

The Power of 3

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Driving the future further



Overview

Often, industry analysts seize on the current statistics for lithium supply and demand as indicative of long-term trends in the market for this valuable commodity.

For many, it seems, the rapid increase in hard-rock production, combined with a slower-than-anticipated uptake of electric vehicles (EVs), is a sure sign that with respect to the lithium price, the sky is about to fall in – they forecast a glut in supply that will send the value of lithium, and the chemicals produced from it, tumbling fast.

Look closely, though, and nothing could be further from the truth ... at least not on the supply and demand sides of the equation.



Part 1 Infinite Lithium

The effect of competition

As with all commodities, the lithium price is driven by supply and demand. That said, competition is also a great enabler. As more lithium players enter the market and supply increases, inevitably there will be downward pressure on price. But, if lithium prices do soften, the bonus is that lithium-ion batteries (LIBs) will be cheaper. Why? Because the chemicals they contain represent a large proportion of the cost of those batteries (which remain relatively expensive). So, if the price of the main commodity (lithium) required to produce the battery chemicals falls in line with current projections, so also will the price of LIBs, which are very much in demand.

The *Australian Financial Review* noted recently that, in February, the Canadian Dutch metals tracker Adamas Intelligence cited 76% more lithium carbonate equivalent (LCE) being deployed worldwide in the batteries of new electric, plug-in hybrid and hybrid electric passenger vehicles compared to the same month in 2018. The research company, which monitors EV registrations and battery chemistries in more than 80 countries, averred that among all metals and materials found in EV battery cathodes, lithium use saw the greatest gains.

And, according to *Bloomberg*, the Global X Lithium & Battery Tech ETF (exchange-traded fund) – valued at less than \$US50 million in early 2016 – had by June 2018 received more than \$US900 million of net inflows.

Moreover, a recent *Renub Research* study tipped the global automotive LIB market to surpass \$US65 billion by the end of 2024, it being underpinned by growing government support for clean energy and environmentally friendly modes of transport.

Reaching economies of scale in LIB production will be a significant step in decreasing the overall cost of EVs, which are expected to surpass traditional vehicles in market share by 2038.

So, lithium 'glut' or not, significant pricing pressure on lithium chemicals will lead to competition among battery manufacturers in the first instance, with EV producers to follow, and have a major influence on cost outcomes right across the board.

Capacity

In terms of lithium supply, production of spodumene (hard-rock production) is expanding the most rapidly worldwide, it being the mineral feed source for most lithium-concentrate refining operations (generally referred to as 'converters'). It is the capacity constraints of these converters that limit the delivery of lithium chemicals to battery producers ... and in so doing inhibit the ability of the EV industry to meet global demand for such vehicles.

In other words, the fact that EV uptake is not meeting projected trends is due neither to a lack of demand for EVs nor a problem with the supply of the lithium itself to feed that demand – the issue is that of insufficient downstream processing capacity.

Nor are increasing stock levels of spodumene concentrates symptomatic of lack of demand for lithium; rather, they too are indicative of insufficient conversion capacity.



Demand seems infinite

Today's most common LIB chemistries consume approximately 700 grams of lithium per kilowatt/hour (KWh) of storage capacity. Since around 1.5 terrawatt hours (TWh) per annum of LIB production capacity will be installed by 2028, it's easy to see how supply constraints could arise.

Such capacity will require about 700,000 tonnes of lithium annually (equating to ~3.6 million tonnes of LCE). Given that current levels of LCE production are barely above 200,000 tonnes per annum, an increase in the production of lithium chemicals in the order of **15-fold** will be required over the next decade to meet future EV demand alone. (In fact, that volume equates to the roughly 50 million new EVs required annually to replace the ICVs due to be outlawed in many jurisdictions – including much of Europe, as well as China and India – by 2030.)

So, despite what's happening in Australia – where production of lithium concentrate is escalating rapidly – it's unlikely that either primary supply or new LCE production can meet demand globally in the longer term.

Satisfying demand for lithium requires not only greater resource utilisation (improved recoveries) but also exploitation of less conventional sources of this element.

Easing constipated supply

New refineries committed to or currently under construction will help alleviate constraints in the lithium chemical supply chain, allowing for a better match between lithium mine capacity and demand not just in the EV space but also for energy storage.

It appears, though, that as new refining capacity is brought on line the supply pressure point may result in the unfortunately-longer-than-planned commissioning of battery megafactories. Tesla's, for instance, are yet to achieve full design capacity and it seems other plants are experiencing similar issues. This means that, potentially, the 2030 targets outlawing new internal combustion vehicles (ICVs) may be almost impossible to attain in that time frame. But will that affect the price of spodumene? Probably not.

Drivers of demand

As mentioned, commentary on demand for lithium (and LIBs), and the reasons why, is ongoing and ubiquitous. Suffice to say here (as in previous issues) that the commitment of many nations to the Paris Agreement and the subsequent One Planet Summit, as well as campaigns like EV30@30, is indicative of policy goals globally (with Australia and the US notable exceptions).



Also as detailed in past issues, original equipment manufacturers in the vehicle industry have hit the ground running, with the majors announcing the introduction of EVs across most of their range.

In fact, the figure of around 50 million new EVs by 2030 that was mentioned earlier could well be eclipsed by factoring in consumer demand.

Moreover, off-grid, supplementary and renewable power applications – which all necessitate energy storage – will be big contributors to lithium demand, despite the lack of weight afforded analyses of this sector.

Australia currently represents the largest market for domestic energy storage, with the South Australian government announcing subsidies for 40,000 household units. In Western Australia, meanwhile (where 30% of power distribution costs service only 2% of the population), there is a huge imperative to go off-grid. Indeed, electricity utility Western Power has plans to establish 25,000 remote-area power units, complete with battery backup, to rationalise its per-capita distribution costs – a potential benefit for all consumers in that state.

With respect to demand for energy storage overall in Australia, utilities are at the fore – South Australia already hosts the world's biggest battery (courtesy of Elon Musk), and batteries are being used by diesel power stations to achieve superior load sharing and reduce the spinning reserve that would otherwise be required.



And finally ... Speaking of EVs, electric now has a Mercedes:

"Here we are again. Back where we were 130 years ago, when we invented the car. At the start of something really great. That's what the first drive in the EQC feels like. Without a single drop of petrol, with no local emissions, and with no trouble whatsoever – it changes everything. Join us as we embark on the next 130 years."

After a long period of intimations, the Mercedes EQC is finally rolling off production lines in Germany. With an 80 kWh LIB pack linked to two electric motors (one on each axle), it's all-wheel drive with around 450 kilometres of range ... and it can tow up to 1,800 kilograms. Just the thing for a spot of glam weekend camping, boating or fishing. Expect it later this year ...

Which Perth-based company is closing the loop on energy metals?

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