ACTION TRACKER

CLEAN AIR AND ELECTRIC VEHICLE PROGRAMME IN RAJASTHAN

SPOTLIGHT ON JAIPUR

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Citation: Anumita Rouchoudhary and Rohit Garg 2024, *Action Tracker—Clean air and electric vehicle programme in Rajasthan: spotlight on Jaipur*, Centre for Science and Environment, New Delhi

Published by
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Action tracker
Clean air and electric vehicle programme in Rajasthan: spotlight on Jaipur

The state of Rajasthan has adopted a state clean air policy and city action plan for five non-attainment cities—Jaipur, Kota, Udaipur, Jodhpur and Alwar—under the National Clean Air Programme (NCAP) that aims to reduce particulate pollution by 40 per cent by 2026. The state has also prepared a state climate action plan to define the low carbon pathways until 2030 to contribute towards the decarbonisation goal as defined in India's nationally determined contribution.

Both clean air and climate action plans are multi-sector strategies that aim to reduce emissions from the key sectors of emissions, including vehicles, industry, power plants, waste streams, construction, use of solid fuels in households among others.

The implementation of these plans is now being monitored and a reporting mechanism has been developed. This is particularly so for the implementation of the Clean Air Plan, as it is tied to performance based grants. Cities have to demonstrate improvement in air quality to access the grants under NCAP and that from the 15th Finance Commission.

While this has created conditions for driving change in the polluted cities, the nature of action and intervention are not uniformly stringent and effective across all sectors and sub sectors. This is particularly a challenge in the transport sector. Even though indicators have been provided by the Central Pollution Control Board (CPCB) for reporting progress in the transport and mobility sector, reporting on on-ground change is minimal.

In view of this, the Centre for Science and Environment (CSE) has initiated the Action Tracker series to track sectoral pathways for clean air and low-carbon action. The initiative aims to assess the progress and identify gaps across various subsectors, highlighting the specific and contextual interventions required to accelerate change.

Therefore, as part of the Action Tracker series on the cities of Rajasthan, a spotlight has been placed on the status of vehicle fleet electrification in Jaipur, the capital city of Rajasthan and one of the non-attainment cities. This is one of the key subsectors being reviewed following the assessment of public transport and mobility in the same city.

This spotlight on the transport sector in Jaipur is critical as vehicles have emerged as the top contributor to PM2.5 load (20 per cent) among the combustion sources and second after the dust sources. This has emerged from the emissions inventory carried out by the Indian Institute of Technology, Kanpur.

Vehicular pollution has continued to remain critical even after the implementation of technology measures, including the implementation of Bharat Stage 6 emissions standards along with 10 ppm sulphur fuels, the initiation of phaseout of old vehicles, and conversion of a segment of auto-rickshaws to LPG.

This challenge can be taken on with massive electrification of the new vehicle fleet with zero tailpipe emissions. This needs to be supported by a significant mobility transition to reduce dependence on personal vehicles and also moving the public transport, para transport, taxi aggregators and delivery fleet to electric.

The state government of Rajasthan has already notified Electric Vehicle Policy and created the conditions for this transition. Picking up on the momentum provided by central subsidies, the state introduced its own set of incentives to further facilitate EV penetration.

The EV transition needs to be accelerated and upscaled to make an effective impact in face of rapid motorisation in the state and in Jaipur. The Vahan database of Ministry of Road Transport and Highways (MORTH) shows that, as of March 2022, Rajasthan's cumulative vehicle registration was about 177.4 lakhs. During 2012–2022, the state registered 12.45 lakh vehicles on an average annually. During FY 2021–22, 72 per cent of the vehicles registered in Rajasthan were two-wheelers, while 14.4 per cent were cars.

Even though the CPCB has given broad indicators for reporting progress in the implementation of the electric vehicle programme, these indicators do not adequately define the full scope of the measures to be implemented and reported. The two indicators given by CPCB include introduction of new electric buses (with proper infrastructure facilities such as charging stations); and steps for promoting battery operated vehicles like e-rickshaw/e-cart. But these are not tagged with

specific targets to define the scale of intervention to be planned for funding and implementation.

Currently, the performance linked funding under the 15th Finance Commission is mostly locked in dust control measures with some additional measures around waste management. Transport and electrification barely get any priority in clean air funding. As a result, the Clean Air Action Plan is not being able to catalyse big changes in the sector.

Under NCAP there is also a provision of reporting progress under convergence funding which include separate line funding from either the state government or the central government. But those interventions are usually not driven by strong targets and lack specific accelerators to upscale change. In the case of EVs, the Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India (FAME India) Scheme of the Central Department of Heavy Industry in 2015 and FAME II in 2021 have catalysed the electric vehicle programme in the state. But clean air targets need to build ambition for this programme.

This therefore makes it necessary to assess the on-ground changes for reality check and if adequate attention has been given to the programme design for an impact. There has to be a stronger interface between the state EV policy and clean air programme to accelerate zero tailpipe emissions transition.

Against the backdrop of the state EV policy and the provisions of the clean air plans, CSE has conducted an assessment of the status of EV adoption and policy implementation in Rajasthan with a special focus on Jaipur. This has been done based on literature review, VAHAN portal data analysis, field investigation and stakeholder surveys in the city of Jaipur.

Highlights and way forward

Rajasthan has witnessed a nascent beginning of fleet electrification. The trend is deeply dominated by the small vehicles – 2Ws and 3Ws with a sprinkling of e-cars. Charging infrastructure has also begun to take shape. Predictably, most of the state level EV market is concentrated in big cities like Jaipur.

One of the strengths of the Rajasthan EV policy is the provision of state-level fiscal incentive programmes to complement the central programme. This has helped to push the market. Not many states in India have separate provisions on state-level fiscal incentives for EVs and rely solely on the central incentives.

Rajasthan is also among the few states that have included industrial policy and manufacturing goals for EVs in the state. This has the potential to upscale the market and also provide economic spinoffs in terms of jobs, livelihood and this will help to retain a great part of the value chain within the state's economy.

However, to make this programme more scalable to deliver on the clean air objectives and low carbon goals, the EV policy needs more explicit connection with the NCAP programme. More detailed indicators need to be developed for helping the state and the non-attainment cities like Jaipur to define the scope and scale of interventions, mobilise resources accordingly and make the programme monitorable and verifiable.

Need vehicle segment-wise targets: More aggressive and targeted medium- and short-term goals for electrification of EVs in specific segments. In addition to setting overall state-wide targets the key cities especially non-attainment cities like Jaipur require more ambitious and time bound targets.

Targets to be enabled by ZEV mandate and enablers: Attainment of vehicle segment-wise targets will have to be enabled by a combination of regulatory mandates. This is needed to boost both demand and manufacturing. The incentives for EV manufacturing in the state needs to be linked with supply side mandates as well. Manufacturers producing in the state should have an obligation to sell a part of their local production in the state. This can help to build competition, market, economy of scale and reduce cost pressures.

Electric bus programme needs to gather momentum: During the initial stages of the central FAME scheme the state government has not mooted the electric bus programme. The state's delay in onboarding electric buses has slowed down this transition towards zero emission mass commuting. However, the e-bus procurement under the new PM-eBus Sewa scheme has catalysed new interest. It is reported that procurement of electric buses is underway. The future strategy for their deployment needs to be in place.

Scale up targeted subsidies for an upscaled market: Provision of additional state subsidy can be linked with procurement of vehicles in targeted segments like delivery fleet, fleet aggregators, and trucks. Quantitative data regarding disbursal of fiscal incentives both on demand and supply side would present a more accurate picture of policy implementation.

Need report card on expansion of charging infrastructure: This is a critical intervention point to build consumer confidence in EVs. Jaipur and other cities need to prioritise implementation of well-defined and well-planned public charging infrastructure including a network of battery swapping stations. This needs to be supported by the building readiness for home charging. Targeted EV adoption can be supported by 100 per cent exemption of duty and tax on electricity tariff for an initial period of five years for EV and charging equipment manufacturers.

Develop EV battery recycling infrastructure: This is needed at the early stages of EV growth market to be able to be prepared for urban mining and recover critical minerals from the spent batteries and also have a reuse strategy for the downgraded batteries. Jaipur and other cities need to develop this plan and the roadmap.

1. Status of implementation of Rajasthan EV policy

The state government of Rajasthan had initially brought out a purchase incentive program for electric vehicles (EVs) and a separate order on EV charging requirements. However, a dedicated policy framework and regulations to accelerate EV adoption in the state was needed.

The state government announced a single comprehensive Electric Vehicle Policy in August 2022, which will remain in force for 5 years. The policy has identified priority cities for the purpose of policy implementation in accordance with the orders of the National Green Tribunal (NGT) regarding non-attainment cities and the NCR sub-region. These are Jaipur, Jodhpur, Kota, Udaipur, Bikaner, Ajmer, Bharatpur and Alwar.

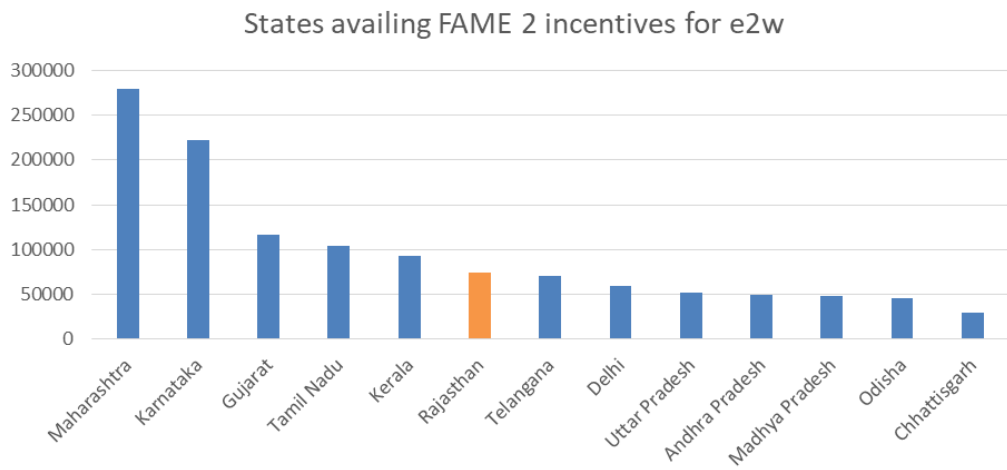
The key stated objectives of the policy are supporting EV adoption in personal mobility and public transport; enabling creation of a robust EV charging network; fostering R&D and skill development; and promoting manufacturing of EVs and batteries.

The state EV policy has established a defined institutional framework by delineating responsibilities across various departments and committees. According to the policy, a State Electric Vehicle Committee and a District Level Coordination Committee are required to be set up to address on-ground challenges. A state EV cell is required to be set up under the transport department to monitor the growth of EVs in the state. However, currently this framework exists only on paper.

Role of fiscal incentives

Central government's FAME scheme has been the primary driver of stimulating consumer demand for purchasing EVs. It offered demand incentives to EVs in the two-wheeler, three-wheeler, passenger car, and bus segments. Demand incentives were made available to EV buyers at the point of sale in the form of a reduced upfront purchase price, which was later reimbursed to original equipment manufacturers by the central government. Two-wheelers (E2Ws), both private and commercial-use vehicles were eligible for incentives. For electric three-wheelers (E3Ws), electric four-wheelers, and electric buses, only vehicles used for public transport or registered for commercial purposes were eligible. Rajasthan was sixth in the list of states availing FAME II subsidies (see Graph 1: States availing FAME II subsidy for electric two wheelers).

Graph 1: States availing FAME II subsidy for electric two wheelers



Source: CSE analysis, data from https://fame2.heavyindustries.gov.in/dashboard.aspx

The state EV policy has also provided for state level incentives. Demand side incentives mentioned in the state EV policy include complete reimbursement of SGST and a one-time upfront purchase subsidy based on the battery capacity of a vehicle for a fixed number of vehicles sold per segment. The subsidy amount is upto Rs 10,000 for e-two wheelers(E-2W), up to Rs 20,000 for e-three wheelers(E-3W), upto R 50000 for e-four wheelers(E-4W) and upto Rs 5 L for buses.

The purchase subsidy is higher for vehicles with fixed batteries compared to those with swappable batteries. The policy also provides incentive for retrofitment amounting to 15 per cent retrofitment kit cost for three wheelers, four wheelers and buses.

Rajasthan EV policy also provides 100 per cent exemption from Motor vehicle tax and registration fees for EVs. However, there is no waiver on road tax.

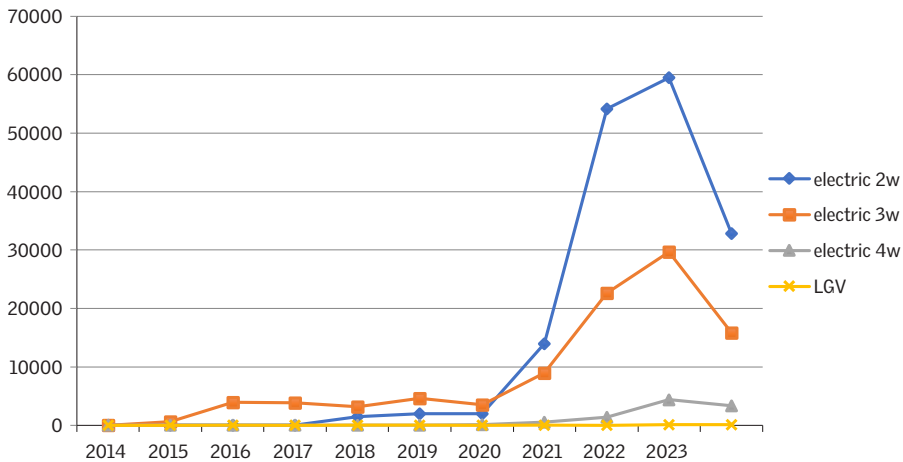
The policy mentions upfront incentives as per battery capacity as a range. For example for two wheeler, fixed battery models are eligible for Rs 5,000 to Rs 10,000 incentive. However, the per KWh rate for incentive amount is not spelled out in the document.

The transport department had received a sum of Rs 40 crore to clear the pending cases of grant on the purchase of electric vehicles in September 2022.[1]

CSE's survey confirmed that the central and state govt purchase incentives were helpful in the initial uptake of e2w by the lower middle class population and e3w for daily wage earners which increased affordability of paratransit vehicles.

The role of the fiscal incentives in clearly evident in the EV sales graph of the state. There is a sharp increase in EV registration after fiscal incentives were available. (see Graph 2: Vehicle category wise trend of EV registrations in Rajasthan).

Graph 2: Vehicle category wise trend of EV registrations in Rajasthan



Source: CSE analysis using VAHAN data

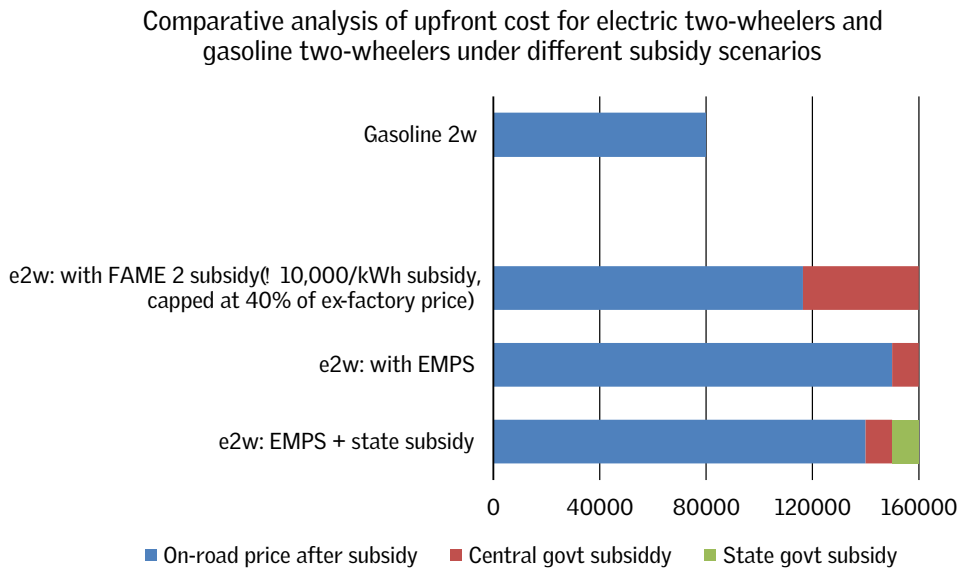
CSE's investigation however revealed that purchase subsidies for EVs by the state government have not been reimbursed for over a year. Around 50000 EV owners[2] are yet to get refunded. Upon enquiry, government officials did not provide any clear reasons for non-dispersal/ delay and provided no guarantee on the timeline of disbursement. While this has not dampened E-2W and e-rickshaw (L3 category)

sales due to their advantages of low operational cost, this was a cause for a latent sense of grouse among EV buyers.

This is also more of a concern for E-autos and E-4W which have higher upfront cost and whose sales have not picked up momentum. Non-timely disbursement of subsidy by the state government is an issue which creates a negative perception among buyers.

In March 2024, as the FAME II scheme came to an end, the government launched the Electric Mobility Promotion Scheme (EMPS) 2024, wherein purchase subsidies were offered for E-2W and E-3W from April to July 2024. The subsidy amount offered under the EMPS was lower than was offered under FAME II. A comparative analysis of the on-road price under various subsidy regimes is shown in graph 3.

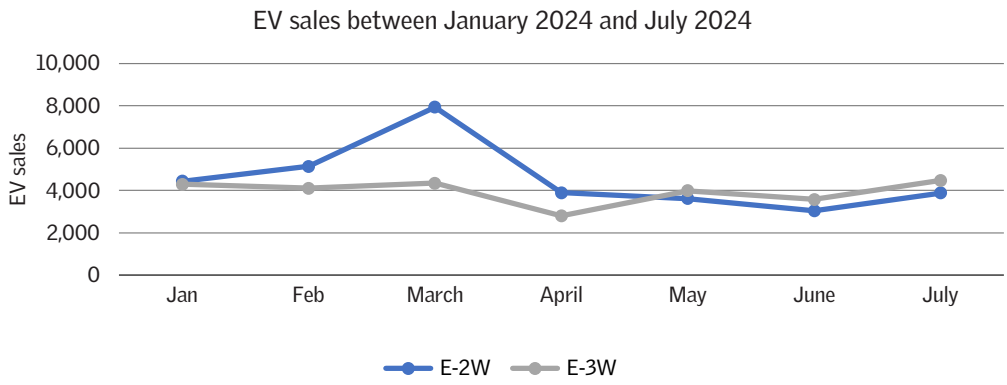
Graph 3: Comparative analysis of upfront cost for electric two-wheelers and gasoline two-wheelers under different subsidy scenarios



Source: CSE analysis

The impact of FAME II incentive withdrawal on EV demand was reflected in the dip in EV sales number in April (see Graph 4: Impact of FAME II withdrawl on EV sales).

Graph 4: Impact of FAME II withdrawal on EV sales



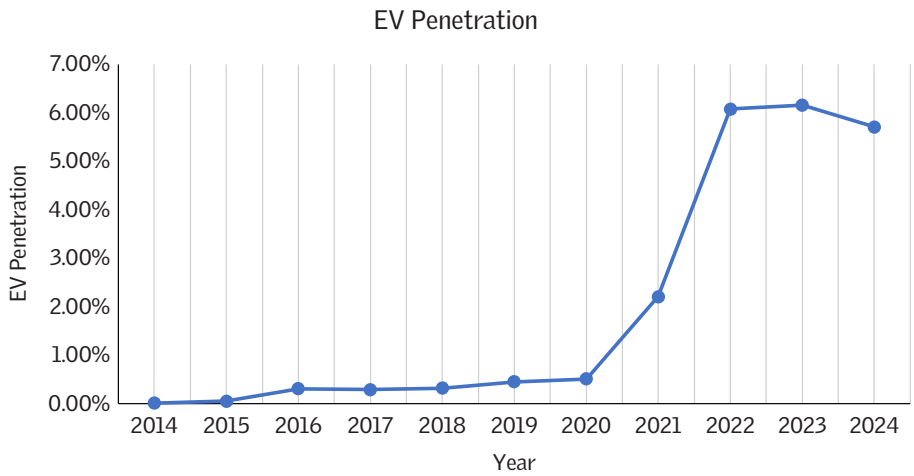
Source: CSE analysis using VAHAN data

Rajasthan government has recently created a Corpus Fund of Rs 200 crore as e-Vehicle Promotion Fund[3] under the Electric Vehicle Policy which will be utilized for upfront incentive disbursement.

EV market penetration

Rajasthan with 277,435 EVs (as of September 2024) has a 6.38 per cent share of the total EV registrations in India.[4] It ranks fifth among all states in the cumulative number of EV sales in the country behind UP, Maharashtra, Karnataka and Delhi. The overall EV penetration (as of September 2024) in the state is 1.95 per cent. (see Graph 5: EV penetration trend in Rajasthan).

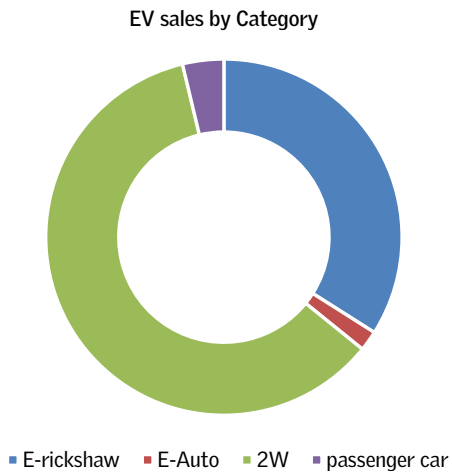
Graph 5: EV penetration trend in Rajasthan



Source: CSE analysis using VAHAN data

EV adoption has been predominantly driven by two wheelers and E-rickshaws and account for around 60 per cent and 34 per cent of the total EV registrations respectively (see Figure 1: Vehicle segment-wise composition of on-road EVs in Rajasthan).

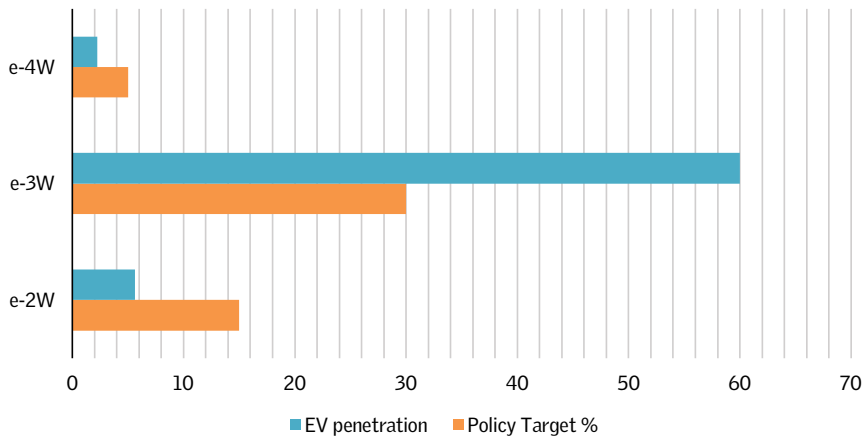
Figure 1: Vehicle segment-wise composition of on-road EVs in Rajasthan



Source: CSE analysis using VAHAN data

The state EV policy mentions specific category-wise targets for EV share in new vehicle registrations by the end of the five year policy period. (see Graph 6: Comparing policy target and actual category-wise EV sales penetration in 2023).

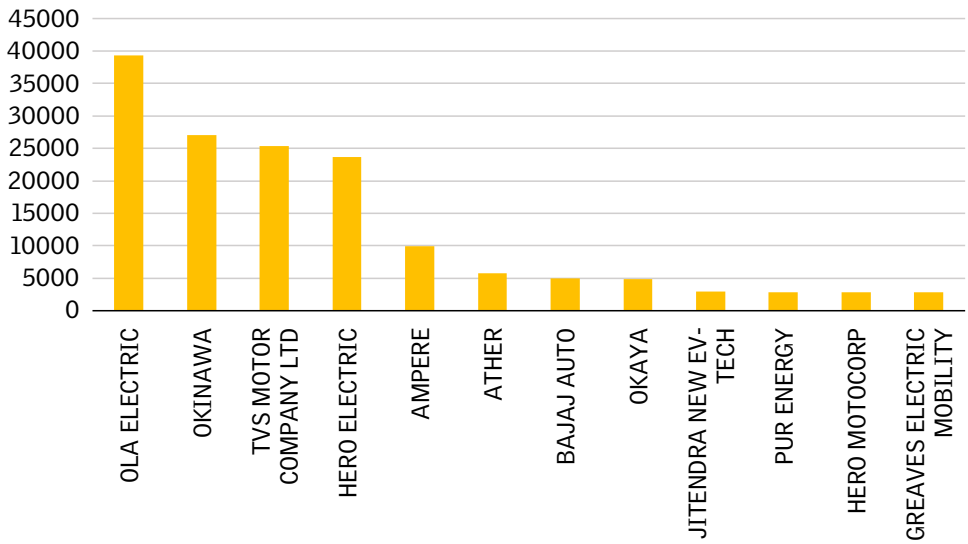
Graph 6: Comparing policy target and actual category-wise EV sales penetration in 2023



At the end of 2023, a year and a half after the policy announcement, Rajasthan had achieved 5.63 per cent of its 15 per cent target of electric two-wheeler registrations, 2.25 per cent of its 5 per cent target of electric four wheelers. In the three wheeler category, EV sales, predominantly driven by E-rickshaws comprised 60 per cent of the share in new vehicle registrations surpassing the 30 per cent target.

CSE's survey showed that there is a positive sentiment about e-two wheelers most predominantly due to operational savings and rising fuel costs. Even OEM dealers like TVS, Ola and Hero reported high customer enthusiasm. Range anxiety is not an issue and home charging was reported as sufficient by responders.

Graph 7: Top selling e-Two wheeler OEMs in Rajasthan



Source: CSE analysis using VAHAN data

The most significant gains have been seen in the three wheeler category where e-three wheelers makeup 58 per cent of new three wheeler registrations surpassing its 30 per cent target for 2027. In fact the L3 category (e-rickshaws with maximum speed upto 25km/h) comprise around 95 per cent of e-three wheeler sales. The L5 category(e-auto with maximum speed above 25 km/h) vehicles are considerably lower in number and adoption faces issues like high cost, range anxiety and maintenance concerns.

CSE's survey revealed that the key factors driving the proliferation of L3 vehicles are seasonality of rural jobs, post-COVID job slump, high tourism density and an alternative to non-motorised vehicles like pedal rickshaws. A study by CUTS

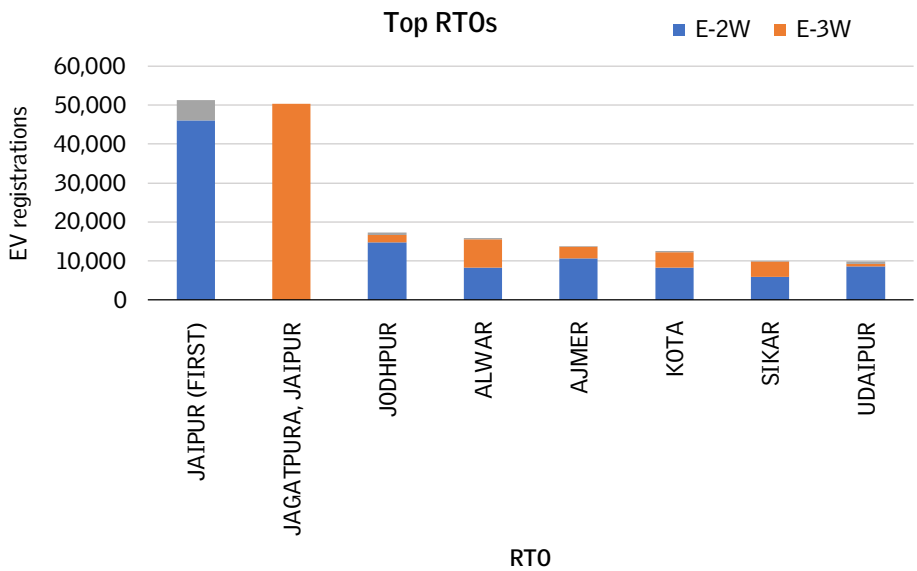
International on employment generation through e-three-wheelers in last-mile connectivity found that Jaipur alone has the potential to generate approximately 1.5 lakh jobs by 2025.[5]

Mixed responses were received regarding after-sales and service costs. E-2W users were servicing their EVs at their respective dealers at time periods specified by OEMs. Some e-auto owners complained about the lack of service centres and the service costs because of the need for skilled mechanics who are adept at handling the electrical components of the vehicle. A point of concern emerged that most of the available pool of such mechanics were based in Jaipur. Thus users in other smaller cities would incur delays or higher servicing costs due to additional cost of transportation.

Regional penetration

Rajasthan is the largest state in India with a relatively low population density in comparison to the average population density of India. The electric mobility transition has predictably manifested most in urban agglomerations with Jaipur exhibiting a clear primate city effect with the bulk of EV registrations. E-three wheelers account for 50 per cent of the EVs in the city, which is higher than the state modal share (37 per cent) (see Graph 8: Vehicle category registrations in major cities of Rajasthan).

Graph 8: Vehicle category registrations in major cities of Rajasthan



Source: CSE analysis using VAHAN data

Jaipur also accounts for almost 50 per cent e-four wheeler registrations in the state. CSE's survey gathered that sales are largely being driven by the upper middle class who are choosing an electric car as their second vehicle of choice in a household and due to the growing presence of public charging stations in the city.

Figure 2: a)TVS iQube was noticed as a popular e2w model in Jaipur; b) e-rickshaw in the old city area; c) a BMW i4 EV spotted in Jaipur

Source: CSE

Status of e-Bus deployment

In the context of electrification of buses, the central government incentive schemes (FAME 1 and FAME II) have prioritised public transit authorities. Under the FAME scheme, in 2018 Jaipur was one of the cities which was sanctioned assistance by the central government for the purchase of 40 e-buses. Jaipur City Transport Service Limited (JCTSL) had the responsibility of deploying these buses on a Gross Cost Contract (GCC) basis through appointment of an operator.[6] However, no e-buses were deployed as part of the FAME scheme.

The Rajasthan EV policy in 2022 has spelled out a non-quantitative target for a phased transition to e- buses for inter-city routes connecting priority cities (non-attainment cities). There is a mention of upfront incentive between Rs 1 Lakh and Rs five lakhs for 500 e-buses as per battery capacity. Rajasthan has five city transport utilities including JCTSL and a state transport corporation (RSRTC). The finance department had appointed Jaipur City Transport Corporation Limited (JCTSL) as the nodal agency to procure 420 e-buses for the state.[7] However, even that target had not materialized. Post state elections in 2024, the new government has made fresh announcement of acquiring 500 e-buses for urban bus services in the cities of Jaipur, Jodhpur, Kota, Ajmer, Bikaner, Bharatpur and Udaipur.[8]

According to survey and investigation by CSE, there are several reasons for the repeated procurement delay of e-buses in the state. Utilities like JCTSL is plagued by organisational issues, staffing issues and lack of institutional capacity. Other obstacles include poor financial performance of transport utilities, mis-allotment of budget and inadequate depot infrastructure. There is a lack of vision and leadership in the organization with transport utilities being seen as a destination for 'punishment' posting i.e., a government unit of seemingly low importance.

Notably, in 2023 JCTSL brought out a Environmental, Social, and Governance (ESG) policy and disclosure framework which aims to serve as an instrument for transparency and accountability. However, baseline assessment for ESG reporting is still under progress. The ESG disclosures also serve as a potential gateway to secure green financing.

Going forward the new PM-e-bus Sewa has created the opportunity for expansion of e-bus service in Rajasthan.

Status of charging infrastructure

While states like Uttar Pradesh, Maharashtra, Delhi, Andhra Pradesh have defined targets for charging infrastructure in terms of number of public charging stations, Rajasthan EV policy has no such defined target. The EV policy assigns Jaipur Vidyut Vitran Nigam Limited (JVVNL) as the state nodal agency (SNA) responsible for EV charging infrastructure.

Ministry of Power EV charging infrastructure guidelines provide the overall framework for adherence for CPOs, DISCOMS, site providers and planning bodies.

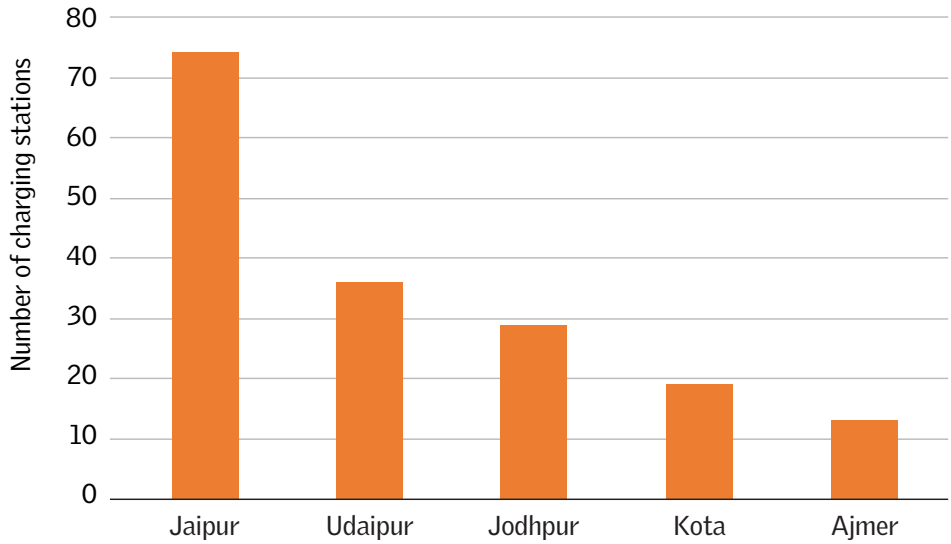
EV charging and swapping stations have been identified as a thrust sector in service enterprises in Rajasthan Investment Promotion Scheme (RIPS) 2019. Fiscal incentives according to the policy for promoting EV charging infrastructure include capital subsidy on charging equipment, interest subvention, tax exemption on charging and swapping stations and concessional EV tariff along with ToD(Time of Day) rebates for EV loads. Rajasthan Electricity Regulatory Commission (RERC) has rolled out a preferential EV tariff of Rs 6 per unit.

However, ToD discounts have not yet been availed in majority of the cases due to the non-availability of smart metering.

According to data from the Bureau of Energy Efficiency (BEE) portal, which is also being used by JVVNL, there are currently 501 public charging stations in

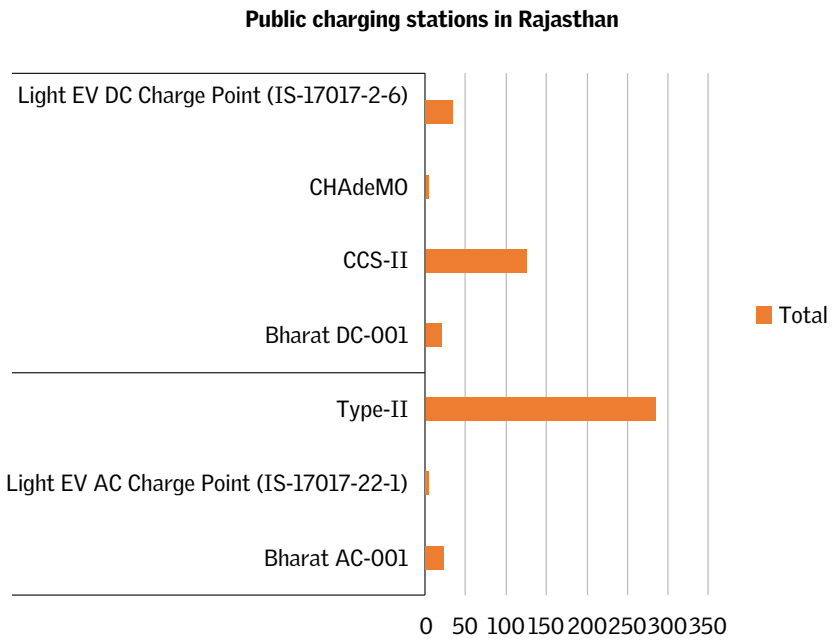
Rajasthan. Among the top five cities in the state with respect to Public Charging Stations (PCS) Jaipur occupies a dominant position.(see Graph 9: Cities with highest number of charging stations, according to BEE data and Graph 10: Distribution of charger type).

Graph 9: Cities with highest number of charging stations, according to BEE data



Source: CSE analysis using JVVNL data

Graph 10: Distribution of charger type



Source: CSE analysis using JVVNL data

Figure 4: AC socket charging of Ola E-2W

Source: CSE

It is imperative for the SNA (JVVNL in this case) to have an accurate and updated data repository of charging infrastructure in the state to make informed policy decisions. The state EV policy mentions that DISCOMs would develop a mobile application for real time information on charging stations. The DISCOM officials mentioned that with the proliferation of e-Mobility Service Providers, the need for such an app is redundant.

CSE's field visit in Jaipur established that battery swapping has emerged as an attractive alternative to home charging or park-and-charge model for e-rickshaws, due to reduced downtimes. A visit to one of the swapping stations of an established battery swapping company revealed a dock less swapping system instead of docked (enclosed) swapping bays. There is a need to conduct a safety audit of such swapping stations due to the safety concerns posed by potential short circuit of exposed wiring of multiple batteries getting charged in close proximity.

Figure 3: a) Sunfuel Electric DC charger, b) Dockless battery swapping centre for e-rickshaws

Source: CSE

The state EV policy refers to the Rajasthan Solar Energy Policy 2019 for renewable energy powered EV charging. There was a policy focus on renewable energy integration and EV charging via land allotment at concessional rates, exemption from electricity duty and exempting transmission and wheeling charges from solar energy powered stations. However, the revised Solar energy policy 2023 has excluded the concessional land clause.

To evaluate the status of implementation of renewable energy based charging station, CSE visited a solar powered PCS (see Fig 5 Solar powered EV charging station). It was operated by TATA power as the CPO on a site provided by a private company, on a revenue sharing model. The PCS had six chargers: two of 10 kW, two of 25 kW, and two of 30 kW. The PCS has been operating since March 2024 and, on average, caters to 4 to 5 four-wheelers daily. The PCS is powered by 60 kW solar panels onsite. The CPO officials revealed that they had not received rebates on electricity duty or time-of-day tariff benefits as per the state EV policy. It was unclear whether EVs are charged during the rebate-eligible night hours. There were also issues with net metering billing which required the attention of JVVNL.

In July 2023, ChargeUp had launched India's first solar-powered battery swapping station in Jaipur.[9]

Figure 5: Solar powered EV charging station

Source: CSE

In Rajasthan, to avail benefits under the solar policy, a captive power plant must have a minimum capacity of 1 megawatt. Therefore, to benefit from this policy, a charging station must collectively draw 1 megawatt of power under one owner. Alternatively, using rooftop solar panels and applying for net metering can reduce the overall operating costs. It was also noted that earnings from customer recharging can be higher than from vehicle charging alone.

From the perspective of a Charging Point Operator (CPO), it is suggested that more power should be allowed on LT services. In Rajasthan, up to 50 kVA can be sanctioned on a 3-phase LT line. Beyond this limit, consumers must apply for an HT connection, which is costly due to the infrastructure expenses borne by the consumer.

Many individuals charging their personal EVs at home are unaware that there is a separate electricity connection category for EV charging, which offers subsidized rates and time-of-day rebates. There is a general lack of awareness among electricity consumers about this special category that provides TOD rebates for LT connections, as no other category in Rajasthan enjoys this privilege. CPOs also lack awareness about TOD rebates.

CSE also visited another PCS operated by XoBolt (see Fig: 6: Charging station operated by XoBolt). XoBolt emphasized that selecting a charging station location involves a detailed thought process, considering not only land price and electricity availability but also equipment security and user behavior. Thus, installation sites

are assessed not only for accessibility but also for safety, including CCTV cameras and secure parking. Additionally, charging stations frequently face network issues, such as a charger not appearing on the app due to network breakdowns. Using SIM cards in chargers could be a solution.

Figure 6: Charging station operated by XoBolt

Source: CSE

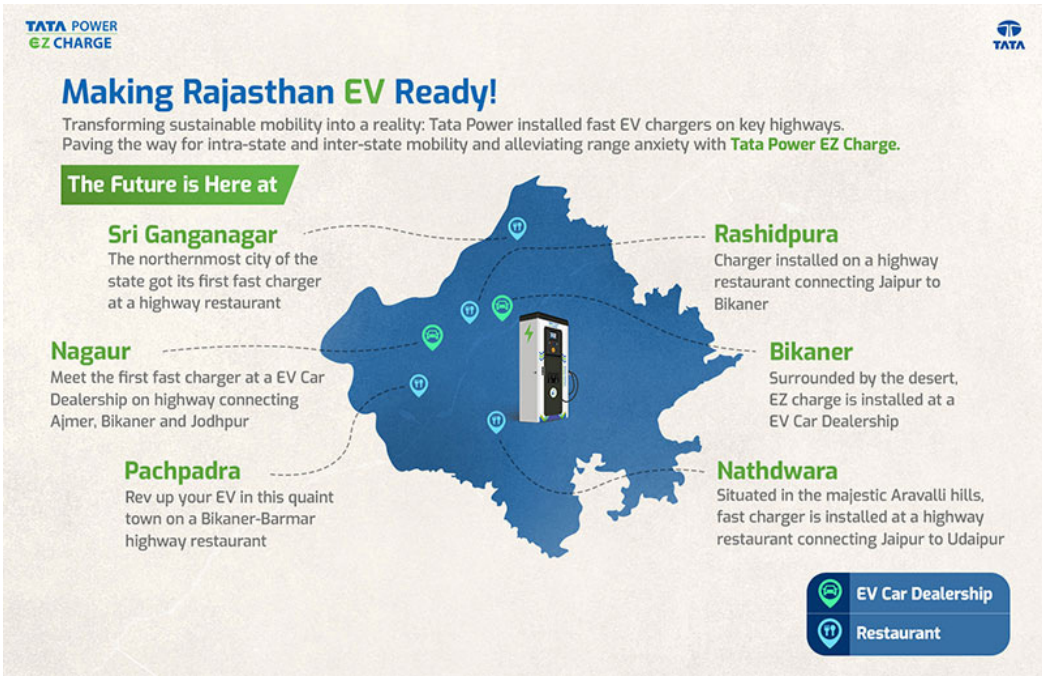
Even with multi-fold policy measures laid out in the policy, given the vast areal expanse of the state, the limited number of EV charging facilities in the state remains as a major roadblock in the adoption of EVs especially in tier 2 cities and the hinterland.

In contrast, the Delhi-Jaipur highway (NH 48) can be called an 'EV oasis'. It is being developed as India's first 'electric highway' and has one of the highest densities of EV chargers on a highway. Tata power has also installed 150 fast chargers across key highways in Rajasthan (Figure 7: Tata Power fast charging network in Rajasthan).

Highways are typically chosen for fast-charging stations every 25 kilometers on both sides of the road. However, these areas often experience frequent power quality issues, causing charging interruptions and delays of 30 minutes to 1.5 hours. To support the acceleration of electric vehicles on highways, it is crucial to prioritize

power quality. In city areas, voltage variations often lead to tripping problems with charging systems, as the load on the grid decreases at night, increasing voltage and causing over-voltage tripping

Figure 7: Tata Power fast charging network in Rajasthan



Source: https://www.tatapower.com/media/PressReleaseDetails/2033/tata-power-installs-ev-fast-chargers-across-key-highways-in-rajasthan

Currently, 'charging deserts' plague underserved areas of the state, making EVs less accessible. Continued attention is required to bridge this charging infrastructure gap, to reduce EV inequities.

EV industrial landscape

Rajasthan is located strategically between key markets of northern and western India. 25 per cent of the NCR falls in Rajasthan and 58 per cent of the state's area falls within the influence zone of the DMIC(Delhi-Mumbai Industrial Corridor). Rajasthan has taken proactive measures to promote EV manufacturing in the state, through Rajasthan State Industrial Development and Investment Corporation Ltd(RIICO), the apex organization engaged in industrialization.

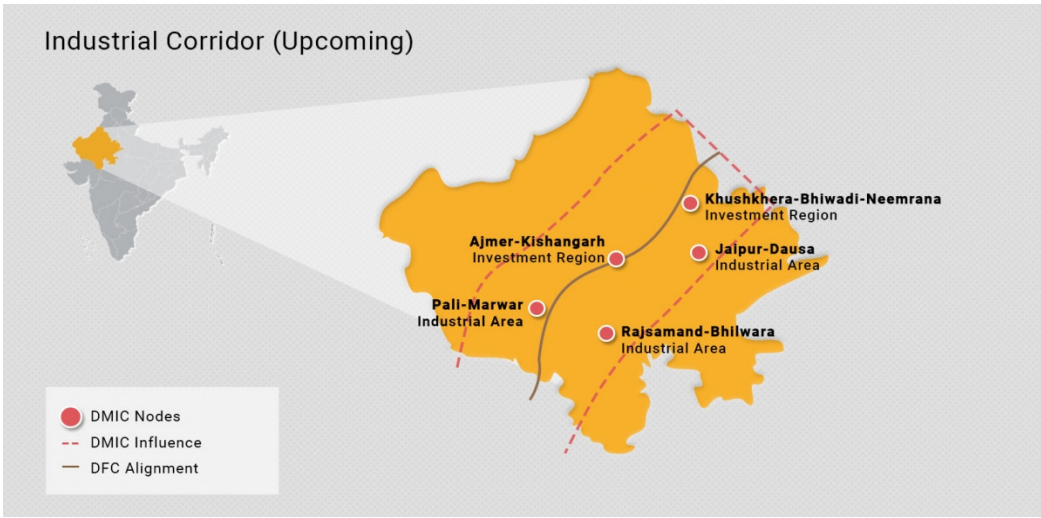
The state EV policy promoted EV manufacturing by providing the benefits of the Rajasthan Investment Promotion Scheme (RIPS) 2019 in which EV manufacturing had been identified as a 'thrust sector'. The updated RIPS 2022 extends these benefits to new EV investments. These financial incentives include investment, interest and capital subsidies along with exemption of taxes(electricity

duty, land tax, market fee, stamp duty, land conversion fee). The non-financial incentives are sectoral development by creating EV Zones, emphasizing the ease of doing business, facilitating charging and swapping infrastructure in the RIICO Industrial areas.

According to the state EV policy five special zones are to be promoted for manufacturing of EVs (Fig:8 Special Zones under DMIC for EV manufacturing). Among them, currently only the Khushkhera-Bhiwadi-Neemrana belt has emerged as a magnet for EV investment. This region was already a prominent auto hub, due to its proximity to NCR and the existing ecosystem consists of over 120 major auto and auto ancillary industries.

Additionally, RIICO has developed an EV Zone at Karoli in Rewari village of Rajasthan on 60 acres of land where Electric two-wheeler manufacturer Okinawa has launched a manufacturing facility. Other EV manufacturers in the Bhiwadi industrial region include Saera and Bounce Infinity. Hero Electric had signed an MoU with the state government to set up a mega EV manufacturing plant which has been deferred temporarily due to land allotment issues.

Figure 8: Special zones under DMIC for EV manufacturing



Source: https://www.rajras.in/delhi-mumbai-industrial-corridor-dmic-rajasthan/

The state EV policy mentions that the state government will encourage establishment of recycling facilities for EV batteries through incentives under the industrial policy and RIPS. RIICO is establishing an Integrated resource recovery park at Tholai near Jaipur for waste recyclers to set up recycling facility for end of the life vehicles, e-waste, battery recycling, plastic waste etc.[10]

Skill development

The state EV policy recognizes the importance of skill upgradation to adapt to the changing requirements of EV manufacturing and servicing. It recommends short term and long term, courses at ITIs and Polytechnic colleges. CSE investigated whether such courses had been undertaken.

Apart from a single example where a temporary Centre of excellence had been set up at the Government Engineering college in Jaipur, no other instance of a government led effort could be found. Even the CoE was used just once, and now lay in a dilapilated condition (see figure 9 EV Centre of Excellence at Government Engineering college Jaipur).

Figure 9: EV Centre of Excellence at Government Engineering college Jaipur

Source: CSE

Capacity building and IT system update

The state EV policy lays special emphasis on capacity building of officials in regional and state departments to create awareness about EV technology and standards. The policy mentions the importance of granular data capture such as transmission type, motor classification, battery capacity, battery chemistry for effective monitoring of policy performance. It also talks about capturing data of EV owner details for ease of incentive rollout. However, as per CSE's investigation, these steps have not yet been initiated by the transport department which is the responsible body.

Highlights and way forward

Rajasthan has witnessed a nascent beginning of fleet electrification. The trend is deeply dominated by the small vehicles – 2w and 3Ws with a sprinkling of e-cars. Charging infrastructure has also begun to take shape. Predictably, most of the state level EV market is concentrated in big cities like Jaipur.

One of the strengths of the Rajasthan EV policy is the provision of state level fiscal incentive programmes to complement the central programme. This has helped to push the market. Not many states in India have separate provision on state level fiscal incentives for EVs and rely solely on the central incentives.

Rajasthan is also among the few states that have included industrial policy and manufacturing goals for EVs in the state. This has the potential to upscale the market and also provide economic spinoffs in terms of jobs, livelihood and this will help to retain a great part of the value chain within the state's economy.

However, to make this programme more scalable to deliver on the clean air objectives and low carbon goals, the EV policy needs more explicit connection with the NCAP programme. More detailed indicators need to be developed for helping the state and the non-attainment cities like Jaipur to define the scope and scale of interventions, mobilise resources accordingly and make the programme monitorable and verifiable.

Need vehicle segment-wise targets: More aggressive and targeted medium- and short-term goals for electrification of EVs in specific segments. In addition to setting overall state-wide targets the key cities especially non-attainment cities like Jaipur require more ambitious and time bound targets.

Targets to be enabled by ZEV mandate and enablers: Attainment of vehicle segment-wise targets will have to be enabled by a combination of regulatory mandates. This is needed to boost both demand and manufacturing. The incentives for EV manufacturing in the state needs to be linked with supply side mandates as well. Manufacturers producing in the state should have an obligation to sell a part of their local production in the state. This can help to build competition, market, economy of scale and reduce cost pressures.

Electric bus programme needs to gather momentum: During the initial stages of the central FAME scheme the state government has not mooted the electric bus programme. The state's delay in onboarding electric buses has slowed down this transition towards zero emission mass commuting. However, the e-bus procurement under the new PM-eBus Sewa scheme has catalysed new interest. It

is reported that procurement of electric buses is underway. The future strategy for their deployment needs to be in place.

Scale up targeted subsidies for an upscaled market: Provision of additional state subsidy can be linked with procurement of vehicles in targeted segments like delivery fleet, fleet aggregators, and trucks. Quantitative data regarding disbursal of fiscal incentives both on demand and supply side would present a more accurate picture of policy implementation.

Need report card on expansion of charging infrastructure: This is a critical intervention point to build consumer confidence in EVs. Jaipur and other cities need to prioritise implementation of well-defined and well-planned public charging infrastructure including a network of battery swapping stations. This needs to be supported by the building readiness for home charging. Targeted EV adoption can be supported by 100 per cent exemption of duty and tax on electricity tariff for an initial period of five years for EV and charging equipment manufacturers.

Develop EV battery recycling infrastructure: This is needed at the early stages of EV growth market to be able to be prepared for urban mining and recover critical minerals from the spent batteries and also have a reuse strategy for the downgraded batteries. Jaipur and other cities need to develop this plan and the roadmap.

References

- During field assessment information has also been gathered from the -- Rajasthan Transport Department; Jaipur Vidyut Vitran Nigam Limited; Rajasthan State Industrial Development and Investment Corporation Ltd. Also from the local think tanks like CUTS International (Consumer Unity & Trust Society), Jaipur and CEEP (Centre for Energy, Environment and People).

Other sources

1. Anon 2022, "Rajasthan EV policy approves Rs 40 crore for incentives on buying electric vehicles", Times of India. Available at https://timesofindia.indiatimes.com/auto/policy-and-industry/rajasthan-ev-policy-approves-rs-40-crore-for-incentives-on-buying-electric-vehicles/articleshow/93930367.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst&pcode=462 as accessed on December 2024

2. Suparna Roy July 2023, "50,000 electric vehicle owners yet to get refund from govt", Times of India. Available at https://timesofindia.indiatimes.com/city/jaipur/50k-electric-vehicle-owners-yet-to-get-refund-from-govt/articleshow/102222119.cms?from=mdr as accessed on December 2024

3. Anon July 2024, Modified Budget 2024-25, Press Note, Government of Rajasthan Finance Department. Available at https://finance.rajasthan.gov.in/docs/budget/statebudget/2024-2025%20(Modified%20Budget)/PressnoteE.pdf as accessed on December 2024

4. Ajit Dalvi August 2023, "India has over 2.8 million EVs on its roads, Central and South India dominate EV ownership", Autocar Professional. Available at https://www.autocarpro.in/analysis-sales/india-has-over-28-million-evs-on-its-roads-central-and-south-india-dominate-ev-ownership-116358 as accessed on December 2024

5. Akash Sharma et al 2022, Exploring the Potential of Last Mile Transportation as an Enabler for Green Jobs, CUTS International. Available at https://cuts-ccier.org/pdf/exploring-the-potential-of-last-mile-transportation-as-an-enabler-for-green-jobs.pdf as accessed on December 2024

6. Integrated Resource Recovery Park, RSPCB,RIICO. Available at https://environment.rajasthan.gov.in/content/dam/environment/RPCB/Publication/RIICO%20RSPCB%20Booklet.pdf as accessed on December 2024

7. Anon 2018, " RFP for selection of bus operator for procurement, operation and maintenance of AC/ Non AC fully built pure electric buses on Gross Cost Contract Basis", Jaipur City transport Services Limited. Available at https://transport.rajasthan.gov.in/content/dam/transport/jaipurbus/image/Electric_Buses_Final.pdf as accessed on December 2024

8. Anon March 2024, "Depriving RSRTC, govt allots e-buses to 7 cities", Times of India. Available at https://timesofindia.indiatimes.com/city/jaipur/depriving-rsrtc-govt-allocates-500-e-buses-to-7-cities/articleshow/108249963.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst&pcode=462 as accessed on December 2024

9. Ibid

10. Anon July 2023, "Chargeup launches India's first solar battery swap station in Jaipur", Economic Times. Available at https://energy.economictimes.indiatimes.com/news/power/chargeup-launches-indias-first-solar-battery-swap-station-in-jaipur/101920164 as accessed on December 2024

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