COP26 will accelerate electrification - can the mining sector keep up?

Published 2 November 2021

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The COP26 conference, being held in Glasgow this month, will bring together the world's policy-makers, businesses and non-governmental organizations (NGOs) to debate the future of international climate policy. Importantly, decisions made around this event are likely to chart the course for the natural resource sector in the coming decades.

A key goal of the climate conference is to secure global net-zero by mid-century and keep 1.5 degrees within reach1. To achieve this, countries are being asked to come forward with ambitious 2030 emissions reductions targets that align with reaching net zero by the middle of the century.

The speeding up of the adoption of electric vehicles (EVs) is one of the four pillars of COP26 aimed at delivering this ambitious net-zero target. After all, transportation accounts for around 23% of global carbon emissions and so accelerating the decarbonisation of this sector will be a major focus of COP26 for all participating countries.

Indeed, compared to the steel or cement industries, passenger cars are theoretically seen as one of the easier to decarbonize sectors given the falling costs of electric vehicles, improving ranges and the roll-out of charging infrastructure. Under Wood Mackenzie's base case view, passenger car sales with a plug – namely Battery Electric Vehicles (BEVs) and Plug-in Hybrids (PHEVs) – account for 11% of total sales by 2025, rising to 23% by 2030.

However, reaching a 1.5 °C or even 2 °C pathway would require a stark pivot from the current base case2. It will require mass market uptake over the next decade, including in emerging markets, with EVs accounting for three-quarters of all sales by the end of the decade. Lithium-ion technology will be the workhorse of this electrification push given its high energy and power density, lightweight and lack of competitive alternatives.

Without taking account of other potential barriers – such as the rollout of charging infrastructure, low-carbon energy generation and grid adaptation to handle mass-market electrification – the required uptake in EV sales to meet a net-zero trajectory will put extreme pressure on lithium-ion supply chains.

Go go Giga-factories

For a start, we will need a lot more large-scale lithium-ion cell manufacturing facilities – dubbed 'giga-factories' or 'mega-factories' – than currently planned for. Building these factories often attracts much of the attention in the sector. Politicians can point to the job opportunities created and proclaim their region to

be on the ‘electrification pathway’! Indeed, we see the current planned manufacturing capacity as largely sufficient to meet demand over the coming decade.

But under accelerated EV adoption to meet net-zero targets, the scale of investment surges. If we use a current 30 GWh facility under development in Hungary by South Korean battery producer SK Innovation as a model, meeting net zero trajectories by 2030 would need an additional 4,600 GWh of capacity requiring around US$353 billion investment.

To add further complexity to the mix, manufacturers will also need to be adaptable to new technologies. Solid-state batteries, for example, will likely enter production in the next decade and require more complex manufacturing processes than current batteries.

The energy transition starts and ends with metals

But it’s on the mining side that things get even more challenging. The lithium-ion batteries powering EVs contain a host of raw materials that will need to see supply massively scaled up to meet a net-zero pathway. In particular, cathode materials like lithium, cobalt and nickel would see unprecedented demand growth over the next decade.

*Source: Wood Mackenzie. Forecasts from 2021. * Lithium Carbonate Equivalent*

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Looking just at lithium, by 2030 the market would require nearly twenty new mines of the same size as Greenbushes in Australia – currently the largest lithium-producing mine in the world. And really, there are no shortcuts to developing primary mine supply with timescales from the first discovery to first delivery that can be ten years or more. Add to those rising ESG requirements, low jurisdictional risk appetite and societal and political resistance to the development of primary extraction.

And this is the needle we need to thread. COP26 is likely to pull all the levers in terms of stimulating demand, with more aggressive carbon reduction targets facilitated by rapid electrification. Yet it is on the supply side – the mines, the smelters and the refineries needed to produce battery materials – that there has been a lack of policy initiatives, at least in Western countries so far. Hopefully, in the wake of the conference, we will see increasing acknowledgement, and more importantly action, towards securing these key materials that are critical to the energy transition.

This article has been drafted by Gavin Montgomery, Director – Battery Raw Materials, at Wood Mackenzie.

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1 The Paris Agreement reached in 2015 is a legally binding international treaty on climate change. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels.

2 Wood Mackenzie's base case is consistent with a 2.5 °C to 2.7 °C pathway

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