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CHARGING INFRASTRUCTURE FOR ELECTRIC VEHICLES
Requirements, Projections, Challenges and Industry Insights

India Infrastructure Research
India’s shift to electric vehicles (EVs) is inevitable, if not imminent. From large automobile manufacturers to technology providers and lithium-ion battery makers, everybody seems to have thrown their hats in the ring. Going forward, battery costs should come down, driven not just by India but also by global EV trends. There also seems to be a higher manufacturer readiness to support the growing demand for EVs.

Rapidly decreasing battery costs, technological advances in charging infrastructure, innovative business models, the influx of smart digital technologies, as well as green policies and subsidies are creating excitement around EVs. As these trends continue, EVs could match the initial cost of conventional internal combustion engine (ICE) vehicles by the early 2020’s. As that happens, India Infrastructure Research projects the EV demand to cross 25 million by 2030.

However, before the mobility revolution begins, India will need an ecosystem that can sustain EVs. India Infrastructure Research expects that, in 2030, around 1 million new charging stations will be required to power India’s EV fleet.

The availability of adequate charging infrastructure will be possible through a combination of industry’s efforts and a supportive regulatory framework. Both the government and the industry are working on these fronts. Regulatory standards and tariffs for developing and using this infrastructure are still work in progress at both the central and state levels. On the industry front, the entry of new players into the market and increased focus on customisation and innovation will drive growth in this space.

This report features an in-depth analysis of the EV market potential and growth trajectory, charging infrastructure requirements, technology options and the supporting regulatory regime. It highlights the recent developments and plans of existing players in the EV space. It explains in detail the cost economics of EV charging and compares the cost-competitiveness of various fuels. The report also talks about the likely impact of EVs on the distribution companies, the viability and cost economics of charging and the upcoming centers of growth. In addition, the report presents the various opportunities for different stakeholders in the EV ecosystem with relevant case studies and insights.
Executive Summary

1. EV Market: Key Trends and Projections
   - Market Potential
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   - Battery Manufacturers and Service Providers
   - Digital Technology Providers

13. Opinion and Insight
   - Policy makers:
     - Abhay Damle, Joint Secretary, Ministry of Road Transport and Highway
     - Anil Srivastava, Adviser, Transport and Director General, Development Monitoring and Evaluation Office, NITI Aayog
   - Charging Infrastructure Developers:
     - Venkatesh Dwivedi, Director (Projects), Energy Efficiency Services Limited
     - Praveer Sinha, Managing Director and CEO, Tata Power
   - Charging Infrastructure Technology Providers
     - Awadhesh Jha, Vice President Charge & Drive and Sustainability, Fortum India Private Limited
     - Maxson Lewis, Managing Director, Magenta Power
     - Neeraj Kumar Singal, Director, Semco Group
   - Automobile Manufacturers:
     - Rohit Gothi, CEO, Hero Cycles
     - Ayush Lohia, CEO, Lohia Auto Industries
     - Manu Saxena, Vice-President, Business Planning, TVS Motor Company
   - EV Consumer:
     - Nandini Maheshwari, Head-Business Development, Uber India
   - Consultant:
     - Rahul Tongia, Fellow, Brookings India

Opinion and Insight
This section chapter has opinions and views of senior representatives from government departments, regulatory agencies, private sector, and top consultancies on the following questions:

Q. What is the current policy direction for EV charging infrastructure?

Q. What are the potential opportunities for various stakeholders in the EV charging ecosystem and what are the associated challenges?

Q. What are the industry's technology, regulatory and pricing expectations for charging infrastructure?

Q. Which user segments will be the early adopters of EVs and why?

Q. What are the biggest challenges in promoting the growth of electric buses in India? How can these be resolved?

Q. What role can power utilities play in setting up charging infrastructure?

Q. How has the manufacturing ecosystem evolved over time? What are the likely price and technology trends?

Q. How should India secure the value chain in terms of materials, battery production, etc?

Q. Who should be responsible for creating charging infrastructure? What should be the business model?

Q. What are financiers' expectations from the stakeholders?

Q. What are the demand and supply expectations for EVs and the related charging infrastructure in the coming years?
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