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CHARGING INFRASTRUCTURE FOR ELECTRIC VEHICLES

Emerging Ecosystem, Policy Framework, Challenges and Outlook



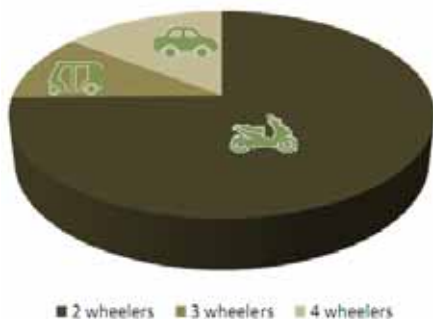
India Infrastructure Research recently released the **Charging Infrastructure for Electric Vehicles 2020**. The report covers:

- ❖ Assessment of the EV charging landscape, growth trends and available opportunities
- ❖ Detailed analysis of policies and regulations governing EV charging infrastructure
- ❖ The available and upcoming technologies along with a focus on cost economics
- ❖ Projections and outlook for EVs, power, battery and charging infrastructure demand up to 2030
- ❖ Major stakeholders and their plans, possible ownership structures and profiles of key charging station developers

Report Summary and Key Insights

The electric vehicle (EV) industry has the potential to grow significantly in the coming years. The growing momentum of EVs presents a host of opportunities for manufacturers and charging infrastructure developers.

Segment-wise share in the overall EV Market by 2030



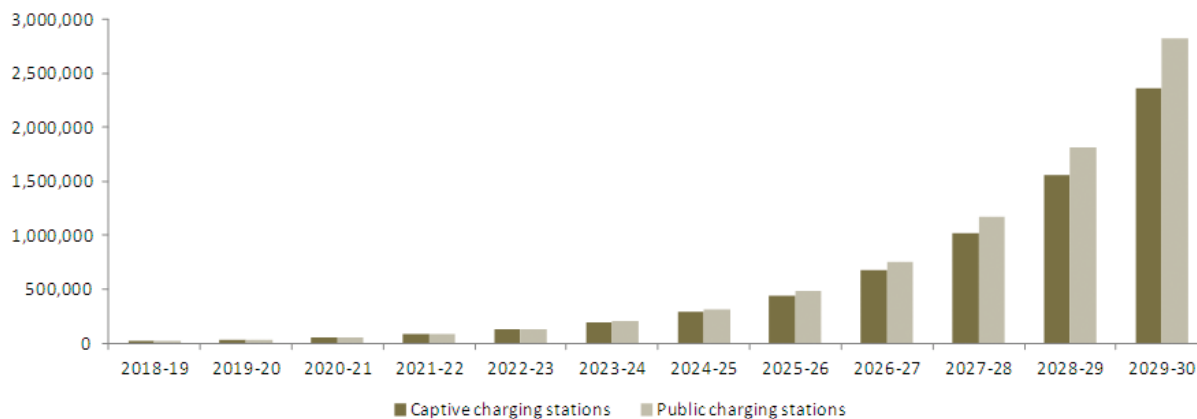
Over the past one year, the industry has seen a rapid decline in battery costs, technological advancements in the charging segment, innovative business models, introduction of policies and subsidies that have all played a pivotal part in enhancing the buzz around EVs.

However, to be able to move to an electric mobility-driven economy, the timely development of an enabling charging infrastructure ecosystem assumes prime importance. The entire EV charging ecosystem in India is still at a nascent stage.

To this end, with FAME I not being entirely successful in creating the demand for EVs uptake in India, FAME II was introduced in April 2019 with a renewed focus on incentives and charging infrastructure with an approved budget outlay of Rs 100 billion. In addition, revised the EV Charging Station Guidelines were released in October 2019 by the Ministry of Power, reiterating that EV charging stations do not require any licence and EV charging is a service.

The number of chargers is expected to go up significantly in the coming years. This is due to the significant efforts made by the government the entry of bigger players like PSUs and discoms, and technological advancements. Demand creation initiatives of entities like EESL, states and city administrations, as well as the private sector will also play a major role in this growth, providing ample opportunities to component manufacturers, service providers, electronics and digital technologies providers.

Charging station projections



This report provides a comprehensive view of the EV charging infrastructure in India with an emphasis on technology, the policy and regulatory regime, and cost economics. It presents an in-depth analysis of the present landscape and various demand creation efforts of state and central entities. The report provides a detailed analysis of ownership structures along with information on city-level pilots and related case studies. It contains profiles of 10 key charging station operators and developers along with recent development plans of key stakeholders. Finally, the report provides a detailed future outlook for EVs, batteries, power demand and charging infrastructure.

About India Infrastructure Research

India Infrastructure Research is a division of India Infrastructure Publishing, a company dedicated to providing information on the infrastructure sectors through magazines, conferences, newsletters and research reports. We have 22 years of experience in tracking and analysing infrastructure sectors and publish about 35 plus multi-client reports in the areas of power, renewable energy, oil & gas, ports & shipping, roads & bridges, urban infrastructure, telecommunications, aviation, railways, water, health, housing, banking and infrastructure finance. We also publish six magazines - Power Line, Indian Infrastructure, Renewable Watch, tele.net, Gujarat infrastructure and Smart Utilities and have two online databases - www.indiainframonitor.com (covering all infrastructure projects with investments of over Rs 1 billion) and www.indiapowerregulation.com, which provides information on the regulatory developments in the Indian electricity sector. India Infrastructure offers custom research services as well, drawing on our staff of almost four dozen infrastructure research analysts.

Executive Summary

SECTION I: KEY TRENDS, EMERGING LANDSCAPE AND GROWTH PROJECTIONS

1. EV Market Size and Opportunity

- ❖ EV Opportunity Size
- ❖ EV Ecosystem in India
- ❖ Segment-wise EV Growth
 - Two wheelers
 - Three wheelers
 - Four wheelers
- ❖ Market Dynamics
 - Drivers
 - Restraints
 - Opportunities
- ❖ Future Addressable Market

2. Charging Infrastructure Landscape

- ❖ Current Status
- ❖ Demand Creation Initiatives
 - EESL
 - PSUs
 - States
 - City Administrations and Discoms
 - Private Players
- ❖ Supply Side Ecosystem
- ❖ Key Issues and Challenges

3. Key EV Policy Initiatives

- ❖ Introduction
- ❖ Progress under NEMMP
- ❖ Key Learnings from FAME I
- ❖ Targets and Plans under FAME II

- ❖ Phased Manufacturing Program
- ❖ Union Budget 2020 Provisions
- ❖ State-level Electric Mobility Targets

4. Policy Framework and Roadmap for EV Charging Infrastructure across States

- ❖ Institutional Framework
- ❖ Key Features of State Policies
- ❖ City-Level Facilitation
- ❖ Policy Outlook

5. Regulatory Regime

- ❖ Charging Station Guidelines
- ❖ Fiscal and Non-fiscal Incentives
- ❖ Licensing Norms and Evolving Tax Regime
- ❖ Provisions for EV Charging in City Plans
- ❖ Charging Infrastructure Requirements for Buildings
- ❖ Emerging Standards and Practices

6. Emerging Tariff Trends, Costs and Returns

- ❖ Implementation Models
- ❖ Tariff Guidelines
- ❖ CAPEX Components
- ❖ Return Assessment: With Capital Subsidy
- ❖ Return Assessment: Without Capital Subsidy
- ❖ Competitive Fuel Analysis

7. Impact on Discoms

- ❖ Demand Side Impact
- ❖ Revenue Side Impact
- ❖ Impact on the Grid
- ❖ Case Study
- ❖ Discom's Approach
- ❖ The Way Forward

8. Projections and Outlook

- ❖ Overview
- ❖ Power Demand Forecast
- ❖ Battery Demand Forecast
- ❖ Charging Station Demand Forecast
 - By Charging Type
 - By Use
 - By Location
- ❖ Outlook and Insight

9. Technology Trends

- ❖ By Type
 - Ultra Fast Charging
 - Battery Swapping
 - Range Extension Systems
 - Wireless Charging
 - Renewable Energy Charging
- ❖ By Output and Power Rating
 - AC/DC
- ❖ By Charging Speed
 - Slow, Fast and Ultra Fast Charging
- ❖ By Connector Type
 - CCS, GB/T and CHAdeMO

10. Battery Recycling

- ❖ Cost of Battery Recycling
- ❖ Government Efforts
- ❖ Private Sector Initiatives
- ❖ Projected Recycling Market by 2025

- ❖ Auto OEMs
- ❖ Power Utilities
- ❖ Charging Infrastructure Developers
- ❖ Oil and Gas Companies
- ❖ Real Estate Firms
- ❖ Financiers
- ❖ Consumers

12. Emerging Business Models

- ❖ ULB Operated
- ❖ PPP-led
- ❖ Managed by Electric Utilities
- ❖ Facilitated by Public Transport Corporations and Cab Aggregators
- ❖ Set up by Automakers and Battery Manufacturers
- ❖ Business Model Evaluation
- ❖ Adoption in India

13. Key Charging Station Operators and Developers

- ❖ Magenta Power (ChargeGrid)
- ❖ Ola
- ❖ Fortum
- ❖ NTPC
- ❖ Volttic
- ❖ Exicom
- ❖ Tata Power
- ❖ SmartE
- ❖ eChargeBays
- ❖ Himachal Road Transport Corporation

SECTION II: VALUE CHAIN, BUSINESS MODELS AND PLAYER PROFILES

11. Key Stakeholders: Recent Developments and their Plans

- ❖ Government and regulators
- ❖ Battery suppliers

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