

China's EV push fuels lithium demand

The Asian giant's move towards electric vehicles, particularly for buses and commercial vehicles, will ensure that lithium remains a cornerstone of battery technology. By Sebastian Lewis

Demand for lithium, one of the key materials used in making lithium ion batteries, is rising rapidly. The metal is used in a wide variety of industrial applications including glass, ceramics and greases. But it's the use of lithium as a key component in the batteries powering electric and hybrid electric vehicles that has so excited markets.

Lithium does not occur naturally in nature. Instead, it is found in a variety of mineral salts, which need to be chemically processed to form the lithium compounds and chemicals required by industry. A number of lithium compounds are used by industry, but lithium carbonate is the most commonly used form of the metal, accounting for more than half of total demand. The lithium industry often expresses lithium production and trade in lithium carbonate equivalent (LCE) units.

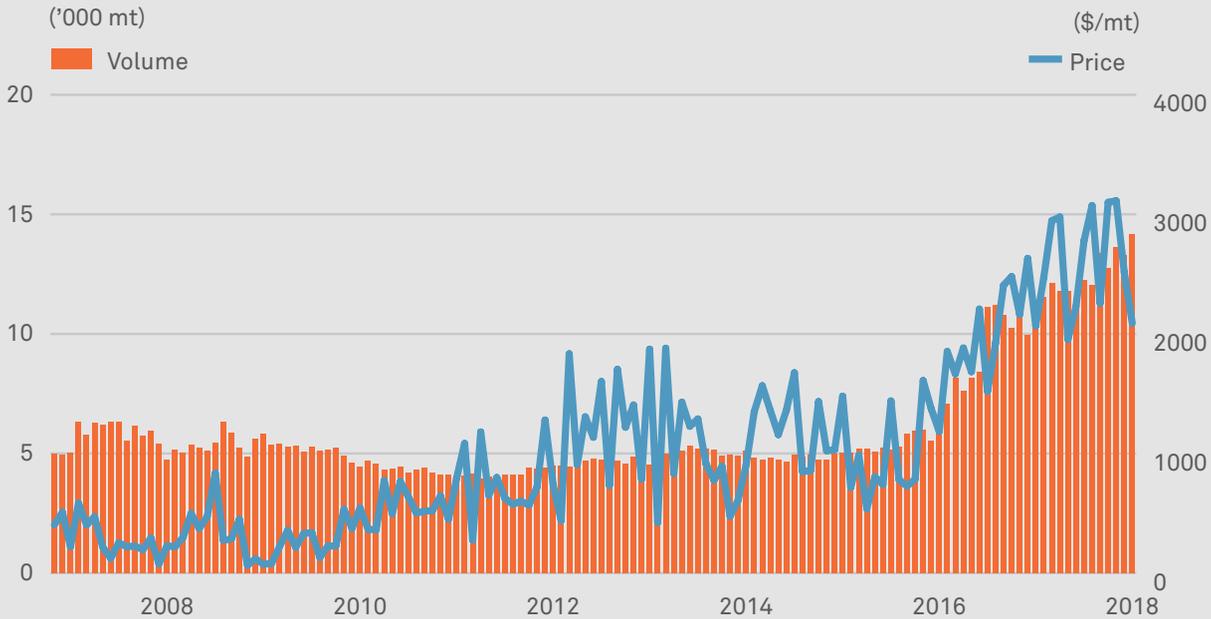
If EVs, which rely wholly or partly on electricity stored in batteries as their source of energy, revolutionize road transport in the way many expect, demand for

lithium will rise exponentially. China will be at the forefront of this.

China is already the world's largest market for EVs, accounting for nearly half of global sales last year. This trend is expected to continue, supported by government policies driving the development and adoption of electric vehicles. This will require a significant increase in both lithium carbonate and increasingly lithium hydroxide, another lithium compound, which is preferred for making the next generation of lithium battery technologies.

China accounted for slightly more than half of total global production last year, producing 123,000 mt LCE, according to statistics from the China Nonferrous Metals Industry Association (CNMIA). Of this, 83,000 mt was lithium carbonate, with the remainder comprising other compounds, such as lithium hydroxide, lithium chloride and lithium metal.

Chinese lithium carbonate imports and price



Source: CEIC/China Petroleum and Chemical Industry Federation

Reliance on imports

China is very reliant on imported raw materials, with many Chinese producers using concentrated spodumene, a mineral form of lithium mainly imported from Australia. Producing lithium from spodumene is expensive, with costs at some Chinese producers using imported material reported to be more than \$10,000/mt of lithium carbonate. In contrast, producers making lithium carbonate from mineral brine, like those in Chile, may have costs under \$2,500/mt.

Strong lithium demand over the last few years has seen high-cost Chinese producers using imported spodumene set the marginal price. This has been reflected in the average price of imported lithium carbonate, which has more than doubled over the past year and a half, according to customs data. The price of battery-grade material is even higher, with S&P Global Platts assessing battery-grade lithium carbonate CIF North Asia at \$16,000/mt in early August.

With demand continuing to outstrip supply and prices holding at elevated levels, lithium carbonate imports

remained strong in the first quarter of this year, up 13% against the same period of 2017.

In a bid to secure future supplies, Chinese companies have therefore been looking overseas. China's Tianqi Lithium controls 51% of Talison Lithium, the world's largest producer of spodumene, most of which is shipped to China. And in May, Tianqi Lithium bought 24% of Chile's SQM, the world's lowest-cost lithium producer. This should support continuing imports of lithium carbonate into China even while a number of new Australian spodumene projects come on line.

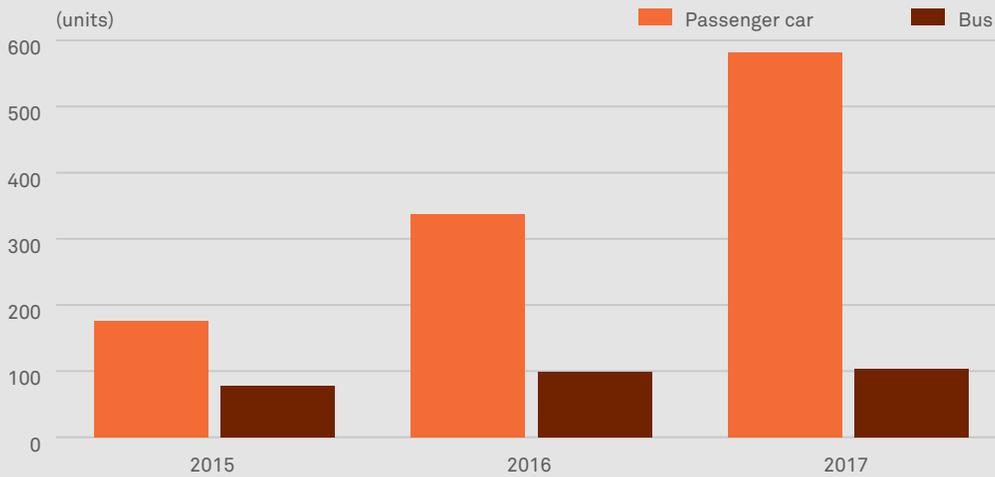
Electric buses

One unique feature of the Chinese EV market is the popularity of battery (BEV) and plug-in hybrid (PHEV) buses. Due to city governments favoring cleaner battery technologies over diesel engines, EV buses last year accounted for over 20% of total sales of buses in China. This contrasts markedly with passenger car BEV and PHEV volumes, which although much higher in absolute terms, accounted for under 2.5% of total car sales.

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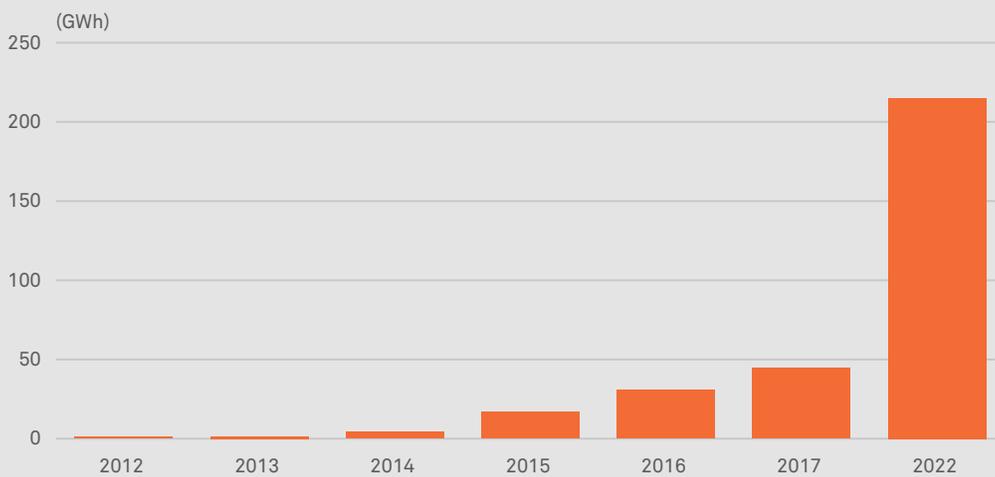
20%
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of buses in China

Chinese sales of BEV and PHEV passenger cars and buses



Source: CEIC/CAAM

Historical and forecast production of batteries for New Energy Vehicles in China



Source: CATL IPO Prospectus

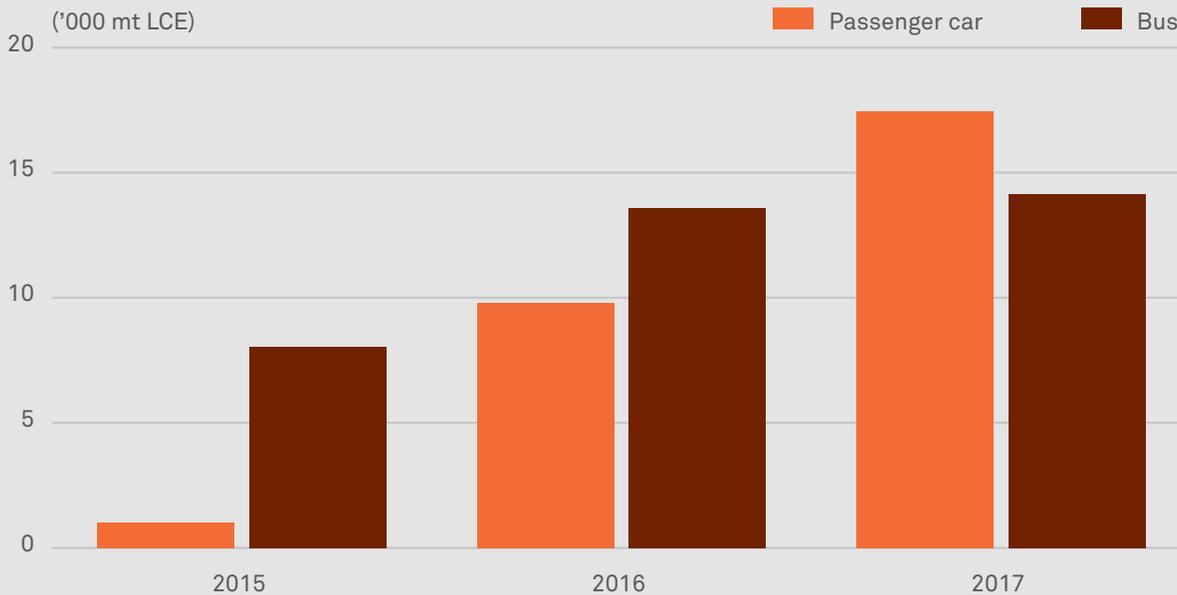
A new policy introduced this year to promote development and production of EVs is expected to change the landscape for EVs in China. Though ambitious, it could see annual EV sales reach 7 million units by 2025, accounting for 20% of new passenger car sales.

The scale at which Chinese EV battery production capacity is expected to rise to meet this demand can be seen in the recent IPO prospectus by battery maker CATL, which shows EV battery capacity

forecast to increase by nearly five times by 2022 to meet the demands of both local and foreign vehicle manufacturers in China.

This increase in battery production will see a significant rise in demand for metals like cobalt, nickel and lithium. Lithium carbonate is currently the predominant form of the metal used by battery makers in China, with lithium-iron-phosphate (LFP) batteries commonly used by Chinese vehicle manufacturers including BYD, FAW-Volkswagen, Geely and Great Wall Motors.

Estimated lithium carbonate demand from Chinese EVs



Source: S&P Global Platts estimates, CEIC/CAAM

Newer battery technologies, like nickel-cobalt-aluminum (NCA) and nickel-manganese-cobalt (NMC), produce more energy for their size than LFP technology, but are more expensive owing to the use of nickel and cobalt. Regardless of the battery technology and the amount and proportions of other metals, the amount of lithium required remains more or less the same. Because newer battery technologies will produce more energy for their size the, lithium intensity — the amount of lithium used per unit of energy the battery produces — is expected to decline slightly over the next decade. But this will be offset by a shift to larger battery packs to give EVs the range that consumers demand.

The next generation of NCA and NMC 8:1:1 batteries, which use eight parts nickel to one part manganese and one part cobalt, will favor the use of lithium hydroxide. However, it is likely that LFP batteries will continue to be used in China. LFP batteries do not provide as much energy as an NCA or NMC battery of the same weight, but in addition to being cheaper to produce they have a higher thermal stability, making them safer. NCA batteries in particular can be unstable and prone to overheating, causing fires. LFP batteries are therefore likely to continue to be used in China, especially in vehicles like electric buses where safety is of paramount importance.

The battery packs used in BEV and PHEV buses are on average much larger than those found in passenger cars, which means that they have been a significant driver of lithium demand. Indeed, S&P Global Platts estimates that in 2017 buses accounted for around 45% of all lithium demand from the Chinese EV sector.

Given the government's desire to reduce air pollution and develop China as a leader in EV technology, it looks like commercial vehicles, and buses in particular, will continue to be significant drivers of EV penetration and lithium demand in the years ahead. ■

S&P Global Platts battery-grade lithium carbonate assessments

The new S&P Global Platts battery-grade lithium carbonate price assessments are available to view in our Metals Daily newsletter or on Platts Metals Alert Page 8888. For more information, or to share any feedback with us, please email battery_metals@spglobal.com.