

PLUGGING INTO A CLEAN ENERGY FUTURE

EFFECTIVE
DEPLOYMENT OF
TELANGANA'S
ELECTRIC VEHICLE
POLICY



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Executive Summary

A thriving, clean electricity-based transportation sector in India could drive economic recovery, create new jobs, reduce dependence on imported oil, improve air quality, and avoid greenhouse gas (GHG) emissions. To advance electric mobility in India, electric vehicle (EV) sales need to drastically increase by 2030, according to Indian government analysis.¹ To reach the national goals, state-level EV policies are a major catalyst and can help generate EV consumer demand, spur manufacturing, and create new jobs.

Telangana released its EV policy, the Telangana Electric Vehicle and Energy Storage (EVES) Policy 2020-2030, in October 2020.² The Telangana EVES policy is one of the most comprehensive among the 15 states in India that have notified or drafted EV policies. The forward-looking policy includes incentives for consumers, manufactures, charging providers, and the EV ecosystem. The Telangana EVES policy will drive investment in the EV market, create jobs, ramp-up shared mobility, decrease air pollution, and help achieve India's climate goals. Hyderabad, the capital city of Telangana, is leading the way in working with stakeholders to advance e-mobility and charging infrastructure.

This report aims to support Telangana with implementation of its EVES policy. The report reviews the status of the transportation market and electric mobility in Telangana, the impacts of the EVES policy, and policy implementation opportunities. Lastly, the report presents the key takeaways based on analysis of the state's EVES policy and the EV market.

Here are some key takeaways from Telangana EVES policy along with some implementation suggestions:

1. **Create a phased implementation plan** with clear short-, medium- and long-term targets. While the current policy identifies several implementation strategies, it does not specify a timeline to meet these strategies over the ten-year policy period. To monitor the progress made toward these targets, the state government should put in place a tracker and set up evaluation metrics and timelines. A clear roadmap can help achieve the targets in an effective way.
2. **Strong inter-departmental coordination.** A planned and structured implementation is key to achieving the targets specified under the policy. Clarifying inter-departmental coordination will serve to streamline policy implementation and advance EV deployment. The National Capital Territory of Delhi adopted a similar approach.
3. **Job creation and "Make-in-India" opportunity.** EVs present large investment opportunities in skill development and a trained workforce. Opportunities will also be created in research and design (R&D), testing, battery manufacturing and management, sales, services, and EV infrastructure. The additional power demand will create jobs in the power and renewable energy sector. This aligns well with the national Make-in-India campaign. Telangana's implementation strategy provides preferential procurement to make EVs and energy storage in Telangana systems for government orders.
4. **Encourage partnerships with business and civil society.** Developing partnerships with businesses, original equipment manufacturers (OEMs), academic institutions, and civil society are crucial to grow the electric mobility market and leverage limited government resources. The EVES policy could include an awareness campaign to enable faster adoption and have a dedicated budget and plan of action to develop the awareness campaign.
5. **Enhance engagement with power utilities.** Develop utility EV programs and policies that advance electric mobility, allow for streamlined EV grid infrastructure investments, grid connections, land availability, and ensure attractive and stable tariffs for EVs. Utilities need to

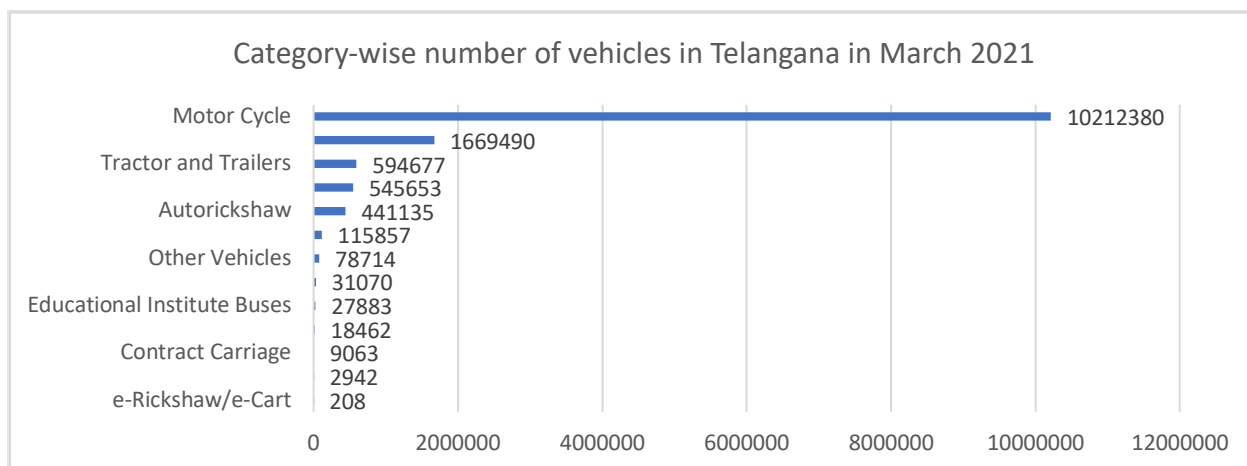
structure and optimize investments into the grid to enhance capacity for EV charging. Utilities should devise mechanisms to encourage smart charging, which can lead to large payoffs.

6. **Provide and enhance incentives for charging infrastructure.** To maximize the economics of electric mobility, policies should introduce state and city-level incentives for charging infrastructure. Streamlining private investments and providing public incentives can create a critical, self-sustaining mass of EVs, service providers, and stakeholders. Telangana's current policy does not specify charging infrastructure incentives, although it does identify other support measures for charging infrastructure.
7. **Expedite land identification and availability.** Telangana can facilitate land for charging infrastructure through incentives, such as long-term leases and lower interest rates. A database of suitable and available land in Telangana's major cities may be developed after due verification from the respective authorities. Furthermore, the nodal agency can allocate the identified sites through a competitive process that keeps a check on end user pricing and help accelerate EV adoption. Standard operating procedures can be developed to deploy public charging infrastructure and periodic performance evaluation.
8. **Strong and integrated city actions on electric mobility,** which include incorporating EVs in shared mobility and public transport. Zero emission vehicle (ZEV) programs, congestion pricing and other non-fiscal incentives, such as mandatory procurements of EVs by state agencies, freight electrification, reserved parking spaces, and low emission zones in major cities like Hyderabad can enhance EV adoption.³
9. **Transition to EVs in rural areas:** Telangana is the first state in India to include incentives for electric tractors in its EVES policy. As free power is available to farmers in Telangana, the state government can facilitate the adoption of solar power for EV charging and encourage electrification of farm equipment and freight vehicles.
10. **Significant economic opportunities with clean air and climate benefits.** India is committed to reducing its polluting emissions and increasing its use of non-fossil fuel-based electricity generation. Air quality problems are driven by pollution from the same fossil fuels that accelerate climate change. Actions to reduce harmful emissions at their sources can achieve major near-term and long-term wins for public health, for the environment, and for India's economy.

Overview of Transportation Market in Telangana

India's auto market consists predominantly of two-wheelers (2Ws).⁴ Consistent with the national trend, two-wheelers dominate the existing volume of vehicles in Telangana, as well as the new entrants in Hyderabad. Telangana has recorded a sustained growth in the number of vehicles over the years. Telangana has more than 1.2 crore registered vehicles on its roads, indicating massive potential for EV deployment (Figure 1).⁵ Almost 1,200 new vehicles got added to the streets of Hyderabad daily in 2018.⁶ The accelerated growth of vehicles is due to the development of good infrastructure and the state becoming a major Information Technology (IT) hub.

Figure 1: Vehicular strength of Telangana as of March 2021 (Source: Transport Department, Government of Telangana, 2021)⁷



Status of Electric Mobility Adoption in Telangana

Electric Mobility in India

Electric mobility in India has been dominated by two- and three-wheelers for the past decade. Electric two-wheelers (scooters, mopeds, and motorcycles) and commercial three-wheelers (rickshaws and goods carriers) reached 242,000 units sold in fiscal year (FY) 2020 or about 1% of new sales of all vehicles in India.⁸ India's electric four-wheeler market is nascent; electric four-wheelers reached just 4,000 units sold or less than 0.14% share of the EV market in FY2020. This is unlike China and the U.S., where four-wheelers (automobiles) make up a large share of the EV market.⁹

The Government of India launched the Faster Adoption and Manufacturing of Electric Vehicles (FAME I) India scheme in 2015. The second phase of FAME (FAME II) launched in 2019 to create growth opportunities for EVs through demand incentives and charging infrastructure programs. FAME II increased the financial investment for EVs and electric mobility to ₹10,000 crore (\$1.4 billion), more than a 10-fold increase from ₹895 crores (\$122 million) under FAME I.¹⁰ As an upfront incentive to reduce the vehicle cost, 86% of the funds are set aside to be distributed, creating more opportunities for states and cities to transition to EVs.¹¹

Telangana first drafted its EV policy in 2017 and finalized the policy after incorporating viewpoints from a diverse set of stakeholders. Telangana, like most states in India, wanted to align its EV policy to complement national targets, which continue to evolve.

Telangana accommodates nearly 10,600 EVs under FAME I and FAME II (1,343 under FAME II specifically).¹² Under FAME I, 40 electric buses have been deployed with Telangana State Road Transport Corporation (TSRTC) in Hyderabad along airport routes.¹³ The Greater Hyderabad region now has more than 10,000 electric and hybrid vehicles: 4,535 battery-operated vehicles, 4,541 hybrid diesel-electric vehicles, and 1,778 hybrid-petrol EVs, according to the Regional Transport Authority (RTA).¹⁴

Hyderabad has more than fifty public charging stations set up by Fortum Charge and Drive, Lithium Urban Technologies, HPCL, PGCL and other companies. Some charging stations are located at metro stations and other key locations in the city and are being used by EV owners and fleet operators. Recently, Telangana State Renewable Energy Development Corporation (TSREDCO) signed memorandums of understanding (MoUs) with Energy Efficiency Services Limited (EESL), Rajasthan Electronics & Instruments Limited (REIL) and National Thermal Power Corporation (NTPC) to set up 170-plus charging stations across the state.¹⁵

Impact of COVID-19 on EV Adoption

India's auto sector, which plays a significant role in the Indian economy, faced challenges and a downturn prior to COVID-19. Experts are uncertain as to how the country's EV sector will emerge from the pandemic. Some forecast stagnation, while others believe the EV sector can become a strong global manufacturing contender.¹⁶

Possible impacts of the COVID-19 pandemic in Telangana include:

- A shift of political priorities to minimize the impact on other essential sectors.
- An economic recession, which would threaten faster adoption of EVs.
- A change in consumer view of EVs with change in social factors such as employment, economic priorities etc.
- Effects on the supply of raw materials used for EV manufacturing.
- A significant reduction in pollution, which could accelerate EV adoption.
- A change in consumer preferences from public transport to private transport, which is also relevant for EVs, as public/shared vehicles were considered early adopters.

Automotive Manufacturing Growth in Telangana

Telangana is one of leading and most advanced states in India in terms of technology adoption and modernization. The state has a history of strong electrical and electronics manufacturing dominated by public-sector undertakings (PSUs), such as the Electronics Corporation of India Limited (ECIL) and Bharat Heavy Electricals Limited (BHEL). The release of the EV policy aims to make Telangana the EV capital of India. In recent years, Telangana enacted Telangana State Industrial Project Approval and Self Certification System (TS-iPASS) Act to facilitate ease of doing of business, and the state notified an Electronics Policy to promote the manufacturing of electronics.¹⁷

Telangana is home to the manufacturing unit of Mahindra and Mahindra, and state of the art research and development (R&D) facility of Hyundai, which are key players among the large automotive original equipment manufacturers (OEMs) in India. It is also home to a significant number of EV, battery manufacturing startups, and few retrofitting companies based in Hyderabad. Gayam Motorworks, E-trio, Lithium, Olectra Green Tech, Ohm Automotive, Vasavi Wheels, Adapt motors, PuREnergy- EV, Axiom EV Products, Amplify Mobility, Medha Servo drives, Eto Motors are a few of the top players in the state.

Following the country's trend, Lithium ion and lead acid batteries are major battery technologies in the existing EVs of Telangana.

Support for the Release of Telangana Electric Vehicle Policy

Prior to Telangana releasing its EV policy, a diverse group of business, civil society, and academic leaders, including NRDC and ASCI, came together and introduced a coalition letter to support the state advancing electric mobility. The coalition letter encouraged Telangana to release, adopt and implement its draft electric mobility policy.

The coalition letter emphasized that electric mobility is critical to rebuilding a stronger economy in India post-COVID-19.

The letter highlights that investing in the larger automotive and EV market, specifically through strong drivers to rapidly scale-up charging infrastructure, is vital to India's COVID-19 economic recovery. Additionally, it is integral to achieve India's national goals on electric mobility, air quality, and climate change.

The Telangana coalition letter is available [here](#) and is included in the Annexure.

Telangana Electric Vehicle and Energy Storage Policy 2020-2030

In October 2020, the state approved the Telangana Electric Vehicle and Energy Storage Policy 2020-2030 to build on progress made under FAME.¹⁸ The policy aims to make Telangana a preferred destination for EVs, component manufacturing units, and energy storage sectors. Telangana proposes to develop an ecosystem of shared mobility through proactive support for charging infrastructure and swapping infrastructure, and intentional support of research and development.

Highlights of the Telangana Electric Vehicle and Energy Storage (EVES) Policy

Telangana desires faster adoption of EVs and strives to become a global hub for EVs and energy storage system manufacturing. The policy's mission statement reflects the ambition of attracting investments, promoting research and development (R&D), manufacturing in the electric mobility and energy storage sector, and reducing the cost of transportation for both personal and commercial purposes.

Attracting investments worth \$4.0 billion is a key objective of the policy. The policy also aims to create jobs for 120,000 workers by 2030 through EVs in shared mobility, charging infrastructure development and EV manufacturing activities. The policy recognizes zero emission vehicles (ZEVs) as part of achieving India's climate goals, improving air quality, and thereby protecting public health from risks, such as heart disease and lung cancer. The EV policy also highlights the anticipated growth in the consumption of batteries by the EV sector in India, from 5-gigawatt-hours (GWh) in 2018 to 36 GWh by 2025.

For demand side incentives, the Telangana EV policy is far-reaching. Consistent with FAME II, demand incentives are available for electric two-wheelers; three-wheeler; four wheelers and buses. The incentives include 100% exemption of road tax and registration fees for the first 2,00,000 electric two-wheelers, 20,000 electric three-wheelers auto rickshaws, 5,000 electric four-wheelers (commercial passenger vehicles), 10,000 light goods carriers, 5,000 private cars, 500 electric buses and all electric tractors purchased and registered within Telangana. A retro-fit incentive at 15% of the retro-fitment

cost (capped at ₹15,000 per vehicle) for the first 5,000 retrofitted three-seater auto rickshaws is included in the policy.

For EV charging infrastructure, Telangana commits to supporting charging infrastructure deployment in the state. It recognizes that the availability and accessibility of EV charging infrastructure is a prerequisite for the penetration of EVs. The state will facilitate setting up the initial batch of fast charging stations in Hyderabad and other major towns in a phased manner and aims to develop a viable business model for private players to set up EV charging/swapping infrastructure. The policy encourages the setting up of chargers in residential townships, on major highways, at Hyderabad Metro Rail stations, bus stops, and in nighttime community parking zones.



Source: Charu Lata, NRDC

For supply side incentives, the policy strives to have Telangana as a forerunner in EV manufacturing and battery storage. The incentives include: EV and EV power train manufacturing and assembly as well as components for EVs, charging infrastructure, and battery storage; capital incentives for plants and machinery as well as “mega” projects that employ over 1,000 people; land and lease rental incentives; tax benefits for goods and service taxes; power subsidies for EV and EV component manufacturing; open access renewable energy systems; exemptions on electricity duties for commercial operations; transportation subsidies for fuel costs; exemptions for registration, transfer and stamp duty; skill development training assistance; and “EV cluster” for a large mega automobile park (similar to solar parks).

State and National Impacts of the Telangana EV Policy

The Indian automobile industry is one of the country’s largest employers and provides around 37 million direct and indirect jobs. With the average age in India is 28 years old, jobs are critical.¹⁹ The auto industry has the potential to contribute about 12% of total GDP and create 65 million jobs by 2026.²⁰ Battery manufacturing could become a ₹85,900 crore (\$12 billion) business in India by 2030.²¹ EV battery charging and swapping would create many jobs throughout the country. In line with a vision for "Atmanirbhar Bharat," or "Self-Reliant India," India’s National Mission on Transformative Mobility and Battery Storage supports the deployment of battery storage both in e-mobility and across the power sector.²² The Mission’s objective is to reduce India's energy import dependence, by reducing direct oil demand, and increasing the uptake of renewable energy in the power sector. The Phased Manufacturing Program (PMP)’s role is to provide a roadmap to localize production across the entire EV value chain to increase the domestic value addition and create employment opportunities.²³ In order to get the demand incentives companies must gradually increase local sourcing of components for their EVs as stipulated in PMP. Department of Heavy Industries (DHI) worked on a list of vehicle types and

equipment that are involved in the manufacturing of EVs and how the implementation of the PMP will bring in a change in the Customs Duties.

Domestic Value

The EV ecosystem presents a market size of ₹2,12,456 crore (\$29 billion) for batteries, powertrains, and charging infrastructure for a 30% passenger EV sales in 2030, in contrast to a 4% EV sales business as usual.²⁴ There can be further increase in value-addition and employment from battery recycling, construction of giga-factories, distribution and sale of electricity, installation and operation of EV charging infrastructure, and telematics products and services.²⁵ The EV transition will create a market opportunity for EV sales worth ₹18,000 crore (\$2.5 billion) in FY21, which will increase up to an ₹3,39,000 crore (\$46 billion) by 2030.²⁶ In total, the transition has the potential to create a value of ₹14,42,400 crore (\$198 billion).



Source: Charu Lata, NRDC

Hyderabad is an Information Technology (IT) hub, and the capital has a strong electric and electronics manufacturing base. Telangana has attracted significant investments from new and existing automotive units. It is home to Mahindra and Mahindra and MRF

manufacturing base along with Hyundai and ZF global research and development (R&D) centers. Many more marquee names are at various stages of setting up their operations in the state. A host of Tier I and II suppliers are also present to support the original equipment manufacturers (OEMs).

Telangana surpassed its southern peer states in attracting investments in 2017.²⁷ These results are built upon radical industrial reforms initiated since Telangana's formation as a state in 2014. To promote Telangana as the investment destination, Telangana State Innovation Cell (TSIC), during 2018-19 launched 'Startup India Telangana Yatra' with an attempt to promote entrepreneurship in Tier II and Tier III cities. Telangana attracted total investments of ₹1,96,404 crore with ₹45,848-crore investments in the pipeline over the past five years, which have the potential to create employment for 83,000 people across various sectors.²⁸

To set up manufacturing units in Telangana, the state signed MoUs with electric bus manufacturers Olectra and Mytrah Energy, and three-wheeler EV manufacturer ETO Motors during the release of the EVES Policy. Another MoU was signed with Automotive Research Association of India (ARAI) to collaborate on research and development of EVs. Other companies like ETO Motors, Gayam Auto Works and PUR Energy have also expressed interest in investing in the state. The current proposed investment amounts to ₹3200 crores (\$438 million).²⁹

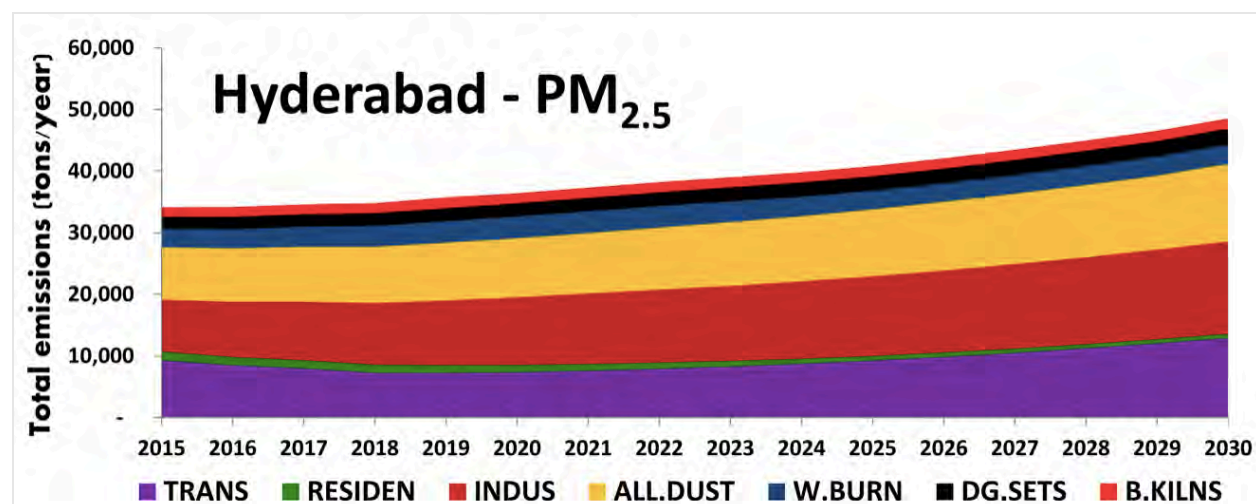
Health

Air pollution is a major problem across India. With local air quality a growing concern in many cities, switching from diesel engines, which produce high levels of fine particulate matter (PM) and nitrogen oxide (NO_x) emissions, to electric powertrains will help improve air quality and public health.³⁰ The social costs of the health impact of outdoor air pollution were about \$0.6 trillion/year in India in 2010 and the

estimated cost of serious health consequences because of outdoor PM air pollution is about 1.7% of India's GDP.³¹ During the national COVID-19 lockdown, air quality drastically improved due to minimized vehicular pollution.³²

Pollution levels in Telangana's cities are alarming because of increased urbanization. The 6th Air Quality Monitoring Committee meeting held in the Telangana State Pollution Control Board (TSPCB) in 2020 advised departments to focus on the implementation of lane discipline, and open biomass burning to keep a check on pollution. Regarding the transport sector, a few measures were introduced including implementation of BS-VI norms for vehicles.³³ According to the state's Pollution Control Board (PCB), the total vehicular pollution load (VPL) in Hyderabad and Secunderabad is 1500 T/day.³⁴

Figure 2: Total PM_{2.5} emissions by sector 2018-2030 (Source: Urban Emissions, 2019)³⁵



Climate

India was the country seventh most affected by extreme weather events in 2019, according to the Global Climate Risk Index, which ranks countries according to their vulnerability both in terms of fatalities and economic losses.³⁶ Implementing strong climate policies early would lead to EVs delivering high co-benefits.³⁷ Currently 15% of global energy-related GHG emissions come from the process of getting oil and gas out of the ground and to consumers.³⁸ If EVs reach 30% share of sales of passenger vehicles (cars and two-wheelers) by 2030, India could reduce GHG emissions by 600 million metric tons in 2050, which would be about 8% of total GHG emissions in 2050.³⁹

Utilities

EVs play a critical role in the stabilizing and balancing the variable renewable energy and grid load, support in demand side management and ancillary services. Utilities around the globe are recognizing that EVs make a good business case by increasing electricity sales, increasing the efficiency and stability of the electrical grid through vehicle-grid integration (VGI), feeding more intermittent renewable energy into the grid, and helping meet obligatory renewable purchase targets. As far as EV charging is concerned, to capture the direct and indirect values, electric utilities in the U.S. are offering incentives to charging station owners, such as equipment rebates or make-ready investments or they are investing in charging stations themselves, if permitted to do so by state legislation and regulation. Smart charging of battery EVs (BEVs) can lower the cost of integrating renewables into the Indian power grid. However, for EVs to serve as grid resources, regulatory changes are required for integration of distributed energy

resources (DER) and EVs. The net revenue from BEV charging alone could cut the current utility financial deficits in India by 50%.⁴⁰

The Telangana EVES Policy focuses on shifting dependence from fossil fuels, which are mostly imported and expensive with unreliable supply during times of crisis, to reliable domestically produced and less expensive renewable energy. Under the Energy Department, Telangana State Renewable Energy Development Corporation Limited (TSREDCO) is assigned as the state nodal agency for implementing charging infrastructure. TSREDCO has a strong interdepartmental relationship with utilities.

Key Government Departments for EV Deployment

Several departments are associated with EV deployment in the state of Telangana. Their roles in the context of EV deployment are highlighted below.

- Industries and Commerce
 - Create an environment to manufacture EVs, batteries, charging infrastructure in the state. Are responsible for the provision of tax benefits and incentives.
- Transport Department
 - Improves access to transit - provide first mile/last mile connections, provide efficiency levels of vehicles, data on vehicle life cycle, retrofitting, vehicle standards, vehicle registrations.
- Municipal Administration and Urban Development (MA&UD)
 - Plays a key role in siting of chargers and enabling an environment for last mile connectivity.
 - Provides permissions for installation of public chargers, allocation of local parking areas, access to urban areas or roads, plan for last mile connectivity and infrastructure provision by coordinating with transport department to convert their existing fleet of vehicles into EVs.
- Energy Department
 - Assesses power demand, supply of power for EV charging, tariff regulations, re-sale of power, integration with renewable energy-use EV as storage, development of charging infrastructure.
 - Telangana State Renewable Energy Development Corporation Limited (TSREDCO) is assigned as the state nodal agency for implementing the charging infrastructure.
- Road and Buildings (R&B)
 - Promotes EVs in state, permissions for installing public chargers in government buildings and on roads, permissions to access parking spaces of any building within the limits of R&B, prepares specification for related infrastructure for faster adoption of EVs.
- Environment, Forests, Science and Technology (Telangana State Pollution Control Board)
 - Monitors the pollution levels and provide guidelines.



Source: Charu Lata, NRDC

Complementary Position of Telangana State Departments

To develop strategic planning on implementation and predict the effectiveness of implementation of any policy, it is vital to understand the comparative position of government departments involved at every level in the process of EV deployment.

The ambitious task of transportation electrification requires facilitation by the state, an efficient policy, regulations, provision for tax benefits and incentives, space for infrastructure development, permissions for operation, and assurance of maintenance and monitoring are the essentials. Several departments play important roles. Each department involved with EV deployment in Telangana underwent a political, economic, social, technological, environmental, and legal (PESTEL) analysis. These analyses are included in the Annexure.

Interagency Coordination

Proper coordination between the state departments involved in EV deployment is essential. A Steering Committee comprising of senior officials from relevant departments is constituted to work towards time bound EV demand creation, charging network development in Hyderabad City, followed by other towns in Telangana, and periodic review of the EV policy. A state-level Steering Committee can be instrumental in transitioning to EVs and prioritizing transportation electrification. The Steering Committee can act as a platform to bring the concerns of manufactures, charging service providers, EV fleet aggregators, industry, and auto associations into the discussion.

The committee can cover various aspects of developing a holistic ecosystem within the state including but not limited to:

- Accelerating EV deployment.
- Expanding the network of public and private charging stations.
- Adoption of zero emission vehicles (ZEV) programs.
- Electrifying freight vehicles.
- Electrifying rural vehicles (tractors, freight, public transportation).
- Developing strong partnerships with businesses, OEMs, service providers, civil society, and academia.
- Showcasing and supporting successful pilots that can be scaled at the city- and state-level.

Table 1: Telangana Steering Committee (Source: Telangana EVES Policy, 2020)⁴¹

Department	Role
Principal Secretary, ITE&C Dept., Govt. of Telangana	Chairman
Director - Electronics Wing, ITE&C Dept., Govt. of Telangana	Nodal Officer
Project Director – EV, TSREDCO	Member Convener
Transport Commissioner, Govt. of Telangana	Member
Managing Director, HUMTA – HMDA	Member
Executive Director – Engineering, TSRTC	Member
Director – IPC & RAC, TSSPDCL	Member
Director – IPC & RAC, TSNPDCL	Member
Chief City Planner, GHMC	Member
Joint Commissioner of Police Department	Special Invitee
Managing Director – Hyderabad Metro Rail Ltd.	Special Invitee

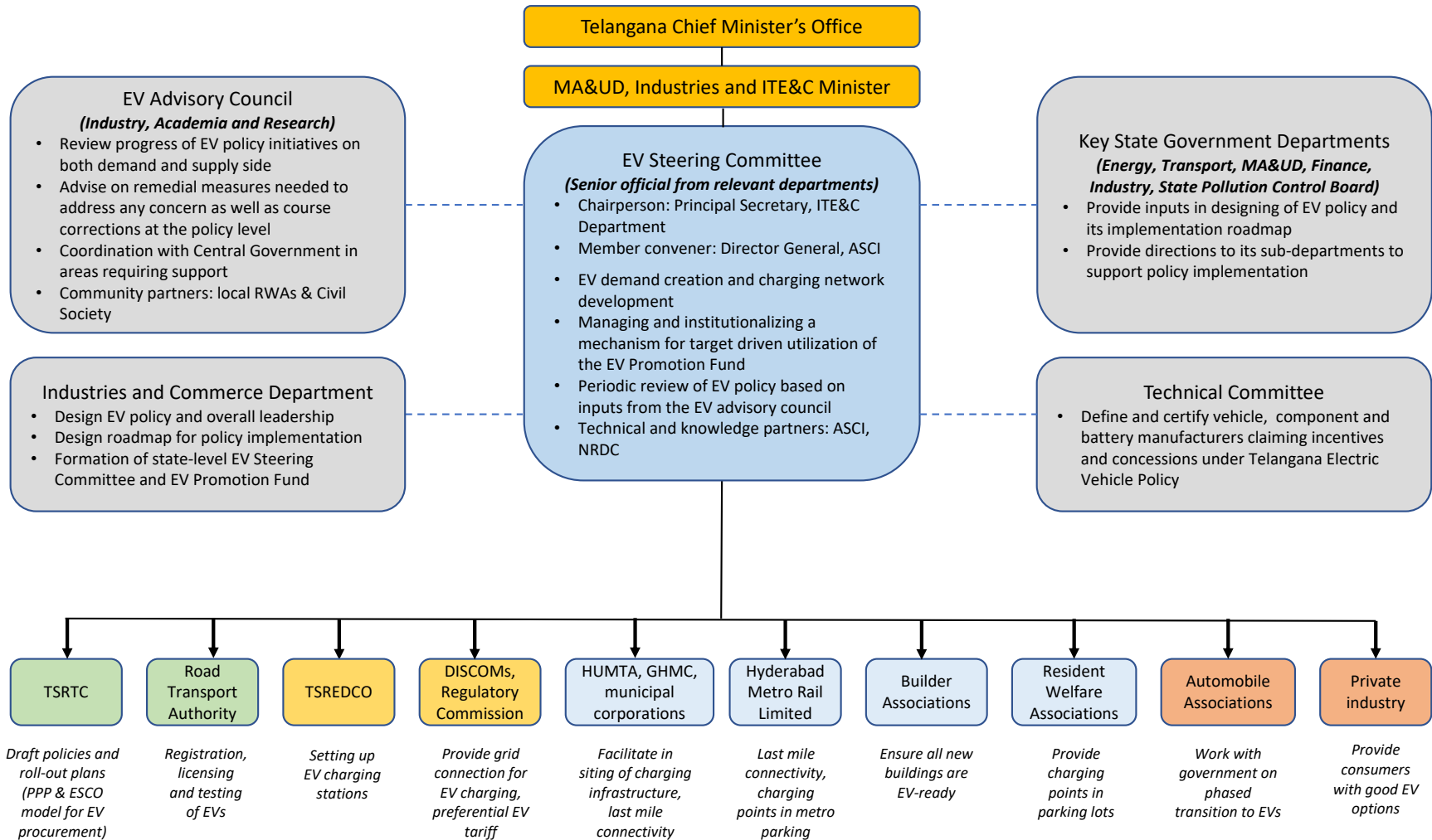
Representative - HMWSSB	Special Invitee
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Prospects are high for the EV industry in Telangana. However, conditions are dynamic and may continually present new challenges for the EV industry. To tackle challenges, a collaborative effort between national, state and local bodies, and stakeholders is needed. Proper coordination between all the state-level departments involved in EV deployment is essential. Strong consistent state EV policies send clearer signals to the industry; however, they should also include some flexibility as national policies develop. A formal EV policy is critical to jump-start the deployment of zero-emission vehicles (ZEVs), which are essential for India to meet its climate, air quality, and clean energy goals.

As several stakeholders are involved in advancing electric mobility, an inter-departmental map is proposed below.

Figure 3: Interdepartmental Mapping for Telangana’s Electric Vehicle Policy (Source: ASCI & NRDC. 2021)⁴²

Interagency Power Mapping for Implementation of Telangana EV Policy



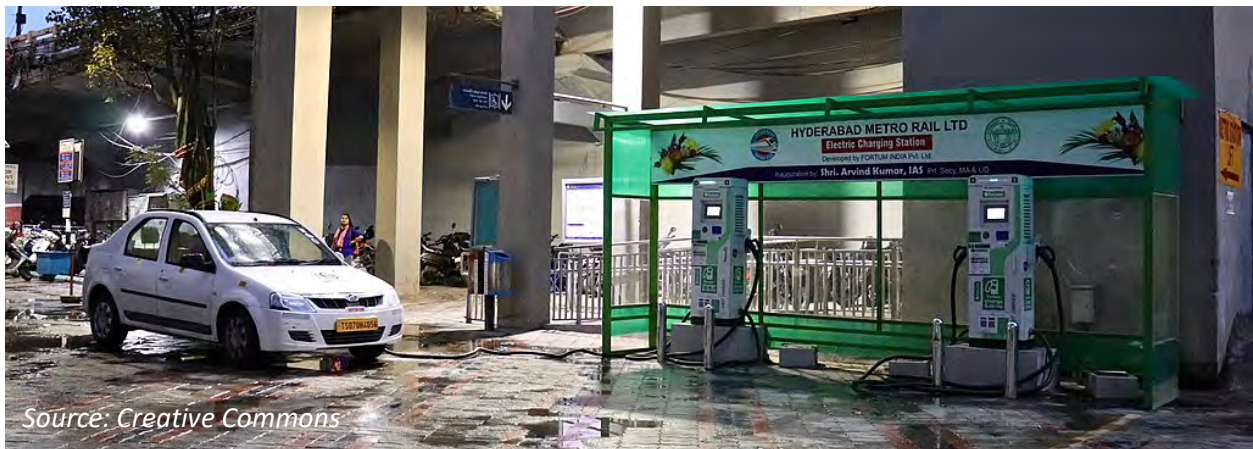
Key Takeaways

The key takeaways of this report based on research and analysis of the EV market and the Telangana EVES policy are:

1. **Create a phased implementation plan** with clear short-, medium- and long-term targets. While the current policy identifies several implementation strategies, it does not specify a timeline to meet these strategies over the ten-year policy period. To monitor the progress made toward these targets, the state government should put in place a tracker and set up evaluation metrics and timelines. A clear roadmap can help achieve the targets in an effective way.
2. **Strong inter-departmental coordination.** A planned and structured implementation is key to achieving the targets specified under the policy. Clarifying interdepartmental coordination will serve to streamline policy implementation and advance EV deployment. The National Capital Territory of Delhi adopted a similar approach.
3. **Job creation and “Make-in-India” opportunity.** EVs present large investment opportunities in skill development and a trained workforce. Opportunities will also be created in research and design (R&D), testing, battery manufacturing and management, sales, services, and EV infrastructure. The additional power demand will create jobs in the power and renewable energy sector. This aligns well with the national Make-in-India campaign. Telangana’s implementation strategy provides preferential procurement to make EVs and energy storage in Telangana systems for government orders.
4. **Encourage partnerships with business and civil society.** Developing partnerships with businesses, original equipment manufacturers (OEMs), academic institutions, and civil society are crucial to grow the electric mobility market and leverage limited government resources. The EVES policy could include an awareness campaign to enable faster adoption and have a dedicated budget and plan of action to develop the awareness campaign.
5. **Enhance engagement with power utilities.** Develop utility EV programs and policies that advance electric mobility, allow for streamlined EV grid infrastructure investments, grid connections, land availability, and ensure attractive and stable tariffs for EVs. Utilities need to structure and optimize investments into the grid to enhance capacity for EV charging. Utilities should devise mechanisms to encourage smart charging, which can lead to large payoffs.
6. **Provide and enhance incentives for charging infrastructure.** To maximize the economics of electric mobility, policies should introduce state and city-level incentives for charging infrastructure. Streamlining private investments and providing public incentives can create a critical, self-sustaining mass of EVs, service providers, and stakeholders. Telangana’s current policy does not specify charging infrastructure incentives, although it does identify other support measures for charging infrastructure.
7. **Expedite land identification and availability.** Telangana can facilitate land for charging infrastructure through incentives, such as long-term leases and lower interest rates. A database of suitable and available land in Telangana’s major cities may be developed after due verification from the respective authorities. Furthermore, the nodal agency can allocate the identified sites through a competitive process that keeps a check on end user pricing and help accelerate EV adoption. Standard operating procedures can be developed to deploy public charging infrastructure and periodic performance evaluation.
8. **Strong and integrated city actions on electric mobility,** which include incorporating EVs in shared mobility and public transport. Zero emission vehicle (ZEV) programs, congestion pricing and other non-fiscal incentives, such as mandatory procurements of EVs by state agencies,

freight electrification, reserved parking spaces, and low emission zones in major cities like Hyderabad can enhance EV adoption.⁴³

9. **Transition to EVs in rural areas:** Telangana is the first state in India to include incentives for electric tractors in its EVES policy. As free power is available to farmers in Telangana, the state government can facilitate the adoption of solar power for EV charging and encourage electrification of farm equipment and freight vehicles.
10. **Significant economic opportunities with clean air and climate benefits.** India is committed to reducing its polluting emissions and increasing its use of non-fossil fuel-based electricity generation. Air quality problems are driven by pollution from the same fossil fuels that accelerate climate change, actions to reduce harmful emissions at their sources can achieve major wins for public health in the near-term and long-term, for the environment, and for India's economy.



Annexure 1: Telangana PESTEL Analysis

Each department involved with EV deployment in Telangana underwent a political, economic, social, technological, environmental, and legal (PESTEL) analysis.

Political

The state of Telangana, which has a total area of 112,077km², possesses a proactive leadership at every level of the state's functioning. Since its formation in 2014, the state government has taken commendable steps toward all-round development of the state. Based on the data, Telangana has consistently been among the top five states with the highest ease of doing business index. Achieving the sustainable development goals and the innovation index, implies the state's political soundness in striving to enterprise the wellbeing of the land.

Economical

According to the state of Telangana's 2020-21 budget, its Gross State Domestic Product (GSDP) for 2020-21 is estimated to be close to ₹11,05,136 crore which makes it occupy eighth place among 28 states in India. According to the Department for Promotion of Industry and Internal Trade (DPIIT), cumulative Foreign Direct Investment (FDI) inflow in Telangana from April 2000 to September 2019, totaled \$18.98 billion. In 2019, 74 investment intentions with proposed investments worth ₹5,432 crores (\$777.2 million) were filed in the state. To promote Telangana as the investment destination, Telangana State Innovation Cell, during 2018-19, launched 'Startup India Telangana Yatra' with an attempt to promote entrepreneurship in Tier II and Tier III cities.

Telangana surpassed its southern peer states by achieving the highest growth rate in terms of attracting investments during FY 2012 and FY 2017.⁴⁴ These results are a result of radical industrial reforms in Telangana since its formation as a state.

Technological

Hyderabad, the capital city of Telangana state, is known as a hub for Information Technology. The city also possesses a strong electric and electronics manufacturing base led by PSUs like ECIL and BHEL. Telangana started the electrification of its transport sector with the setting up of its Metro Rail. As of February 2020, Telangana had 30 operational SEZs, 56 notified SEZs and 63 formally approved SEZs. Telangana has attracted significant investments from new and existing automotive units. It is home to Mahindra and Mahindra and MRF manufacturing base along with Hyundai and ZF global R&D centers. More marquee names are at various stages of setting up their operations in the state. A host of Tier I and II suppliers are also present to support the OEMs.

Environmental

Telangana is a semi-arid area and has a mix of composite and warm-humid climate types. The areas covered by the Deccan Plateau are characterized by hot summers with relatively mild winters and gentle rains. The geographical and climatic conditions of the state, especially Hyderabad, makes the place a favorable one for any kind of industry. But, with increased urbanization, the pollution levels of the city became alarming which brings in an opportunity for the development and deployment of EVs.

Social

The sociocultural milieu and historical context of the state provide a fertile ground for proactive social engagement for any new advances. This sociocultural trend in Telangana state presents a positive prospect for the success of EV industry in the state.

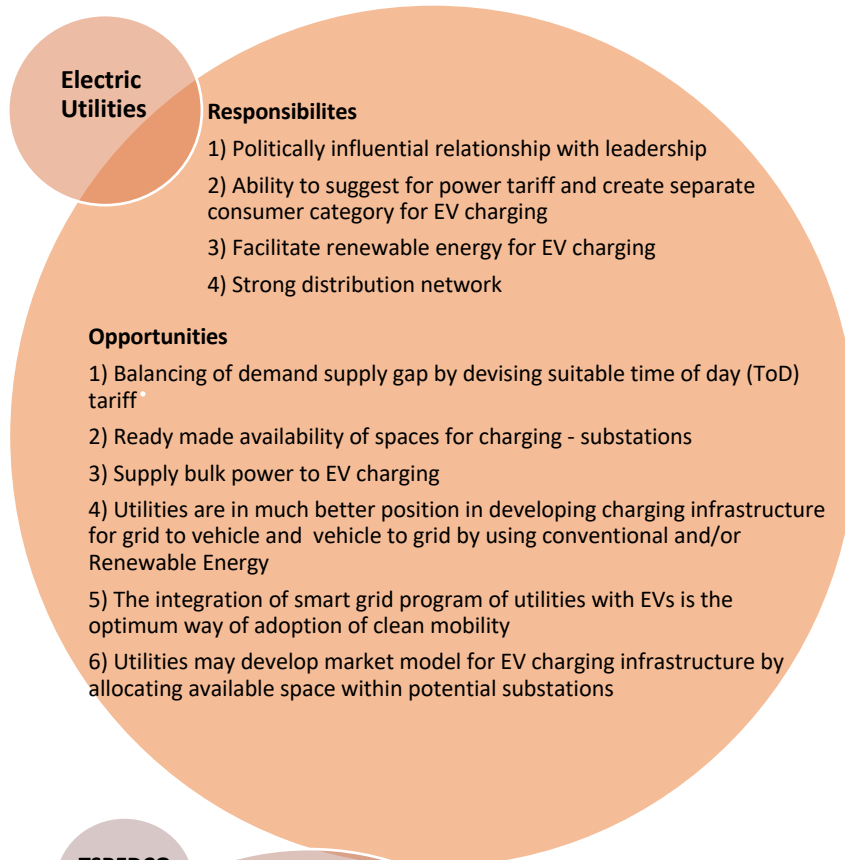
Legal

Telangana developed the TSi-PASS a unique industrial project approval system that provides time-bound clearances (15 days for mega projects) based on self-certification. Investments worth \$19.5 billion and generating employment for 540,000 people have been approved through TS-iPASS.

Departmental Analysis

Energy Department

The Energy Department in Telangana, headed by the Principal Secretary (Energy), looks after generation, transmission, and distribution of energy in the state including non-conventional energy sectors. The



energy department of Telangana has seven organizations under its control, of which six have direct or indirect influence on the adoption of EVs:

1. Telangana Generation Corporation Limited (TSGENCO)
2. Transmission Corporation of Telangana Limited (TSTRANSCO)
3. Telangana State Southern Power Distribution Company Limited (TSSPDCL), Hyderabad
4. Telangana State Northern Power Distribution Company Limited (TSNPDC), Warangal
5. Telangana Power Finance Corporation Limited (TSPFC)
6. Telangana State Renewable Energy Development Corporation Limited (TSREDCO)



Power utilities

The role of the power utilities will be crucial for the successful development of a sustainable electric mobility ecosystem. Though the promising rise

of electricity demand from EVs presents an opportunity for increased revenue for utilities, the additional investments required for strengthening or augmenting the present infrastructure to cater to the intermittent demand remains a financial challenge. TSREDCO is designated as the state-level nodal agency for deploying EV charging infrastructure in the state.

Transport Department

The major functions of the transport department are the enforcement of the motor vehicles act and rules, collection of taxes and fees, issuance of driving licenses and certificate of fitness to transport vehicles; registration of motor vehicles and granting regular and temporary permits to vehicles, etc. Telangana has recorded sustained growth in the number of vehicles over the years. The accelerated growth of vehicles is a result of the development of good infrastructure and the state's emergence as a major IT hub.

Transport Department Responsibilities

- 1) Create a level playing field for EVs in the state
- 2) Granting authority for all kind of vehicular permissions
- 3) Responsible for large scale deployment of EVs in public transport
- 4) Authority to conduct vehicle fitness tests

Opportunities

- 1) Provide first mile/last mile connectivity
- 2) Can lead the EV Technical Committee
- 3) Provide department's land for establishing EV charging stations

Municipal Administration and Urban Development Department

The Municipal Administration and Urban Development Department is one of the most proactive department in the state of Telangana. The department is entrusted with the responsibility of urban sector management. The department holds the control of six other sub departments namely:

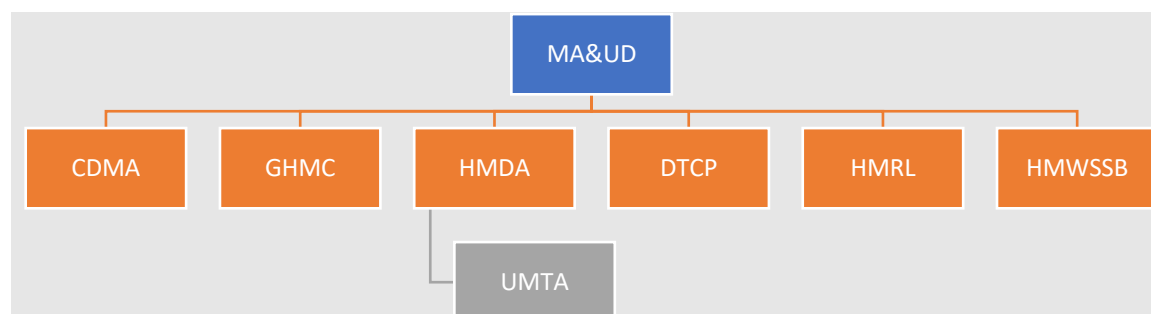
1. Commissioner and Director of Municipal Administration (CDMA)
2. Greater Hyderabad Municipal Corporation (GHMC)
3. Hyderabad Metropolitan Development Authority (HMDA)
4. Directorate of Town and Country Planning (DTCP)
5. Hyderabad Metro Rail Limited (HMRL)
6. Hyderabad Metropolitan Water Supply and Sewerage Board (HMWSSB)

With respect to electric mobility, the department plays a key role in providing land for establishing public EV charging stations and providing an enabling environment for last mile connectivity. The Hyderabad Metro Rail Limited, which operates the Hyderabad Metro Rail, is under the control of MA&UD. Recognizing this department as the key player to support the implementation of the EV policy would therefore have an added benefit.

MA&UD	Responsibilities
	<ol style="list-style-type: none"> 1) Authority to grant permissions for availing space for charging stations 2) Oversee GHMC, HMRL which are key departments to support EV deployment
	Opportunities
	<ol style="list-style-type: none"> 1) Strong political support 2) Rights to amend the Municipal Act 3) Can issue guidelines to all institutions, associations for proving charging spaces

Unified Metropolitan Transportation Authority (UMTA)

UMTA was formed to deal with issues related to traffic and transportation in the Hyderabad Metropolitan Region. Some of its functions include: overseeing the implementation of various traffic and transportation measures undertaken by various agencies in the region; ensuring that effective public transport systems are in place for the metropolitan region; and integrating various routes of public transport, and handling issues including combined ticketing and feeder services. Considering the departmental profile, the presence of UMTA is an additional advantage to EV deployment in the state.



Industries and Commerce Department

Telangana’s future in the electric mobility segment is currently vested in the state’s Industries and Commerce Department. This department, which usually possesses the responsibility of handling the industrial sector, has played a key role in drafting and issuing the state EV policy. Relevant to its work with EVs, the Industries and Commerce Department is also responsible for the provision of tax benefits and incentives and setting up new manufacturing facilities in the state.

Responsibilities	Opportunities
<ul style="list-style-type: none"> • Played a key role in drafting and releasing the state EV policy • Authority to provide land and Infrastructure facilities to industrial investors • Provides investment subsidies and incentives to entrepreneurs • Strong leadership and political support 	<ul style="list-style-type: none"> • Can support in setting up new EV, charging and battery manufacturing in the state • Can focus on expanding R&D for the electric mobility and energy storage sectors

Roads and Buildings Department

The R&B department strives to provide efficient, affordable, customer-focused, environmentally sustainable integrated transportation solutions, connecting villages, towns, cities with centers of industry, commerce, tourism, and pilgrimage across the State. The department constructs and maintains roads and bridges for all roads under its control.

In Telangana State, the road assets of the R&B Department comprise 24,245 kms of road length with 3,152 kms of state highways, 12,079 kms of major district roads, and 9,014 kms of other district roads. Sixteen national highways pass through Telangana and cover a length of 2,592 kms, out of which 868 kms are with under the jurisdiction of the National Highways Authority of India. The Ministry of Road Transport, Highways and Shipping, Government of India provides complete financial support for the development and maintenance of National Highways under the control of the R&B department.

In this context, the department becomes one of the major players that influence the adoption of EVs in Telangana state. In line with the role of MA&UD in the state, R&B also is responsible for:

- Siting of locations for EV charging infrastructure on inter-city and intra-state highways
- Granting permissions and approvals as needed
- Providing access to avail parking spaces in buildings under its jurisdiction
- Allocating land for public charging stations

State Pollution Control Board

The Pollution Control Board (PCB) comes under the department of Environment, Forests, Science and Technology of Telangana. PCB ensures proper implementation of the statutes, and judicial and legislative pronouncements related to environmental protection within the State. The PCB is important in not only promoting EVs in Telangana, but also ensuring the proper monitoring of pollution levels following the introduction of EVs.

According to the state's PCB, the total vehicular pollution load (VPL) in Hyderabad and Secunderabad is 1500 T/day.⁴⁵

Various pollutants released into the atmosphere are detailed below:

Carbon monoxide (CO) contribution	61.4%
Hydrocarbon (HC) contribution	34.00%
Nitrogen oxides (NOx) contribution	3.85%
Sulfur dioxide (SO ₂) contribution	0.54%
Suspended particulate matter (SPM) contribution	0.18%
Lead (Pb)	0.023%

Pollution load by different categories of vehicles:

Two wheelers	56.2%
Three wheelers	9.08%
Four wheelers (Petrol)	12.00%
Four wheelers (Diesel)	2.00%
Trucks	18.85%
Buses	1.54%
Others	0.26%

Annexure 2: Telangana EV Coalition Support Letter



Dr Nirmalya Bagchi
Director General (I/c)

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Email: nirmalya@asci.org.in
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Date: 28.07.2020

Shri K. Chandrasekhar Rao
Hon'ble Chief Minister
Government of Telangana
Pragathi Bhavan
Greenlands Road, Begumpet
Hyderabad – 500 082
Telangana State

Dear Respected Sir,

Greetings from Administrative Staff College of India (ASCI).

We hope you and your family is keeping safe and healthy during these challenging times. We are sincerely thankful Sir for Government of Telangana's pre-emptive efforts in keeping us all safe during this pandemic. We are grateful for the support and actions taken by the Government during these trying times.

This pandemic has once again brought to fore front the importance of the action on climate change, which is a looming challenge of our times and for our next generation. Government of Telangana has however, shown leadership in this sphere by taking several actions towards sustainable development including sustainable mobility.

In this context, I'm writing to you today to share with you a support letter requesting the Government of Telangana to accelerate the release of Telangana State Electric Vehicle (EV) Policy.

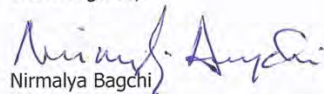
The letter is signed by a diverse coalition of business leaders, science and public health supporters, academic institutions and community organisations that support and share the Government's vision and commitment for improving air quality and addressing climate change, while creating a more equitable and inclusive Telangana.

On behalf of the coalition, I'm enclosing the support letter with this email.

The coalition believes that under your great leadership, the required steps to release the EV policy will be undertaken in a time-bound manner to jumpstart the deployment of zero-emission vehicles in the state of Telangana.

We very much appreciate your consideration of this request and we look forward to hearing from you soon. Please do let us know if you have any questions, we will be happy to answer. We at ASCI share the vision and are available to support the Government initiatives, as desired.

Warm regards,


Nirmalya Bagchi

Encl: a/a

www.asci.org.in



July 24, 2020

Shri K. Chandrasekhar Rao, The Honourable Chief Minister, Government of Telangana

Dear Respected Sir,

Subject: Support for the release of Telangana Electric Vehicle Policy

We write to thank you and your administration for initiating the drafting of Telangana's Electric Vehicle (EV) Policy and taking this essential step toward clean and healthy air, expanded consumer options and clean energy economy. Recently, due to COVID-19, we have seen a striking improvement in the environmental quality with vehicular pollution down to a minimum level. To sustain this change, transitioning to EVs in a timebound manner is imperative.

We are strong supporters of the state EV policy and represent a diverse coalition of business leaders, science and public health supporters, academic institutions, and community organizations. We share a commitment to improving air quality and addressing climate change, while creating a more equitable and inclusive Telangana.

The release of the Telangana EV policy under your great leadership is critical to jumpstarting the deployment of zero emission vehicles that will be important to bring this sustainable change in the state of Telangana. We are excited to discuss the many benefits of this policy from both a demand (offering scale for EV deployment) and supply (manufacturing investments) perspective and provide any support toward the drafting of the policy and its implementation.

The transition to electric vehicles offers opportunities across both mobility as well as manufacturing. With regards to mobility, it will enable a more efficient, affordable, and clean transport ecosystem for the local population and serve as a key differentiator for both domestic and international visitors to the state. With Telangana already being a base for the auto industry, EV manufacturing will open new opportunities across a range of products and services such as electric vehicle components, batteries, EV chargers and charging infrastructure. Further, it will lead to skill development and generation of millions of jobs for the local population across industries. Clean mobility solutions like electric vehicles will also improve the energy demand in the state which will strengthen the electricity utility business and improve the demand supply balance.

It is an apt time for the Telangana government to opt for this future oriented technology by releasing the 'Electric Vehicle Policy of Telangana'. This will not only attract investments in the state to secure the supply chain through domestic manufacturing but will also reduce the dependence on vehicle and component imports and develop the ecosystem for in-house manufacturing, aligning with the "Make in India" campaign.



The renewed focus on innovation, design, development, and competitive local manufacturing can support in meeting not only the domestic demand but also in making use of the domestic size and scale for Telangana to become a global leader. The release of EV policy will also provide 30 million people living in the state access to cleaner air.

We look forward to working with the state administration in the upcoming release of the electric vehicle policy to ensure that the people of Telangana have access to affordable, clean transportation, cleaner air, and stable climate for generations to come.

Respectfully,

- Administrative Staff College of India (ASCI), Mr. K. Padmanabhaiah, Chairman
- Bounce, Vivekananda Hallekere, CEO & Co-Founder
- Climate Trends, Aarti Khosla, Director
- Council on Energy, Environment and Water (CEEW), Dr. Arunabha Ghosh, CEO
- Energy Efficiency Services Limited (EESL), Mr. Saurabh Kumar, Managing Director
- Gayam Motor Works, Mr. Raja Gayam, CEO
- Indian Green Building Council, Mr. C Shekar Reddy, Chairman, IGBC – Hyderabad Chapter
- India Energy Storage Alliance (IESA), Debi Prasad Dash, Executive Director
- Lithium Urban Technologies, Mr. Vikash Mishra, Business Head (North and East India)
- Mahindra Electric Mobility Ltd., Mr. Mahesh Babu, Managing Director and CEO
- Natural Resources Defense Council (NRDC), Ms. Anjali Jaiswal, Senior Attorney and Senior Director
- Sun Mobility Private Limited, Mr. Chetan Maini, Co-Founder and Vice Chairman
- Tata Motors Ltd., Mr. Sushant Naik, Global Head-Govt & Public Affairs
- The Climate Group, Ms. Divya Sharma, Executive Director

CC:

1. Sri K. T Rama Rao, Minister – MA&UD, Industries & IT E&C
2. Sri Puvvada Ajay Kumar, Minister – Transport
3. Sri Guntakandla Jagadish Reddy, Minister – Energy
4. Sri Vemula Prashanth Reddy, Minister – Roads & Building, Legislative Affairs and Housing
5. Sri Thanneeru Harish Rao, Minister – Finance
6. Dr. Rajiv Sharma, Chief Advisor
7. Sri Somesh Kumar, Chief Secretary

End Notes

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Resources Guide



Location is Everything: Approaches to Siting Electric Vehicle Charging Infrastructure for the Indian Context

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Scaling up Electric Vehicle Charging Infrastructure: Lessons from China and the United States for the Indian Context

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Stakeholder Driven Solutions for Financing Electric Mobility

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Best Practices for Commercial and Industrial EV Rates

https://www.nrdc.org/sites/default/files/media-uploads/best-practices-commercial-industrial-ev-rates_0.pdf

Highlighted Blogs

- **Electric Three-Wheelers Charge ahead in Telangana, Sameer Kwatra, Anjali Jaiswal, Charu Lata and Jessika Korsh, April 2021**
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- **Charging Ahead: Siting EV Charging Stations in Hyderabad, Anjali Jaiswal, Charu Lata and Rajkiran Bilolikar, December 2020**
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- **India Focus: Telangana Approves Ground-Breaking EV Policy, Anjali Jaiswal, October 2020**
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- **Review of State EV Plans Across India Amidst COVID-19, Anjali Jaiswal and Jessika Korsh, September 2020**
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- **COVID-19 Rebuild: Scaling Electric Mobility in India, Anjali Jaiswal, July 2020**
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- **Mobilizing Finance for Electric Vehicle Charging in India, Sameer Kwatra, March 2020**
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