

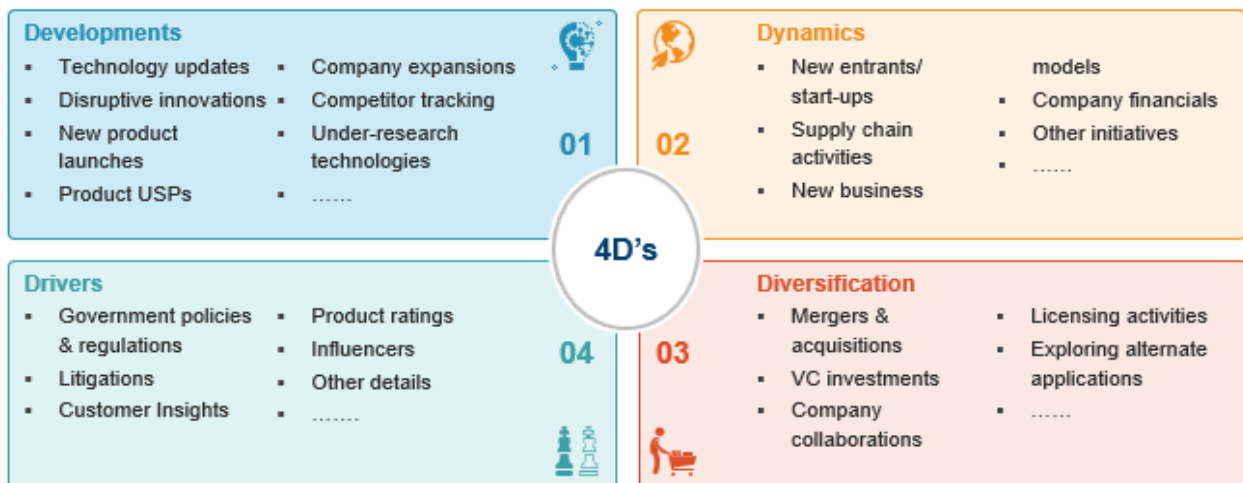
INTELLOTRACKER

Battery Recycling

May 2023



ARANCA'S QUARTERLY SECTORIAL UPDATE ACROSS FOUR DIMENSIONS....





DEVELOPMENTS

Recent Technology Updates		Engineers at RMIT University have developed a nanomaterial innovation that enables mobile phone battery recycling by using high-frequency sound waves to remove rust and extend battery lifetimes up to three times longer. <i>Source: Innovation News Network</i>
Recent Technology Updates		Researchers from Linnaeus University in Sweden and the Indian Institute of Technology Madras have developed a new method for recycling lithium-ion batteries (LIB) that reduces the use of cobalt and requires less energy. The method utilizes a solvent made from two chemicals, one derived from urea and the other from acetic acid. <i>Source: Anthropocene Magazine</i>
Recent Technology Updates		Scientists at Lawrence Berkeley National Laboratory have developed a new material that allows LIB to be recycled using water, making the process cheaper and safer. The quick-release binder dissolves in alkaline water, allowing the battery metals to be filtered out and reused. <i>Source: Forbes</i>
Recent Technology Updates		Rice University has a patent for a process that involves contacting battery waste products with a deep eutectic solvent, leaching, and extracting the metal from the waste into the solvent through heat and agitation. <i>Source: Patent</i>
New manufacturing set-ups		SMS Group has patented a method for recycling lithium-containing electrochemical energy storage devices. The method involves comminuting the devices, melting down the active material fraction with slag-forming agents, and converting lithium and carbon into a gas phase for removal. <i>Source: Patent</i>



DYNAMICS

New business model		Hu Ying, CEO of the "Lithium++" platform, has established a lithium battery recycling system in China, aiming to create a green industry chain and promote an Internet + industry-finance alliance for battery recycling. <i>Source: Pan Daily</i>
Key initiatives		Breckland, Kings Lynn and West Norfolk, and North Norfolk Councils have partnered with Serco to launch a free weekly kerbside collection service for household batteries. Residents can place their used batteries in a bag on top of their bins for recycling, contributing to a sustainable closed-loop battery materials supply chain and reducing the risk of fires. <i>Source: Breckland Government</i>
Key initiatives		The Bicycle Association (BA) in the UK has partnered with the European Recycling Platform UK (ERP UK) to establish a service for collecting and recycling electric bike batteries, aiming to prevent them from ending up in landfills. <i>Source: InsideEVsvv</i>
Key initiatives		South Cambridgeshire District Council encourages residents to safely recycle batteries to prevent fires and environmental harm, with Valpak facilitating the collection and recycling process. The initiative aims to divert batteries from landfill and reintroduce materials like cobalt, nickel, and steel back into production for various industries. <i>Source: South Cambridgeshire District Councils</i>



DIVERSIFICATION

Company Collaboration		Honda has partnered with Ascend Elements to ensure a stable supply of resources from recycled LIB in North America, supporting Honda's carbon neutrality goals and promoting a circular economy for their electric vehicle battery supply chain. <i>Source: Pnewswire</i>
Company Collaboration		BASF has teamed up with Tenova to improve the recycling process for LIB at BASF's prototype plant in Germany. The collaboration aims to efficiently recover metals and produce lithium salts from end-of-life batteries, reducing CO2 emissions and promoting sustainable practices in the eMobility industry. <i>Source: Company Website</i>
VC investment / Funding		Singapore-based company Green Li-ion has raised \$20.5 million in a recent pre-series B funding round, with investment from TRIREC, Banpu NEXT, and Equinor Ventures. Green Li-ion has developed recycling technology for LIB and plans to begin commercial production in the first half of 2023 at its plant in Oklahoma, USA. <i>Source: Saur Energy</i>
VC investment / Funding		CATL, a Chinese battery manufacturer, plans to invest 3.25 billion Euros in constructing an industrial park for battery raw material recycling. The park will focus on recycling cathode materials and graphite from lithium-ion cells to produce new batteries, with a processing capacity of 500,000 tonnes per year. <i>Source: Electrive</i>
Mergers & Acquisitions		American Battery Technology Company (ABTC) has acquired a commercial-scale battery recycling facility in Nevada to expand its operations in LIB recycling with an aim to meet increasing demand for sustainable battery metals in domestic lithium-ion battery manufacturing and electric vehicle adoption. <i>Source: Recycling Today</i>

Other Relevant Information		<p>Aqua Metals has announced its plans to develop a 5-acre recycling campus in Tahoe-Reno, Nevada, designed to process over 20 million pounds of LIB material annually using its Li AquaRefining technology. The recycling campus aims to contribute to the state's comprehensive LIB supply chain, covering mining, manufacturing, and recycling.</p> <p>Source: Recycling Today</p>
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DRIVERS

Government Policies		<p>Washington state lawmakers are considering Senate Bill 5144, which would require battery producers to fund a state-approved program for collecting and recycling batteries. The proposed law aims to address the environmental and safety concerns associated with battery disposal, promote recycling, and create targets for recycling rates and public education.</p> <p>Source: Geek Wire</p>
Government Policies		<p>The Indian government is set to announce a policy for recycling LIB in the union budget, aiming to meet carbon emission reduction goals and support the adoption of electric vehicles. The policy will focus on cluster-based recycling units near battery manufacturing factories, backed by government incentives, and may include a deposit-refund system to incentivize battery returns.</p> <p>Source: Livemint</p>
Other Relevant Information		<p>The Argonne National Laboratory has received \$3.5 million in funding from the US Department of Energy to advance battery recycling technology and promote domestic production of battery materials.</p> <p>Source: Mining</p>
Other Relevant Information		<p>The Department of Energy (DOE) has pledged a \$2 billion conditional loan to support the development of Redwood Materials' battery recycling facility in Nevada. Redwood Materials, founded by former Tesla CTO JB Straubel, specializes in repurposing end-of-life electric vehicle batteries and scrap from car factories to produce raw materials and components for new battery cells.</p> <p>Source: CNBC</p>
Other Relevant Information		<p>The U.S. Department of Energy's Loan Programs Office has conditionally committed a \$375 million loan to Li-Cycle Holdings to support the expansion of its battery recycling facility in Rochester, New York. The loan aims to help Li-Cycle supply battery-grade lithium and other metals to meet the growing demand of the U.S. electric vehicle battery industry.</p> <p>Source: Canary Media</p>

SOLUTION PORTFOLIO – TECHNOLOGY RESEARCH & ADVISORY

IP Strategy	Technology Intelligence	Growth & Strategy

How best can we proactively manage and monetise our technical knowhow / intellectual property?

How best can we keep abreast of technology trends, competitor activity and headwinds / tailwinds in our domain?

Which technologies do we invest in?
How do we ensure quick wins?
Speed to market?

- IP Portfolio Analysis

- Competitor Benchmarking

- R&D Strategy Roadmaps

- IP Monetisation

- Tech / IP Landscapes

- Technology Scouting

- IP Valuation

- Technology Watch

- Open Innovation

- Prior Art Searches

- Market Analysis / Trends

- Product Development



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