

XProEM Ltd. eyes the Indian Market with launch of new disruptive technology for LIB Recycling and Cathode Restoration

A closed loop, environmentally friendly, and economically viable process for LIB recycling and a bright future for cathode and anode restoration in India



Ontario, Toronto, Feb 8, 2021 ([Issuewire.com](https://www.issuewire.com)) - XProEM Ltd, developers of lithium-ion battery (LIB) recycling technologies, announced today the next phase of their project, which will involve the building of a pilot recycling facility by mid-2021. Numerous sources report that LIB disposal without recycling or proper handling can lead to severe environmental pollution and adversely affect human health due to the toxic materials used in their makeup. The economic impetus for recycling has become particularly prevalent since 2017 when lithium prices hit 15,000 USD/t Li_2CO_3 . Treating and recycling spent LIBs is essential both from an environmental and an economic perspective. Additionally, this would alleviate a supply chain impact by recycling key raw materials for cathode manufacturing that can otherwise face a supply shortage. The ever-increasing applications of rechargeable LIBs in a host of portable electronics and electric vehicle (EV) applications has led to an explosion in their manufacturing, with a cumulative market size estimated to reach 130 GWh in India by 2030. Further, owing to the environmental impacts associated with the use of fossil fuels, i.e. greenhouse emissions and associated climate change, the lion's share of LIBs in transportation-related applications will grow rapidly, driven by strong momentum built in the EV industry. Such a sudden increase in LIB manufacturing would result in large volumes of

spent batteries in our ecosystem, which can potentially become an environmental hazard. Furthermore, as Li is a strategically critical metal with costs forecasted around \$10,000 - \$15,000 per tonne, recycling of Li in spent batteries has immense commercial value. According to recent estimates, the recycling of spent LIBs in India will become increasingly important post-2021 as the batteries used thus far in EVs will growingly reach the end of their lives. With EVs globally expected to exceed 145 million vehicles on the road by 2030, the use of LIBs in EV applications is expected to be the primary driver of growth. More than 2 million tonnes of spent LIB EV packs need to be recycled by 2025 globally, representing a market value of over \$5 -10 billion. According to these projections, in India alone, recycling spent LIBs could open up a market worth up to \$1.5 billion by 2030.

Mr. Xintong Liu, President, and CEO of XProEM Ltd. strongly feel that “lithium-ion batteries will be the powerhouse of the global energy ecosystem for the next two decades, and XProEM will be there the entire way to safeguard the development of the LIB industry by taking care of the environmental aspects. With the ability to properly handle the waste batteries, and recover valuable components from within, and technologies like direct cathode/anode restoration, XProEM has a sustainable solution to several challenges around the application and recycling of LIBs.”

Hydrometallurgy is currently the main process route used to recycle LIBs. Since large amounts of chemical solvent and complicated leaching/extraction steps are used, the hydrometallurgy process is highly sensitive to process inputs and prone to instability under feed composition variations. Hydrometallurgical processes generate huge effluent volumes and utilize a large amount of water, both of which have negative environmental impacts. On the other hand, pyrometallurgical processes are focused on the production of metallic alloys by melting the entire spent LIB pack at high temperatures, thus consuming a significant amount of energy. While hydro and pyrometallurgy are capable techniques for now, there is clearly a dichotomy on which route is more advantageous, and the answer may be neither. As the complexity and amount of LIB applications continue to grow and evolve, these technologies need to be challenged, and the status quo should be disrupted.

Dr. Kinnor Chattopadhyay, Chairman and CTO of XProEM Ltd., said “While recycling and resource recovery is a necessity to ensure a sustainable circular economy for the lithium ion battery supply chain, it is also a cornerstone of our proprietary solid-state processes (S3M & D3R process), allowing us to create value in an environmentally friendly and low-cost manner. The Indian market has huge potential owing to a large volume of portable electronics, and electric two and three wheelers, and it is the right time to engage with potential stakeholders and lay out the groundwork for expedited project implementation soon to happen”

XProEM has also developed a proprietary physical separation process, Variable Vacuum Vapour Extraction (V3E), to process battery packs and produce spent cathode/anode materials that are compatible with the solid state processes. The V3E physical separation process can accept spent battery packs and physically separate them robustly and safely into Black Mass, which becomes a feed to either the S3M or D3R process, among many other recycled components. XProEM’s integrated technology system provides a uniquely sustainable solution to tackle the imminent problem of recycling a large amount of spent LIBs by directly recovering battery materials into their reusable forms via a solid-state thermal treatment process. As much of the XProEM process is operated in a solid-state, it is expected to consume much less energy than current recycling processes and eliminates the requirement for toxic solvents and treatment of hazardous wastewater. The integrated process is compatible with various LIB types and allows for efficient recovery of waste battery materials into high-value products. The XProEM process effectively lowers the energy and consumable cost by 55%, lifting the gross operating margin to over 45% (compared to 20-25% for pyrometallurgical and hydrometallurgical processes).

XProEM truly stands to lead the development of regional & global industry standards for LIB recycling, and build an independent and complete technical framework for LIB recycling. Additionally, XProEM will also focus on the future of LIB recycling by converting innovative R&D work into an IP portfolio to safeguard its competitive advantages over its peers. Key pipeline projects to enable this include expanding R&D activities to improve and develop recycling technologies compatible with future LIB types (SS, Li-Air, Li-S, etc.) and continue to improve cathode restoration techniques. With the rapid demand for cheaper electrode materials, the key question lies, can we restore cathodes and anodes back to their original states rather than recovery of individual components through segregation of each key element? The answer is a firm yes as XProEM has also developed the D3R restoration process for directly replenishing lithium in lithium-depleted cathode from spent LIBs to restore the stoichiometric amount of lithium in the spent cathode. The re-lithiation is accomplished by mixing with lithium-bearing compounds to provide the source of lithium, and diffusion of lithium from the mixed material into spent LIB cathode, with both material morphology and composition, restored. Based on the current work program underway, XProEM expects to carry out the pilot operation on D3R in the next year.

For the integrated technology package, XProEM has currently completed all the required technical validation stages including:

- Technical validation
- Process development
- Key equipment design
- Economic assessment
- Pilot plant preliminary engineering design

Giving his outlook on the next steps for XProEM Ltd., Mr. Nishit Patel, COO explained, “After years of extensive research & development and testing, XProEM is ready to commence the next key phase of our commercialization roadmap by building and operating a pilot facility in 2021. This pilot facility will allow us to test feed materials directly from suppliers in large quantities. As these feed materials can vary in their impurity levels and chemical makeup, being able to test them at our pilot facility will give us the opportunity to customize our process design to best fit the needs of each customer. We are currently engaging with certain partners in India, among several key strategic markets to us, to ensure we establish a sustainable framework within the local ecosystem in the next couple of years.”

XProEM has begun setup for the pilot plant facility, expected to commence operations by mid-2021 to produce the first batch of sellable products. In addition to completing the important milestone of technology commercialization, the pilot facility will also allow XProEM to test the robustness and efficiency of their technology against feed materials of varying composition and impurities provided from different suppliers and supply chain partners, requiring customized design and adjustments to both process conditions and the equipment configuration. XProEM also plans to complete a pre-feasibility study on the process by late 2021, which will further validate the viability of the proprietary technology to be commercialized under various market conditions and financial assumptions, and focus on to the design, engineering, construction and commissioning of the first full-scale operational commercial facility by 2022 - 2023. Once that first small-scale commercial facility has been built and operated successfully, it will serve as a demonstration showcase for XProEM, allowing us to work with more partners and clients for scaling up the large commercial plant at a required capacity of up to 50,000 t/year of spent LIB packs. The implementation of the first large commercial plant can commence as soon as late 2022.

Firm commitments from funding partners have been received by XProEM to date for the pilot facility, in addition to other key resources such as land, personnel, and feed materials, which all have been readily secured. More to follow once the pilot plant is built and commences operations.

About XProEM Ltd.

Founded in 2018 and established in Toronto, XProEM is a Canadian company developing a disruptive clean technology and business solution to sustainably tackle the imminent problems associated with recycling spent electric vehicle (EV) lithium-ion batteries (LIBs) through their proprietary process. This is achieved by employing a closed-loop recycling process that transforms LIB waste into high-value materials in an environmentally friendly and economically feasible fashion.

Twitter: [@XProEMLtd](https://twitter.com/XProEMLtd)

LinkedIn: <https://www.linkedin.com/company/xproem/>

Website: <https://xproem.com/>

For media enquiries please contact: info@xproem.com

###



Media Contact

XProEM Ltd.

info@xproem.com

+1 (905) 629-1304

250 Yonge Street, Suite 2201

Source : XProEM Ltd.

[See on IssueWire](#)