

“TDB-DST supports Indigenous Energy Storage Technologies Pvt. Ltd. for Commercialization of Bio-Waste Derived Hard Carbon for Sodium-Ion Batteries”

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The Technology Development Board (TDB), Department of Science & Technology (DST), Government of India, has extended financial assistance to Indigenous Energy Storage Technologies Private Limited, Roorkee, Uttarakhand for the project titled “*Commercialization of Bio-waste / Agricultural Waste Derived Hard Carbon for Sodium-Ion Batteries.*” The project aims to establish indigenous capabilities for the production of advanced anode materials, contributing to the development of cost-effective and sustainable energy storage technologies in the country.

The TDB-supported project focuses on the commercial-scale production of hard carbon derived from bio-waste and agricultural residues, to be used as a key anode material in sodium-ion batteries (SIBs). Sodium-ion technology is emerging as a viable alternative to conventional lithium-ion systems, particularly for applications such as grid-scale energy storage, UPS/inverter systems, solar street lighting, and low-speed electric mobility, including e-rickshaws, e-scooters, and e-cycles.

Hard carbon, as a class of carbonaceous materials, offers significant advantages for sodium-ion batteries, including high initial coulombic efficiency, stable cycling performance, and enhanced energy storage capacity. Unlike graphite, hard carbon retains its disordered microstructure and porosity even at high temperatures, making it particularly suitable for sodium-ion chemistry. The use of biomass-derived precursors further enhances sustainability by utilizing locally available resources and reducing dependence on imported raw materials.

By leveraging agricultural and bio-waste streams, the project introduces a circular and resource-efficient approach to advanced material manufacturing. The technology also addresses critical supply chain concerns, as sodium and carbon resources are more abundant and geographically distributed compared to lithium, thereby reducing exposure to global supply risks.

With TDB support, Indigenous Energy Storage Technologies Private Limited will scale up its production capabilities and enable the commercialization of indigenous hard carbon materials tailored for sodium-ion battery applications. The initiative is expected to strengthen India’s position in next-generation battery technologies while promoting sustainable manufacturing practices.

Speaking on the occasion, **Shri Rajesh Kumar Pathak, Secretary, TDB**, stated that the development of alternative energy storage technologies is critical for India’s clean energy transition. He noted that projects focused on indigenous materials innovation, particularly those leveraging waste-to-value approaches, are essential for building a resilient and self-reliant battery ecosystem in the country.

Promoters of Indigenous Energy Storage Technologies Private Limited expressed appreciation for the support and highlighted that the project will enable the company to accelerate commercialization of sustainable battery materials, while contributing to the development of affordable and scalable energy storage solutions.



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