

Getting charged up - OPINION

Piyush Goyal, Union Minister of State with Independent Charge for Power, Coal, New & Renewable Energy and Mines, recently announced that only electric vehicles (EVs) will be sold in India from 2030. The current National Electric Mobility Mission Plan (NEMMP) has set a sales target of only 5-7 million EVs and hybrid electric vehicles annually by 2020. On the other hand, the Indian automobile market, which includes two-, three- and four-wheelers, is expected to clock an annual sales figure of around 23 million by 2030. Replacing these with EVs would require a significant push as far as vehicle-charging infrastructure and batteries are concerned.

Vast opportunities

The transition would require a battery capacity of about 400 GWh (gigawatt hours) each year, equivalent to increasing the current global EV battery production by a factor of five, just to cater to the Indian EV market. This gigantic demand for batteries is an ideal opportunity for the domestic manufacturing industry and job creation. However, India has missed many such opportunities to be integrated in the global value chain for solar cells and wafers and electronics manufacturing due to a lack of suitable policy support. This has led to an ever-increasing import bill for electronics products, currently the highest after oil and gold. The annual EV battery market is expected to be around \$30-55 billion and India cannot afford to fulfil the demand solely through imports.

Different variants of lithium-ion batteries are predominantly used in electric vehicles. Manufacturing lithium-ion batteries would require critical minerals such as cobalt, graphite, lithium and phosphate. Among them, lithium is of particular importance.

The resource endowment is limited to only nine countries and 95% of global lithium production comes from Argentina, Australia, Chile and China. The recent demand surge in the electric mobility market has already resulted in a twofold increase in lithium prices from \$4,390 per tonne (in 2013) to \$9,100 per tonne currently. It is estimated that India would require about 40,000 tonnes of lithium to manufacture EV batteries in 2030, considerably higher than the current annual global lithium production of 32,000 tonnes. To meet India's demands amid a global surge in electric vehicle demand, the entire mineral supply chain needs to be overhauled and expanded.

China and U.S. in the lead

China and the U.S., which have ambitious electric mobility targets, are way ahead in the race to secure lithium supplies. China, with the second largest reserves of lithium, is making strategic moves to control the majority of international lithium mining assets. China's Tianqi Lithium holds a majority share in the expansion of the Talison Lithium plant in Australia, which would make it the single largest producer of lithium globally upon completion. Also, its equity investors are planning to buy stakes in Chile's lithium mining companies.

Similarly, U.S.-based lithium mining companies have already secured mines in Chile and also hold significant shares in several upcoming mining projects in Australia. Tesla, which plans to manufacture half a million EVs annually by 2020, is investing in R&D to reduce supply risks. It has partnered with Pure Energy Minerals to extract high-purity metal from Nevada, using radically different and cost-efficient production technology.

In order to avoid a scenario like the one that played during the oil crises of the 1970s and the price shocks of 1980s and 2000s, it is imperative that India secure mineral supplies for its domestic industry by acquisition of overseas assets such as mineral reserves and the associated production.

India has long-term trade relations with lithium-producing countries in Latin America through preferential trade agreements (PTAs). A recent extension of the PTA with Chile provides India some tariff concessions for lithium carbonate imports. India needs to further diversify the supply risk by including lithium in existing PTAs or establishing new PTAs with other lithium-producing countries. However, the move will only enable and not ensure risk-free mineral supplies to India.

Trade links, R&D, recycling

There is a need to formulate policies incentivising domestic public and private mining companies to invest in overseas lithium mining assets.

Simultaneously, India must focus on creating a vibrant battery research and development ecosystem domestically. Currently, the domestic battery market is largely dominated by lead-acid battery technologies. Research should focus on developing alternative technologies containing minerals with low supply risks and battery recycling techniques to recover associated minerals and materials. Recycling lithium batteries present in the waste stream will significantly reduce the burden in procuring fresh resources.

Mr. Goyal has repeatedly highlighted 'fuel security' as a key driver in the push for electric vehicles. However, given India's limited hold on critical lithium reserves and concentration of production in the hands of a few, fuel security concerns could still be the same with 'white gold' lithium, replacing 'black gold'. Policies that incentivise domestic manufacturing, address the need for virgin resources and recycling of used batteries, while constantly pushing R&D for substitutes and alternatives are vital to secure electric mobility.

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