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EMobility+

POWERING SMART, ELECTRIC, EFFICIENT MOBILITY

COVER STORY

EXPLORING OPPORTUNITIES & CHALLENGES IN INDIA'S INDIGENOUS BATTERY MANUFACTURING

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**HOW TO TAKE CARE OF YOUR
ELECTRIC VEHICLES AND
BATTERIES POST-MONSOON?**



CIRCULAR ECONOMY

How Recycling Companies Drive
Sustainable Resource Management

GOALS

TOWARDS NET ZERO 2070
Through Sustainable Battery
Storage Adoption in India

Navigating the layers of the Indian Battery Landscape

The pressing need to develop a robust Indian battery ecosystem is the tangible evidence of a desire to improve our environment, simultaneously, create a more sustainable environment. Demand for batteries is increasing, driven largely by the need to reduce climate change through the electrification of mobility and broader energy transition. Using batteries can prove to be extremely beneficial since they can reduce greenhouse gas emissions and environmental pollution. Batteries can help integrate more clean energy into the grid, displacing fossil fuels and reducing carbon footprint as well as reduce the need for building new power plants or transmission lines, saving land, water, and resources.

The Indian battery market, over the years, has witnessed significant growth and transformation and will continue to develop in the upcoming years. According to the latest reports, India's battery market is estimated to be at USD 16.77 billion by the end of this year and is projected to reach USD 27.70 billion in the next five years, registering a CAGR of over 10.56% during the forecast period. This change in dynamics of the Indian Battery Market is due to factors like increasing demand for electric vehicles, renewable energy integration and a strong need for reliable power backup solutions. Apart from this, the government has also launched its production linked incentive (PLI) scheme for the production of 30 GWh of advanced chemistry cell (ACC) batteries. Furthermore, the ministry has awarded an additional 20 GWh capacity, with a target to achieve 50 GWh ACC production capacity by 2030. A core feature of the scheme is its unwavering commitment to domestic value addition. Steps like these reinforces India's commitment towards building a robust and sustainable Indian Battery Landscape.



Rise of Lithium-ion Battery in the Indian Battery Landscape

Demand for lithium-ion batteries is expected to escalate over the next decade and this is majorly due to these factors. Firstly, there has been a swift but fast transition towards the need of cultivating a greener environment. There has been a regulatory shift towards sustainability which includes new net zero targets and guidelines. The second reason is the increasing awareness of greener solutions and technologies among the masses. The generation of the modern times is becoming more and more environment-conscious. This transformed consciousness has resulted in greater customer adoption rates as well as increased consumer demand for greener technologies. Lastly, government has made a remarkable contribution by introducing policies and incentives. These government introduced policies and incentives have contributed tremendously towards the growth of India's battery ecosystem.

Servotech Power Systems Ltd., founded and managed by Mr. Raman Bhatia, is at the forefront of the Indian battery ecosystem. With a strong commitment to environmental sustainability, this company has played a pivotal role in India's battery market growth. As the demand for batteries surges, Servotech Power Systems Ltd. contributes to a cleaner future by offering innovative power backup solutions and integrating renewable energy into the grid. The company's dedication to domestic value addition aligns with India's vision of a robust and sustainable battery landscape.

A core feature of Servotech's approach is their unwavering commitment to domestic value addition, which aligns perfectly with India's goal of building a robust and sustainable battery ecosystem. The company, under the visionary leadership of Mr. Raman Bhatia, is dedicated to reshaping India's energy landscape towards a cleaner and greener future.



India's journey towards energy security hinges on the development of an 'Aatmanirbhar' battery ecosystem, with lithium-ion batteries currently playing a pivotal role.



RAMAN BHATIA
FOUNDER & MANAGING DIRECTOR
SERVOTECH POWER SYSTEMS LTD.

Atmanirbhar Bharat and Lithium-ion Battery

India's journey to energy security will be powered by the creation of an 'Atmanirbhar' battery ecosystem. Lithium-ion batteries (LIBs) are currently the dominant technology for electric vehicles (EVs) in India and globally. The government has been promoting the production of lithium-ion batteries in India to power the dream of Atmanirbhar Bharat.

India produces 81 percent of lithium-ion batteries for electric vehicles in the country. They are also fast emerging as the preferred choice for battery energy storage systems (BESS) for large-scale penetration of renewable energy sources such as solar and wind.

Lithium ion batteries are widely considered as one of the life changing technological advancements due to their ability to create a significant impact on various industries and modern life. Lithium ion batteries have revolutionized the automotive industry by serving as the primary source for electric cars. They offer high energy density, quick charging capabilities and a longer lifespan as compared to other battery technologies which has advanced the transition towards sustainable transportation. Lithium ion batteries enhance grid stability and reliability. They manage to provide power during peak demand, prevent power outages and smooth out fluctuations in electricity supply, which is imperative to maintaining a stable and resilient electrical grid. In this era where there is a shift towards sustainable energy, lithium ion batteries contribute to increased energy efficiency across various industries. They enable energy storage and management solutions that reduce waste and optimize the use of electricity. Lithium ion batteries help reduce greenhouse gas emissions and decrease the reliance on fossil fuels, playing a key role in a cleaner and greener future. Ongoing research and development into improving lithium ion battery technology has led to further innovations in energy density, safety and cost reduction. As technology continues to grow multiple folds, lithium ion batteries are likely to become an indispensable part in the process of shaping our future.

Providing Alternatives; Emergence of Solid State Batteries, Zinc Batteries,

Battery demand is growing and so is the need for creation of alternatives of lithium ion batteries along the value chain.

Lithium reserves are limited and almost 60 percent of today's lithium is mined for battery-related applications, a figure that could reach 95 percent by 2030. Lithium reserves are well distributed and theoretically sufficient to cover battery demand, but high-grade deposits are mainly limited to Argentina, Australia, Chile, and China. With technological shifts toward more lithium-heavy batteries, lithium mining will need to increase significantly. In order to prevent the overexhaustion of lithium resources, ultimately, leading to a complete stoppage of lithium ion batteries production. It becomes important to develop alternatives of lithium ion batteries and there have been developments towards this direction.

One of the significant step taken towards this direction is the invention of solid state batteries. Solid state batteries are a type of rechargeable battery that uses solid electrolytes. These batteries have garnered significant attention due to their potential to offer several advantages over conventional batteries. These batteries with their solid electrolyte, are expected to provide greater safety and performance. Solid-state batteries just like lithium ion batteries reduce the carbon footprint of an electric car battery. Solid state batteries also can reduce climatic impact of batteries significantly. They are compact and possess a high energy density as well. Another noteworthy development is the introduction of zinc batteries. They refer to a category of batteries that

use zinc as one of the primary components, typically as the anode. Zinc batteries are yet to reach the Indian market. This innovative and promising battery is cost effective and offers good performance, enhanced safety features and long lifespans.

Promoting Sustainability through Recycling of Lithium-ion Battery

Recycling of lithium ion batteries can prove to be a good solution for maintaining the sustainable battery ecosystem that is being cultivated apart from making use of the alternative battery technology because alternative battery technology like zinc batteries will take time to reach the Indian market. Recycling of lithium ion batteries aim at recovering valuable material and reducing environmental impact. Recycling these batteries help recover valuable metals like lithium, cobalt, nickel and manganese while minimizing the environment footprint associated with battery production and disposal. The process of recycling involves collection, sorting, dismantling, crushing and shredding of the battery. Lithium ion battery recycling not only conserves valuable resources but also reduces the environmental impact associated with mining and processing raw materials. It also help mitigate the risk of environmental pollution. Many countries including India have established regulations and incentives to promote lithium ion battery recycling as it plays a crucial role in the sustainability of electric vehicles and the transition to cleaner energy sources.

Path forward.

In conclusion, the development of a robust Indian battery ecosystem is not only a pressing need but also a critical step towards improving the environment and creating a more sustainable future. The demand for batteries, particularly lithium-ion batteries, is on the rise due to the imperative to combat climate change through electrification and the broader transition to cleaner energy sources. Several factors are driving the demand for lithium-ion batteries, including a global shift towards sustainability, increased awareness of greener technologies, and government policies and incentives. India's journey towards energy security hinges on the development of an 'Atmanirbhar' battery ecosystem, with lithium-ion batteries currently playing a pivotal role.

Lithium-ion batteries have revolutionized multiple industries, offering high energy density, quick charging, and longer lifespans. They enhance grid stability, reduce greenhouse gas emissions, and contribute to a cleaner and greener future. Research and development efforts continue to improve battery technology, ensuring their continued importance in shaping the future.

However, as demand for lithium-ion batteries grows, concerns about the limited availability of lithium reserves emerge. To prevent overexhaustion of these resources, alternative battery technologies like solid-state and zinc batteries are being explored.

In addition to exploring alternative technologies, recycling lithium-ion batteries is essential for maintaining a sustainable battery ecosystem. Recycling helps recover valuable materials like lithium, cobalt, nickel, and manganese while reducing the environmental impact associated with battery production and disposal. Many countries, including India, are implementing regulations and incentives to promote battery recycling as a crucial step in the transition to cleaner energy sources.

India's journey towards a sustainable and environmentally friendly future heavily relies on the development of a robust battery ecosystem. This ecosystem must address challenges, embrace alternative technologies, and prioritize recycling to ensure a cleaner and greener environment for generations to come.