



Subscribe today: info@benchmarkminerals.com

Wednesday 24 January 2018

www.benchmarkminerals.com

Author

Andrew Miller

Senior Analyst

Office: +44 20 3289 3076

amiller@benchmarkminerals.com

Managing Director

Simon Moores

Office: +44 20 3287 3399

smoores@benchmarkminerals.com

Benchmark Mineral Intelligence

info@benchmarkminerals.com

Social:

 @benchmarkmin

 Benchmark Mineral Intelligence
Group

 Benchmark Mineral Intelligence

SUBSCRIBE TODAY

Benchmark's Lithium Price Assessments
includes monthly assessments on:

Lithium hydroxide

■ 4 grades and global weighted average

Lithium carbonate

■ 4 grades and global weighted average

Lithium price index

Contact: info@benchmarkminerals.com

Distribution warning: This market intelligence is for subscribers to Benchmark Mineral Intelligence services and other selected channels. If you do not subscribe, or have not received this directly from Benchmark, you are not authorized to read, use or distribute this document of the information it contains. For access, please email us at info@benchmarkminerals.com

Lithium oversupply fears grip investors as industry still awaits Auto, Grid era

by **Simon Moores, Andy Miller**

Fresh off Bank of America Merrill Lynch (BAML) and Benchmark Mineral Intelligence's energy storage seminar in New York on Wednesday, it became clear that top level investors were gripped by a fear of lithium oversupply and a subsequent price crash.

Lithium stocks have taken significant hits over the last week and the seminar sought clarification from Benchmark and guest speakers.

Here, Benchmark outlines the main points of contention and its independent thoughts on the matter.

SUPPLY

Oversupply fears

1. China conversion capacity

Spodumene conversion capacity in China will have the greatest bearing on lithium supply and price in 2018. Calculating an accurate figure for spodumene conversion capacity in China has been somewhat of a challenge for many analysts new to the space as well as those that take a hands-on approach when choosing whether or not to visit operations around the world.

Last year, the bulk of new lithium carbonate equivalent (LCE) units were from China securing more spodumene feedback from Western Australia (thanks to Mt Cattlin, Mt Marion and Greenbushes). Although the country's converters boast a combined nameplate capacity of over 200,000 tpa, in reality the usable capacity is in the region of 140,000 tpa – much of which is unable to produce to battery-grade specifications.

Chinese converters worked at close to this capacity last year, producing 120,000 tonnes in 2017. This is a significant increase on 2016 when China produced 85,000 tonnes of LCE from a similar capacity.

The key question is over expansions of these facilities. Of course the premier converters are Ganfeng Lithium and Sichuan Tianqi and both are planning significant expansions domestically and abroad.

At the conference, many data points were being thrown with regards to China's planned expansion in 2018. The biggest number was 180,000 tpa of additional LCE capacity coming online in the next 12 months, the bulk of which from many new and fringe players in the space.

Benchmark Mineral Intelligence discounts a large proportion of this new capacity as hearsay and conjecture. Historically the installed nameplate capacity of many Chinese facilities has been much higher than their actual output levels.

The data points that Benchmark works from is 100,000 tpa of new conversion capacity in China by the end of 2019 at the earliest.

To impact the price of lithium carbonate and lithium hydroxide that Benchmark assesses, you will have to look to the established names that have a history of creating high quality battery grade chemicals – and they are few and far between.

January 2018

■ Focus has to be on battery grade hydroxide and carbonate and not on converted material

■ DSO not yet included in Benchmark's data

■ Status quo remains as new SQM supply still focused on Argentina with Lithium Americas

■ CORFO-SQM settlement will secure more bullish long term lithium demand as auto makers gain confidence

6,250

The equivalent number of Tesla Model 3s worth of energy storage consumed at Aliso Canyon's project in 8 months

Certainly, Ganfeng Lithium, Sichuan Tianqi and Albemarle's GRM stand out. But as we track the supply chain from spodumene to battery grade chemicals the bottlenecks become apparent.

- Ore / DSO (No bottleneck, low barriers to entry)
- Spodumene Concentrate (No bottleneck)
- Lithium Chemicals (Semi bottleneck)
- Battery Grade Lithium Chemicals (Bottleneck)
- Cathode (Bottleneck)

As spodumene players tie in conversion partnerships, its critically important to ask who is converting this material and if they can reach specification for battery makers. Just selling to China is not the end of the story, its just the beginning.

DSO entering the supply chain

With DSO (Direct Shipped Ore) becoming a topic of discussion in 2017, the question of whether this spodumene ore is being purchased by China-based customers has arisen a number of times.

Benchmark does not include DSO in its spodumene or lithium chemical supply numbers until firm evidence of this being first processed into spodumene and then into LCE units presents itself. In 2017 the volumes that made their way from DSO to market were marginal but with large stockpiles now in China this material is expected to have a some impact on supply in H2 2018.

Benchmark's analysts will be on the ground in China to monitor this situation throughout 2018.

LONG TERM SUPPLY

SQM Atacama deal

As **Benchmark** keynoted the Bank of America Merrill Lynch event, one of the three lithium developments to watch was the SQM-Corfo peace talks that we described as "imminent".

Little over two hours later and the deal was announced to increase SQM's extraction licence to 216,000 tpa LCE to 2025.

This is good news for a lithium industry post-2021. Until then the status quo remains.

SQM will continue to work on its JV with Lithium Americas in Argentina to bring new supply into the industry by the 2020 mark. After this is successful, SQM will then review the many raw material it has created itself including:

- Expanding the Atacama (Production expected >2022)
- Building out spodumene conversion capacity and progressing its deal with Kidman Resources (>2022)
- Securing a fourth lithium resource and putting it into production (>2025)

DEMAND

Auto era is yet to arrive for lithium

Is Toyota auto really in the lithium game? This was one of the most immediate demand questions to answer at BAML's energy storage seminar.

Toyota Tsusho announced its deal with Orocobre to take a 15% stake in the Argentina-based brine producer to fund a 25,000 tpa expansion to 42,000 tpa nameplate capacity.

This led to many headlines around the world such as *Orocobre surprises market with new Toyota*

January 2018

100 days

Tesla installed the 129MWh lithium ion system in South Australia in under this contracted time period

partnership (Sky News Australia) or *Toyota buys key stake in lithium miner* (The Australian).

Those familiar with the lithium industry in 2010 will remember Toyota Tsusho was Orocobre's key partner investing cash to help get the new project up and running. In return, Toyota Tsusho – the Japanese trading company and not the car producer – earned the rights to sell Orocobre's lithium into Japan.

The investment should not come as any surprise to the market.

The new deal is a great boost for Orocobre and a vote of confidence for the Olaroz project that has had its share of criticism. This is simply the next stage of a producer and trader relationship, rather than a decision from the top of Toyota's electric vehicle (EV) planning tree. Toyota's EV ambitions will crystallise towards the end of 2018 and into 2019.

No lithium deals yet for VW, Ford, GM et al

This then brings us onto the other auto majors that are ramping up their pure and hybrid EV plans.

VW's high-profile pursuit of lithium and cobalt – including hosting two unfruitful supply side summits in late 2017 for each mineral – was just the start.

All auto makers are now fully aware of the need for secure, long term lithium supply but none have yet locked in long term contractual agreements. Their negotiating stance is weakening by the day as more auto makers commit tens of billions of dollars to build out their EV production capacity – Ford being the latest, committing \$11bn to build 40 hybrid and pure EVs by 2022.

Therefore, while this auto speculation aids the upward trajectory of lithium's price curve, it is not yet the defining factor. Real lithium supply and demand – producers selling to cathode manufacturers – is what is driving this price. The auto majors are yet to enter this "real" market.

2018 is decision time and you can expect a number of lithium auto deals to be struck within the next 24 months as the need for long term supply intensifies.

Grid Storage sneaks up on lithium

Grid storage (also referred to as utility or stationary storage) was the main downstream focus of the BAML conference – the first event to really dig deeper into the impact of grid storage in relation to the entire battery supply chain.

The reality of the situation is that lithium ion based grid storage snuck up on the lithium industry in 2017 and manifested itself in two landmark projects: Aliso Canyon and Hornsdale.

Aliso Canyon has been described as a *movie quality crisis* that resulted in a tender for 343MWh worth of energy storage to address a power shortage following a major gas leak. The response was rapid and significant in scale.

326MWh worth of lithium ion batteries were installed and operating in 8 months. Most telling were the size of some of the batteries: AltaGas-Greensmith Pomona and Tesla each installed 80MWh systems while AES Escondido built a 120MWh facility using Samsung SDI cells.

The second major project was Tesla's 129MWh Hornsdale lithium ion installation in South Australia which was installed in well under the 100 days promised by Elon Musk. Within two weeks of coming online, the system was put to the test when the Loy Yang coal power plant dropped output. The Tesla system kicked in 0.14 seconds later.

January 2018

Benchmark Minerals' lithium hydroxide prices (mid point, assessed December 2017)

- Exw China \$22.6/kg
- CIF Asia \$20.5/kg
- FOB, N America \$16.5/kg
- CIF Europe \$16/kg



Price takeaways:

- Room for price convergence, yet global average to still rise
- Sky high China prices may see correction in H1
- ROW prices have room to continue their rise in H1

The two major takeaways here are:

- a) the size of the batteries
- b) the speed in which they can be deployed.

The batteries installed at Aliso Canyon, for example, equates to over 6,250 Tesla Model 3s. As confidence in energy storage using lithium ion batteries gathers pace, these systems will get bigger and will be installed quicker. And it is a trend that has snuck up on a lithium industry that is laser focused on electric vehicles.

PRICES

Convergence more likely than crash

As a result of these most critical supply and demand dynamics, it is important to remember the fundamentals of the lithium industry have not changed.

It continues to operate as a niche, speciality industry that is serving a high spec end market in lithium ion batteries. This analysis has not even discussed the other 50% of supply that serves a wide variety of growing markets and how this will impact demand.

Quite simply, to impact the battery grade lithium carbonate and lithium hydroxide prices that **Benchmark Mineral Intelligence** assesses on a monthly basis, battery grade product has to be produced and sold to cathode and battery makers.

Producing DSO or even spodumene concentrate and adding it to stockpiles is not creating new LCE supply. Then understanding the conversion capacity in China – what is real versus what is conjecture, what is technical grade versus what is battery grade – is key to understanding how much of these feedstock makes its way into batteries. Only then will you see a price correction on the global price averages.

Under the most likely scenario, we can see the prices of Chinese lithium chemicals and rest of the world prices converging.

Chinese lithium carbonate and hydroxide prices have been high for some time and the rest of the world has been playing catch up. The grades for **Benchmark Minerals'** lithium hydroxide per tonne, as an example, are as follows:

- EXW China- \$22.6kg
- CIF, Asia - \$20.5kg
- FOB, North America - ~\$16.5kg
- CIF, Europe - \$16kg
- **Benchmark Minerals'** global weighted hydroxide average: \$18.81/kg

The difference between the highest priced grade (converted material within China) and the lowest price grade (brine sourced European hydroxide) is \$6,600 – there is certainly room for these prices to converge but the overall global weighted average to carry on rising.

That is why its vitally important to also understand that there is not just once price for lithium but a wide range of grades and specifications that command their own prices on their own merits.

It is why **Benchmark Mineral Intelligence** was established, to bring an independent price assessment system that was designed for the lithium space by analysts that understand the industry. **Benchmark Minerals'** lithium prices have become the industry reference in a short period of time and are also published by Bloomberg and Thomson Reuters.