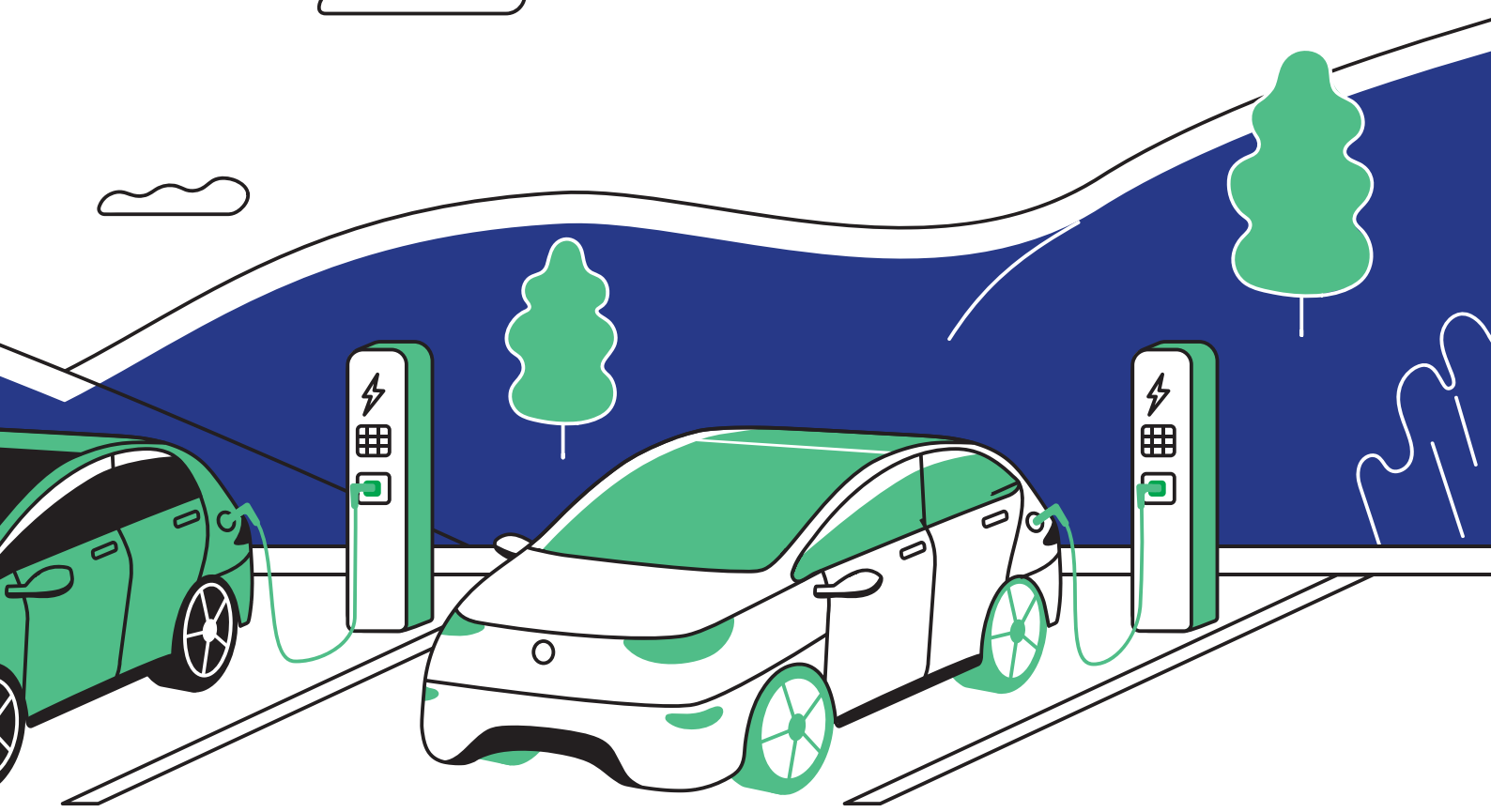
CLIMATE TRENDS

ANALYSIS OF STATE ELECTRIC VEHICLE POLICIES AND THEIR IMPACT



Date of publication: February 2023

About Climate Trends
Climate Trends is a research-based consulting and capacity building initiative that aims to bring greater focus on issues of environment, climate change and sustainable development. We specialise in developing comprehensive analyses of complex issues to enable effective decision making in the private and public sector.

For more information, please visit:
www.climatetrends.in

EXECUTIVE SUMMARY

The role of transport decarbonisation in global climate action is gaining attention, as governments around the world are implementing supportive policies to phase out Internal Combustion Engines and push for Zero Emission Vehicles. With several countries, including India, committing to achieve net zero emissions before or by 2070, transitioning the transport sector to zero emission technologies is now inevitable as this is the fastest growing sector in terms of energy use. **More than 66 country governments have national or regional ICE phase out targets, and more than 200 stakeholders, including India, have joined the world's largest transport coalition – Accelerating to Zero – where they have committed to ensure that all sales of new cars and vans are zero emission globally by 2040**.

India has made notable progress towards accelerating e-mobility in the country. Along with the national level FAME II scheme, 26 States have also released electric vehicle policies that aim to increase EV adoption and encourage manufacturing of EVs and its components. Towards this, these policies offer a range of incentives to create EV demand, increase manufacturing and build charging infrastructure. **Of these 26 State EV policies, 16 policies were launched between 2020 and 2022, eight have been active for two years or more, and one state policy, Goa, has been discontinued.**

The success of these state policies in accelerating transport electrification will be key for India to achieve its Nationally Determined Contributions and Long Term Low Emissions Development Strategy, both of which focus on transport decarbonisation. Therefore, it is important to assess the design and implementation of these policies and take stock of their impact so far.

To that end, this analysis assesses the comprehensiveness of state EV policies based on the various incentives they offer, draws a comparison among all policies to facilitate peer to peer learning, and also assesses the impact of state policies that have been active for two years or more. **This analysis aims to support states in identifying important gaps in their policies, and provide recommendations to address these when these policies are revised.**

For this assessment, we have defined 21 parameters that can largely be divided across the following categories. Policies have been scored on the basis of each parameter to draw inferences on their comprehensiveness, strengths and areas of improvement.

A Parameters for Assessment

EV Targets and Budgets

- Defined target for sales penetration and/or investments and/or charging infrastructure
- Specific budget allocated for dispersing incentives such as State EV Fund

Demand Side Subsidy for Consumers

- Subsidy support for consumers for 2, 3 4 wheeler EVs in addition to FAME II
- Road tax and registration fee exemptions
- Subsidy for e-buses in addition to FAME II.
- Subsidy for tractors, e-cycles, strong hybrid vehicles.
- Financing support through Interest Subvention (Subsidy offered on interest rates)
- Scrappage incentive
- Retrofitment incentive
- Electricity tariff benefits for consumers

Industry Incentives

- Manufacturing incentives
- Research and Development incentives or funds
- Charging infrastructure incentives
- Focus on battery recycling
- Employment generation incentives
- Focus on skill development
- Promotion and creation of Green Zones

Focus on Fleets, Job Creation and Charging Infrastructure Mandates

- Formation of State EV Cell or Steering Committee responsible for overseeing EV growth
- Specific targets for fleet electrification
- Targets or focus on job creation
- Mandates for charging infrastructure

		EV targets and budgets		Demand side incentives								Industry incentives								Others				
Parameters	**Launch date**	Defined target for sales penetration and/or investments and/or charging infrastructure	Specific budget allocated for dispersing incentives such as State EV Fund	Subsidy support for consumers for 2, 3 4 wheelers EVs in addition to FAME II	Subsidy for e-buses in addition to FAME II	Subsidy for tractors, e-cycles, strong hybrid vehicles	Road tax and registration fee exemptions	Financing support through Interest Subvention (Subsidy offered on interest rates)	Vehicle scrappage incentive	Retrofitment incentives	Electricity tariff benefits for consumers	Manufacturing incentives			Research & Development fund	Focus on battery recycling	Employment generation incentive	Focus on skill development	Charging infrastructure support	Promoting & creation of Green Zones	Formation of State EV Cell or Steering Committee responsible for overseeing EV growth	Specific targets for fleet electrification	Targets or focus on job creation	Mandates for charging infrastructure in housing, building, commercial complex etc
States												Slab 1	Slab 2	Slab 3										
Maharashtra	Jun 2021	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Haryana	Jul 2022	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Uttar Pradesh	Sep 2022	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Delhi	Aug 2020	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Punjab (draft)	Aug 2022	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Odisha	Feb 2021	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Rajasthan	Sep 2022	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Tamil Nadu	Sep 2019	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Andhra Pradesh	Jun 2018	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Chandigarh	Feb 2022	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Jharkhand	Oct 2022	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Bihar	Jun 2019	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Karnataka	Sep 2017	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Meghalaya	Feb 2021	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
West Bengal	Jun 2021	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Telangana	Oct 2020	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Assam	Jul 2021	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Chhattisgarh	Apr 2022	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Madhya Pradesh	Nov 2019	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Andaman & Nicobar (draft)	Mar 2022	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Gujarat	Jun 2021	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Ladakh	Aug 2022	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Kerala	Mar 2019	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Uttarakhand	Dec 2022	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Himachal Pradesh	Dec 2021	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Manipur	Nov 2022	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Arunachal Pradesh (draft)	Dec 2021	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Goa		●										●												

Note: **Slab 1** – States extending support as per the State Industrial policy.
Slab 2 and 3 – State extending support as per Industrial policy along with special incentives for EV investments. Differentiation between these two slabs has been made based on the quality of additional EV investments.

C | Key Findings

Top states with the most comprehensive policies

- **Maharashtra, Haryana, Delhi** and **Uttar Pradesh** have the widest range of parameters included in their policies, making them the most comprehensive policies.
- **Punjab** follows at a close second.

States with the least holistic policies

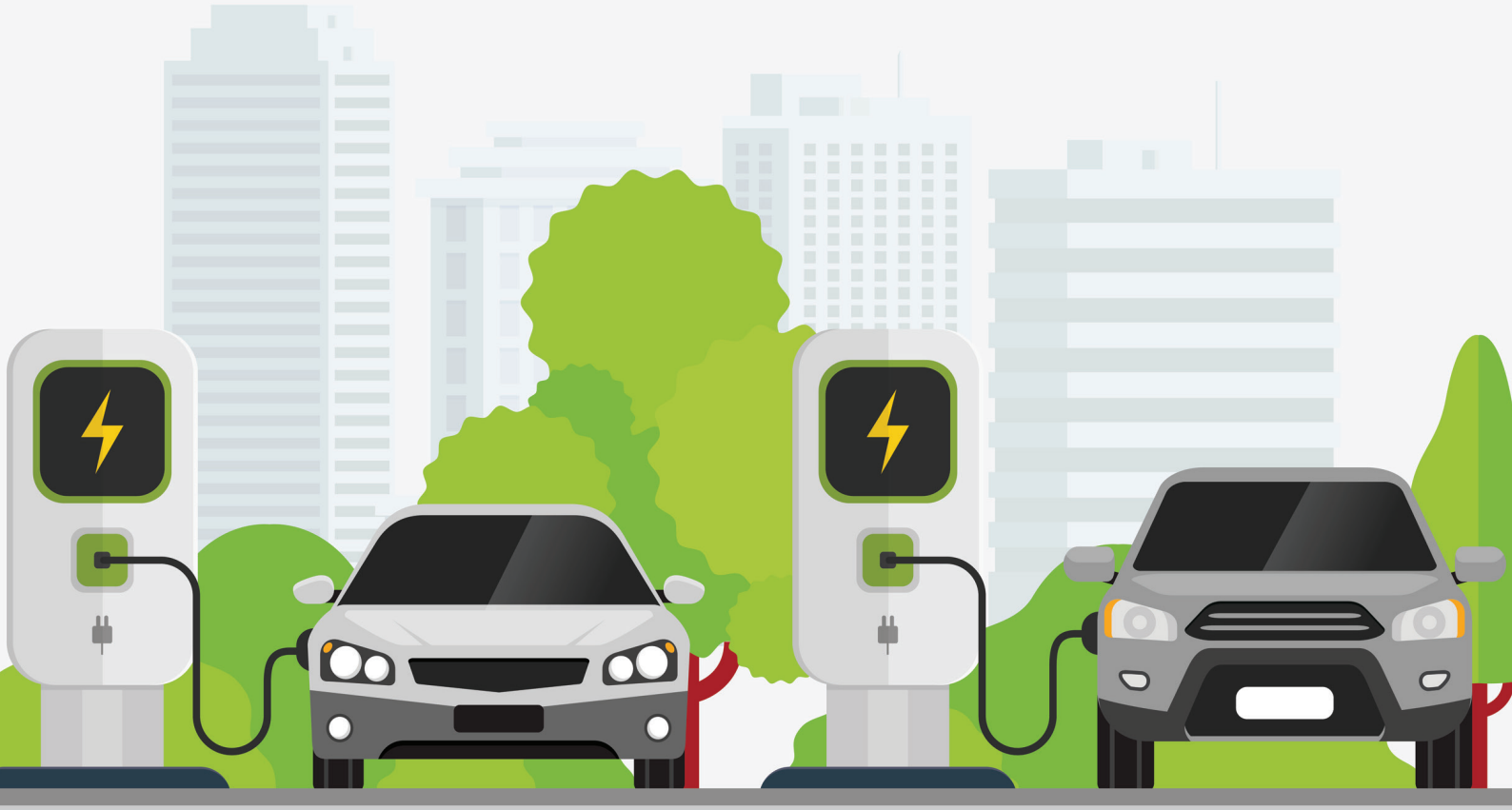
- **Arunachal Pradesh's** policy covers only three out of the 21 defined parameters, making it the least holistic policy.
- This is followed by **Manipur** and **Himachal Pradesh** covering five and six parameters respectively.
- **Ladakh, Kerala** and **Uttarakhand** covering only seven parameters.

States with strongest demand side incentives

- **Delhi, Odisha, Bihar, Chandigarh** and **Andaman & Nicobar** have the widest range of demand side incentives for consumers, including road tax and registration fee exemption, subsidy on upfront cost of 2, 3, 4 wheelers and buses in addition to FAME II, retrofitment or scrappage incentives, electricity tariff incentives for charging.
- **Maharashtra, Haryana, Rajasthan** and **Meghalaya** follow close with five of the eight parameters considered under this category of incentives.

States with weakest demand side incentives

- **Andhra Pradesh, Arunachal Pradesh** and **Manipur** offer only one form of demand side incentive. Andhra Pradesh & Manipur offer only road tax and registration fee exemption and Arunachal Pradesh offers subsidy on 2, 3, 4 wheeler.
- **Karnataka, Himachal Pradesh, Tamil Nadu, Gujarat, Madhya Pradesh** and **Kerala** offer only two of the eight parameters considered under this category of incentives.



States with strongest incentives to attract EV investments

- **Tamil Nadu, Haryana** and **Andhra Pradesh** have the strongest supply side incentives, with special incentives to boost manufacturing in the state, apart from incentives offered in the state's industrial policy. These states also offer incentives for charging infrastructure development, skill development support, employment incentives as well as a special fund to encourage research and development in the state.
- **Punjab** and **Uttar Pradesh** follow at a close second.

6 states out of 27 have allocated budgets to disperse incentives:
Maharashtra, Delhi, Uttar Pradesh, Rajasthan, Meghalaya, Gujarat

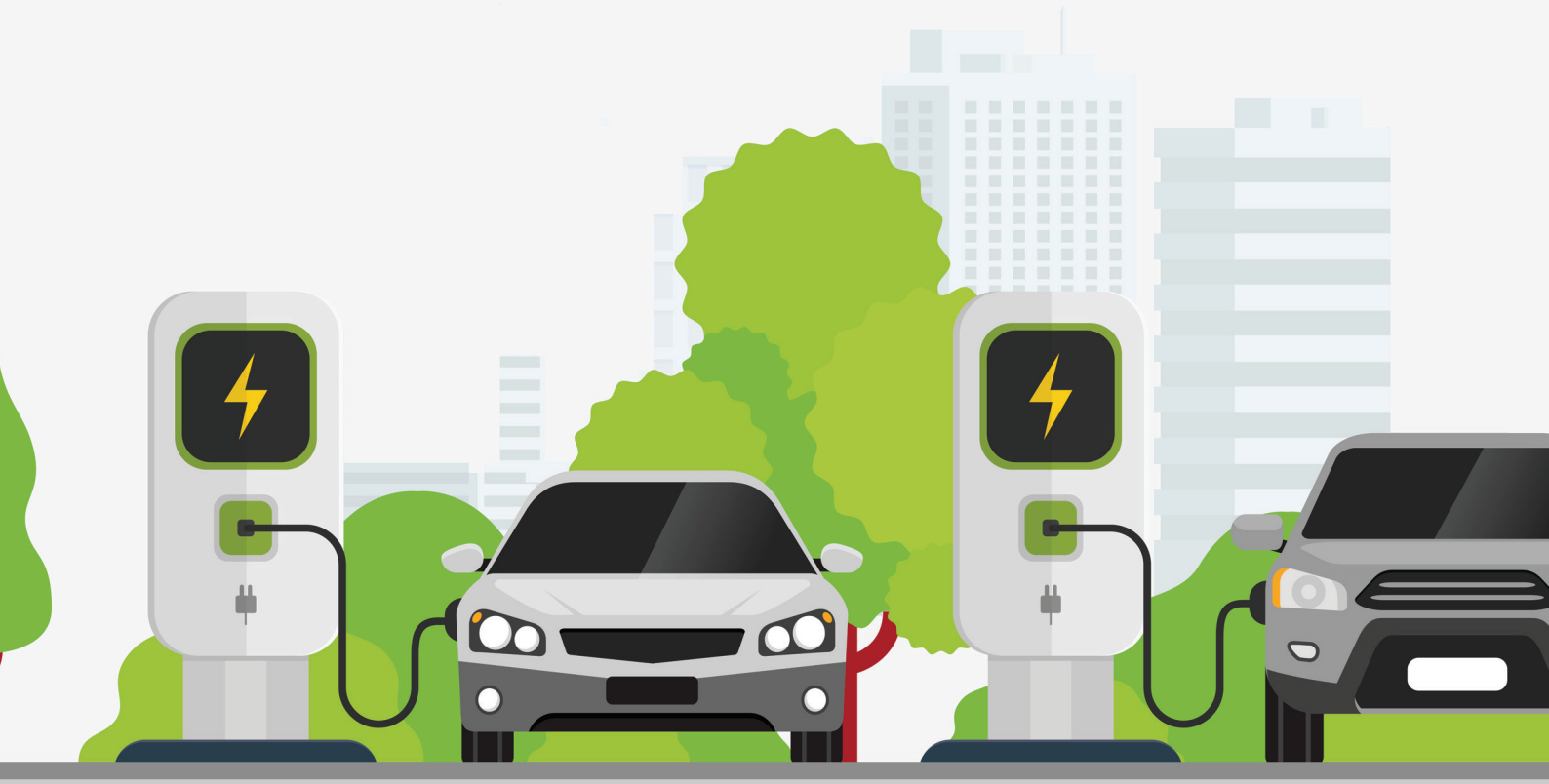
8 states have specific targets for electrification of fleets such as last mile delivery vehicles, aggregator cabs, government vehicles, etc.:
Maharashtra, Delhi, Haryana, Karnataka, Assam, Madhya Pradesh, Manipur, Andaman & Nicobar

6 states have defined targets for job creation in the EV sector:
Andhra Pradesh, Telangana, Tamil Nadu, Bihar, Karnataka, Himachal Pradesh

9 states have mandated the creation of charging infrastructure in new residential buildings, offices, parking lots, malls, etc.:
Chandigarh, West Bengal, Andhra Pradesh, Tamil Nadu, Odisha, Delhi, Maharashtra, Meghalaya, Ladakh

3 states offer interest subvention on loans taken for EVs through specific financial institutes: Delhi, Odisha, Bihar

Arunachal Pradesh is the only state with no defined target for EV sales, manufacturing or charging infrastructure.



C IMPACT OF STATE POLICIES RELEASED IN OR BEFORE 2020

Eight states released their policies before October 2020, and have been in circulation for two years or more - **Andhra Pradesh, Bihar, Karnataka, Kerala, Madhya Pradesh, Tamil Nadu, Telangana** and **Delhi**.

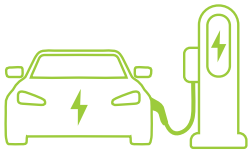
We assessed the impact of these policies against the targets defined for electric vehicle penetration, creation of charging infrastructure and attracting investments through manufacturing.

i Electric Vehicle Penetration

As of December 2022, none of the 8 states have achieved their EV penetration targets for specific years, as shown in Table 1.

- **Madhya Pradesh** aims for 25% of all new registered vehicles to be electric by 2026, but its current EV penetration stands at 2.2% of total vehicle sales since policy launch.
- **Delhi** aims for 25% of all new registered vehicles to be electric by 2024. Although the city has the highest number of EVs in the country, its penetration is still only 7.2% of total registered vehicles.
- **Kerala**, **Andhra Pradesh**, and **Karnataka** have targets in terms of absolute numbers, and none are on track to meet their figures.
- **Bihar** is the only state that has achieved its overall EV penetration target of 1,00,000 EVs by 2024. However, this is mostly due to an increase in sales of EV three wheelers. All other vehicle segment targets such as two wheeler, four wheeler and e-buses are far behind.
- **Tamil Nadu** has no defined EV penetration, but our calculations show that Tamil Nadu EV penetration stands at 2.02% of the registered vehicles respectively. Tamil Nadu aims to convert 5% of buses to electric every year till 2030, but the state has no e-buses as of today.

ii Charging Infrastructure Targets



- None of the states are on track to meet their charging infrastructure targets, with **Kerala** and **Madhya Pradesh** already missing their 2022 target.
- **Delhi**, with the highest number of charging stations in the country, has only achieved 9.67% of its charging infrastructure target of 30,000 charging stations by 2024.
- **Tamil Nadu** has no charging infrastructure target but their current charging station ratio stands at 1 public charger per 386 EVs for Tamil Nadu.

iii Investment Targets

Only five of the eight states have defined investment targets.

- **Karnataka** has missed its 2022 target by 34%.
- **Andhra Pradesh** has achieved roughly 33% of its target by 2022, leaving close to two third to be achieved in just 2 years before the policy ends by 2024.
- **Tamil Nadu**, with the highest investments in India in the e-mobility sector, has achieved 64% of its target over 4 years.
- **Bihar** has a target of ₹2500 crore but data is not publicly available on the e-mobility investment status in the state.

iv Green Zones

Seven states aimed to create green zones either under their Smart Cities Initiative or in the pilot e-mobility cities. '**Green zones**' are defined as areas where the entry of fossil fuel powered vehicles is restricted, thereby making them zero emission zones. Only zero emission vehicles such as EVs, cycle rickshaws and cycles would be allowed.

As of November 2022, none of these states have implemented Green Zones. Some cities in Karnataka and West Bengal have prepared proposals but there is no action on ground. As a show of support to electric vehicles, Bangalore has recently allowed the use of EVs on weekends on Church Street, which has banned vehicle use since 2020 as part of the Clean Air Street initiative.

v Status of E-mobility in Pilot Cities in States

The EV policies of six states focus on building the e-mobility ecosystem in pilot cities, with defined targets for EV penetration, charging infrastructure and electrification of public transport such as buses. As shown in Table 4 below, none of the targets in the pilot cities have been met.

Table 1: Electric Vehicle targets as per state policies and their current status

S. No.	State	EV Penetration Target	Status as on November 2022
1.	**Andhra Pradesh**	10,00,000 EVs by 2024	27,662 units of EVs 2.7% of target
2.	**Bihar**	1,00,000 EVs by 2024 2W - 24,000; 3W - 70,000; 4W - 4,000; E-bus - 1,000	1,08,217 units of EVs 2W - 13,039; 3W - 94720; 4W - 238; E-bus - 27
3.	**Karnataka**	1,500 e-buses by 2022	357 e-buses
4.	**Kerala**	By 2022, 2W - 2,00,000; 3W - 50,000; goods carrier - 1,000 By 2025, e-Bus - 6,000	50,348 units of EVs 2W - 36,573; 3W - 4010; 4W - 5699; Buses - 56
5.	**Madhya Pradesh**	25% of all new registered vehicles by 2026	9,638 units of EVs 2.2% of total vehicle sales since policy launch
6.	**Tamil Nadu**	No EV penetration target e-Bus: Electrify 5% of buses every year by 2030	99,022 units of EVs 2.02% of total registered vehicles are EVs Zero e-buses
7.	**Telangana**	No penetration target	–
8.	**Delhi**	25% of all new vehicle registrations are EVs by 2024 Buses 1,000 by 2020	83,300 units of EVs 7.2% of all new registered vehicles since 2020 Buses - 423
9.	**Uttar Pradesh** (First launched in August 2019. Discontinued in October 2022 and new policy launched in September 2022)	10,00,000 EVs by 2024; 1000 electric buses; 70% EV public transportation on identified green routes in identified 10 EV cities by 2030	2,78,218 EVs 27.82% of target 632 Buses

Source: Sales figures for each state is listed from Vahan
Note: The complete data of Telangana is not available in Vahan4 hence they are not included.

Table 2: Charging Infrastructure targets in state EV policies versus status of charging infrastructure on-ground

S. No.	State	Target	Status as on November 2022 based on publicly available data
1.	**Andhra Pradesh**	1,00,000 slow and fast charging stations by 2024	99
2.	**Bihar**	250 charging stations by 2024	20+
3.	**Karnataka**	No charging infrastructure target	500+
4.	**Kerala**	400 charging stations by 2022	413
5.	**Madhya Pradesh**	400 charging stations by 2022	70+
6.	**Tamil Nadu**	No charging infrastructure target	256
7.	**Telangana**	No charging infrastructure target	300+
8.	**Delhi**	30,000 by 2024	2900, 9.67% of target
9.	**Uttar Pradesh**	2,00,000 slow and fast charging, swapping stations by 2024	95+, status as of Nov 2022 from the day of policy launch

Note: All data is for public and semi public charging stations.

Source: https://evyatra.beeindia.gov.in/public-charging-stations; https://nexonev.tatamotors.com/charging-locator/

Delhi: *https://timesofindia.indiatimes.com/city/delhi/delhi-gets-11-cheaper-ev-charging-stns/articleshow/9 4951197.cms*

Telangana: *https://www.newindianexpress.com/states/telangana/2022/aug/31/1000-ev-charging-stations-to-co me-up-across-telangana-under-ppp-mode-2493252.html#:~:text=At%20 present%2C%20around%2032%2C000%20 electric,stations%20are%20 being%20set%20up. https://www.thehindu.com/news/cities/Hyderabad/space-for-ev-charging-stations-in-tsiic-facilities-sought/article66145212.ece#:~:text=A%20total%20 of%20292%20EV,stations%20and%20in%20tourist%20areas.*

Tamil Nadu: *https://www.news18.com/news/auto/tamil-nadu-to-float-tenders-for-ev-charging-stations-at-100-sp ots-across-highway-5772793.html*

Kerala: *https://www.thehindu.com/news/national/kerala/145-ev-charging-stations-getting-ready-in-thiruvan anthapuram/ article65612978.ece; https://www.thehindu.com/news/national/kerala/145-ev-charging-stations-inaugurated-in-capital-di strict/article65891045.ece*

Karnataka: *https://evjagruthi.karnataka.gov.in/*

Table 3: Investment targets in EV sector versus status of actual investments

S. No.	State	Target	Status as on December 2022 based on publicly available data
1.	**Andhra Pradesh**	₹30,000 crore by 2024	₹10,400 crore, roughly 33% of target
2.	**Bihar**	₹2,500 crore	Data not publicly available
3.	**Karnataka**	₹31,000 crore by 2022	₹22,419 crore
4.	**Kerala**	No target	
5.	**Madhya Pradesh**	No target	
6.	**Tamil Nadu**	₹50,000 crore by 2025	₹31,960 crore
7.	**Telangana**	₹33,000 crore	₹5147 crore
8.	**Delhi**	No target	
9.	**Uttar Pradesh** (2019-2022 Policy)	₹40,000 crore by 2024	NA (No investment yet - during the previous EV policy)

Source: **Andhra Pradesh:** *https://www.thehindubusinessline.com/news/hero-motocorp-to-invest-1600-cr-in-ap-facility-foundation-stone-laid/ article23336516.ece#:~:text=The%20Chittoor%20plant%20is%20to,million%20units%20over%20multiple%20phases. https://www.thehindubusinessline.com/news/avera-set-to-open-50-cr-e-scooter-plant-in-ap/article24116389.ece https://www.business-standard.com/article/companies/kinetic-green-plans-rs-1-750-crore-investment-in-andhra-pradesh-121100101347_1.html https://www.deccanherald.com/national/south/amara-raja-intends-to-invest-rs-9500-crore-in-telangana-1167978.html https://www.business-standard.com/article/pti-stories/munoth-ind-to-invest-rs-799-cr-for-making-lithium-ion-batteries-in-india-118061301364_1.html*

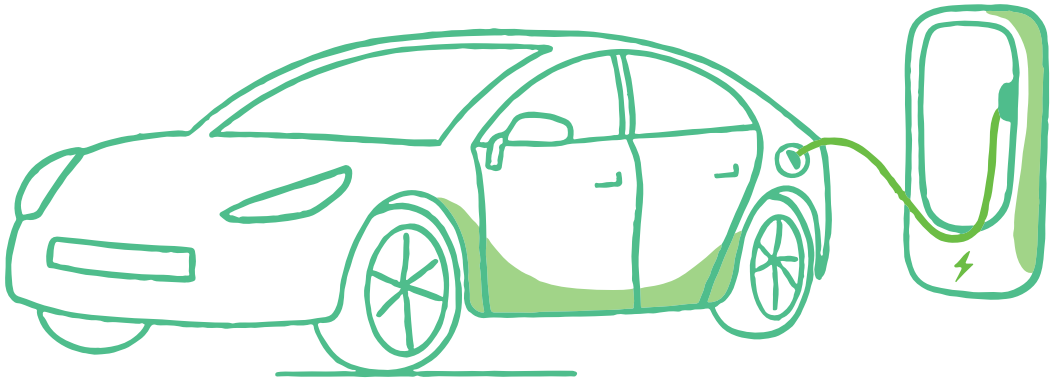
Karnataka: *https://www.livemint.com/news/india/karnataka-approves-ev-manufacturing-projects-of-nearly-rs-23-000-cr-11608565430950.html*

Tamil Nadu: *https://timesofindia.indiatimes.com/business/india-business/indias-ev-space-to-see-investments-worth-rs-94000-cr-tamil-nadu-to-lead-with-34-share/articleshow/88383183.cms*

Telangana: *https://telanganatoday.com/electric-vehicle-sector-thriving-in-telangana*

Table 4: Pilot cities in states, their EV ecosystem target and current status on-ground

S. No.	State and Pilot Cities	Target	Current Status as on December 2022
1.	**Andhra Pradesh** – Vijayawada – Vishakhapatnam – Amaravati – Tirupati	• Convert 100% of all commercial & logistics fleets to electric fleet by 2024, including government organization, APSRTC, educational institutes, hospitals or corporates and other institutions. • 100 DC public charging stations per city. • Designing of Green zones	• Buses: 10 e-buses in Tirupati and 10 e-buses under APSRTC • 20 battery swapping stations in Tirupati • No green zones created
2.	**Bihar** – Bodhgaya – Rajgir	• 100% EV city or Zero Emission zone in both cities by 2024	
3.	**Karnataka** – Bangalore (Vaayu Vajra)	• Implement e-bus programme in Vaayu Vajra	• No e-bus deployed as yet
4.	**Kerala** – Kovlum – Munnar – Trivendrum/Kochi – Kozhikode	• 20 Public Charging Stations each and 150 swapping outlets for 2/3 Wheelers to be set up in the initial pilot cities by KSEB	• Kozikode: 148 PCS: Pole mounted as per KSEB; 10 Swapping station • Kochi: 15 PCS • Trivendrum: 10 swapping station in
5.	**Madhya Pradesh** – Bhopal – Indore – Jabalpur – Gwalior – Ujjain	• 100% electric buses by 2028, with the first phase of 100% conversion of bus fleet in top 5 cities by 2026. • Creation of e-zones • Cities will develop specific goals of charging infrastructure density within a defined timeline linked to target for deployment of EVs.	• 40 e-buses in Indore and 11 e-buses in Bhopal • No further actions plans yet
6.	**Tamil Nadu** – Chennai – Coimbatore – Trichy – Madurai – Salem – Tirunelveli		



8.08, Avanta Business House,
4th Floor, Statesman House, Barakhamba Road
New Delhi : 110001

011-4209160 www.climatetrends.in