Tesla's pivot towards LFP batteries and the impact on the cobalt and nickel markets.

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Electric cars today predominantly use 3 main types of cathodes in their batteries – Nickel Manganese Cobalt ("NMC"), Nickel Cobalt Aluminum ("NCA"), and Lithium Iron Phosphate ("LFP"). CNBC reported last month that Tesla (TSLA) plans to pivot towards now using LFP batteries for all their global 'standard range' ("SR") electric cars, previously LFP use by Tesla was only for the SR models made in China. Tesla's long range and performance electric cars will continue to use nickel-cobalt chemistries. Tesla is the global number one seller of electric cars and commands a 14.7% global market share. This means when Tesla acts others follow. In this case Volkswagen, Renault and Mercedes are also considering a similar move towards LFP for their shorter range vehicles. BYD Co, albeit one of the world's largest manufacturers of LFP batteries, already widely uses LFP batteries.

Another recent news article reported a rumor that BYD is to supply Tesla with 10 GWh of LFP batteries, in addition to their existing supplier CATL. This would make sense as neither Tesla nor Panasonic yet make LFP batteries. As of now around 95% of LFP cathode manufacturing is produced in China. The two key LFP producers are CATL and BYD Co.. LG Energy Solutions is also developing LFP batteries. LFP patent restrictions will start to expire in 2022, then battery cell makers will potentially be able to produce LFP cells outside China without paying for licenses and royalties.

In recent years LFP batteries have improved considerably, in

their energy density (i.e., storage capacity), and they are now suitable for shorter (standard range) electric cars. Previously LFP was used predominantly in China mostly for heavy EVs such as electric buses, trucks, and low range electric cars. For example Tesla's Model 3 SR (made in China with LFP batteries) has been tested and shown to achieve 391 km (243 miles) of real world range, which is satisfactory for many people, in particular in China.

LFP batteries advantages are a longer lifespan, and being safer and cheaper than NMC and NCA. LFP s batteries' disadvantages are lower range (due to lower energy density), a slightly higher self-discharge rate, and reportedly , a loss of range in very cold conditions. LFP batteries contain no nickel and no cobalt.

The question then for investors is, has Tesla's (and soon likely others) pivot towards LFP batteries affected the market for cobalt and nickel for batteries?

The short answer is YES. The battery market will now need less nickel and cobalt relative to before. For now, cobalt and nickel prices continue to perform well, simply due to the current EV sales boom, with 2021 sales up over 100% on 2020.

Global electric car sales in 2021 are booming – Up over 100% on 2020

Source: EV-Volumes

The long answer is that due to the expected ~10-20x increase in electric car sales this decade, both LFP and NMC/NCA type batteries will experience accelerating demand. **This means the demand for battery grade nickel and cobalt will still increase significantly**, just not as much as was previously anticipated.

Lithium is likely to be the biggest winner as it is used in all types (LFP, NMC, NCA). In particular lithium carbonate (mostly sourced from brines) will be the winner as the precursor chemical for LFP battery cathodes.

Investors can consider holding more weight in lithium stocks but keep some weighting still for nickel and cobalt stocks. Of course investors must also remember that these trends are always evolving, and, hence, they are subject to change. For example, for the last few years NMC was gaining in popularity and so was the source material lithium hydroxide made from the hard rock lithium mineral, spodumene. Investors need to also consider the supply-side dynamics, where new battery-grade cobalt and nickel supply looks very constrained.

Benchmark Mineral Intelligence stated in October 2021:

"High-nickel cathode chemistries, which require lithium hydroxide, have not been deployed as quickly as expected, at the same time lower energy density, but cheaper, LFP cathodes have dominated the Chinese cell production industry in recent months. Cells with LFP cathodes have held an average market share of 51.1% so far in 2021, compared to 42.6% in 2020, showing a step-change in demand as a result of technological improvements to the cathode chemistry and indirect policy support from the Chinese government for applications most suited to LFP."

Lithium pricing also gives a clue to demand. Lithium chemicals pricing has surged higher in 2021 from around US$7/kg to US$26.50-27.00/kg. Interestingly lithium carbonate prices are at US$26.50/kg and lithium hydroxide are at US$27.00/kg suggesting demand for both remains extremely strong.

Demand for lithium from booming EV sales in 2021 has pushed prices up from US$7/kg to US$26.50-27.00/kg

Source: Fastmarkets

Looking ahead lithium demand is forecast to outstrip supply leading to prolonged high lithium prices.

Recent quotes from industry insiders and experts

Rio Tinto: “60 Jadar mines wouldn’t fill looming lithium gap…..EV sales are on track to hit up to 55% of the world’s total light vehicles sales as early as 2030, reaching about 65 million units.” (2020 sales were 3.1M)

Benchmark Mineral Intelligence (Simon Moores tweet): “Lithium carbonate price today in China is $28k tonne high end, mid point $24k. This is the top end of what we experienced 4/5 years ago and there’s a long way to go before this price surge runs out of steam.…I don’t feel we are even half way thru yet……prices in China would exceed $40,000/t.” (US$40/kg)

Pala Investments: “I think it’s important to remain balanced across the portfolio, and have exposure to both carbonate and hydroxide…..These prices are probably going to remain elevated for the next 12 months or so, at least in our view.”

Pilbara Minerals CEO Ken Brinsden: Lithium market is ‘desperately short’.

Closing remarks

LFP batteries have always been popular in China, where their advantages of lower cost, safety, and longer cycle life have been favored over the more expensive NMC/NCA types. In the month of September 2021 58% of Chinese electric cars used LFP. However, Europe and USA have favored NMC for its greater energy density and hence longer range.

With battery raw material supply a growing concern (especially cobalt, but also nickel) it is quite understandable why Tesla is pivoting to using more LFP batteries and less NMC/NCA. Perhaps the safest way for investors considering to pivot is to increase exposure to lithium (ideally the lithium carbonate producers, typically from Chilean and Argentina brine salars), but not reduce nickel and cobalt exposure in case the trend changes again next year. Additionally, it may potentially pay to consider investing in lithium brine 'juniors' (non-producers) that will benefit from surging lithium demand in future years.

The other winners will be Tesla (lower input costs on standard range cars) and the big two LFP battery manufacturers BYD Co and CATL.

Disclosure: The author owns stock in Tesla (TSLA), BYD Co (HK:1211), and numerous lithium, cobalt, and nickel miners.