

Analyzing Critical Barriers to Develop Battery-Swapping Ecosystems (BSE) for Sustainable Transportation in India.

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Abstract

In today's era, the world has been moving substantially towards adopting cleaner fuel for energy demands. Transportation is a specific domain that needs to be addressed as soon as possible because of limited fossil fuel availability. Electric vehicles have come up with a potential solution for reducing Greenhouse Gas emissions (GG). E-mobility has increased in the last decade in developed nations. However, developing countries are still in the initial phase of moving towards E-mobility. India, for instance, has been making rigorous efforts to adopt Electric vehicles, particularly in the 2-wheeler and 3-wheeler segments. However, due to some constraints, the passenger 4-wheeler segment is still lagging in adoption. Mining critical elements like lithium and cobalt are subjected to various constraints, so to secure the complex supply chain of Electric vehicle batteries (EVBs), a Battery-Swapping Ecosystem (BSE) could be a potential solution to address this issue and improve circularity in the battery business. Therefore, this study aims to identify critical barriers in developing a battery-swapping ecosystem that could contribute towards the Nationally Determined Contributions (NDC) targets of net neutrality by 2070. The study identifies potential obstacles through a literature review and consultation with experts. This study can help researchers, policymakers and managers make critical decisions for developing a sustainable battery-swapping ecosystem.

Keywords

Electric Vehicles (EVs), Battery-Swapping Ecosystem (BSE), Circularity.

Biography

Utkarsh Nigam is presently a research scholar in the Department of Management Studies, Indian Institute of Technology Delhi (IIT Delhi). He has completed his B.Tech Degree in Textile Chemistry from Uttar Pradesh Textile Technology Institute, Kanpur and M.Tech Degree in Textile Chemical Processing from Indian Institute of Technology Delhi (IIT Delhi). His area of interest includes Sustainability, Resiliency in Supply chain, Operation Research, Operations Management, Product Recovery System and Machine Learning. He has started reviewing reputed journal papers.

Prof Jitender Madaan received his B.Tech degree in Production and Industrial Engineering from M.B.M Govt. Engg College Jodhpur (JNV University), India, and obtained his M. Tech in Manufacturing System Engg. from Department of Mechanical Engg. MREC (Now MNIT), Jaipur and PhD in Mechanical Engineering from the Indian Institute of Technology (IIT) Delhi, India. Prior joining IIT Delhi, Dr. Madaan has many years of working experience in other universities including IIT Roorkee, GGSIP University Delhi. His current research interests are Reverse Logistics and Supply Chain Management, Sustainable Operations Management, Production Management, Information and Governance Effectiveness, Systems Modeling and Simulation etc. Dr. Madaan has published over 4 book chapters, over 25 refereed international journal papers and 48 peer reviewed international conference papers. He is a reviewer of several international journals of repute.