

# Decarbonizing Transport

## Supply-Side Policies and Opportunities for Uttar Pradesh



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# List of Abbreviations

2W	Two wheelers
3W	Three wheelers
AQI	Air Quality Index
CPCB	Central Pollution Control Board
EV	Electric Vehicle
FAME	Faster Adoption and Manufacturing of Electric Vehicles
GDP	Gross Domestic Product
ICE	Internal Combustion Engine
LGV	Light Goods Vehicles
NAAQS	National Ambient Air Quality Standards
NCAP	National Clean Air Programme
NCR	National Capital Region
OEM	Original Equipment Manufacturer
PM	Particulate Matter
WHO	World Health Organization
ZEV	Zero Emission Vehicles

# 1 Introduction

Uttar Pradesh, with a projected population of 24 crores in the year 2025, is the most populous state in India.<sup>1</sup> The pace of urbanization in the state is accelerating, with nearly 30% of the population currently residing in urban areas spread across 762 Urban Local Bodies (ULBs). This urban share is expected to rise to 40% in the next five years, placing increasing pressure on infrastructure and public services.<sup>2</sup> Economically, Uttar Pradesh stands as the second-largest state economy in India after Maharashtra, contributing 9.2% to the national Gross Domestic Product (GDP).<sup>3</sup> Complementing this economic growth, the state has seen a significant rise in vehicle ownership. In the financial year 2025–26, Uttar Pradesh recorded the highest number of vehicle registrations in the country, with over 42.6 lakh new vehicles added to the roads in a single year.<sup>4</sup>

In Uttar Pradesh, the sharp rise in the number of vehicles, coupled with other factors, has significantly contributed to worsening the air quality. Uttar Pradesh, home to four of the world's ten most polluted cities, with 15 of its cities have been included under the National Clean Air Programme (NCAP), is signalling the urgency for immediate and effective interventions.<sup>5</sup>



Vehicle electrification has emerged as a key strategy to tackle vehicle-related air pollutant emissions (such as particulate matter and nitrogen oxides, as well as greenhouse gas CO<sub>2</sub>). Recognizing this, both the national and state governments have taken various initiatives to decarbonize the transport sector. These include schemes such as PM E-DRIVE, Production Linked Incentive (PLI) at the national level, and initiatives such as Uttar Pradesh Electric Vehicle Manufacturing and Mobility Policy 2022 at the state level. However, despite these efforts, the share of zero emission vehicles (ZEVs) in the state, excluding e-rickshaws, remains limited to just 4.9 % for FY 2025–26.<sup>6</sup> The term ZEVs in this report refers to battery electric vehicles, fuel-cell electric vehicles, and any other alternative technology that results in zero-tailpipe emissions. However, in India, majority of the clean technology vehicles registered are under the battery electric vehicles category.

While demand-side interventions such as subsidies, tax exemptions, and preferential access have created initial momentum, these alone are insufficient to drive systemic change. There is now a pressing need to focus on supply-side interventions to create a robust and self-sustaining ZEV ecosystem in the state.

This report aims to identify and assess the scope of such supply-side regulation to accelerate ZEV adoption, leading to reduced emissions from the transport sector in Uttar Pradesh. It seeks to provide actionable insights to support Uttar Pradesh's transition to clean sustainability, thereby contributing to the goal of air quality improvement and climate mitigation.

## 1.1 Overview: Transport Sector in Uttar Pradesh

Uttar Pradesh has witnessed rapid growth in the vehicle fleet, driven by factors such as increasing population, increasing urbanization, and rising income levels. All vehicle categories have shown steady growth, with 2W leading the market owing to their affordability and convenience, followed by passenger cars, goods vehicle and auto-rickshaws. This section presents an overview of the transport sector in Uttar Pradesh, highlighting vehicle registration trends, sales pattern across different vehicle segments, and the revenue generated by the sector.

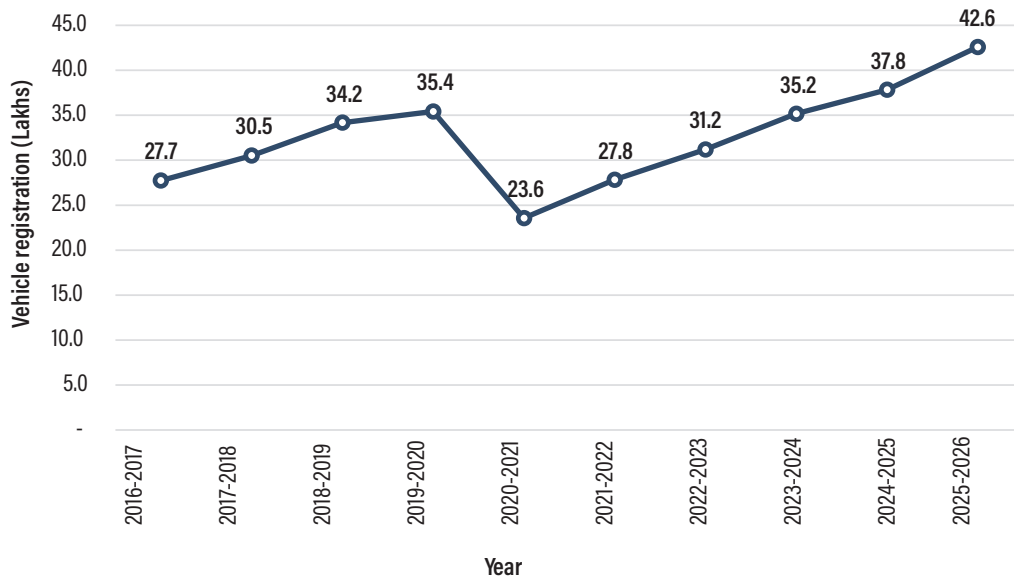


This report aims to identify and assess the scope of such supply-side regulation to accelerate ZEV adoption, leading to reduced emissions from the transport sector in Uttar Pradesh.

### 1.1.1 Vehicle Ownership

In the financial year 2025-26, a total of 2.97 crore vehicles were registered across 1,377 Regional Transport Offices (RTOs) in India.<sup>6</sup> Uttar Pradesh has witnessed a strong upward trend in vehicle registrations, growing at an average annual rate of 12.6% since 2020–21.

**FIGURE 1: Trend in Vehicle Registrations in the State of Uttar Pradesh**



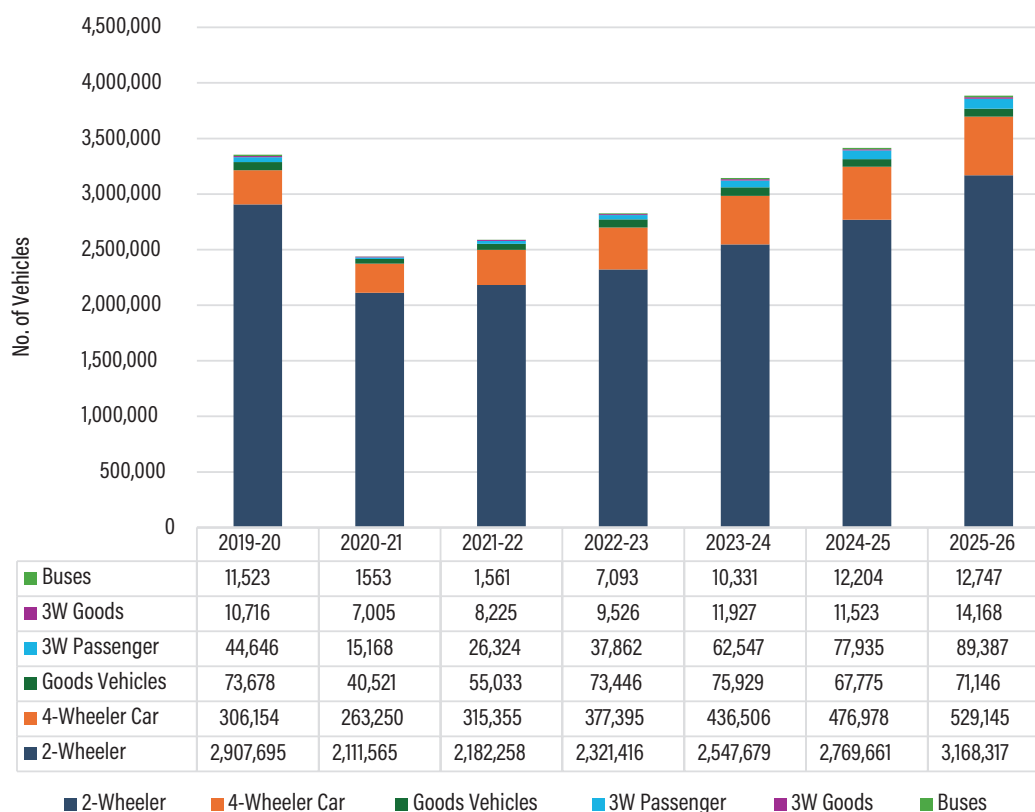
Source: Vahan Dashboard

As shown in Figure 1, registrations in Uttar Pradesh grew steadily between 2017–20, experienced a temporary decline in 2020–21 due to the Covid-19 pandemic, and subsequently rebounded. The growth rate reached a Compound Annual Growth Rate (CAGR) of 18.1% in 2021–22, followed by 12.1% in 2022–23, 12.7% in 2023–24, 7.6% in 2024–25 and 12.6% in 2025–26.

While this growth reflects rising transport and economic activity, it also poses several challenges. The surge in vehicle registration has led to increased traffic congestion, fuel consumption, and fuel import dependency. It has significantly contributed to air pollution. This escalation in emissions raises serious public health and environmental concerns across the state.

### 1.1.2 Segment-wise Vehicular Sales

Uttar Pradesh's vehicle market is dominated by 2Ws, with registrations having consistently remained highest among vehicle types from 2019 to 2025, as illustrated below in Figure 2. This predominance of 2Ws can be attributed to their affordability and fuel efficiency, making them a preferred choice among users.

**FIGURE 2: Segment-wise Vehicle Registration Trend in Uttar Pradesh**

Source: Vahan Dashboard (FY 2025-26)

Four-wheeler (4W) passenger cars are the second most sold category of vehicles in Uttar Pradesh. As shown in Figure 2, car sales were stable from 2019–22, followed by a noticeable increase till FY 2025-26. This upward trend may be attributed to the improvement in road infrastructure across the state and the introduction of a full waiver on registration fees for hybrid vehicles.<sup>7</sup> 3Ws represent the third largest segment of the vehicle fleet, with a steady rise.

Three-wheeler (3W) auto-rickshaws play a vital role in the state, both in passenger and goods movement. According to data retrieved from the Vahan dashboard (portal for vehicle-related data & services by MoRTH), passenger 3Ws have witnessed a fivefold growth in registrations between FY 2020-21 and FY 2025-26, likely driven by the rising demand for on-demand public transport<sup>a</sup> in the urban and semi-urban areas. Additionally, the number of buses is growing in the state, especially the electric buses, due to government initiatives and policies for public transportation such as PM E-Bus Sewa, UP Electric Vehicle Manufacturing and Mobility Policy 2022, Meri Bus Meri Sadak initiatives, etc., for public transport.

a On-demand public transport provide shared or on-demand transport services. They typically operate without fixed routes or schedules, offering flexible connectivity for short- to medium-distance travel and serving as feeder modes to formal public transport systems.

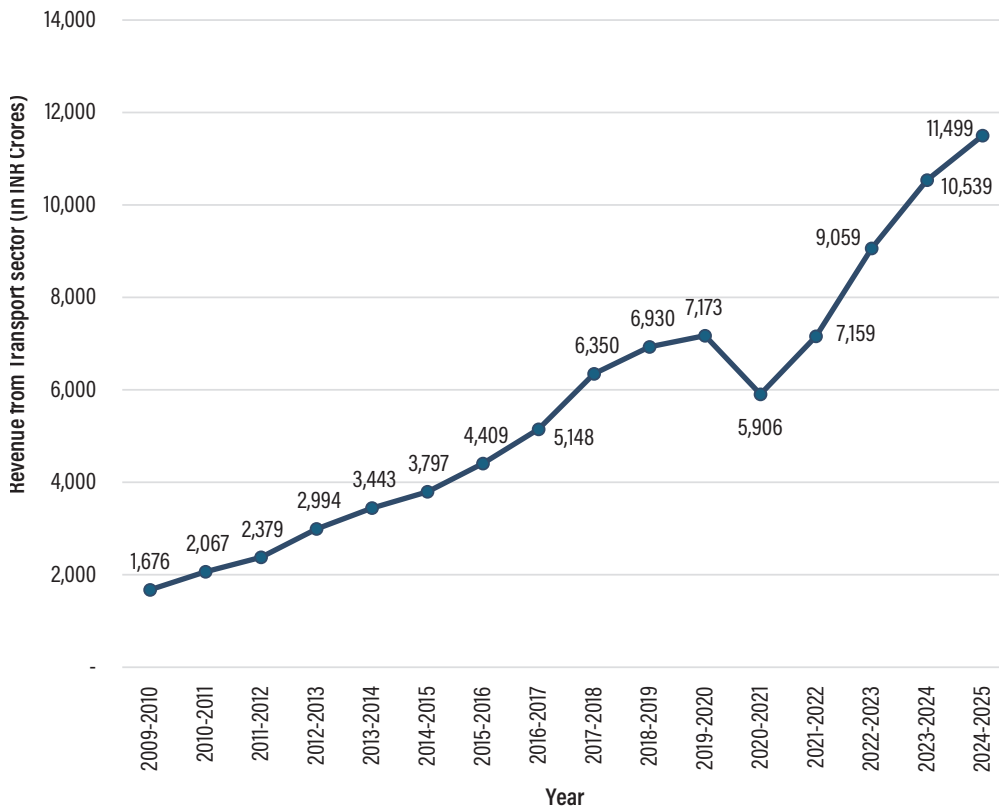
### 1.1.3 Transport Revenue Overview

The transport sector in Uttar Pradesh generates revenue from various sources, mainly through taxes and fees. Major sources include road taxes collected from both goods and passenger vehicles, levies on out-of-state registered vehicles, and additional charges from public transport providers such as UPSRTC. Motor vehicle registration fees also contribute a substantial share to the transport department's revenue.

In FY 2024–25, the state collected a total of INR 11,499 crores in transport revenue. The largest portion of 58.7% came from non-transport vehicle taxes, while motor vehicle (MV) fees emerged as the second-highest contributor, generating INR 1,679 crores, i.e., 14.6% of the total revenue.<sup>8</sup>

The year-wise trend in transport revenue collection for Uttar Pradesh is presented below.

**FIGURE 3: Year-wise Revenue Collection in Uttar Pradesh (INR Crores)**



Source: Transport Department, Govt. of Uttar Pradesh

As shown in Figure 3, revenue collection has seen a threefold increase over the last decade, reflecting the growth in vehicle registrations and economic activity. Although a noticeable decline was observed in FY 2020–21 due to the COVID-19 pandemic, revenue collection has since recovered strongly, with a 9.1% increase over the previous FY 2023–24.<sup>8</sup>

While the surge in vehicles contributes to improved mobility and economic growth in Uttar Pradesh, it has also exacerbated challenges related to air quality and environmental sustainability.

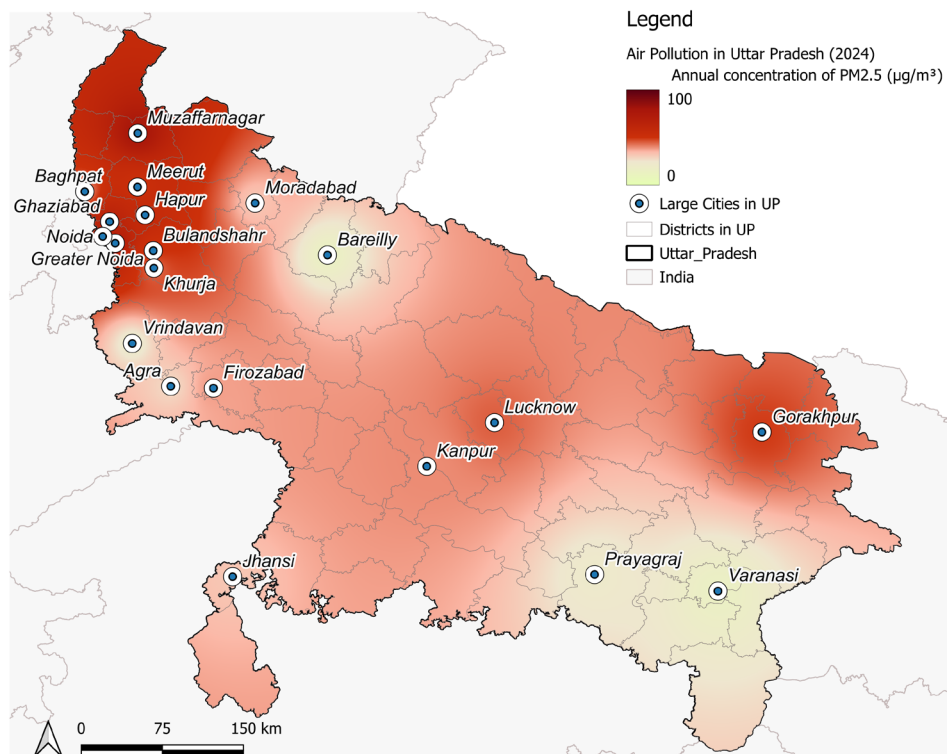
## 1.2 Understanding Air Quality Patterns Across Cities in Uttar Pradesh

Uttar Pradesh is facing a critical air pollution challenge that poses a serious risk to both public health and the environment. In recent years, air quality has significantly deteriorated across cities in the National Capital Region (NCR), particularly in key urban centres within Uttar Pradesh, including Bagpat, Bulandshahr, Ghaziabad, Greater Noida, Hapur, Khurja, Meerut, Muzaffarnagar, and Noida. As per the rankings by AQI.in, four of these cities—Greater Noida, Noida, Ghaziabad and Muzaffarnagar were listed among the world’s ten most polluted cities in 2024, underscoring the scale of the crisis.<sup>9</sup>

To address this growing concern, the Government of India launched the National Clean Air Programme (NCAP) in 2019, targeting 131 non-attainment cities, which consistently fail to meet the National Ambient Air Quality Standards (NAAQS). Uttar Pradesh has 15 such cities under NCAP, representing 13% of all non-attainment cities under NCAP, highlighting the burden of air pollution the state faces.<sup>10</sup>

Figure 4 below illustrates the average annual  $PM_{2.5}$  concentrations in 20 major cities of Uttar Pradesh, encompassing both non-attainment and NCR cities. The data reflects persistently high pollution levels across the state.

**FIGURE 4: Annual  $PM_{2.5}$  Concentration in Major Cities of Uttar Pradesh**

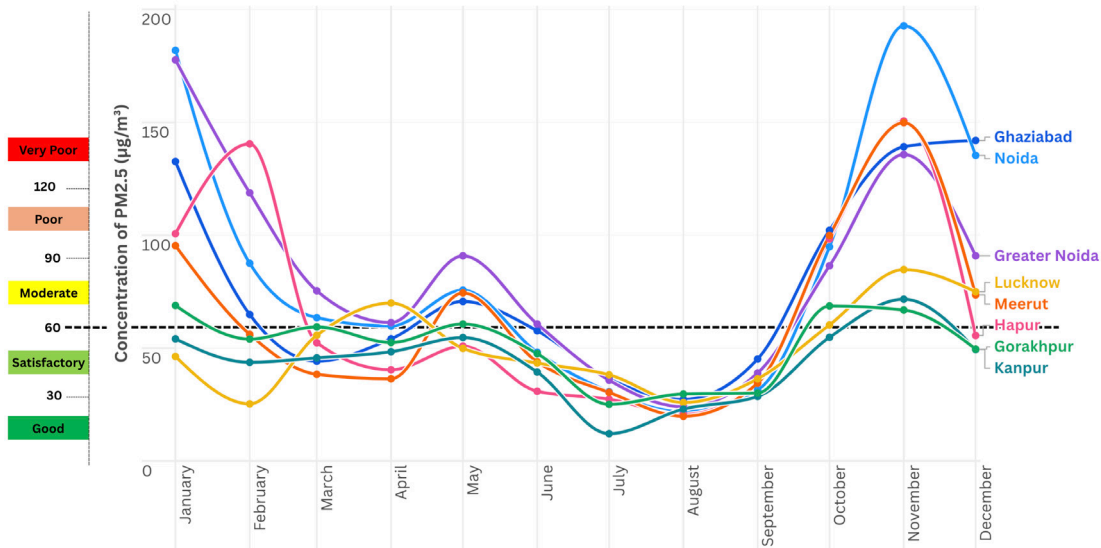


Source: CPCB (2024)\* and TERI analysis

\*The average annual concentration of  $PM_{2.5}$  particles for the year 2024, recorded at various monitoring centres of the Central Pollution Control Board, was considered to prepare the map.

Air pollution levels in Uttar Pradesh also show considerable seasonal fluctuation. Pollution peaks during the winter months (October to February), while levels tend to improve during the summer and monsoon seasons (July to September), as depicted in Figure 5.

**FIGURE 5: Monthly Variation of PM<sub>2.5</sub> Concentration**



Source: CPCB (2024) and TERI analysis

As indicated in Figure 5, most major cities in Uttar Pradesh experience air quality in the 'moderate' to 'poor' category for the part of the year, with a sharp decline to 'very poor' levels during winters. This persistent air quality deterioration, especially in the case of cities in the NCR region, poses serious health risks and compromises the liveability of urban areas in the state.

Among the various contributing sectors, vehicular emissions are a key source of air pollution. The following section delves into the role of the transport sector in worsening air quality issues in Uttar Pradesh.

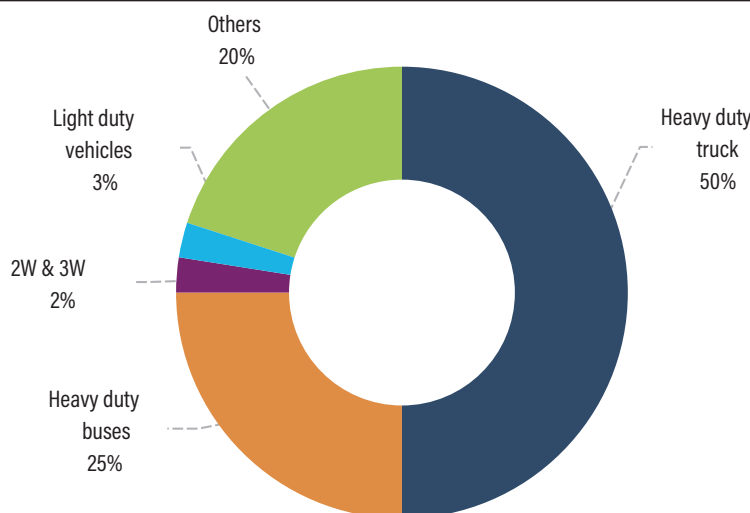
### 1.3. Vehicular Emissions and its Impact in Uttar Pradesh

Air pollution in Uttar Pradesh originates from various sources, including household and commercial activities, transportation, agriculture (livestock and fertilizers), waste burning, Micro, Small, and Medium Enterprises (MSMEs), thermal power plants, and large industrial units. A recent study, conducted during 2019-20, under the Uttar Pradesh Clean Air Plan (UCAP) for the Directorate of Environment, Uttar Pradesh, with support from the World Bank and several research institutions, including, utilized the World Bank's GAINS (Greenhouse gas–Air pollution Interactions and Synergies) model. This model is designed to identify the most cost-effective strategies for reducing emissions of multiple air pollutants and greenhouse gases, while also focusing on mitigating their negative impacts on human health, ecosystems, and climate change.

The study found that the transport sector contributes around 13% of the total  $PM_{2.5}$  mass concentration in the state, making it as one of the key pollution sources.

As part of the transport emissions, **road dust resuspension accounts for the majority share of  $PM_{2.5}$  pollution at 60%, while the remaining 40% is attributed to tailpipe emissions from different vehicle categories.** The breakup of 40% tailpipe emissions from these categories is illustrated in Figure 6 below.

**FIGURE 6: Contribution of the Transport Sector (Excluding Road Dust Resuspension) to  $PM_{2.5}$  Concentration in Uttar Pradesh**



Source: TERI analysis based on the information extracted from GAINS Model, World Bank

$PM_{2.5}$  concentration is a key indicator of air pollution due to its severe health impacts and the dominant role of transport in its emissions. In addition to  $PM_{2.5}$ , the transport sector is also a major emitter of nitrogen oxides (NOx) and volatile organic compounds (VOCs) that degrade air quality, and carbon dioxide (CO<sub>2</sub>) that contributes to climate change .

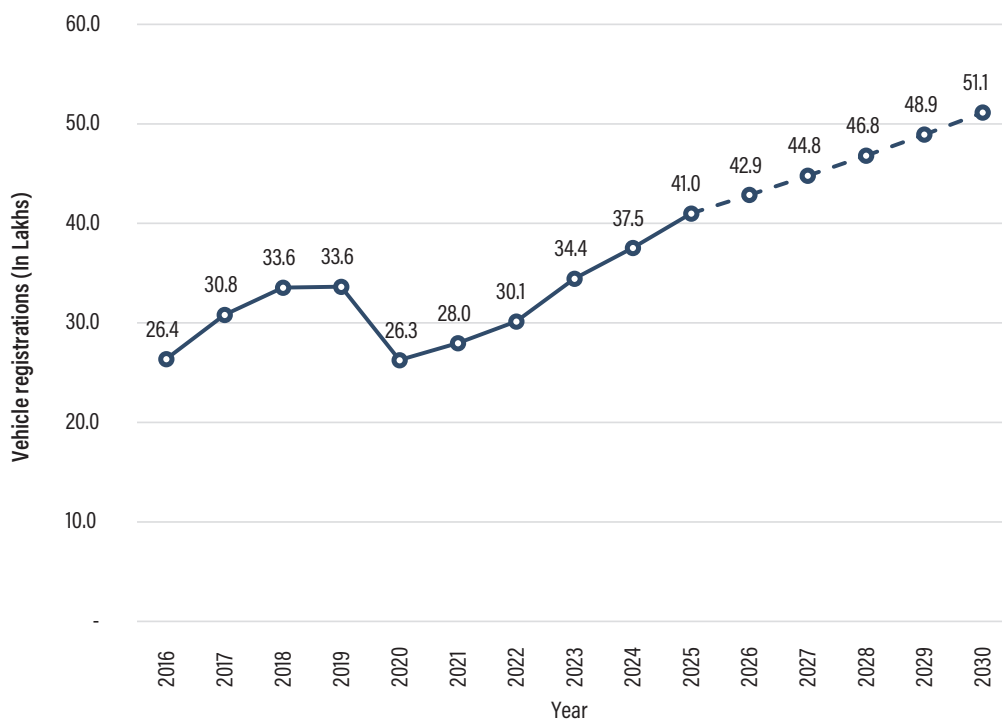
Given this significant environmental burden, it is imperative to implement targeted policy measures that support sustainable mobility, including vehicle electrification, alternative fuel use, tighter emission norms, and the strengthening of public transport infrastructure.

The next section provides future projections for the state's vehicle population by 2030. It further explores pathways for Uttar Pradesh to align its ZEV roadmap with the EV30@2030 vision.

### 1.3.1 Future Vehicle Growth Scenario for Uttar Pradesh

In the year 2025, Uttar Pradesh recorded registrations of approximately 41 lakh vehicles, reflecting a 9% increase as compared to the previous year.<sup>11</sup> With the steady upward trend in annual vehicle registrations, projections have been made up to 2030 using historical data from the Vahan portal (covering 2016–2025), and applying the CAGR method.

**FIGURE 7: Vehicle Sales Projections till 2030 for Uttar Pradesh**



Source: TERI

As depicted in Figure 7, by 2030, the number of vehicle registrations in the state is expected to reach approximately 51.1 lakh, a 1.2-fold increase over the 2025 levels. This continued rise, if left unaddressed, will likely intensify air pollution and worsen public health. To mitigate these risks, accelerating the adoption of ZEVs is essential.

#### Impact Scenario I: Accelerated EV Penetration by 2030

Building upon the projected vehicle registrations for Uttar Pradesh in 2030, it is pertinent to assess a more ambitious transition pathway that aligns with national-level aspirations. According to a report by NITI Aayog<sup>12</sup>, if the FAME II scheme and other enabling measures are successfully implemented, India could achieve EV sales penetration levels of 30% of private cars, 70% of commercial cars, 40% of buses, and 80% of two- and three-wheelers by 2030.

Applying these ZEV penetration goals to Uttar Pradesh's projected vehicle sales in 2030, the state would require a total of approximately 34 lakh ZEV registrations, as shown in Table 1. The estimated ZEV registrations across various vehicle form factors were derived by distributing the estimated total vehicle registrations for 2030, based on the vehicle segment distribution observed in FY 2025–26.

**TABLE 1: Segment-wise ZEV Registrations Required to Achieve Accelerated ZEV Penetration in Uttar Pradesh by 2030**

Vehicle Form Factor	Total Vehicle Sales (projected)	ZEV Penetration Considered	Estimated ZEV Sales for 2030
2-Wheeler	38,08,100	80%	30,46,480
3-Wheeler Auto	1,07,287	80%	85,830
3-Wheeler Goods	62,193	80%	49,754
4-Wheeler Car	5,96,920	30%	1,79,076
4-Wheeler Taxi	39,899	70%	27,930
4-Wheeler Goods	62,193	70%	43,535
Buses	8,877	40%	3,551
<b>Total</b>	<b>51,12,808</b>		<b>34,36,156</b>

*\*E-rickshaws have not been considered in the analysis*

Source: TERI analysis

Under this scenario, Uttar Pradesh would require close to 30.4 lakh e 2Ws, 86,000 e-3W (Autos), 49,754 e-3W (Goods), 1.8 lakh e-cars, 28,000 e-taxis, 44,000 e-goods vehicles, and 3,500 e-buses registrations in the year 2030.

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## 2 Demand-side Enablers for ZEV Adoption in Uttar Pradesh

India has been actively promoting electric mobility through various initiatives at both the national and state level. Early efforts such as the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME-I & II) laid the foundation for ZEV adoption by offering direct subsidies and infrastructure support. At the national level, two significant policies and schemes, namely, the **PM Electric Drive Revolution in Innovative Vehicle Enhancement (PM E-DRIVE) scheme** and the **PLI scheme for automobile and auto components**, are present to strengthen the domestic ZEV ecosystem. At the state level, the **Uttar Pradesh Electric Vehicle Manufacturing and Mobility Policy 2022** aim to accelerate the ZEV penetration.

Table 2 provides an overview of these three policies, focusing on key parameters, highlighting the demand-side measures to accelerate the adoption of ZEVs. The policies in the state are specifically focused on electric vehicles (EVs).



**TABLE 2: Overview of National and Uttar Pradesh State-specific EV Policy**

Parameter	National Level Policy		State Level Policy
	PM E-DRIVE Scheme	PLI Scheme for Automobile and Auto Components	Uttar Pradesh EV Policy 2022
<b>Year of Notification</b>	2024	2021	2022
<b>Budget Allocation (INR crores)</b>	10,900	25,938 (for five years – FY 2022-23 to FY 2026-27)	100 (2W); 60 (3W), 250 (4W); 80 (e-bus); 10 (e-goods carrier)
<b>Incentives</b>	Subsidies for various EVs, including 2Ws, 3Ws, ambulances, trucks, and buses	Sales-based incentives (8%–11%), with an additional 2% for cumulative sales exceeding INR 1,250 crore over five years; extra 5% for BEV and Hydrogen Fuel Cell components	Subsidies: INR 5,000 for 2Ws, up to INR 12,000 for 3Ws, up to INR 1,00,000 for cars; 100% waiver on road tax and registration fees
<b>Target Vehicles</b>	2Ws, 3Ws, ambulances, trucks, buses	Battery Electric Vehicles (BEVs), Hydrogen Fuel Cell Vehicles Advanced Automotive Technology Components	2Ws, 3Ws, cars, buses
<b>Charging Infrastructure</b>	Focus on enhancing infrastructure nationwide	No allocation for charging infrastructure, but supports production of EV components, including charging infrastructure parts	Installation of 207 charging stations in nine cities
<b>Adoption Targets</b>	Increase EV adoption to 30% by 2030	Indirect promotion through incentives for advanced automotive technologies	Rollout of 1 million EVs by December 2024; deployment of 1,000 e- buses by December 2030
<b>Manufacturing Focus</b>	Promotion of new technologies	Enhancing domestic manufacturing of BEVs, Hydrogen Fuel Cell Vehicles, and their components	Establishment of Uttar Pradesh as a manufacturing hub for EVs and components

Source: TERI analysis based on PM E-DRIVE, PLI Scheme and UP EV Policy 2022

Uttar Pradesh has positioned itself as a leader in India's ZEV sector through the implementation of the EV Manufacturing and Mobility Policy 2022. To encourage ZEV adoption, the state offers subsidies of INR 5,000 for electric 2Ws, up to INR 12,000 for 3Ws, and up to INR 1 lakh for electric cars. Additionally, a 100% waiver on road tax and registration fees is provided for ZEVs purchased within the state.<sup>13</sup> Uttar Pradesh leads the nation by accounting for over 17% of India's ZEV market in FY 2025-26, particularly dominating the 3W segment with about 26% of electric 3Ws in the country.<sup>14</sup> Uttar Pradesh ZEV Manufacturing and Mobility Policy 2022 aims to roll out 1 million ZEVs across various segments by December 2024, along with deploying 1,000 e-buses by December 2030.

Alongside government policies, leading original equipment manufacturers (OEMs) are gaining interest in establishing a ZEV manufacturing ecosystem in the state. Recently, Ashok Leyland has set up a new ZEV manufacturing unit in Lucknow, spread across 70 acres. Once fully operational, this facility will have an annual production capacity of 2,500 vehicles.<sup>15</sup>



### 3 Supply-side Interventions for ZEV Adoption in Uttar Pradesh

Despite the introduction of various demand-side initiatives aimed at encouraging ZEV uptake, such as subsidies, incentives, and consumer awareness programmes, ZEV adoption in Uttar Pradesh remains limited. This indicates a critical need to strengthen supply-side policy approach to accelerate the state's transition to clean mobility. Effective supply-side measures, such as setting sales requirements for manufacturers, incentivizing local ZEV production, and tightening emission norms, are essential to ensure the availability, affordability, and technological advancement of ZEVs across all segments. This section focuses on how robust supply-side interventions can drive the ZEV ecosystem forward and unlock broader environmental, economic, and health benefits for the state.



### 3.1. Key Policies in the State to support ZEV adoption

Uttar Pradesh Electric Vehicle Manufacturing and Mobility Policy 2022 seeks to attract investments for indigenized manufacturing of batteries, charging equipment, and other components, and provides a mix of fiscal and infrastructure support. The state EV policy is designed with a focus on EVs. These are in the form of capital subsidies for EV projects, stamp duty concessions for mega EV plants, industrial park incentives, exemptions on electricity duty, and SGST. Collectively, these supply-side measures have been designed to set up an EV manufacturing ecosystem in Uttar Pradesh.

**TABLE 3: Supply-side Incentives for the EV Ecosystem under the Uttar Pradesh EV Policy**

Category	Incentives provided under UP EV Policy 2022
Capital subsidy (one-time) on EVCI <sup>b</sup>	<p><b>Charging Stations:</b></p> <p>20% of eligible fixed capital investments for service providers, upto INR 10 lakh per unit (applicable for first 2,000 charging stations in the state)</p> <p><b>Swapping Stations:</b></p> <p>20% of fixed eligible investments for service providers, upto INR 5 lakh per unit (applicable for first 1,000 stations in the state)</p>
Capital subsidy on EV manufacturing projects	<p><b>First two integrated EV projects and first two Ultra Mega Battery Projects:</b> 30% of eligible fixed capital investment, upto INR 1000 crore per project over 20 years</p> <p><b>First five Mega EV Projects and First five Mega Battery Projects:</b> 20% of eligible fixed capital investment, upto INR 500 crores per project over 10 years</p> <p><b>Large EV Projects and Large Battery Projects:</b> 18% of eligible fixed capital investment, upto 90 crore per project over 10 years</p> <p><b>MSME Projects:</b> 10% of eligible fixed capital investment, upto INR 5 crore per project over 2 years</p>
Stamp duty reimbursement on purchase/lease of land	<p><b>Integrated EV Projects &amp; Ultra Mega Battery Projects:</b> 100%, anywhere in Uttar Pradesh</p> <p><b>Mega/Large/MSME Projects:</b> 100% in Poorvanchal and Bundelkhand region, 75% in Madhyanchal and Paschimanchal (except GHZ and GBN districts), and 50% in GBN &amp; GHZ districts</p>
Quality certification charges reimbursement (one-time)	<p><b>Large and MSME EV/Battery Projects:</b> 50% of fees paid for obtaining certification, upto INR 10 lakh per unit</p>

<sup>b</sup> Electric Vehicle Charging Infrastructure (EVCI) is a network of charging stations catering to diverse EV charging requirement

Category	Incentives provided under UP EV Policy 2022
Patent registration fees reimbursement	<b>Large and MSME EV Battery Projects:</b> 75% of cost incurred (upto INR 50,000) for acquiring domestic patent and upto INR 2 lakh for acquiring international patent
Skill development incentive (for all defined manufacturing projects)	One-time reimbursement at INR 5,000 per employee annually to first 50 employees

Source: UP EV Manufacturing and Mobility Policy 2022

The incentives detailed in Table 3 underscore Uttar Pradesh's strategic focus on establishing a robust supply-side ecosystem for electric mobility. By offering differentiated capital subsidies across project scales (from MSMEs to Ultra Mega Projects), the policy aims to catalyse both large-scale industrial investment and local manufacturing. Special emphasis is placed on providing higher stamp duty reimbursement in underdeveloped regions such as Poorvanchal and Bundelkhand, thereby fostering a balanced economic development. Additional benefits, such as reimbursements for quality certification, patent filing, and skill development, further support competitiveness and innovation. The policy also promotes setting up 'collection centres' for end-of-life batteries at dealerships by EV/battery OEMs.

### 3.2. Uttar Pradesh's Automobile Sector

Uttar Pradesh, being the most populous state of India, records the highest number of vehicle registrations, making it a critical market for both OEMs as well as emerging players. The state is also home to leading automotive manufacturers, component suppliers, and a growing ecosystem of ZEV startups. This section presents an overview of the major OEMs whose vehicles were registered in the state across various vehicle segments in FY 2025-26. It also provides a detailed analysis of top ten OEMs, highlighting their overall vehicle registrations and the adoption trends of ZEVs in the state.



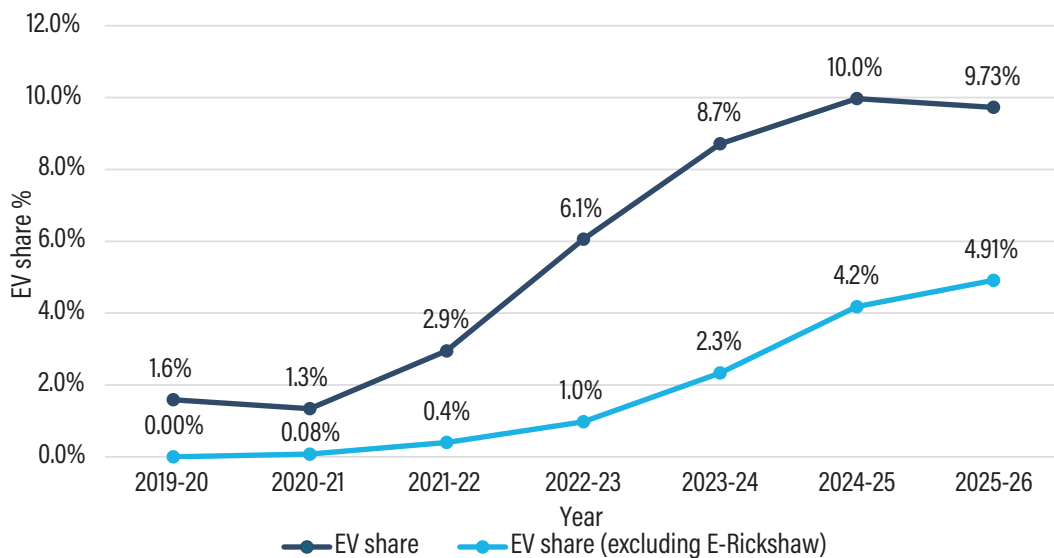
Uttar Pradesh, being the most populous state of India, records the highest number of vehicle registrations, making it a critical market for both OEMs as well as emerging players.

### 3.2.1. Growth in ZEV Registrations

Uttar Pradesh, being the leading state in vehicle registrations, presents a significant market for the automotive sector. In FY 2025–26, around 42.6 lakh vehicles were registered, with ZEVs accounting for nearly 4.1 lakh units, i.e., 9.7% share of the total registrations. However, most of these ZEVs were e-rickshaws, contributing 2 lakh units or 49.4% of the total ZEV registrations. When e-rickshaws are excluded, the ZEV share drops to a mere 4.9%, underscoring relatively low uptake of ZEVs among several vehicle categories.<sup>16</sup>

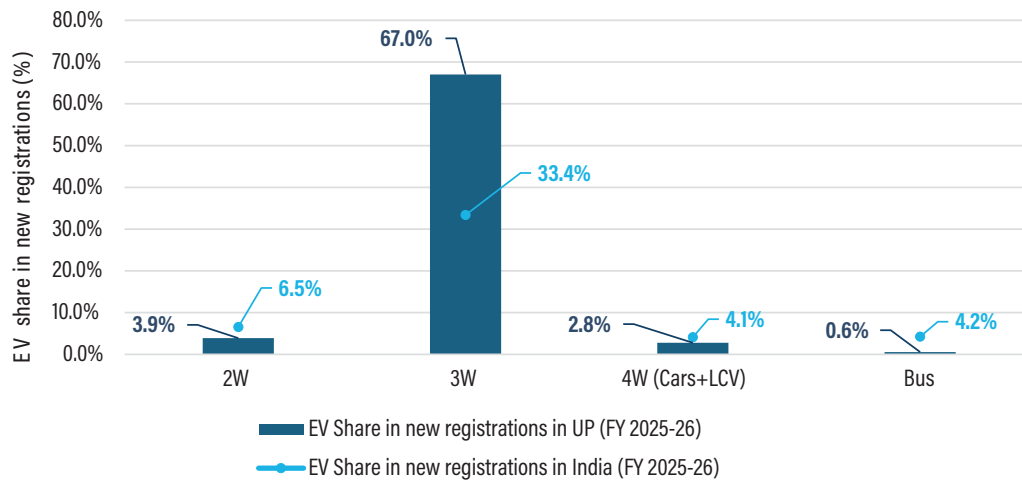
Figure 8 depicts the growth trend of ZEV adoption in the state. Over seven years, the ZEV share increased from 1.6% in 2019–20 to 9.73% in FY 2025-26, with a noticeable change evident from 2022–23. Despite this progress, the adoption is heavily skewed towards specific segments.

**FIGURE 8: Year-wise ZEV penetration in Uttar Pradesh**



Source: Vahan Dashboard

Figure 9 highlights segment-wise ZEV penetration for FY 2025-26. The 3W category, including both passenger and goods (excluding e-rickshaws) leads with a dominant ZEV share of 67%, followed by 2W at 3.9%. Cars and light goods vehicles together hold a 2.8% share, while e-buses constitute only 0.6% of total bus registrations.

**FIGURE 9: Vehicle segment-wise ZEV penetration in Uttar Pradesh**

Source: Vahan Dashboard

This uneven adoption pattern emphasizes the need for targeted policy support across all segments to drive broader electrification.

### 3.2.2. Vehicle Sales: OEM-wise across segments for FY 2025-26

In Uttar Pradesh, over 1,500 OEMs are actively involved in selling ICE and alternative fuel vehicles across various categories. While many established players are venturing into the ZEV segment, several others are still in early phases of their ZEV transition. Simultaneously, a growing number of startups are emerging in the ZEV space, quickly gaining a substantial foothold in the market.

For the purpose of this analysis, ZEVs are defined strictly as vehicles with zero tailpipe emissions, specifically including only battery-operated vehicles (BOVs) or pure ZEVs. Hybrid models, such as plug-in hybrids and strong hybrids, are excluded from this category since they depend on ICE technology but still emit pollutants.

#### Two Wheelers (2Ws)

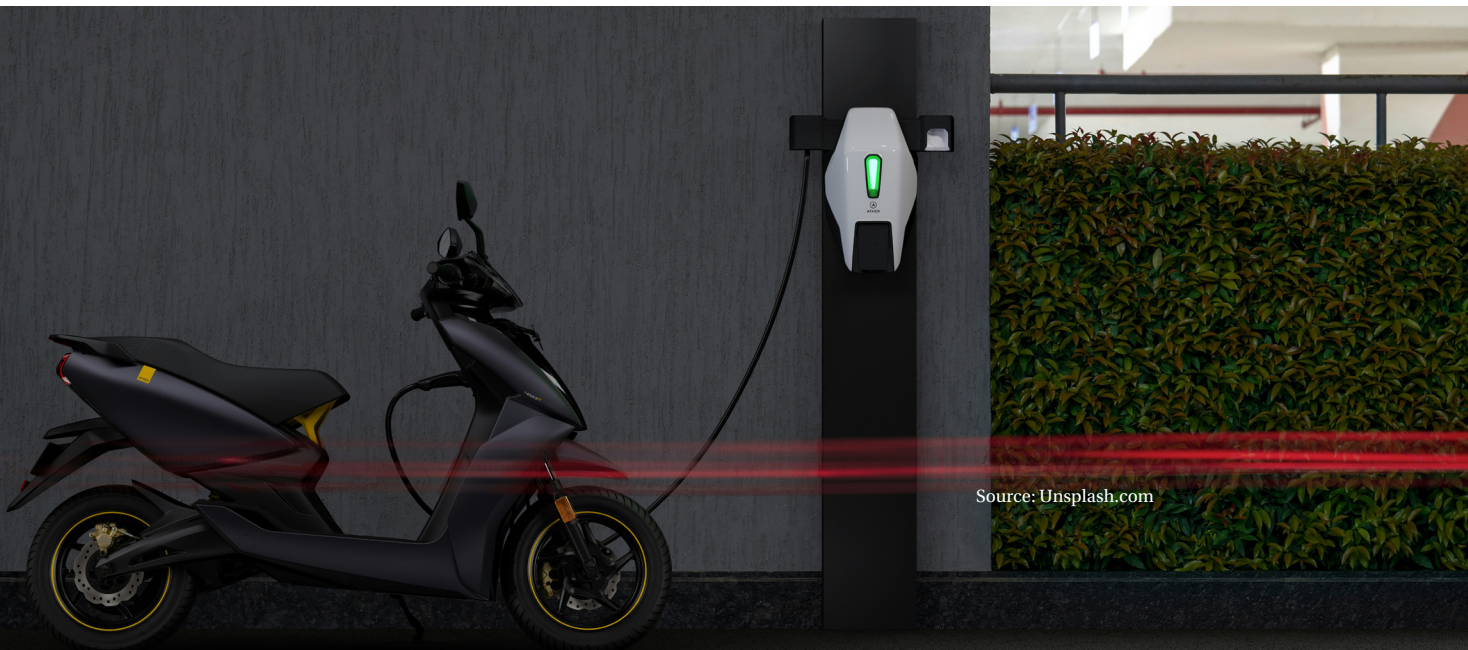
The 2W market dominates India's automotive landscape, constituting around 74.5% of all vehicle registrations. As shown in Table 4, during FY 2025-26, Hero MotoCorp led the 2W segment in Uttar Pradesh with sales of around 15 lakh units. TVS Motors followed with 6 lakh units, Honda with 4.2 lakh units, Bajaj Auto with 3.5 lakh units, and Royal Enfield with 1.6 lakh units. Collectively, these five OEMs represented 97% of the total 2W sales in the state.

**TABLE 4: Leading OEMs by Two-Wheeler Registrations in Uttar Pradesh**

S. No	OEM	2W Registrations (FY 2025-26)			Market Share (%)	ZEV Sales as % of total vehicle sales by OEM*
		Total	ICE	ZEV*		
1	Hero MotoCorp	15,07,500	14,90,305	17,195	47.57%	1.14
2	TVS Motor Company	6,05,070	5,69,564	35,506	19.09%	5.87
3	Honda Motorcycle and Scooter India	4,28,533	4,28,258	275	13.52%	0.06
4	Bajaj Auto	3,53,660	3,29,129	24,531	11.16%	6.94
5	Royal-Enfield	1,63,626	1,63,626	-	5.16%	-
6	Suzuki Motorcycle India	32,049	32,002	47	1.01%	0.15
7	Yamaha Motor India	27,574	27,574	-	0.87%	-
8	OLA Electric Mobility	22,918	0	22,918	0.72%	100
9	Ather Energy	9,535	0	9,535	0.30%	100
10	Classic Legends	4,424	4,424	-	0.14%	0
11	Other OEMs	14,137	878	13,259	0.45%	93.79
	<b>Total</b>	<b>31,69,026</b>	<b>30,45,760</b>	<b>1,23,266</b>	<b>100</b>	<b>3.9</b>

\*Note: ZEV includes Battery Electric Vehicles only

Source: Vahan Dashboard (FY 2025-26)



Source: Unsplash.com

As shown in Table 4, electric 2W sales still make up a small portion of total registrations among leading OEMs. Major OEMs are yet to prioritize electric 2Ws. For example, Bajaj sold 24,531 electric 2Ws, which formed 6.9 % of its total sales. TVS sold around 35,506 electric 2Ws, comprising just 5.9% of its total 2W sales. Hero MotoCorp, despite being the largest player, recorded only 17,195 electric 2W sales. Honda started with selling 275 electric 2W. Royal Enfield, although a significant player, has not yet entered the electric 2W segment.

In contrast, some emerging manufacturers are now specializing exclusively in manufacturing electric 2Ws. OLA Electric Technologies led this group with 22,918 electric 2Ws sold, followed by Ather Energy with 9,535 units.

### Three Wheelers (3W)

Three-wheeler passenger vehicles contributed around 2.1% of total vehicle registrations in Uttar Pradesh. A notable portion of this segment consists of electric autos, signalling a strong transition in last-mile transport from conventional fuels to electric mobility.

**TABLE 5: Leading OEMs by Three-Wheeler (Passenger) Registrations in Uttar Pradesh**

S. No	OEM Name	3W (Passenger) Registrations (FY 2025-26)			Market Share (%)	ZEV Sales as % of total vehicle sales by OEM*
		Total	ICE	ZEV*		
1	Bajaj Auto	43,674	18,330	25,344	48.9	58.0
2	Mahindra Last Mile Mobility	22,793	231	22,562	25.5	99
3	TVS Motor Company	10,830	2,284	8,546	12.1	78.9
4	Piaggio Vehicles	4,283	1,047	3,236	4.8	75.6
5	Omega Seiki	2,084	-	2,084	2.33	100
6	TI Clean Mobility	1,229	-	1,229	1.4	100
7	Saera Electric Auto	676	-	676	0.8	100
8	Euler Motors	667	-	667	0.8	100
9	J S Auto	504	89	415	0.6	82.3
10	Atul Greentech	296		296	0.3	100
11	Other OEMs	2,355	547	1,808	2.63	76.8
	<b>Total</b>	<b>89,391</b>	<b>22,528</b>	<b>66,863</b>	<b>100</b>	<b>74.8</b>

\*Note: ZEV includes Battery Electric Vehicles only; E-rickshaws have not been considered in the analysis

Source: Vahan Dashboard (FY 2025-26)



The top five OEMs—Bajaj, Mahindra, TVS, Piaggio and Omega Seiki, account for 93.6% of the total 3W passenger vehicle market. As shown in Table 5 Bajaj Auto dominates the segment, selling around 43,674 three-wheelers, of which 58% are electric. Mahindra follows with sales of 22,793 units, with ZEVs accounting for 99% of its portfolio in FY 2025-26. TVS & Piaggio also has a strong ZEV presence in this category, with 78.9% & 75.6% of their 3W sales being electric. New players such as Omega Seiki and TI Clean Mobility are entirely focused on electric 3Ws, selling 2,084 and 1,229 electric units, respectively in the state.

Electric mobility is also gaining traction in 3W goods vehicle segment. Bajaj leads this market as well, followed by Piaggio, Mahindra, YC Electric, and Euler. Collectively, these five OEMs accounted for 93% of goods 3W sales in Uttar Pradesh in FY 2025-26.

**TABLE 6: Leading OEMs by Three-Wheeler (Goods) Registrations in Uttar Pradesh**

S. No	OEM Name	3W (Goods) Registrations (FY 2025-26)			Market Share (%)	ZEV Sales as % of total vehicle sales by OEM*
		Total	ICE	ZEV*		
1	Bajaj Auto	9,608	9,256	352	67.8	3.7
2	Piaggio Vehicles	1,356	1,289	67	9.6	4.9
3	Mahindra	1,213	733	480	8.6	39.6
4	YC Electric	613	-	613	4.3	100
5	Euler Motors	403	-	403	2.8	100
6	Atul Auto	143	144	3	1.0	2
7	Thukral Electric Bikes	137	-	143	1.0	100
8	TVS Motor Company	123	101	36	1.0	26.3
9	Mini Metro EV	79	-	123	0.9	100

S. No	OEM Name	3W (Goods) Registrations (FY 2025-26)			Market Share (%)	ZEV Sales as % of total vehicle sales by OEM*
		Total	ICE	ZEV*		
10	Unique International EV	60	-	79	0.6	100
11	Other OEMs	341	99	242	2.4	71
	Total	14,163	11,622	2,541	100	17.9

\*Note: ZEV includes Battery Electric Vehicles only

Source: Vahan Dashboard (FY 2025-26)

As mentioned in Table 6, Bajaj Auto sold 9,608 3Ws, with electric variants making up just 3.7% of its sales. Piaggio followed with 1,356 units sold, of which 4.9% were electric. Mahindra showed a stronger shift toward electrification, with 40% of its 3W sales being electric. YC Electric and Euler Motors, are fully electric OEMs, sold 613 and 403 electric 3Ws in FY 2025-26.



Source: Unsplash.com

## Cars

Passenger cars are the second most popular vehicle category in Uttar Pradesh, accounting for about 11.7% of all vehicle registrations in FY 2025-26. As shown in Table 7, the top five OEMs contributed 89% of the state's car sales. Maruti Suzuki remained the dominant car manufacturer, selling over 1.75 lakh units, followed by Mahindra & Mahindra, Tata Motors, Hyundai, and Kia.

**TABLE 7: Leading OEMs by Car Registrations in Uttar Pradesh**

S. No	OEM	Car Registrations (FY 2025-26)			Market Share (%)	ZEV Sales as % of total vehicle sales by OEM*
		Total	ICE	ZEV*		
1	Maruti Suzuki India	1,75,332	1,75,221	111	37.8	0.1
2	Mahindra & Mahindra	77,652	74,459	3,193	16.7	4.1
3	Tata Motors	65,638	59,329	6,309	14.1	9.6
4	Hyundai Motor India	55,428	55,109	319	11.9	0.6
5	KIA India	31,562	31,326	236	6.8	0.7
6	Toyota Kirloskar Motor	26,996	26,996	0	5.8	0
7	Skoda Auto Volkswagen India	8,932	8,932	0	1.9	0
8	Honda Cars	6,423	6,423	0	1.4	0
9	JSW MG Motor India	5,839	1,353	4,486	1.3	76.8
10	Renault India	4,433	4,433	-	1	
11	Other OEMs	6,087	5,451	636	1.3	10.45
	<b>Total</b>	<b>4,64,322</b>	<b>4,33,313</b>	<b>15,290</b>	<b>100</b>	<b>3.29</b>

\*Note: ZEV includes Battery Electric Vehicles only

Source: Vahan Dashboard (FY 2025-26)

According to the data from the Vahan portal given in Table 7, Tata Motors stands out among the top OEMs with the highest electric car sales (6,309 units), making up 9.6% of its total car sales. Mahindra follows with 3,193 electric cars representing a 4.1% share of its total sales. In comparison Hyundai, and KIA have a negligible ZEV presence, with ZEVs comprising only 0.6%, and 0.7% of their respective sales. Maruti Suzuki, the market leader, has only recently entered the EV segment. Selling 111 units, which accounts for just 0.1% of its total car sales.



Source: TERI

On the other hand, MG Motor India emerged as the leading ZEV focused OEM in Uttar Pradesh, selling 4,486 electric cars in FY 2025-26, which made up a remarkable 76.8% of its total car sales.

### Light Goods Vehicle (LGV)

Although LGVs contribute just 1.2% to total vehicle registrations in Uttar Pradesh, they play a vital role in freight movement and are a significant source of emissions. In FY 2025-26, five OEMs, including Mahindra, Tata Motors, Ashok Leyland, Maruti Suzuki, and VE Commercial Vehicles, accounted for 98% of LGV sales in the state.

**TABLE 8: Leading OEMs by LGV Registrations in Uttar Pradesh**

S. No	OEM Name	LGV Registrations (FY 2025-26)			Market Share (%)	ZEV Sales as % of total vehicle sales by OEM*
		Total	ICE	ZEV*		
1	Mahindra & Mahindra	28,238	28,033	205	54	0.7
2	Tata Motors	16,266	15,929	337	31.1	2.1
3	Ashok Leyland	3,407	3,407	-	6.5	0
4	Maruti Suzuki India	2,788	2,788	-	5.3	0
5	VE Commercial Vehicles	772	717	55	1.5	7.1
6	Euler Motors	221	0	221	0.4	100
7	SML Isuzu	183	183	-	0.3	0
8	Isuzu Motors India	106	106	-	0.2	0
9	Switch Mobility Automotive	75	0	75	0.1	100
10	Force Motors	43	43	-	0.1	0
11	Other OEMs	195	137	58	0.4	29.7
	<b>Total</b>	<b>52,294</b>	<b>51,343</b>	<b>951</b>	<b>100</b>	<b>1.8</b>

\*Note: ZEV includes Battery Electric Vehicles only

Source: Vahan Dashboard (FY 2025-26)

As depicted in Table 8, Electric LGV adoption remains limited. Only five OEMs in the top ten accounted for electric LGV sales. Tata Motors led with 337 units, followed by Euler with 221 units, Mahindra with 205 units, and VE Commercial Vehicles with 55 units of electric LGV.

## Bus

Tata Motors, VE Commercial Vehicles, Force Motors, SML ISUZU, and Ashok Leyland collectively dominated the bus segment, making up 96% of total bus sales in FY 2025-26 in Uttar Pradesh. Altogether, buses from 12 OEMs were registered in the state in FY 2025-26.

**TABLE 9: Leading OEMs by Bus Registrations in Uttar Pradesh**

S. No	OEM Name	Bus Registrations (FY 2025-26)			Market Share (%)	ZEV Sales as % of total vehicle sales by OEM*
		Total	ICE	ZEV*		
1	Tata Motors	5,794	5,794	-	45.4	0
2	VE Commercial Vehicles	2,972	2,962	10	23.3	0.3
3	Force Motors	1,688	1,688	-	13.2	0
4	SML Isuzu	1,194	1,194	-	9.4	0
5	Ashok Leyland Ltd	652	652	-	5.1	0
6	Mahindra & Mahindra	297	297	-	2.3	0
7	Daimler India Commercial Vehicles	62	62	0	0.5	0
8	Switch Mobility Automotive	41	0	41	0.3	100
9	Toyota Kirloskar Motor	35	-	-	0.2	0
10	Pinnacle Mobility Solutions	14	-	14	0.1	100
11	Aeroeagle Automobiles	6	0	6	0	100
12	JBM Auto	1	0	1	0	100
	<b>Total</b>	<b>15,578</b>	<b>15,516</b>	<b>62</b>	<b>100</b>	<b>0.4</b>

\*Note: ZEV includes Battery Electric Vehicles only

Source: Vahan Dashboard (FY 2025-26)



Source: Unsplash.com

E-bus segment was dominated by Switch Mobility (41 buses), Pinnacle Mobility Solutions (14 buses), VE Commercial (10 buses), Aeroeagle Automobiles (6 buses), and JBM (1 bus).

Given that e-buses are generally procured in bulk by the government, annual sales figures for one year may not capture the real scenario. To provide a broader view, cumulative OEM-wise registration data from the year 2016 to 2026 was analysed. A total of 862 e-buses were registered in Uttar Pradesh up to the FY 2025-26. Most of these registrations took place in recent years (FY 2021-22 to FY 2025-26).

As per Table 10 a total of 8 OEMs have supplied e-buses in the state over the past ten years.

**TABLE 10: OEMs Supplying E-buses in Uttar Pradesh (2016–25)**

S.No	OEM	E-bus Registrations (2016–2025)
1	PMI Electro Mobility Solutions	712
2	Tata Motors	40
3	Switch Mobility Automotive	68
4	JBM	11
5	MYTRAH Mobility Pvt Ltd	1
6	Aeroeagle Automobiles	6
7	Pinnacle Mobility Solutions	14
8	VE Commercial vehicles	10
Total Bus Registration		862

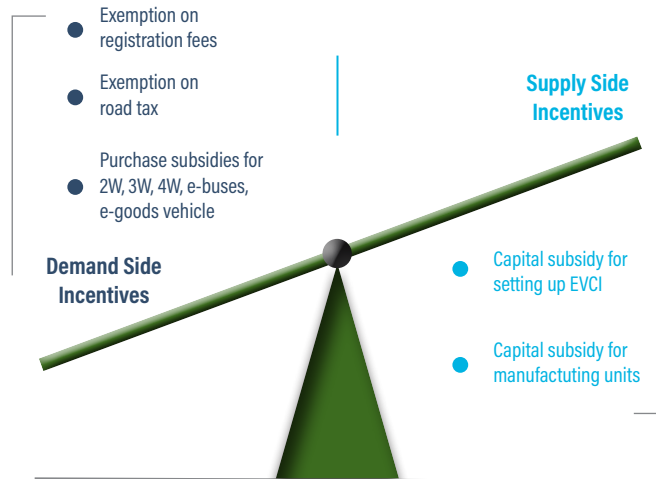
Source: Vahan Dashboard

According to Table 10, PMI Electro Mobility Solutions Private Limited has emerged as the leading supplier, accounting for 712 e-buses, approximately 82% of the total e-bus registrations in Uttar Pradesh. This is followed by Switch Mobility (68 units), Tata Motors (40 units), Pinnacle Mobility (14 units), and JBM (11 units).

### 3.3. Conceptualizing Supply-side Policy Tailored Approach for Uttar Pradesh

Despite Uttar Pradesh government's efforts to promote ZEV uptake, only 4.1 lakh ZEVs were registered in FY 2025-26, making up just 9.7 % of total new registration. To significantly scale up the adoption of ZEVs, it is crucial to reinforce supply-side policy actions. As outlined earlier, a balanced combination of demand and supply-side interventions is vital.

Figure 10 presents the existing initiatives by the state government. While demand-side tools like tax exemptions and purchase subsidies are in place, upcoming policy approaches should incorporate sales-linked strategies to position Uttar Pradesh as a frontrunner in electric mobility.

**FIGURE 10: Demand and Supply-Side Measures for ZEVs in Uttar Pradesh**

Source: TERI analysis

Globally, supply-side regulations are emerging as a central approach to accelerate the transition to ZEVs. By 2023, 29 countries had established electrification or ICE phase-out targets, up from 22 in 2021.<sup>17</sup> These measures, when combined with demand-side interventions, help create long-term market certainty, enabling countries meet climate and industrial goals without overdependence on ongoing government subsidies.

Comprehensive supply-side mechanisms, such as ZEV sales requirements, credit-based regulations, and fuel efficiency standards, not only drive compliance but also foster innovation, aid traditional automakers in their transition, and attract sustained investment in clean mobility. These tools have shown notable success in regions that balance regulatory enforcement with market-driven flexibility.

❖ **California** has been at the forefront of the global shift to cleaner transportation with the launch of the **Advanced Clean Cars I (ACC I) programme** in 2012. This initiative brought together greenhouse gas emissions standards, ZEV requirements, and low-emission vehicle norms into a single regulatory structure.<sup>18</sup> Building on this foundation, Advanced Clean Cars II (ACC II) programme was introduced in 2022, mandating that all new passenger vehicles and light trucks sold in the state must be ZEVs by 2035.<sup>19</sup>

California's leadership in implementing strong supply-side regulations has set a global example, delivering measurable environmental and economic gains. Recently, the US federal government moved to overturn California's landmark regulation to phase out gasoline-powered cars and trucks by 2035.<sup>20</sup> While this may make implementation more challenging for the California administration, the experience remains a model for other regions aiming to adopt a more realistic and phased strategy. Its story underscores that supply-side regulations go beyond climate ambition—they are pivotal to transforming markets by offering the consistency needed to align fiscal policy with long-term economic and sustainability goals.

- ❖ **China's Dual Credit Policy**, introduced in 2017, requires automakers to achieve yearly targets for manufacturing and selling New-Energy Vehicles (NEVs). The policy was designed to achieve 20% NEV market by 2025 (already achieved) and 40% NEV sales by 2030.<sup>21</sup> In 2024 alone, NEV production and sales rose by 34.4% and 35.5% respectively, capturing over 40% of the new vehicle market in China.<sup>22,23</sup>
- ❖ **The United Kingdom (UK)** continues to align with Euro emission norms but has adopted its own **ZEV sales targets**, aiming for 80% of new cars and 70% of new vans to be ZEVs by 2030, gradually reaching 100% by 2035.<sup>24</sup>
- ❖ The **European Union (EU)** supports its regulatory efforts through a zero- and low-emission vehicles (ZLEV) credit system that incentivizes manufacturers exceeding electric and hydrogen vehicle sales targets.<sup>25</sup> As part of the 'Fit for 55' proposal, the EU seeks to ensure all new cars and vans registered by 2035 are ZEVs and reduce emissions from new cars by 55% and vans by 50% by 2030, as compared to 1990 levels.<sup>26</sup>

Collectively, these policies have delivered tangible outcomes, including increasing the variety of ZEV models, reducing ZEV prices, boosting ZEV adoption, accelerating investment in charging infrastructure, and generating employment in the green mobility sector. Such supply-side strategies reduce dependence on continuous subsidies. Unlike demand-side incentives alone, they provide long-term market signals that encourage ongoing investments by both manufacturers and infrastructure providers. Detailed insights into global experiences with supply-side regulations and their outcomes are presented in NRDC's report, 'Fueling ZEV Transition: Global Review of Supply-side Regulations and India's Opportunity'.<sup>27</sup>

The ZEV mandate in the US, began at a sub-national level with California as the pioneering state to implement it. Later, with the proactive approach shown by the states, the multi-state task force in the US, successfully brought together 16 states to collectively implement ZEV programs that resulted in achieving the combined target of 3.3 million ZEV sales by 2025.<sup>28</sup>



The tailored approach includes a risk-reward design customized for the state, offering a streamlined and simplified approach to ensure ease of execution.

In the Indian scenario, states already progressing in ZEV adoption could consider forming a coalition to jointly design and pilot a tailored approach focused on ZEV. These regulations could be adapted to reflect the country's unique vehicle ownership patterns and manufacturing capacities. Such partnerships could mark an important step in advancing state-level ZEV efforts, providing a clear path towards transport decarbonization and strengthening alignment with national net-zero commitments.

Below, we outline a strategy to operationalize supply-side regulation through a ZEV sales-linked credit mechanism. The regulation could be developed at the state level, tailored to specific vehicle ownership trends and manufacturing strengths of each state. For Uttar Pradesh, this intervention can be adapted to reflect its unique mobility patterns and automotive production capacity. A designated nodal agency could be appointed to manage the entire process of this approach. Every automobile manufacturer selling vehicles in the category eligible for credit within the state may be assigned an annual ZEV credit requirement to be met each financial year. The approach for implementing this credit mechanism for Uttar Pradesh is detailed below. The tailored approach includes a risk-reward design customized for the state, offering a streamlined and simplified approach to ensure ease of execution.

### **Key Elements of the Proposed Approach**

- 1. Lead Time for Implementation:** To facilitate a seamless transition, the industry should be granted a lead time of 3 to 8 years, depending on the vehicle category, to scale manufacturing and align dealership operations. The timeline would be informed by the ZEV technological maturity and the existing market share of each segment.
- 2. Categorization of Vehicle Manufacturers:** Given the wide variation in sales volume across OEMs, manufacturers may be grouped into small, medium, or large categories. This categorization could be based on the average vehicle sales during the three financial years prior to the start of the regulation reporting period.
- 3. Setting Eligibility Criteria for ZEV:** To promote adoption of high-quality vehicles, ZEVs would need to meet a minimum range threshold and comply with the Phased Manufacturing Plan (PMP) to qualify under the proposed regulation. These requirements aim to support the deployment of better-performing models and encourage localization. Note that range will only determine eligibility and it will not be considered for credit calculation.
- 4. ZEV Credit Calculation:** The regulation may begin as a voluntary initiative for the first two years and can be later modified based on industry feedback and performance. The annual ZEV requirement could be based on an OEM's average sales over the three consecutive financial years preceding the lead time.

Annual ZEV requirement (tailored for each relevant vehicle category separately based on the market and technological maturity) could be set using the following formula:<sup>26</sup>

$$\text{Annual ZEV requirement} = \text{ZEV \% requirement} \times \text{Sales volume (number)}$$

ZEV percent requirement will be the percentage of total vehicle sales by a particular OEM that are required to be ZEVs across the state. It will be fixed for each year, based on the vehicle segment and OEM category.

$$\text{ZEV credits} = \text{Actual number of ZEVs sold by the OEM} - \text{Annual requirement for number of ZEVs to be sold}$$

**Here, one credit = 1 ZEV sold over and above the annual requirement, and ZEVs will include BEVs, FCEVs<sup>c</sup> and any alternative technology that will result in zero-tailpipe emissions.**

**For PHEVs, the value of the credit will be less than 1 and it will depend on the all-electric drive range of the PHEV<sup>d</sup>.**

Any shortfall in meeting the ZEV requirement would be recorded as a deficit. Small and medium OEMs may be granted greater flexibility than large manufacturers. OEMs could also fulfil part of their obligation using other low-emission technologies, such as PHEVs or strong hybrids. ZEV credits may remain valid for up to three years, promoting consistent progress and motivating OEMs to boost ZEV sales year-on-year.

5. **Trading of ZEV Credits:** OEMs may be allowed to trade or bank credits for up to three years from their issuance, providing flexibility to OEMs. Credit prices could be determined by the market, but all trades must be approved by the nodal agency. The agency would oversee credit verification and transfers. A cap may be introduced on the proportion of the annual requirement that can be met via traded credits.
6. **Mechanism to Compensate for Deficit:** The OEMs falling short of meeting its ZEV requirement could compensate their deficit within three years by:
  - Using valid credits from the previous reporting periods
  - Purchasing credits from other OEMs
  - Earning excess credits through over-compliance in the following three years

If compliance with the ZEV requirements is not met in a particular reporting period, even after the grace period of three years, the manufacturer could be subjected to a suitable penalty. The penalty could be set higher than the cost of meeting ZEV requirements and serve as a deterrent to inaction.

<sup>c</sup> Fuel Cell Electric Vehicles (FCEVs) employ 'fuel cell technology' to generate the electricity required to run the vehicle. The chemical energy of the fuel is converted directly into electric energy.

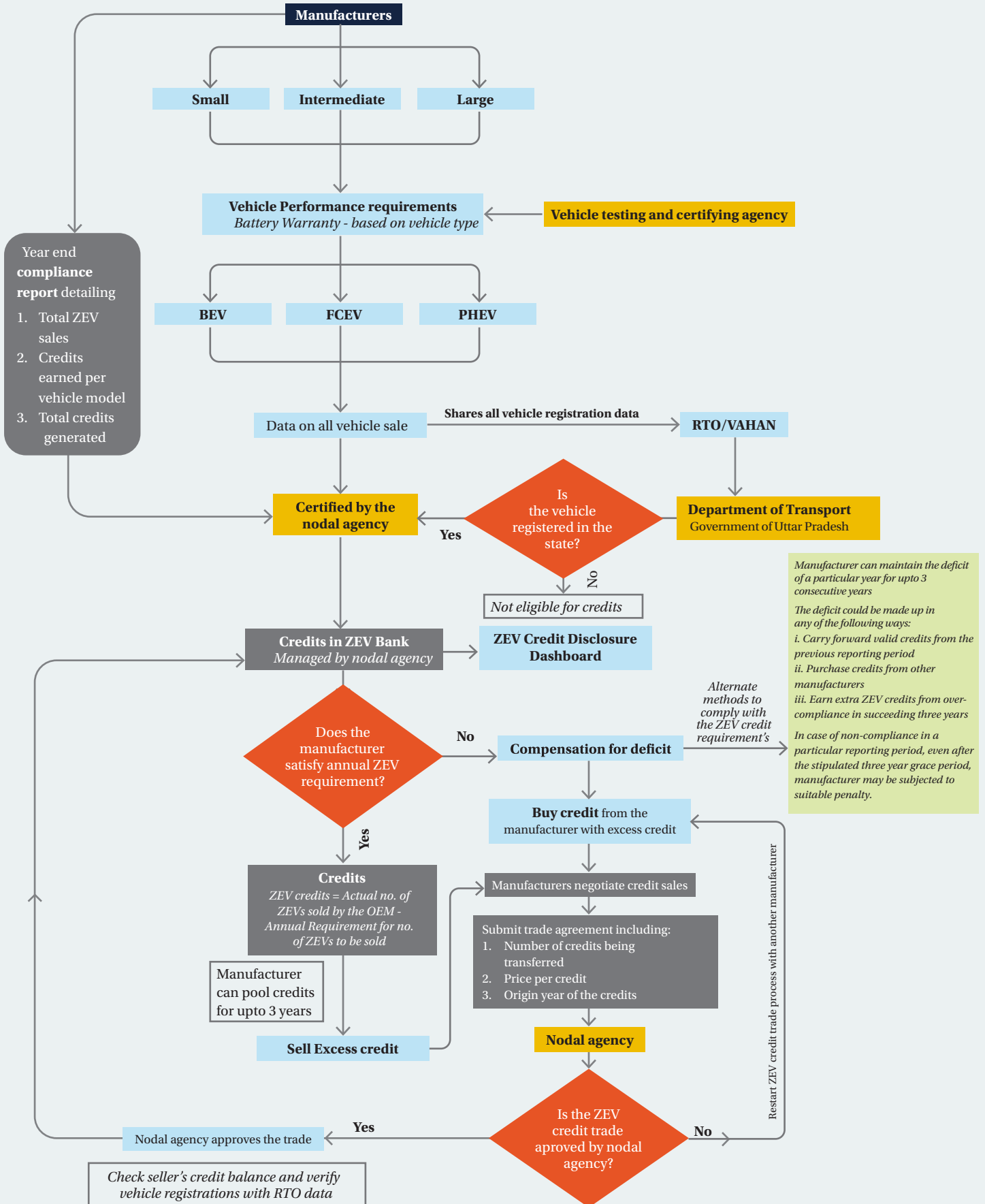
<sup>d</sup> Plug-in Hybrid Electric Vehicle (PHEV) uses both an internal combustion engine and a battery charged from an external socket. This means the vehicle's battery can be charged with electricity rather than the engine.

**Reporting Requirements:** The reporting period could follow a twelve-month period (one fiscal year), starting from April 1 to March 31 of the following year. OEMs would submit vehicle sales and credit data to the nodal agency, which would verify it with the state transport data. Compliance would be confirmed post-verification, and annual summary reports could be published on a dedicated public portal.

**Public Dashboard on ZEV Credits:** A central dashboard could be launched to display details of each OEM's credit requirements, performance, earned and traded credits, and balances by reporting period. This would ensure transparency and accountability.

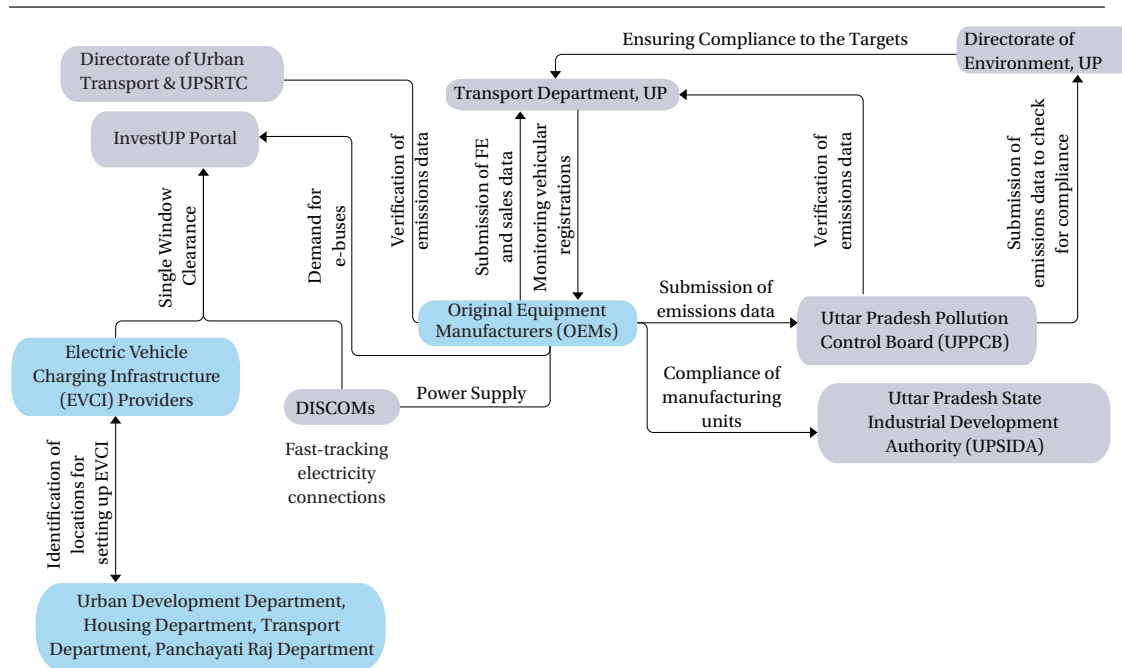
The flow chart for implementation of ZEV regulation in Uttar Pradesh is given in Figure 11.

FIGURE 11: Flow Chart for Implementation of ZEV Sales Requirement in Uttar Pradesh



To effectively leverage supply-side regulation for accelerating e-mobility in the state of Uttar Pradesh, a well-structured coordination approach among government departments is also essential. Collaboration with the energy and urban development departments will play a key role in expanding charging infrastructure, integrating better planning aspects into ZEV ecosystem, and ensuring fast-tracking of electricity connections. Figure 12 highlights proposed departmental coordination network to facilitate infrastructure development and the adoption of e-mobility in the state.

**FIGURE 12: Proposed Coordination Network for Uttar Pradesh**



Source: TERI

InvestUP<sup>29</sup> serves as the primary platform for single-window clearance in the state, while agencies like Directorate of Urban Transport, UPSRTC and other government agencies may generate demand for ZEVs. OEMs can invest in setting up new manufacturing plants through NiveshMitra Portal<sup>30</sup>, and are required to submit fuel efficiency and sales data to the transport department, via regional transport offices (RTOs). The transport department, through RTOs, will oversee and verify vehicle registration data. Emissions data will also be submitted to the Uttar Pradesh Pollution Control Board (UPPCB), that will cross-check it with the transport department.

UPPCB's role remains very crucial during the transition phase; to ensure compliance, UPPCB will forward the validated data for each OEM to the Directorate of Environment, which will oversee adherence to emission targets. Additionally, Uttar Pradesh State Industrial Development Authority (UPSIDA) may conduct parallel compliance checks. This interlinkage will help streamline approval processes and ensure clear accountability at every level of implementation.

### 3.3.1. Potential Benefits of State Level Supply-Side Regulations

Supply-side policies prioritize incentivizing OEMs and infrastructure providers to scale up production of ZEVs, rather than just focusing on consumer demand. By offering incentives like land and subsidies for setting up EV manufacturing facilities, such policies can attract domestic and global OEMs, boost local jobs, reduce import dependency, and enhance ZEV infrastructure. This can help diversify the industrial base and position Uttar Pradesh as a key e-mobility hub.

#### Fiscal Impact on the State

In FY 2024–25, Uttar Pradesh’s transport revenue stood at INR 11,499 crore. The revenue was majorly in the form of taxes from non-transport vehicles (INR 6,755 crore), goods vehicles (INR 1,862 crore), passenger vehicles (INR 747 crore), vehicles from other states (INR 147 crore), MV fees (INR 1,680 crore), and additional tax revenue from UPSRTC (INR 308 crore).<sup>31</sup> A supply-side regulation can reduce long-term fiscal pressure by supporting local manufacturing, supply chain, thereby decreasing reliance on consumer subsidies. The following is a list of some key benefits provided by these supply-side regulations:

- ❖ **Lower Fiscal Burden:** The transport department in Uttar Pradesh spent a total of INR 30.24 crore on ZEV subsidies.<sup>32</sup> Going forward, the state can focus on improving the supply chain and local manufacturing, thus lowering the overall costs of ZEVs in the long run. As production scales and unit costs decline, dependence on subsidies can reduce significantly.
- ❖ **Revenue Generation:** Local ZEV manufacturing and infrastructure growth can enhance state revenues through taxes and new economic activities.
- ❖ **Sustainability and Self-sufficiency:** By focusing on building a self-sustaining ZEV ecosystem, Uttar Pradesh can reduce reliance on central government demand-side incentives (which often come with budgetary constraints), and can move towards more localized, targeted financial solutions.

#### Accelerating the State’s Net-Zero Transition<sup>e</sup>

Uttar Pradesh, like many other regions in India, is aiming for a net-zero carbon future, and supply-side policies could play a pivotal role in fast-tracking this transition. As ZEV adoption rises and demand for charging infrastructure grows, this opens avenues to integrate more renewable energy (RE), especially solar, into India’s energy production system. In the long term, prioritizing supply-side policies will help establish a circular economy around clean vehicles, including battery recycling and renewable energy production, further reinforcing the path to achieve net-zero emissions.

<sup>e</sup> Net-zero refers to a state in which the GHG gases going into the atmosphere are balanced by removal out of the atmosphere

### **Positioning Uttar Pradesh as a Manufacturing and Technology Hub**

To lead in ZEV manufacturing, Uttar Pradesh must build capabilities in R&D, battery technology, and vehicle software. Strategic investments in large-scale ZEV production facilities, battery assembly units, and component manufacturing can position Uttar Pradesh as a critical hub in the national and global ZEV supply chain. Initiatives like dedicated EV clusters or special economic zones (SEZs) can attract OEMs, while supply-side policies can further accelerate industry growth through fiscal incentives, workforce training, and collaboration with established automotive players.

### **Boosting Investments & Job Creation**

Well-crafted supply-side policies can attract both domestic and foreign investments for ZEV plants, battery units, and R&D centres. This will create diverse jobs across manufacturing, charging, logistics, and servicing, particularly benefitting rural and semi-urban areas. It can also promote entrepreneurship in areas like battery swapping, recycling, and charging networks, backed by policy support and financing.

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## Conclusion

Uttar Pradesh has taken significant steps towards becoming a leader in e-mobility through various policies, including Uttar Pradesh EV Policy and FDI, Fortune Global and India-500 Investment Promotion Policy.<sup>33</sup> While demand-side incentives such as subsidies, tax exemptions, and fee waivers have contributed to initial growth, a stronger push on the supply side is necessary to ensure faster adoption of ZEVs in the state.

Despite the ongoing efforts, challenges remain in accelerating the adoption of ZEVs across all vehicle segments. The state's high number of registered vehicles, rising pollution levels, and the dominance of fossil-fuel based transport indicate the need for a more integrated approach. As per TERI's projection, under accelerated EV penetration scenario, the state will need to register approximately 34 lakh ZEVs in 2030, more than eight-fold increase from the current level of 4.1 lakh ZEVs (FY 2025-26).

A particular opportunity lies in Uttar Pradesh's extensive public transport network (3Ws and buses), which operates at high capacity utilization. Targeting full electrification of the 3Ws and buses, and certain percentage of electrification in the commercial vehicle segments could serve as a model for other regions/states. With its rich cultural and historical legacy, Uttar Pradesh has the potential to designate heritage locations as ZEV-only zones in heritage-rich cities/locations such as Agra, Ayodhya, Varanasi, etc., setting a national precedent for sustainable tourism.



Moving ahead, Uttar Pradesh's ZEV transition must leverage both supply and demand levers, boosting investments, scaling infrastructure, and supporting local innovation. Encouraging OEMs to scale up ZEV production, attracting investments in battery technology, and ensuring a seamless supply chain for critical ZEV components are crucial for long-term success. By manufacturing ZEVs locally, Uttar Pradesh can meet its own demand and emerge as a key supplier for the rest of India.

By leveraging both demand and supply-side policy measures, the state can not only reduce transport emissions but also emerge as a leader in India's ZEV transition. Such efforts will have a direct impact on improving air quality and public health, especially in cities grappling with severe pollution levels. A well-executed ZEV transition roadmap for the state will bring out transformative benefits, boosting economic opportunities, while supporting national commitments. Strategic supply-side interventions, will be essential to scale local production and enhance domestic value addition, making the state more competitive.

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