonstrated by the Nemaska saga.

Thus, whereas the China Association of Automobile Manufacturers forecasts that EV sales will be flat in 2020 versus 2019. Bloomberg forecasts that the market will increase by 20% to 2.5m EVs globally, with 60% growth in Europe leading the way, and the number of public interconnectors growing from 880,000 to 1.2m.

According to Seeking Alpha, this will result in the lithium carbonate price reaching US\$12,000/t by the year end and US\$13,000/t in 2025, when demand for lithium will reach 1.637Mtpa and the lithium hydroxide price will have reached a premium US\$16,500/t.

### **Are all battery suppliers the same?**

As a consequence of all of the investment in battery capacity, the cost of battery manufacture has continued to fall – by 13% over the course of the past year, by 50% over the last five years and by 89% over the past 10 years. Moreover, it is forecast to fall further. Bloomberg estimates an average cost of production of US\$135/kWh in 2020 for large cars, with manufacturers targeting US\$105/kWh and ultimately below US\$100/kWh.

This has coincided with the realisation that not all lithium-ion battery cells are suitable for electric vehicles, with consequent shortages of so-called 'Tier 1' cells. This has prompted auto manufacturers to become more assertive in aligning more closely with Tier 1 battery producers (which account for only 30–40% of battery supply) to guarantee security of supply.

In the most recent example, Volkswagen has taken a stake in Guoxuan Hi-Tech, which has 13GWh of capacity in the form of three mega-factories, with a fourth in prospect.

### **Have all lithium equities reacted in this way?**

While the share prices of many of the lithium majors (eg SQM) have doubled in recent months, those at the junior end of the spectrum have, to date, been noticeably more prosaic. This is despite the fact that many of the developments in the market are of a long-term nature and therefore affect the economics of the juniors at least as much, if not more, than the majors.

Two companies of note in this respect are Rock Tech Lithium and Lepidico. Both are seeking to contribute to future lithium supply. Rock Tech Lithium is developing a conventional, hard-rock lithium prospect in Canada. Lepidico is seeking to use a unique, patented processing technology to bring less contested, and therefore often overlooked, lithium micas (eg lepidolite) to account profitably and economically.