Driving Gujarat Towards Net Zero: EV Adaptation as a Strategic Response to Climate Change and Carbon Credit Opportunities

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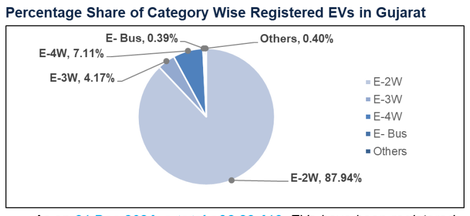
Gujarat's Transport Sector

- Vehicle Stock: **2.41 crore** growing at **CAGR of 17.5%**
- Transport sector: **22.11 MT** carbon emission, i.e. **10%** of Gujarat's overall carbon emission
- **56.8% of the total fleet** in non-attainment cities - **Surat, Ahmedabad, Vadodara and Rajkot**
- CAGR of **183%** in **EV sales** since commencement of **Gujarat EV Policy 2021**
- Attracted investment of **Rs. 35,000 crores** for EV manufacturing
- With an annual export of **8 lakhs vehicles Gujarat has been a vital contributor to India's automotive industry**

Current Status of EV Adoption in Gujarat

Percentage Share of Category Wise Registered EVs in Gujarat

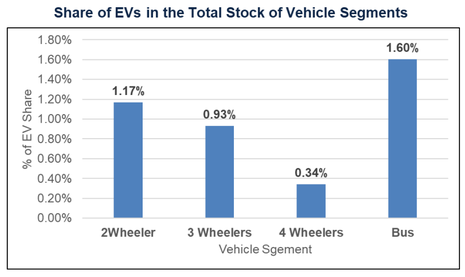


- *As on 31 Dec 2024, a total of 2,23,416 EVs have been registered.*

Segment Wise EV Subsidies Claimed (December 2024)

Vehicle Segment	Policy Target	Registered EVs / Approved*	% Achieved
2W	1,10,000	1,10,309 / 9,5290*	100
3W	70,000	2,328 / 1,763*	2.51
4W	20,000	8,686 / 7,541*	37.70
Total	**2,00,000**	**1,21,014**	**60.51**

Share of EVs in the Total Stock of Vehicle Segments



- **INR 870 Cr** was sanctioned for the period of 4 years as a subsidy
- Gujarat in **eighth position** among all Indian states in EV adoption with 7.04% EV penetration.
- Delhi, Karnataka, Maharashtra and Uttar Pradesh are leading EV adoption with 19.89%, 14.89%, 13.52% and 9.96% EV penetration respectively.

Gujarat's Climate Vulnerabilities: The Urgency for Action

Rising Temperatures

Gujarat faces increasing average temperatures. These changes exacerbate heat waves. They impact agriculture.

Erratic Rainfall

Rainfall patterns are becoming unpredictable. This leads to droughts and floods. Water security is at risk.

Coastal Erosion

Sea levels are rising, threatening coastal communities. Increased erosion and salinity intrusion are key concerns.

The Electric Vehicle Revolution: A Pathway to Decarbonization

1. **Reduced Emissions**
   EVs produce zero tailpipe emissions. This significantly cuts air pollution. It lowers greenhouse gas emissions.
2. **Energy Security**
   EVs reduce reliance on fossil fuels. They support energy independence. They diversify energy sources.
3. **Sustainable Transportation**
   EVs offer a cleaner transport solution. They are eco-friendly. They contribute to a sustainable future.

Policy Frameworks Supporting EV Adoption in Gujarat

Subsidies

Government provides financial incentives. These subsidies lower the upfront cost of EVs.

Charging Infrastructure

Policies support public charging stations. This encourages private investment. It builds a robust network.

EV Mandates

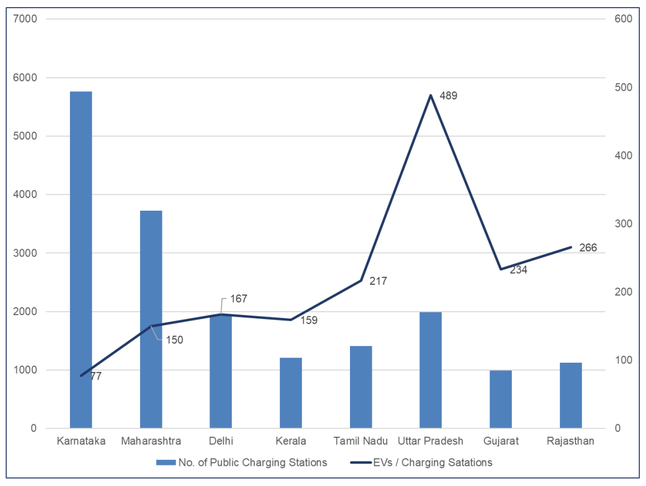
The state can set targets for EV sales. This drives manufacturers. It increases adoption rates.

Infrastructure Development: Charging Networks and Battery Swapping

1. **Strategic Locations**
   Charging stations at highways and cities are key. Battery swapping stations offer quicker solutions.
2. Public-Private Partnerships
3. **Standardization**
   Uniform charging standards ensure compatibility. Interoperability is vital for user convenience.

- As of **December 2024,** there were **997 Public Charging Stations (PCS)** in Gujarat
- **~ 70%** are fast chargers and **~ 30%** are slow/moderate chargers
- **Ahmedabad - 201** , **Surat – 110**, **Rajkot - 56** and **Vadodara – 57 (Dec. 24)**
- FAME I: **278 charging stations** sanctioned for Gujarat
- FAME II:
  - **637 charging stations** were sanctioned for Gujarat
  - Ahmedabad – Vadodara Expressway **(10)**, Surat – Mumbai Expressway **(30)**

Comparison - no. of EV Charging Stations and it's Ratio to the EVs



Economic Benefits of EVs: Job Creation and Reduced Fuel Costs

1. **Manufacturing Jobs**
   EV production generates employment opportunities. Battery manufacturing and component assembly are key.
2. **Service Sector Growth**
   Maintenance and charging infrastructure require skilled workers. The service sector expands with EV adoption.
3. **Fuel Savings**
   EVs lower transportation costs significantly. Reduced fuel expenses benefit consumers and businesses.

No. of EV Chargers Supported under PM E-DRIVE

EV Segment	Charger Type	Number of Chargers Supported under PM E-DRIVE
e2W / e3W	LECCS / LEVDC	48,400
e4W (Including Cars and LGV)	CCS-II	22,100
e-Buses / e-Trucks	CCS-II	1,800
	Total	**72,300**

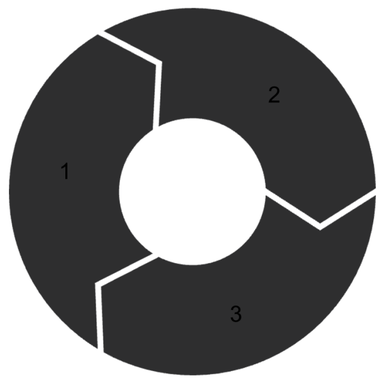
EV PCS Subsidy Outlay under PM E-DRIVE (excluding charger cost)

Charger Type	BEE benchmarks of Upstream Infrastructure Cost	Upstream Subsidy / charger (@80%)	Total Outlay
Connector	**INR Lakhs**	**INR Lakhs**	**INR Crores**
LECCS/LEVDC 12 kW	1.5	1.2	581
CCS-II – 60 kW	6.0	4.8	1,061
CCS-II – 240 kW	24.0	19.2	346
Total			**1,988 Cr.**

Carbon Credit Mechanisms: Monetizing Gujarat's Emission Reductions

Carbon Offset

EV projects generate carbon credits. These credits can be sold on carbon markets.



Revenue Generation

Carbon credits provide additional income. This incentivizes further EV adoption.

Sustainable Development

Carbon finance supports green initiatives. It promotes overall sustainable development.

Case Studies: Successful EV Implementations

Ahmedabad E-Bus

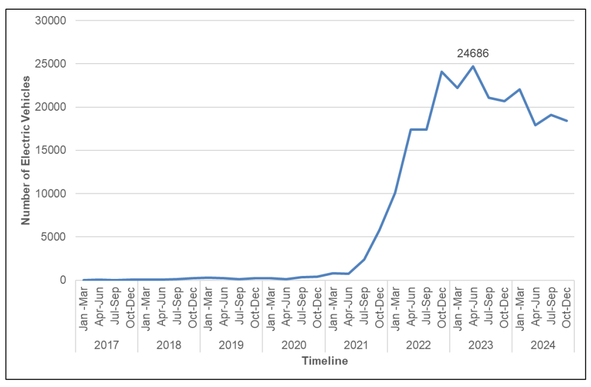
Electric buses reduce emissions. They improve air quality in Ahmedabad. They demonstrate public transport electrification.

Surat EV Charging

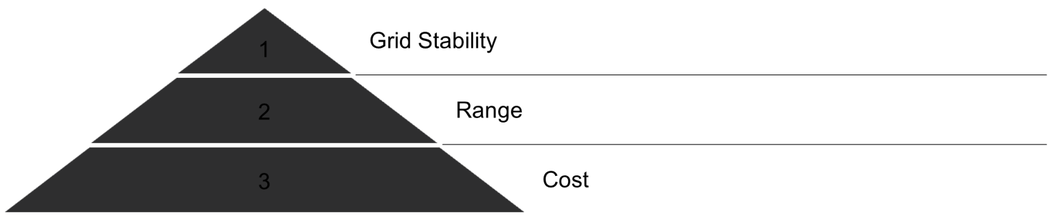
Public-private partnership for charging infrastructure. Surat showcases successful EV charging implementation.

Rajkot Carbon Offset

EV projects generate significant carbon credits. Rajkot leads in monetizing emission reductions.



Overcoming Challenges: Cost, Range Anxiety, and Grid Capacity



Addressing high initial EV costs is crucial. Expanding charging infrastructure mitigates range anxiety. Upgrading grid capacity supports EV growth.

Conclusion

- **Increase Density of PCS**
  - State Target for cities & rural areas
  - EV charging hubs for fleets
- **Incentives for PCS**
  - Prioritize fast chargers
  - Basis upstream power infrastructure Vs Equipment Cost
  - Incentive structure for Battery Swapping
- **Upgrading upstream grid infrastructure**
  - Leverage RDSS, PM E-DRIVE
  - Demand Assessment
- **Amendment to Model Building Bye-Laws**
  - Reservation for EVs in parking
  - Malls, Housing societies, public parking, commercial
- **Electrify Highways with PCS for HDVs**
  - EV charging hubs on highways
- **Renewable Energy for EV charging**
  - CAPEX subsidy for solar PCS
  - Incentives for sourcing RE power
- **Concessional Land Pricing for PCS**
  - Accessing strategic locations at viable prices
  - Alternate business models for added revenue

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