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An efficient recycling plan would grant us input security as we make our transition to clean mobility

In March this year, the Indian government announced four recipients for its Production Linked Incentive (PLI) scheme for advanced cell chemistry batteries, which aims to establish 50 gigawatt hours (GWh) of domestic cell manufacturing capacity by 2030. This is intended to enable the quick growth of high-value emerging sectors such as renewable energy and electric mobility, which are driving battery demand. India's annual demand is projected to grow to a level between 105 GWh and 260 GWh by 2030. The establishment of a domestic manufacturing capacity will be essential for ensuring supply chain and energy security.

However, scarce materials that are used in lithium-ion battery chemistries, such as cobalt, nickel and graphite, pose a significant risk for India, which has extremely limited domestic reserves of these materials. The industry's upstream supply chain is largely dominated by China, and markets have been volatile. Hence, a robust reuse-and-recycling programme for batteries will enable India to reduce raw material risk and help the country establish sunrise industries that are climate-friendly.

Several international actors are taking steps to build necessary recycling capacity as a response to growing battery demand. In China, a suite of policies introduced in 2018 was aimed at the growth of recycling centres in proximity to electric vehicle (EV) manufacturing hubs. In the West, the EU has begun the process of establishing policies requiring collection targets, coupled with minimum local content requirements. In the US, the country's department of energy has awarded grants to innovative recycling companies.

India has also taken steps to establish a domestic market for battery recycling, but must do more. In February 2020, the ministry of environment, forestry and climate change (MoEFCC) introduced draft rules on battery-waste management. These rules would establish an extended producer responsibility (EPR) programme.

Under an EPR framework, stakeholders in the domestic battery industry (including manufacturers, producers and importers) would be responsible for establishing a collection plan to be approved by regulators. The plan must enable the collection of 30% of end-of-life batteries by weight two years after implementation, and gradually escalate this to 70% by the seventh year.

Under this policy, materials recovered from recycled EV lithium batteries could provide 5% of our domestic manufacturing needs for minerals such as lithium, nickel, cobalt, and graphite by 2030. If EV sales accelerate on account of effective market development policies, recovered materials may exceed 20% of domestic lithium battery manufacturing demands for certain materials. The quantity of recoverable material will only increase with time as the volume of EV batteries due for retirement increases.

Utilization of recovered minerals to meet lithium battery demand within India would reduce greenhouse gas emissions by avoiding upstream emissions associated with extraction, processing and transportation. It has been estimated that implementation of the draft rules could reduce 50,000 to 180,000 tonnes of emissions by 2030. Further, as the Indian power grid gets decarbonized, the lithium battery manufacturing process will also become less carbon intensive.

Battery recycling would therefore reduce risks to the domestic battery-making industry while complementing the national emissions reduction targets announced by India at the CoP-26 summit held in Glasgow last November.

However, the draft regulations can be improved upon. Currently, they have only set a battery collection target, but policy can be used to bolster the market for second-life batteries.

A lithium battery used in an EV typically reaches its end of useful life when its usable capacity reaches 70-80% of its nameplate capacity. Once the diminished capacity of such a lithium battery pack renders it no longer optimal for EV usage, it can be repurposed for various secondary applications. These include stationary storage, renewable power integration, or backup for commercial or industrial purposes. In this context, were the MoEFCC to establish modest reuse targets for, say, four-wheel passenger and commercial vehicles and e-buses, between 1.2 GWh and 5.9 GWh of storage capacity could be provided by 2030. This is an opportunity that must not be missed.

The draft rules should also look to include specific language on hazardous material transport and handling guidance for lithium batteries, formalize second-life performance standards and warranties, and also establish a transparent methodology for identifying issues and stages for remediation and penalties. In the meanwhile, the plans of battery industry stakeholders must take into consideration how costs will impact EV market parity vis-a-vis conventional vehicles, and what mechanisms are used to incentivize consumer adoption.

India is on a journey to become a key global player in the battery market. The implementation of a reuse-and-recycling programme would not only enhance the resource security of the country's vehicle electrification and energy transition ambitions, but could also deliver economic development and job growth, while ensuring improved public health and environmental safety. Enabling this virtuous circular economy is the need of the hour as India moves towards a sustainable future.

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