Can we really ‘westernise’ the battery supply chain?

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Within WisdomTree’s range of thematic strategies, we frequently have the opportunity to work with different subject-matter experts. For our Battery Solutions strategy, we partner with theme experts, Wood Mackenzie. On 30 March 2023, Chris Gannatti, WisdomTree’s Global Head of Research, caught up with Adam Woods, Senior Research Analyst, Global Coal Markets, for Wood Mackenzie. The below is an edited excerpt from their discussion. All views from this point on are those of Wood Mackenzie.

Battery technology requires a range of raw materials: which countries are these being extracted from?

When you think of battery raw materials, you're thinking specifically lithium-ion batteries. These go into the cell phones, they go into electric vehicles (EVs), they go into what we're considering ‘storage’. That could be for power generation or energy storage, but EVs are the largest part of that by far.

Looking at Figure 1, you can see the main raw materials required: nickel, lithium, cobalt, graphite etc.

Figure 1: Building blocks of the battery value chain

Sources: WisdomTree, Wood Mackenzie.

The regional areas that those battery raw materials come from tend to be Australia, Indonesia, Argentina, Chile, Central Africa and China. What's really being talked about right now in the US is the Inflation Reduction Act (IRA). But the tax credits available for US-domestically made cells and packs is dependent on where those materials are sourced. So, for US made cells, it's going to need to be either sourced from the US or from a free trade partner.

Of the list I mentioned, we have Australia, Chile, and Argentina - those are the ‘friendlies’. The Democratic Republic of the Congo, on the other hand, is not a free trade player and also has its own ESG concerns with labor, water use, and the sustainability of mining practice there. Then there is China, and China wouldn't be able to reap any of the benefits in the IRA. However, we should note that China doesn’t have a huge amount of raw materials aside from graphite. Nevertheless, all of the other raw materials do flow into China for the refining and the component manufacturing. So even if we have a sustainably sourced lithium from Australia, it's still going into China first before it goes anywhere else, at least in the current supply chain.

How big do you expect the battery market to become in the next 5, 10, 15 years?

In short, it's going to be massive. That's the five-word answer. But the longer answer is that it is better to think about it and segment it into what we think of as energy storage and batteries. Energy storage for power generation has the potential for massive growth. Part of what we'll see, as certain renewable sources like wind and solar are adopted more and more, is certain types of energy storage will grow alongside to mitigate the intermittent nature of these types of power generation.

But that storage system is a classic case of fast growth from a low baseline—the bigger part of the pie should come from electric vehicles (EVs) —and that EV growth is expected to grow not as quickly, but steadily all the way out into 2050. We don't see any real lags in that growth potential on the EV side, and that's mainly driven by lithium-ion batteries, so, in short, there is a huge amount of growth potential, mainly driven by EVs.

Figure 2: Global passenger car sale forecasts

Are there enough raw materials to keep up with demand?

We, at Wood Mackenzie, have individual teams looking at each material on its own and the consensus is that the supply is there, the reserves are there. The planned and pledged investment does meet the demand for this lithium-ion growth within the EV battery sector. So, it's possible, but there are caveats of course.

One of them is going to be, we're going to need more investment to convert those reserves into supplies. They're planned, they're there in the earth, it's just going to be a matter of whether the investment side will meet up with those reserves and be able to bring them to market.

Another side is sustainable sourcing. EVs are going to be on the greener side of things, but this massive influx of mining has its detriments as well. And where it's mined can have detrimental effects. When you talk about the IRA, you have to be very careful about where exactly you are sourcing these materials. If you're going to want to take advantage of the IRA and the credits it provides (I think they're pledging about $7,000 per car right now per EV passenger), you're going to have to invest in the trade partners, you're going to have to invest locally in the US and Canada. Right now, most of that supply is going to be in Indonesia, China, the Democratic Republic of the Congo and Australia.

What about battery recycling?

There's a lot of excitement around battery recycling. The obvious potential, especially with cobalt recycling, is massive. But what we're seeing is that the price of cobalt/cost of cobalt versus the cost of recycling has a bit of a disparity. We've seen cobalt surge in price before, but we're going to need to see a more sustained high price of cobalt in order to encourage the build out of the recycling plants. There's simply not enough recycling capacity right now to really be commercially viable.

We're going to need more batteries, and a higher price for cobalt in order for it to be worth bringing recycling plants into play. There are a couple of other things in play like policies in Europe that would encourage more of this and more recycling plants. But where it stands right now, it's just not competitive. It's a future endeavor that has to take off in the late 2020s to mid 2030s.

Given current geopolitical tensions, will it be possible to 'westernise' the battery supply chain?

In the future, it should be and every team is looking at this, especially since the IRA was signed in. The answer is, today, obviously it can't be. Currently, a very large majority of the componentry is China based. And, like we said, even if the materials aren't sourced there, which they normally aren't, it still goes through China.

Can it be done without China? Our view is 'yes', but it's not easy. It's going to require a lot of investment. The first number that we throw out there is, 10 years. From today, if all facets of the value chain were to start investing either domestically or with trade partners, we're looking at 10 years until we see those projects come to fruition and be commercially available. This is, of course, the opinion of Wood Mackenzie, taking into account what is known in our research today, and the reality may be a bit faster or a bit slower depending on new information that becomes available all the time.

Our view is that, on the renewables side, to pivot just a little bit, it's even more commercially viable. We expect that the componentry cost element, if fully taken advantage of the IRA credits, is cost competitive with imported componentry for renewable generation. Just simply because we already have component manufacturers set up. There are certain areas of this battery value chain that aren't even in their infancy yet. They're just being talked about, they're being planned, we don't even have any active ones domestically. So it's going to require a massive amount of investment and something like the IRA to make it competitive because right now the cost competition is just....it's hard to beat the Chinese import right now!

Figure 3: Country exposure of the WisdomTree Battery Solutions Index

We thank Adam Woods and Wood Mackenzie for working with us on our Battery Solutions strategy. To find out more information about the investment opportunity please visit our website at: https://www.wisdomtree.eu/en-gb/strategies/battery-solutions

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