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## ELECTRIC VEHICLES

# Your EV is 40% Chinese, and will remain so if this jigsaw is not solved



## Synopsis

Battery accounts for 40% of an EV's total cost. India faces challenges in accessing raw materials for making EV batteries locally. However, up to 80% of a battery can be potentially made in India once a conflict is resolved.

Here's a piece of good news if you are a staunch believer of **electric vehicles (EVs)**. The Indian EV market is expected to expand from USD3.21 billion in 2022 to USD113.99 billion by 2029, at a CAGR of 66.52%, according to **Fortune Business Insights**. With this, the Indian EV **battery** market is projected



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to surge from USD16.77 billion in 2023 to a USD27.70 billion by 2028.

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The good news ends here.

For, India is heavily dependent on battery imports to power its EVs.

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The country's lithium-ion battery imports have nearly tripled in four years, reaching INR24,346 crore in FY24. Of this, a whopping 85% came from China. The demand for lithium-ion batteries is expected to grow strongly in the next few years, as companies roll out new EVs.

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But India can localise 70%-80% of the batteries and drastically reduce import dependency by augmenting its own cell **manufacturing** and battery material-making capacity and capability.

Here's how.

Materials account for around 60% of a battery cell's cost, according to Redseer. This means cell makers do 40% value addition. The battery material processors, too, are likely to provide 30%-40% of the value addition depending on chemistry, according to industry estimates. This means the value of critical metals (lithium, phosphate, nickel, cobalt) that India will need to import will be only 20%-30% — 20% for LFP (lithium iron phosphate battery) chemistry and around 30% for NMC (nickel manganese cobalt) chemistry.

If India develops the capability to import these raw materials – instead of importing the batteries in their entirety — the scope for unlocking 70%-80% value addition opens up. But it's easier said than done.

The logo consists of the letters 'ET' in a large, serif font, centered within a light gray rectangular background.

### **The challenge in developing a battery ecosystem in India**

The Union Budget 2024 offered a big push in this direction. It allowed customs duty-free import of critical battery metals like lithium, cobalt, and nickel, and a reduced duty of 2.5% on graphite. The Budget has also extended zero customs duty on import of capital goods for EV battery manufacturing to March 2029.

Vikram Handa, founder and managing director of Epsilon Advanced Materials (EAM), which aims to become a leading global manufacturer of battery materials, emphasises on the need for more incentives, particularly for processing companies that manufacture anode, cathode, and electrolyte as they are the end-users of critical minerals. These companies can then invest in domestic and foreign critical mineral assets.

Handa founded one of India's most profitable chemical companies, Epsilon Carbon (parent of EAM), which has a revenue of INR3,000 crore with 21% operating profit (Ebit) margin (FY23 financials).

While access to raw materials is a significant challenge, there's a more pressing conflict that threatens the battery ecosystem's development in India. In an interview with ET Prime, Handa explains why. His company has invested over INR500 crore in R&D mainly to qualify with customers, but the next step is building manufacturing plants that require significant scale – a 30,000tonne plant capable of supplying just the

anode material needs an investment of around INR4,000 crore. This plant produces the anode requirement of a 30-gigawatt hour of battery cell making capacity. However, these large plants take a year and a half to build, and the question remains: How do you build them without guaranteed offtakes, considering the highly personalised and technical nature of the product?

Batteries are unique differentiators for EVs, much like how Apple's batteries could last eight hours, whereas Oppo's could last four hours. The battery material inside the cell plays a huge part in this. After talking to the phone maker, the battery cell manufacturer provides the battery material makers with a specification for graphite (one of the materials that goes in the battery), which cannot be used by another customer. For instance, the graphite supplied to Apple's cell maker cannot be given to Oppo's, and Reliance won't accept what Ola Electric uses – everyone has distinct requirements. And just like car engines are tied to car models and supplier relationships are sticky, battery material relationships will be long term.

"So, customer commitment is crucial. But today, unfortunately, Indian customers are saying they will buy from China since it's available. This problem is not only about us; we are one of many companies in India doing battery materials. But what happens when you put the Chinese supplier into your supply chain, you cannot replace him," says Handa.

The risk of having Chinese suppliers is that they can't be easily replaced if they change prices or face geopolitical issues. For example, China imposed export restrictions on graphite in December 2023.

### **What India can learn from the US, South Korea**

Handa suggests that in India, a cell maker setting up a 10 GWh factory should split his 10,000tonne per annum requirement between a local supplier and a Chinese supplier. To ensure a stable supply chain, customers should provide offtakes to local suppliers, guaranteeing purchase when their factory is ready. This is the approach taken in the US, where an auto OEM (original equipment manufacturer) building three factories provides offtakes to five qualified suppliers, signs a bankable contract and, in some

cases, provides upfront funding.

“We've made inroads in the US by qualifying with Korean cell makers, in a rigorous two-year qualification process and these Korean cell makers are building cell plants in partnerships with OEMs,” Handa says.



Korean cell makers, keen on a China+1 strategy, are working with new suppliers and have done batch production with material sent by EAM. “They were [initially] hesitant but in the end your quality, your product, all speak for itself,” Handa adds.

### **Why collaboration is key for material suppliers**

All the battery cell makers building plants in India are still learning and developing their expertise. These companies say they prefer working with established and proven suppliers, which are dominated by the Chinese. This collaboration offers three key benefits:

1. Speed: Proven suppliers can accelerate the development process.
2. Technology: They bring expertise and knowledge of the latest technological advancements.
3. Cost: Chinese suppliers are willing to sign competitively priced long-term contracts

An official at a cell maker says he prefers suppliers with the latest technology and scale who can provide material solutions with faster turnaround time.

Exide, which is likely to be among the first to start large-scale cell production in India, in its investor call had said it would source materials from S-volt's approved suppliers (mostly based in China) with commercial terms tied to benchmarks, ensuring competitive input costs. Adding new suppliers, including Indian ones, would require a rigorous approval process that can take over a year. This will likely involve vetting by S-volt teams after Exide proposes new suppliers.

Ola Electric is currently importing small quantities of cathode active material (CAM) and anode active material (AAM) from China for research and testing. Once the Ola Gigafactory begins cell production, it plans to continue sourcing CAM and AAM from Chinese suppliers.

A top executive at a cell maker suggests that Indian suppliers should form technical partnerships with established players. This will make approving them easier. He warns that waiting for firm contracts at this stage will make market entry for battery material suppliers too late.

Harin Kanani, managing director of Neogen Ionics, says new cell makers seek reliable supply-chain partners to minimise risks and ensure high-quality production. Neogen Ionics has established an electrolyte plant in FY25 (Dahej, Gujarat) with a capacity of 2,000 MT, equivalent to 2 GWh battery production. Additionally, the company plans to set up another plant in Dahej in FY26, which will utilise Mitsubishi Japan's technology to produce electrolyte for 30 GWh of battery production.

Customers prioritise safety, performance, and costs, and want to assess facilities before committing. Neogen's technology licence partnership with Mitsubishi gives its customers confidence in the quality of the electrolyte and safety. The company is building its plant without a firm contract, using a flexible production process to minimise risks, and mitigates the Indian market risks by exporting intermediate products to global markets.

Cathode and anode materials need to be a lot more customised than electrolytes, and in those battery material suppliers seek more long-term contracts.

### **The way out**

For just-in-time inventory (lower inventory /transportation cost and risks), OEMs prefer nearby tier-I suppliers who, in turn, want to source from nearby tier-II suppliers. This need will be even more with EVs given batteries are hazardous, and battery materials are active chemicals that need careful transportation.

Ola Electric mentioned in its IPO prospectus how importing exposes the company to risks of supply disruption, increased costs, and trade tensions. Alternative suppliers may not be readily available, and quality issues or global shortages could impact cell production, EV delivery timelines, and increase manufacturing costs. This risk will exist for every cell maker in India. So, all cell makers would prefer to source locally if their concerns are addressed. This way new EV models can be launched with higher made-in-India content.

“The market opportunity for battery materials is big and global. So that's why we want to build in the US and use India as a base to make intermediate materials for export,” says Handa, adding that in three or four years when the Indian market picks up, “we want to make in India for India.”

This conflict simply boils down to the fact that since battery makers and battery material makers are new in the game, they are keen to minimize the risks, and that's what makes signing up the contracts between the two more difficult. The conflict is likely to be resolved when the EV market becomes bigger, more mature and cell makers are more confident of their art. Then they will consider Indian suppliers if the commercials work out. But it's not a given as we have seen in India's import dependence on API in the pharmaceutical industry.

In our next article on this topic, we will tell you what companies in the space are up to.

*(Graphics by Mohommad Arshad)*

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