



Accelerating Electric Mobility in Delhi:

Journey and Insights from Implementing the Delhi Electric Vehicles Policy



About the Authors



About Dialogue and Development Commission of Delhi (DDC of Delhi)

The Dialogue and Development Commission (DDC) is a premier think tank of the Government of the National Capital Territory (NCT) of Delhi and advises the government in finding sustainable, people-centric solutions to the critical development challenges facing Delhi.



About the Department of Transport, Government of NCT of Delhi

The Department of Transport of the Government of NCT of Delhi is responsible for providing an efficient public transportation system, control of vehicular pollution, registration of vehicles in Delhi, issuance of driving licences, issuance of various permits, and collection of road taxes. The department is also entrusted with policymaking, coordination, implementation, monitoring, and regulatory functions of all the transport-related aspects of the National Capital Territory of Delhi. It is the nodal department for the implementation of the Delhi EV Policy.



About RMI India Foundation

RMI Energy Solutions India Foundation (RMI India Foundation)'s mission is to support the transformation of India's economy into a clean, thriving, and inclusive energy future. This mission is in line with the country's bold ambition to achieve a net-zero emissions economy by 2070. We aim to drive impact on the ground through deep research and rigorous analysis, which informs the development of sustainable clean energy policies and programmes across the country to enhance the lives and livelihoods of all Indians.

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Foreword



We live in times of unprecedented urbanization. More than half of the world's population already lives in cities and it is projected that by 2050 this will increase to more than two-thirds of the world's population. Governments across the world face an uphill battle of providing basic services like education, health, water, transport, and a clear air to breathe to the burgeoning population of its cities.

In Delhi, we have taken this challenge head on to ensure equitable access to high quality basic services to every one of our 2.5 crore residents. In this regard, reduction in pollution has been a key priority of my government.

Delhi has initiated work on reducing air pollution levels on a war footing. A major initiative of my government is the electrification of the transport sector aimed at reducing vehicular pollution, which constitutes 30 percent of Delhi's pollution. Towards this, we launched the Delhi Electric Vehicles (EV) policy in August 2020 which is regarded as among the most progressive sub-national policy on EVs in the world.

When we notified the policy, the target of ensuring 25 percent of all new sales of vehicles to be EVs and 50 percent of all new buses added to the public transport fleet of Delhi to be electric by 2024 was considered very ambitious. However, in the last two years, Delhi has shown what can be achieved if the government is committed to achieve its goals aimed at serving the people. I am happy to note that Delhi has made rapid strides in the electrification of its transport sector and has emerged as a model for governments not just in India but across the world.

In the last two years, Delhi has emerged as the first state where EV adoption rates have reached double digits with average 10 percent in the year 2022, and as high as 12.5 percent in March 2022. This is at par with some of the most progressive states and cities in the world including California and New York. Close to 25 percent of all new buses inducted in Delhi are electric, with another 1500 e-buses expected to be on Delhi's roads by December 2022.

I congratulate the Department of Transport, Dialogue and Development Commission (DDC) and all the people of Delhi for this remarkable success in the decarbonisation of the transport sector in Delhi. In just two years, Delhi has emerged as the EV capital of the country. This report is a testament of the hard work and commitment with which the Government of NCT of Delhi has worked in ensuring that the people of Delhi have a clean air to breathe for themselves and their children. I am confident that this pace of progress will inspire many cities and states across India to set and achieve ambitious targets for EV adoption, and will pave the way for Delhi to be regarded as a model for EV adoption globally.

Arvind Kejriwal

Chief Minister

Government of National Capital Territory of Delhi

Foreword



The Government of NCT of Delhi, launched the Delhi Electric Vehicles (EV) policy on 7th August 2020 with a mission to make Delhi pollution free and establish Delhi as the EV capital of India. The current month marks two years of implementation of the policy. In the last 2 years, under the leadership of Hon'ble Chief Minister Shri Arvind Kejriwal, Delhi has made exceptional progress in accelerating the pace of EV adoption across vehicle segments and has brought significant transformation in Delhi's transportation landscape.

The Delhi EV policy is driven by three key drivers - Incentivisation, Innovation, and Inclusion. The policy focuses on 'Incentivisation' by offering subsidies on purchase of EVs and 100 percent waiver of Road tax and Registration fees. Nearly 100 crores of subsidy has been disbursed through the policy for various vehicle segments and creation of charging infrastructure in the city, the highest among any state in the country. It has developed and encouraged 'Innovation' both across design and technology, aimed at enabling convenience and access for citizens in availing the benefits of the policy and adopting EVs. These include facilities like digital disbursement of purchase incentives, 'Single Window' mechanism for hassle free purchase of EV chargers net of subsidy, and online portal for purchase of e-autos with 5 percent interest subvention to name a few. In May 2022, Delhi became the first state in India to introduce and incentivise e-cycles in the EV policy. Finally, 'Inclusion' of all relevant stakeholders from formulation to implementation of the policy has played a critical role in the success of Delhi EV policy. To promote gender inclusion, out of a total of 4261 e-auto permits, 33 percent have been reserved for women. The transition of Delhi's public transport system to electric is also underway, with close to 2000 e-buses slated to be on Delhi's Road by December 2023.

Delhi Government, through its Electric Vehicle policy has established a world class model of governance. It has also regularly shared best practices from its governance model with key stakeholders. Today, Delhi's EV landscape is not restricted to one vehicle segment but is spread across all segments. In addition to enabling the reduction of vehicular emissions and air pollution, EVs are also creating more employment opportunities, increasing earnings of commercial vehicles and auto-owners with lower cost of ownership, and giving users an opportunity to take rides in zero noise, comfortable vehicles. There is a lot that Delhi can share with stakeholders in India and across the world from its EV journey. I am positive that this report on the learnings from 2 years of implementation of Delhi EV policy will kickstart a new EV journey for several cities and initiate meaningful conversations among all stakeholders, including governments, on innovative paths to achieve a clean mobility future.

Kailash Gahlot

Minister of Transport

Government of National Capital Territory of Delhi

Foreword



Delhi's electric vehicle journey over the last two years has been a story of many firsts. When Hon'ble Chief Minister Shri Arvind Kejriwal launched the Delhi Electric Vehicle (EV) Policy in August 2020, Delhi was the first state to set a clear and firm target for driving rapid adoption of EVs across vehicle segments—increasing the share of EVs to 25 percent of all new vehicle registrations by 2024. Delhi was the first to prioritize the demand side in its EV policy by giving incentives to the people purchasing EVs, rather than to the companies for manufacturing EVs.

As we reach the halfway mark, Delhi has already emerged as the first state in India where EV adoption rate has reached double digits, with an average of 10 percent in the year 2022, and as high as 12.5 percent in March 2022. Delhi is on par with the states and cities across the world leading EV adoption, like California, New York, and Paris.

As of July 2022, Delhi has an on-road EV fleet of about 1.60 lakh vehicles, of which over 62,000 EVs have been registered in the last two years. This steady growth of EVs is supported by 2,452 public charging points and 234 battery swapping stations which is a 28x growth since the launch of the policy in August 2020. With such an accelerated expansion of charging points, Delhi has achieved an EV to public charger ratio of 25:1, which is comparable to leading cities like Oslo and Helsinki.

To enable such an accelerated deployment of charging infrastructure in Delhi, the regulatory changes introduced in Delhi are globally unique including the provision of special EV tariffs, creating a single window process for encouraging residential and office/business premises to set up EV charging points, adoption of minus metering, allowing separate EV meters in buildings with existing connection, etc.

Delhi has become the first state in India to have implemented a unique model of setting up charging stations under a PPP model, with the government providing land and infrastructure like cabling and transmission, and private entities contributing with smart charging stations, staff, and services. A hundred such charging stations, with around 900 charging points and 103 battery swapping stations, will be operationalized within the next three months where one can charge their EVs at just INR 2 per unit of electricity.

With such a boldly innovative approach to its EV policy, Delhi has emerged as the lighthouse state for clean mobility in India. We hope that our learnings from this journey, as summarised in this report, will go a long way towards strengthening the EV ecosystem and accelerating transport decarbonisation in India and around the world.

Jasmine Shah

Vice Chairperson

Dialogue and Development Commission of Delhi

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Executive Summary

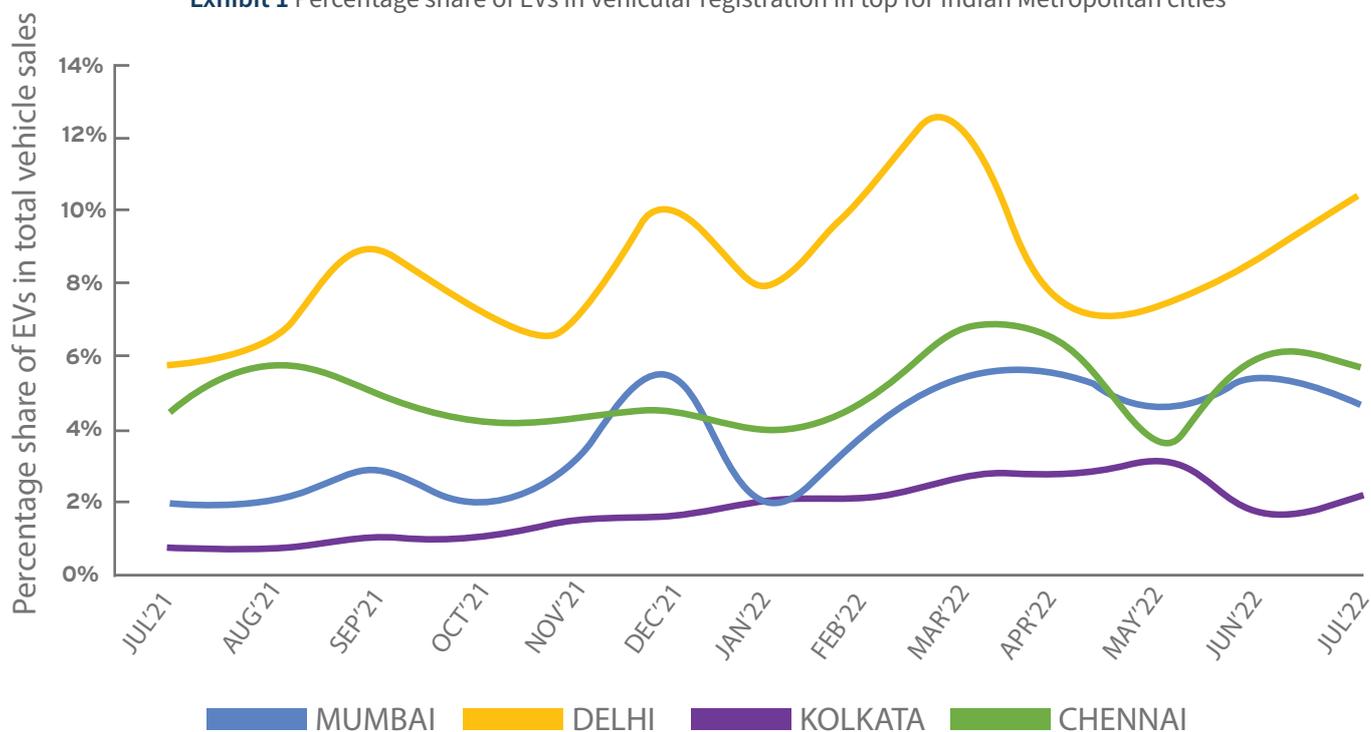


Executive Summary

The global mobility landscape is at the cusp of transformation with the advent of the age of electric vehicles (EVs). This revolution is anchored by regulatory frameworks that support and/or mandate transitioning to clean modes of transport and creating a facilitative environment for EV manufacture and adoption. Across the world, this transformation is often led by progressive states and cities. In India, the National Capital Territory (NCT) of Delhi (with a population of 20.6 million in 2021) has unarguably emerged as one of the leaders in enabling this paradigm shift. The platform for this transformative change was laid on August 7, 2020, when the Government of the National Capital Territory of Delhi (GNCTD) notified the Delhi EV Policy.

Following the launch of the policy and its subsequent implementation, EV sales in Delhi recorded remarkable growth. Till July 2021 within the first year of the policy notification, EV sales in the capital increased threefold. In 2022, thus far, monthly EV sales consistently averaged 10 percent of the total monthly vehicle sales, including a high point of 12.5 percent in March 2022. EV sales in Delhi are thrice the national average, which is about 3 percent, leading India's top four metropolitan cities (**Exhibit 1**) and at par with some of the most progressive cities in the world such as California and New York.¹

Exhibit 1 Percentage share of EVs in vehicular registration in top for Indian Metropolitan cities



As of July 2022, Delhi had an on-road EV fleet of about 1.60 lakh vehicles, of which over 62,000 EVs were registered in the last two years. The steady growth in EVs in Delhi is supported by 2,452 public charging points and 234 battery swapping stations, indicating 28x growth since the policy was launched in August 2020. The accelerated expansion of charging points helped Delhi achieve an EV-to-public-charger ratio of 25:1,¹ which is comparable with that of cities such as Oslo and Helsinki.

The impressive growth in the NCT of Delhi's EV ecosystem can be attributed to a consultative, collaborative, adaptive, and systems approach to policy implementation. This is

complimented by the commitment of GNCTD toward achieving the ambitious targets outlined in the policy and making Delhi the EV capital of India in the process. At every step of its EV journey, Delhi integrated context-specific solutions and innovations in the design and development of operational strategies. Five key milestones (**Exhibit 2**) form the cornerstones on which the e-mobility transition of Delhi is built and driven and which anchor continuous growth in EV sales, awareness, charging and swapping stations, and electric public transport services in the NCT of Delhi.

¹Five swap points are considered equivalent to one charging point.

Exhibit 2 Key milestones in operationalising Delhi EV Policy



1. Operationalisation of demand incentives:

Incentives are fundamental to EV adoption to ensure parity with conventional fuel-based vehicles vis-a-vis the total cost of ownership (TCO). However, the provision for incentives must be supported by a robust mechanism to ensure its seamless and time-bound disbursement. The incentives provided for by the Delhi EV Policy are supported by detailed operational guidelines, seamless disbursement process, and a user-friendly web platform enabling easy access for consumers. While consumers can avail exemption on road tax and registration fee upfront, demand incentives are reimbursed through a digital, robust, and transparent mechanism within 7–10 working days. A key aspect of operationalising demand incentives was capacity building for dealers across the NCT of Delhi. Roughly INR 94 crore (\$11 million) was disbursed as demand incentives to over 36,000 consumers until July 2022.

2. Consumer-centric Switch Delhi campaign:

To increase awareness about the economic and environmental benefits of adopting EVs, GNCTD launched the Switch Delhi campaign. It focuses on weekly themes, including dedicated campaigns on all vehicle segments and charging, and addresses various issues through citizen engagement on several platforms such as print media and multimedia advertisements. Dedicated social media handles were launched to address queries regarding EVs in Delhi. Under the campaign, several awareness drives were organised in partnership with Resident Welfare Associations (RWAs) to sensitise and encourage citizens to switch to EVs.

3. Single-window process to install charging points at private/semi-public locations:

GNCTD, in close coordination with distribution companies (DISCOMs), implemented a single-window system to install EV chargers in Delhi. This system enables selecting EV chargers/vendors, obtaining new EV connections, installing charging points, and availing subsidy for chargers through the online portal of the DISCOMs or a simple phone call. With the applicable demand incentive of INR 6,000 (\$75.42) per

charging point for the first 30,000 charges, the cost of these chargers is only INR 2,500 (\$31.43). The incentives can reduce the cost of chargers by up to 70% and potentially provide additional revenue generating opportunities to thousands of kirana store owners. Over 550 chargers have been installed under the single-window process as of July 2022.

4. Deployment of over 900 charging points at 103 battery swapping stations across 100 locations:

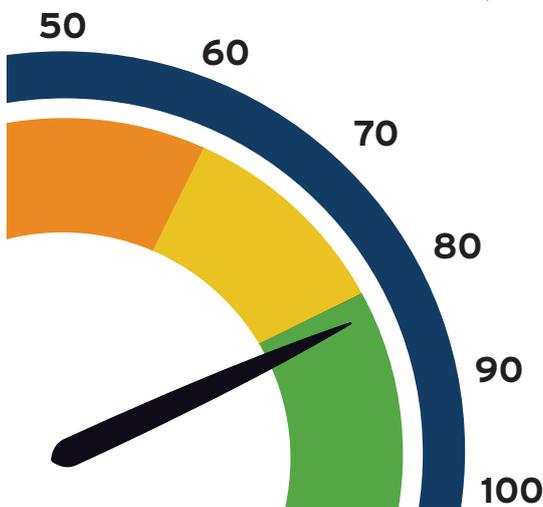
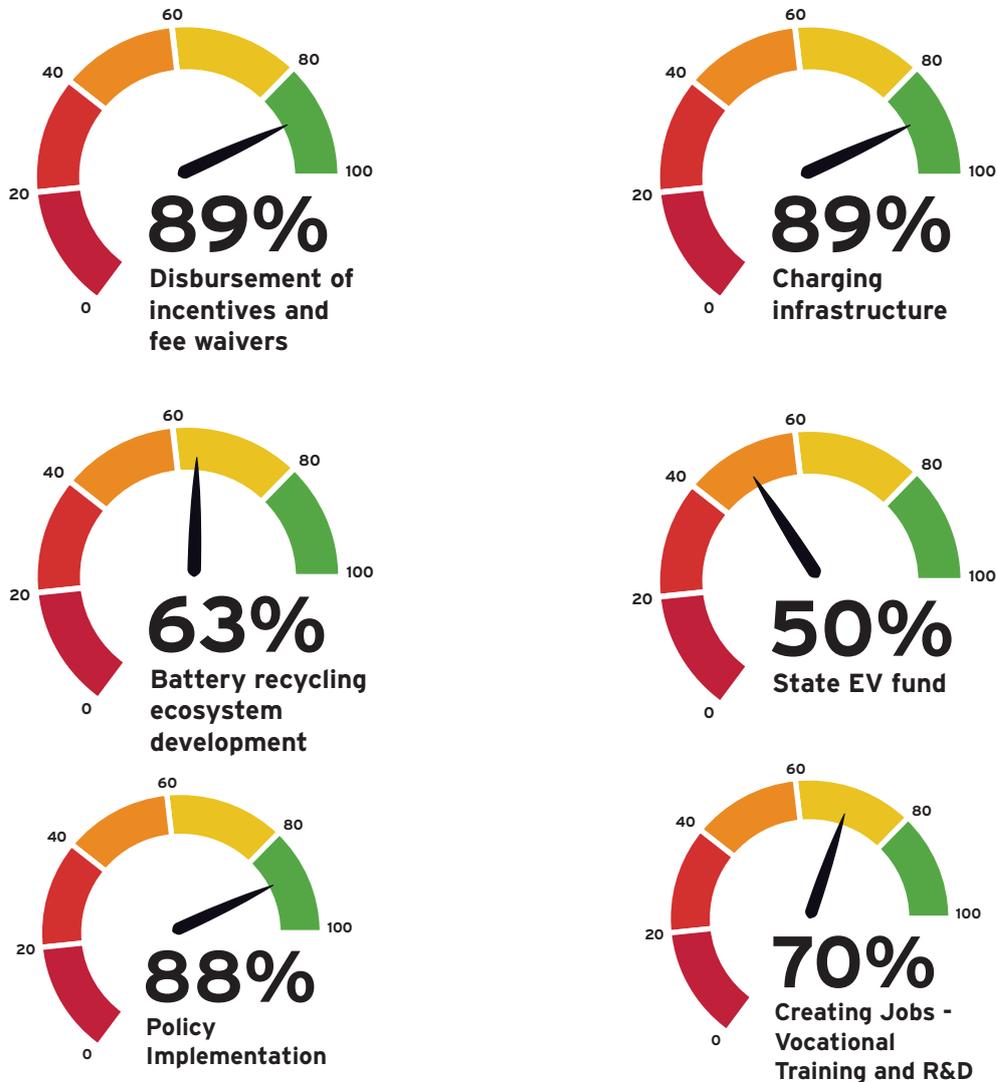
To promote public charging and swapping infrastructure, Delhi aggregated 100 land parcels from different land-owning agencies in the region and floated a common tender to set up charging and battery swapping stations on these land parcels on concessional basis. These sites were awarded to four concessionaires who will install nearly 900 charging points and 103 battery swapping stations in Delhi. The tender incorporated five key innovations in design, namely, aggregation of public land parcels, linking of lease with capacity utilisation of charging/swapping stations, allowing flexibility in determining combination of chargers, expanding the pool of bidders, and keeping service charge as the bidding criteria. These innovations ensured aggressive competition in the market and resulted in the discovery of service charge, which would enable EV users in the NCT of Delhi to charge their EVs at merely INR 2 per unit, perhaps cheaper than anywhere else.

5. Electrification of public transport:

GNCTD has committed to transition to an all-electric public transport fleet by 2030, which would translate to an overall bus fleet of over 9,500 buses. Since the policy launch, Delhi procured 644 buses, of which 152 are e-buses, constituting to about 24 percent of the total new fleet. In addition, the NCT of Delhi will introduce 148 e-buses by September 2022. Moreover, GNCTD has approved the procurement of 1,500 more e-buses under the e-bus Grand Challenge conducted by Convergence Energy Services Limited (CESL). These buses are expected to be operational by December 2022, leading to Delhi having one of the largest fleet of e-buses in the country.

While milestones represent some of the key initiatives of GNCTD under the Delhi EV Policy, there is more to the implementation of the policy. Over the past two years, the policy was operationalised clause by clause. As a result, GNCTD successfully operationalised about two-thirds of the 54 measurable clauses outlined in the policy, with the remaining 18 under various stages of implementation. According to the implementation scoring matrix, Delhi implemented 83 percent of the Delhi EV Policy. **Exhibit 3** illustrates the implementation scores by segment.ⁱⁱ

Exhibit 3 Delhi EV Policy Implementation Scores



83%
Delhi EV
Policy score

ⁱⁱ The detailed methodology of EV policy scoring and clause-wise scores are captured in Annexure A.

The high implementation score of the Delhi EV Policy translates to an EV adoption level significantly higher than the “tipping point” of 5 percent EV sales penetration described by Bloomberg New Energy Finance as a signal of the start of mass adoption.³ Over the past two years, Delhi set the benchmark and has been informing the state and national policy frameworks on e-mobility transition. A comprehensive analysis of the implementation of the Delhi EV Policy to explicitly identify the key learnings over the past two years can further inform the strategic and policy approach to e-mobility actions. This will also provide a head start to any city or state in India and across the world to understand and replicate the success of the policy. A summary of the six key insights from the implementation of the Delhi EV Policy is provided herewith:

1. Continuous and inclusive consultations:

Continuous consultations with the entire gamut of stakeholders is essential to ensure impediments to implementation are actively identified and solutions are designed based on inputs from all the concerned stakeholders. This was naturally implemented in the Delhi EV Policy as it was a logical extension of the process through which the policy was drafted. Drafting included multiple rounds of individual, focus group, & roundtable consultations with vehicle, charger, and battery manufacturers; charge point operators (CPOs); fleet and logistic service providers; experts, think tanks, and academia; government officials; and consumers. For instance, as far back as in June 2019, GNCTD, along with RMI India and RMI, hosted the Urban Mobility Lab for obtaining inputs for the Delhi EV Policy. Following the policy notification, regular and inclusive formal consultations continued to effectively implement different clauses.

2. Time-bound operationalisation of the policy:

Delay in operationalising the policy’s key provisions will lead to consumer dissonance and erode market confidence. Therefore, work on operationalising them (such as incentive disbursement) should start before the policy notification. This approach allowed the Delhi government to initiate incentive disbursement within less than two months of the policy announcement.

3. Equitable access to benefits, infrastructure, services, and information:

It is important to identify priority vehicle and consumer segments upfront and use this to ensure equitable access to benefits, infrastructure, services, and information. GNCTD ensured equitable access to benefits by creating a transparent and completely digital process to disburse incentives within two weeks of the purchase of an EV. Furthermore, the system design ensured the burden to apply for incentives does not fall on the consumer. In this regard, to make sure the impact of digital divide is minimised and provided capacity building to vehicle dealers to apply for the incentives on behalf of the

consumers. To ensure equitable access to EVs and charging, GNCTD put in place a mechanism to access interest subvention for financing EVs and determined lowest service charge for chargers as the bidding criteria. Finally, to provide equitable access to information, GNCTD launched the Switch Delhi campaign, which leveraged all forms of media (print, radio, digital) to build awareness about EVs among all consumer segments.

4. Dedicated funding source:

The operationalisation of incentives requires a dedicated funding source such that benefits are passed on to consumers timely over the entire policy duration. To realise this, Delhi created a dedicated, non-lapsable State EV Fund sourced through cess collected by disincentivising conventional vehicles. To this end, one of the primary sources of the State EV Fund is the Air Ambience Fund (collected on per litre of diesel consumption) and the Environment Compensation Charge (ECC) (levied on heavy-duty vehicles entering the city). The remaining deficit is met through budgetary allocation. Additionally, the day-to-day balance of account is monitored by the State EV Cell of the Department of Transport, GNCTD.

5. Dedicated institutional setup:

Institutional mechanisms are crucial to ensure the day-to-day implementation, monitoring, and evaluation of the policy. GNCTD formed a dedicated state EV cell to facilitate the implementation of the Delhi EV Policy. Additionally, it constituted a Working Group (WG) for the accelerated rollout of charging infrastructure in Delhi with representation from the leadership of all stakeholder agencies to obtain a holistic view of Delhi’s charging infrastructure and recommend strategies to accelerate its deployment. Finally, the process of continuous and inclusive stakeholder consultations was institutionalised through the Delhi EV Forum.

6. Technology and business model agnostic approach:

The e-mobility sector is still in its nascent phase of development and therefore records rapid changes in technology and value propositions. The Delhi EV Policy provides an equitable growth opportunity for multiple technologies, solutions, and business models. Equitable incentives are offered for fixed and swappable battery models. In the deployment of public charging infrastructure, the maximum possible flexibility is ensured in determining business models by excluding 70 percent of the space from the price mandate and expanding the pool of potential operators for charging stations. For instance, Delhi allowed fleet operators to participate in the charging and swapping tender. Notably, two of the winners of the tender are EV fleet operators. Since EV charging is fundamental to their fleet operations, these entities were able to offer extremely competitive bids for service charge, which would be extremely difficult to match for any entity with charging as the only source of revenue.

The immediate next step for the NCT of Delhi in its journey toward electrification of its transport sector is the 100 percent operationalisation of the remaining policy provisions within the next year. This includes developing a battery recycling ecosystem, operationalisation of the open database for charging and swapping stations, setting in place a state EV board, and scaling its skilling initiatives in the e-mobility sector. It will also expand upon existing initiatives such as increasing its EV fleet of public transport and electrification of all its bus depots, notifying mandates for fleet transition through the aggregator policy, launching the second phase of public charging and swapping tender, empanelling more chargers under the single-window process, and broadening the scope of the Switch Delhi campaign. In addition, it will initiate the process to develop the policy actions required after the tenure of the policy ends. For instance, GNCTD will soon launch a three-year action plan to deploy charging and swapping infrastructure in the NCT of Delhi and work toward enabling interoperability between charging stations in Delhi. Furthermore, GNCTD is currently exploring a mechanism to

digitise the process of retrofitting old internal combustion engine (ICE) vehicles to electric. Similarly, it will introduce mechanisms to enable the electrification of premium bus services in Delhi.

The Delhi EV Policy is an example of what can be achieved when all stakeholders collaborate to enable transformation. Its successful implementation enabled Delhi to emerge as a lighthouse city whose journey will inspire states and cities globally to transition to EVs. This report documents the opportunities, challenges, solutions, and insights obtained through two years of rigorous, day-to-day policy implementation, which enabled the NCT of Delhi's march toward becoming the EV capital of India. It aims to disseminate the successful implementation of the Delhi EV Policy and share its approach and learnings with states in India and around the world. We firmly believe Delhi's learnings from this journey will go a long way in strengthening the EV ecosystem and accelerating transport decarbonisation in India.



1. Context and Need for Delhi EV Policy

Delhi is one of the largest urban agglomerates in the world with an estimated population size of 20.6 million in 2021.⁴ Spread across 1,483 square kilometres, Delhi represents a blend of ancient culture and trade with a thriving economy. With attractive economic opportunities, the population and vehicle stock of the state grew rapidly over the last few decades. The total number of motor vehicles in the NCT of Delhi as of March 31, 2021, was 11.22 million. Delhi registers the most vehicles annually in Indian cities, with a daily average of over 2,000 registrations.⁵ With the largest population of vehicle stock among Indian cities, addressing vehicular emissions is a priority for the Delhi government.

According to the air pollution source apportionment study conducted by The Energy and Resources Institute (TERI) and Automotive Research Association of India (ARAI) in 2018, vehicular emissions contribute to 40 percent of the PM_{2.5} and 20 percent of the PM 10 emissions and more than 80 percent of all nitrogen oxide (NOx), carbon monoxide (CO), and

non-methane volatile organic compound (NMVOC) emissions. 2 and 3-wheelers account for approximately 45 percent of the total PM_{2.5} emitted by vehicular emissions.⁶

To bring about a material change in Delhi's air quality, GNCTD notified the Delhi EV Policy in August 2020. The policy aims to shape a sustainable and affordable urban mobility landscape for the city and establish Delhi as India's EV capital. It is aimed at making EVs account for 25 percent of the new vehicle sales by 2024.⁷

Meeting the target of 25 percent EV penetration by 2024 would add approximately 500,000 EVs across vehicle segments in the city. These vehicles would reduce PM_{2.5} emissions by 159 tons and CO₂ emissions by 4.8 million tons over their lifetime compared with an equal-sized fleet of ICE vehicles. These savings are equivalent to eliminating life CO₂ emissions from nearly one lakh petrol cars.⁸



2. Policy Design: Approach and Guiding Principles

Delhi's unique journey of formulation of the Delhi EV Policy started in 2018 when the Delhi government decided to accelerate action to mitigate air pollution in the city. Considering vehicular emissions primarily contribute to air pollution in Delhi, GNCTD focuses on shaping the mobility landscape toward a sustainable path. **Exhibit 4** maps the

journey of policy notification since its inception. The extensive stakeholder consultation was instrumental in understanding the government's role in strengthening the nascent EV ecosystem and provided insights on key actions and regulations required by industry stakeholders and consumers to develop Delhi as the hub for EV adoption.

Exhibit 4 Timeline of Delhi EV Policy notification



Delhi's electric mobility journey is distinctive in its approach and guiding principles. The provisions and interventions outlined in the policy are based on an understanding of the local on-ground and market challenges of promoting EVs and designed to address them in a way that accelerates Delhi's EV transition. The vision to make Delhi India's EV capital is shared by multiple stakeholders, including original equipment manufacturers (OEMs), fleet aggregators, charging infrastructure providers, civil society groups, and academic institutions, alongside government agencies.

Policy implementation follows a similar approach wherein all stakeholders are consulted and engaged to ensure speedy implementation. **Exhibit 5** illustrates key principles that guided the implementation of the Delhi EV Policy, **Exhibit 6** presents the six pillars of the policy.



Exhibit 5 Guiding principles for implementation of Delhi EV Policy



Consultative approach: Delhi constantly engages with various stakeholders (industry, think tanks, and academia) to identify and address the critical barriers impeding EV adoption in Delhi. Extensive stakeholder inputs were considered during the development of the policy. Moreover, to maintain these discussions after the policy notification, Delhi EV Forum was conceptualised to continue the engagement with stakeholders. The insights shared by EV manufacturers, fleet operators, charging infrastructure providers, energy operators (EOs), civic bodies, and academic institutions helped identify local and systemic barriers and design an effective implementation strategy for provisions in the policy.

Time-bound implementation of policy provisions: Delay in operationalising the policy’s key provisions will lead to consumer dissonance and erode market confidence. To address this, the Delhi government started operationalising key provisions (such as incentive disbursal) before the policy notification. This approach allowed the government to initiate incentive disbursal in less than two months from the policy announcement. Furthermore, incentive disbursement is a transparent, efficient, time-bound, and completely digital process to reimburse demand incentives to beneficiaries within 7–10 working days of the claim.

Equitable access to infrastructure/services: The policy believes equitable access to infrastructure/services can help scale EV adoption. As the private sector leads the business, charging and swapping stations must be accessible, affordable, and viable for EV users. To promote business viability, the government undertook sighting for charging stations, provided land parcels at highly concessional rates, and defrayed the cost of electrical infrastructure. To ensure affordability and accessibility, EV charging tariff is maintained at INR 4.60 (\$0.061), which is among the lowest in India; lowest service charge is fixed as the bidding criteria; and open database is envisaged to be set up, thus promoting easy discoverability of charging and swapping stations.

Any individual, household, or establishment in Delhi must be able to easily install charging points in its premises. Toward this, Delhi set in place a single-window process to facilitate the installation of subsidised charging points with EV meters anywhere in the city. The subsidy of INR 6,000/charging point for slow chargers reduces the cost of purchase and installation of light EV chargers by almost 70 percent.

Technology and business model agnostic approach: The policy provides an equitable growth opportunity for multiple technologies, solutions, and business models. Moreover, equitable incentives are provided for fixed and swappable battery models. In deploying public charging infrastructure, the maximum possible flexibility is provided in determining business models by keeping 70 percent of the space allocated to Charge Point Operator (CPO) outside the price mandate and expanding the pool of potential operators for charging stations.ⁱⁱⁱ

Dedicated funding source: The EV policy funds a high proportion of incentives through sources such as pollution cess and ECC, which disincentivise conventional fuel vehicles. Delhi levies a pollution cess of INR 0.25/litre of diesel, of which 50 percent is diverted to a non-lapsable State EV Fund. In addition, GNCTD filed an application with the Hon’ble Supreme Court to grant it permission to utilise INR 100 crore to implement various provisions of the Delhi EV Policy.

Dedicated institutional setup: For the day-to-day implementation of the Delhi EV Policy, a state EV cell was instituted and housed under the Department of Transport, GNCTD. The Delhi government also constituted a Working Group (WG) for Accelerated Rollout of Charging Infrastructure in Delhi with representation from the leadership of all stakeholder agencies to obtain a holistic view of the charging infrastructure in Delhi and recommend strategies to accelerate its deployment.

ⁱⁱⁱThe tender for public EVCSs in Delhi allows CPOs, battery swapping operators, EV/EVSE/advance chemistry battery manufacturers, delivery service providers, fleet owners, and DISCOMs to participate in the bidding process.

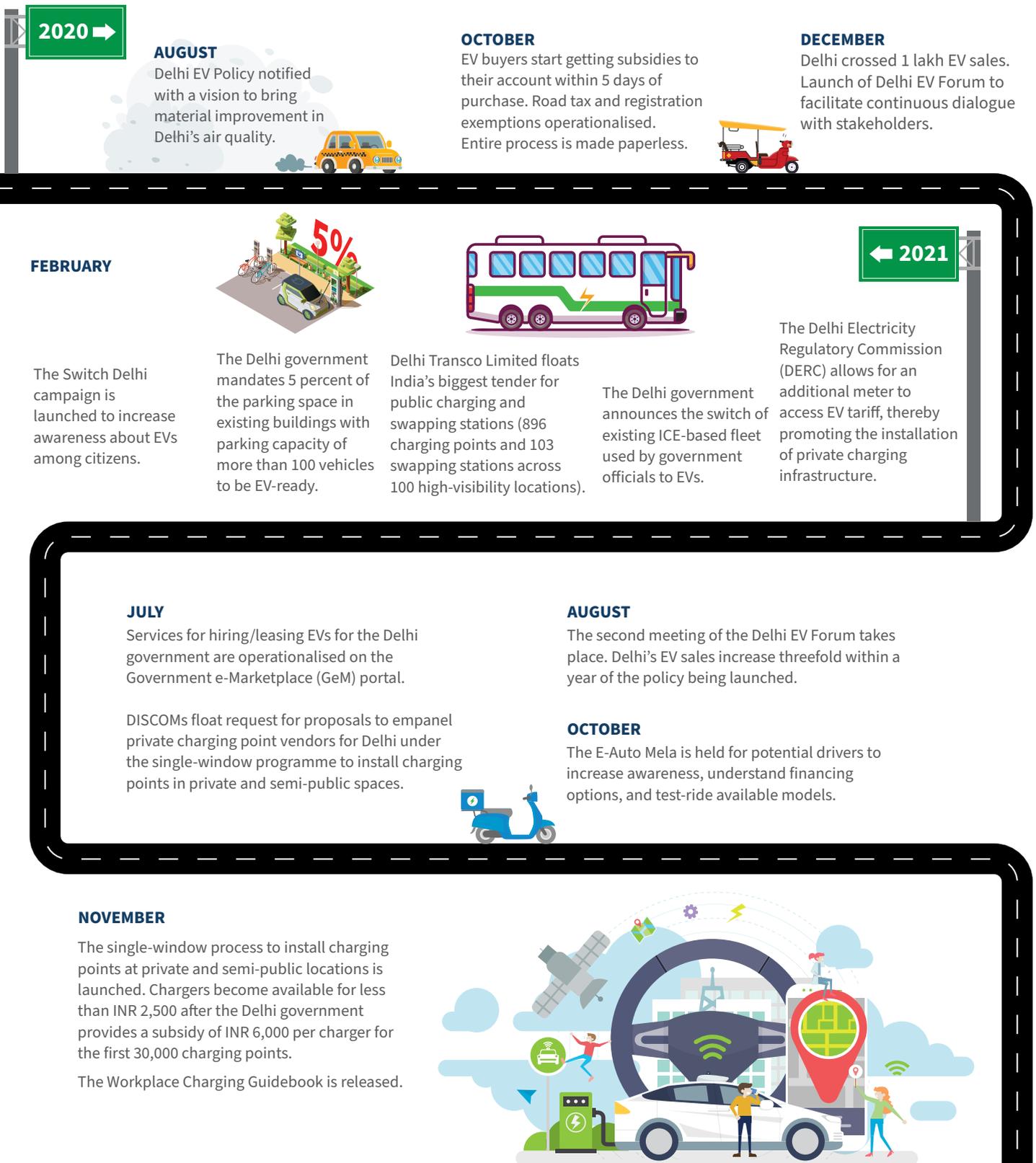
Exhibit 6 Six pillars of the Delhi EV Policy

Pillar	Description	Provisions
Driving EV Adoption	Drive large-scale EV adoption, focusing primarily on two-wheelers, three-wheelers, and public/shared transport.	<ul style="list-style-type: none"> • Exemption from road tax and registration fee on all EVs. • Two-Wheelers: INR 5,000/kWh battery capacity (not exceeding INR 30,000 per vehicle) and up to INR 5,000 scrapping incentive per vehicle. • E-Autos: INR 30,000 per vehicle and up to INR 7,500 scrapping incentive per vehicle. • E-Light Commercial Vehicles (LCVs): INR 30,000 per vehicle and up to INR 7,500 scrapping incentive per vehicle. • E-Rickshaws and E-Carts: INR 30,000 per vehicle and up to INR 7,500 scrapping incentive on advanced battery e-rickshaws and e-carts per vehicle. • E-cars: INR 10,000/kWh battery capacity (not exceeding INR 1,50,000 per vehicle) for the first 1,000 buyers. • E-cycles: INR 5,500 per passenger e-cycle and an additional INR 2,000 top-up incentive for the first 1,000 buyers and INR 15,000 for e-cargo cycles with up to INR 3,000 additional scrapping incentive per cycle. • Interest subvention of 5 percent on loans availed on e-autos, e-LCVs, and advanced battery e-rickshaws and e-carts.
Charging Infrastructure	Create an enabling environment for provision of private and public charging and swapping infrastructure.	<ul style="list-style-type: none"> • Capital subsidy and land at concessional rates for public charging and swapping infrastructure. • Up to INR 6,000 purchase incentive on charging equipment per charging point for the first 30,000 charging points; implemented a simplified mechanism for charger installation. • Ensures incentive for battery swapping EVs at par with fixed-battery vehicles; favourable tariff for EV charging. • For EVs sold without the battery, 50 percent of the incentive to be provided to energy operators (EOs). • Amendments in building bye-laws to mandate EV-ready parking in new buildings. • Incentives for renewable energy charging. • Creation of open database and unified payment infrastructure.
Recycling Ecosystem	Encourage the reuse and recycle of EV batteries that are set to exhaust.	<ul style="list-style-type: none"> • Encourages the reuse of exhausted EV batteries and sets up recycling businesses in collaboration with battery and EV manufacturers to focus on “urban mining” of rare materials. • Sets up recycling facilities for batteries that cannot be reused, either because of their poor condition or lack of demand for reuse.
Funding	Implement the “feebate” concept to fund a high proportion of the incentives under the policy.	<ul style="list-style-type: none"> • Outlines three sources to fund various incentives offered in the policy — pollution cess, additional road tax on conventional fuel vehicles, and congestion fee — the last two of which are yet to be operationalised. • Any gap left after funding to be filled through allocations from ECC being collected in Delhi.
Job Creation	Create jobs in the EV ecosystem and set up skill centres for training in EV-related jobs.	<ul style="list-style-type: none"> • Attempts to build Delhi as the hub for training related to jobs in the EV ecosystem. • Outlines the design of courses to train EV drivers, mechanics, and charging station staff in partnership with auto OEMs and EOs. • Regular recruitment fairs hosted by GNCTD. • Short re-training courses for ICE mechanics.
Policy Implementation	Support day-to-day implementation through a dedicated team of professionals.	<ul style="list-style-type: none"> • A set of operational guidelines to be issued at regular intervals by the Department of Transport, GNCTD, after the policy notification to ensure smooth functioning. • A dedicated EV cell to be established within the Department of Transport for effective day-to-day implementation of the Delhi EV Policy and led by a chief EV officer. • State EV board to be constituted as the apex body for effective implementation of the Delhi EV Policy and chaired by the Hon’ble Minister of Transport, GNCTD.

3. Journey Thus Far

The Delhi EV Policy is regarded as one of the most progressive sub-national EV policies in the country.⁹ Since its notification, Delhi adopted a multipronged approach to create a conducive environment for EV adoption. **Exhibit 7** maps the implementation of the Delhi EV Policy and highlights the key milestones determined by the government to pioneer the EV ecosystem and improve air quality in Delhi.

Exhibit 7 Delhi EV Policy Implementation Scores—Key Milestones



Journey Thus Far

2022 →

JANUARY

The Delhi government signs an MoU with CESL to deploy charging stations at seven DTC bus depots.

The Delhi government unveils the Switch Delhi website to provide consumers a one-stop solution for all EV-related information.

FEBRUARY

The EV Charging Guidebook for shopping malls is released.

The Residential EV Charging Guidebook is released.

The share of EVs in total vehicle sales reaches 12.4 percent — the highest during the policy period thus far.

MARCH

The Delhi government awards 100 sites for public charging and swapping stations to four concessionaires. EV charging will be provided at INR 2.50/unit of electricity to consumers.

The Delhi government issues over 2,800 e-auto letters of intent (Lols) and flags off a fleet of 30 electric auto-rickshaws.

DTC approves the deployment of 1,500 e-buses under CESL's Grand Challenge.

APRIL

The third meeting of the Delhi EV Forum is conducted.

The government releases a report to achieve 100 percent electrification of delivery service fleet in Delhi.

Interest subvention of 5 percent for e-auto drivers is operationalised to further reduce the cost of owning an EV.

Delhi becomes the first state to install LEV AC chargers.



MAY

One hundred and fifty e-buses are flagged off in Delhi.

Demand incentives on e-cycles are notified and operationalised to promote micro-mobility in the city.

Delhi crosses 1,500 charging points.

JUNE

Delhi achieves total registration of 1.5 lakh EVs.

JULY

The Delhi government announces the Aggregator Guidelines to mandate an all-electric fleet for cab aggregators, food deliveries, and e-commerce companies by April 1, 2030.

Delhi Skill and Entrepreneurship University launches a training programme for EV mechanics as part of its diploma course on Automobile Engineering.

Five hundred and sixty-three chargers are installed under the single-window process. Delhi crosses 2,000 charging points.



3.1 Driving EV adoption

To transition 25 percent of the new vehicle registrations to EVs by 2024, the Delhi EV Policy provides the necessary impetus for EV adoption in the form of fiscal incentives, exemptions in road and registration tax, robust charging infrastructure network, and extensive awareness campaigns. These measures help accelerate the transition to EVs and achieve thresholds that can trigger mass uptake, especially in the two- and three-wheeler vehicle segments.

The Delhi EV Policy offers a combination of targeted fiscal and non-fiscal incentives, which form the bedrock of Delhi’s transport electrification journey. **Exhibit 8** provides a brief description of the incentives applicable to various vehicle segments under the Delhi EV Policy.

Exhibit 8 Purchase incentives provided to various vehicle segments under Delhi EV Policy

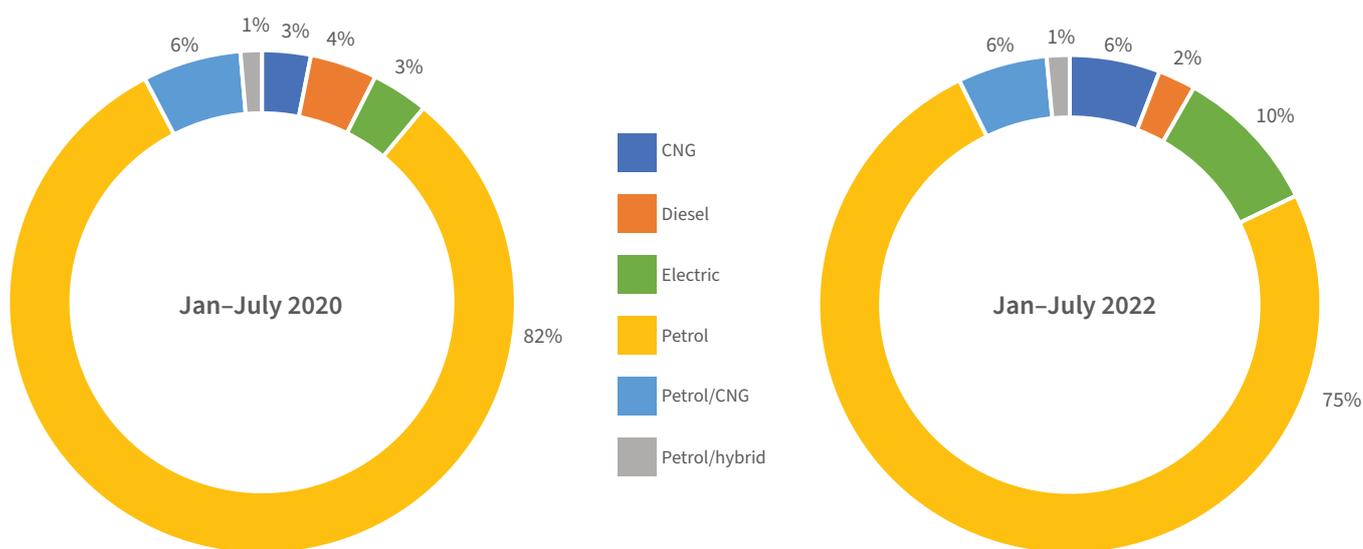
EV Segment	Purchase Incentives
 <p>Electric Two-Wheelers</p>	<ul style="list-style-type: none"> • Purchase incentive: INR 5,000 per kWh battery capacity per vehicle (not exceeding INR 30,000). • Scrapping incentive: up to INR 5,000 per vehicle for scrapping two-wheelers (shared with OEMs).
 <p>Electric Three-Wheelers (Auto and Goods Carriers)</p>	<ul style="list-style-type: none"> • Purchase incentive: INR 30,000 per vehicle. • Scrapping incentive: up to INR 7,500 per vehicle for scrapping three-wheelers (shared with OEMs). • 5 percent interest subvention on the loan amount to be offered through DFC or any other agency empaneled by GNCTD.
 <p>E-Rickshaws and E-Carts</p>	<ul style="list-style-type: none"> • Purchase incentive: INR 30,000 per vehicle. • 5 percent interest subvention on the loan amount to be offered through DFC or any other agency empaneled by GNCTD on advanced battery vehicles.
 <p>E-Cars</p>	<ul style="list-style-type: none"> • Purchase incentive: INR 10,000 per kWh battery capacity for the first 1,000 cars subject to a cap of INR 1,50,000 per vehicle.
 <p>Buses</p>	<ul style="list-style-type: none"> • Appropriate incentives and other necessary support to ensure e-buses constitute at least 50 percent of all new stage-carriage buses (i.e., for all public transport vehicles with 15 seats or more) procured for the city.

3.1.1 EV sales in Delhi

The Delhi EV Policy has 26 clauses concerning demand incentives for EVs, of which 23 are operationalised and the remaining are partially operational. In the first two years of the policy being effective, Delhi recorded sales of over 62,000

EVs. This translates to about 10 percent of the EV contribution in total vehicle sales in Delhi in the last six months compared with 3 percent before the announcement of the policy (January–July 2020) (**Exhibit 9**).

Exhibit 9 Fuel-wise distribution of vehicular sale in Delhi (before and after Delhi EV Policy)



To enable the disbursement of the demand incentives laid down under the Delhi EV Policy, GNCTD developed a state-of-the-art web application.

3.1.2 Disbursement of subsidies

The transparent, efficient, time-bound, and completely digital process for the disbursement of incentives can be attributed to the proliferation of EVs in Delhi. While consumers can avail exemption from road tax and registration fee upfront, demand incentives are reimbursed to beneficiaries through a robust digital system within 7–10 working days of the claim. The process follows a simple four-step methodology explained in **Exhibit 10**. Additionally, the system raises an alarm and announces a nudge for delay of over three days at any step of approval of an incentive request.

The web application for incentive disbursement was developed by a dedicated team of website developers with continuous support from GNCTD’s IT department. During the course of the website development, multiple brainstorming sessions were held on the functionality, user interface (UI), and payment gateway integration of the web application. The existing mechanism takes learnings from other incentive disbursement procedures being operated by GNCTD. For instance, the Department of Transport was

convinced to ensure the entire process of incentive application, approval by authorities, and accounting was paperless. In addition, the web application provides a descriptive dashboard to monitor real-time progress and status of incentive requests made by dealers on behalf of consumers. Furthermore, the dashboard provides the following information:

- Incentives disbursed to beneficiaries as per vehicle segments and categories on monthly basis
- Incentive requests rejected by the National Payments Corporation of India (NPCI) due to incomplete Know-Your-Customer (KYC) of beneficiaries based on respective regional authorities and on monthly basis
- Incentive requests returned by the Regional Transport Authorities due to incomplete documents based on respective regional authorities and on monthly basis
- Detailed description of funds spent for incentives based on vehicle segments and categories along with the remaining corpus of fund

The system went through multiple iterations and tests to ensure the web application was equipped to handle traffic as EV sales in the city increased. The system is managed, operated, and implemented by the EV Cell, Department of

Transport, which is the nodal department for implementing the Delhi EV Policy. The mechanism and functionality of the system were subsequently notified as the operational guidelines of the Delhi EV Policy.

Exhibit 10 Step-wise demand incentive disbursement mechanism of GNCTD



3.1.3 Delhi's approach to incentive design

The demand incentive under the Delhi EV Policy primarily focuses on addressing the high upfront cost of EVs (compared with ICE vehicles).

1. Incentives to improve cost parity of EVs:

The Delhi EV Policy offers purchase and scrapping incentives besides those offered to EVs under the FAME-India phase-II scheme, which can reduce the cost of an electric two-wheeler by approximately 25 percent and that of an electric three-wheeler by approximately 20 percent. These incentives were curated considering the TCO of EVs and to positively impact the overall return of investment on EVs.

2. Promote scrapping of old and more polluting vehicles:

Incentive is provided on deregistration of BS II and BS III and polluting vehicles. Scrapping old vehicles has been one of the major challenges for authorities across various cities; the

policy incentivises the deregistration and purchase of EVs.

3. Motor vehicle tax exemptions:

The Delhi EV Policy exempts road tax and registration fee on all EVs.

4. Technology-agnostic incentive allocation:

To support the operations of a battery-swapping operator, the policy allocates up to 50 percent of the purchase incentive to the operator by defraying the cost of any deposit that may be required.

5. Facilitating financing for EVs:

To address the challenge of unattractive loan terms for EVs, the policy provides 5 percent interest rate subvention for EVs availing loans from empaneled agencies (scheduled banks, NBFCs, or MFIs).

3.1.4 Ensuring access to affordable financing for EVs

The present rate of interest on electric three-wheelers is 20–25 percent. To address the dearth of affordable and accessible financing options for EVs, the Delhi EV Policy adopted a progressive approach of providing 5 percent interest subvention to specific vehicle segments (e-autos, e-LCVs, and advanced battery e-rickshaws and e-carts) to make EVs an attractive value proposition for buyers. Using this provision, the Delhi EV Policy aims to bring interest rates for electric three-wheelers down to 15 percent.

To operationalise this provision, the Delhi government collaborated with CESL, which was provided the mandate to empanel financial institutions (FIs) through an open and transparent process to pass on the interest subvention benefit to EV buyers. Through the empanelment, the Delhi government aims to ensure the following:

1. Attractive/feasible loan terms:

To get empaneled, FIs (scheduled banks, non-banking financial companies, and microfinance institutions) would have to agree to provide loans with a minimum 80 percent loan-to-value (LTV) and at interest rates less than 20 percent (including the interest subvention) for a loan tenure that is in consumers' best interests. These provisions ensure the benefits of the 5 percent interest subvention are passed on to the consumer rather than providing risk cover to FIs on EVs. Moreover, these criteria were developed through extensive consultations with FIs and OEMs.

2. Assured vehicle performance:

Under the scheme, subvention benefits can be obtained only on the purchase of vehicles eligible for purchase incentive under the Delhi EV Policy. Therefore, vehicles must meet the

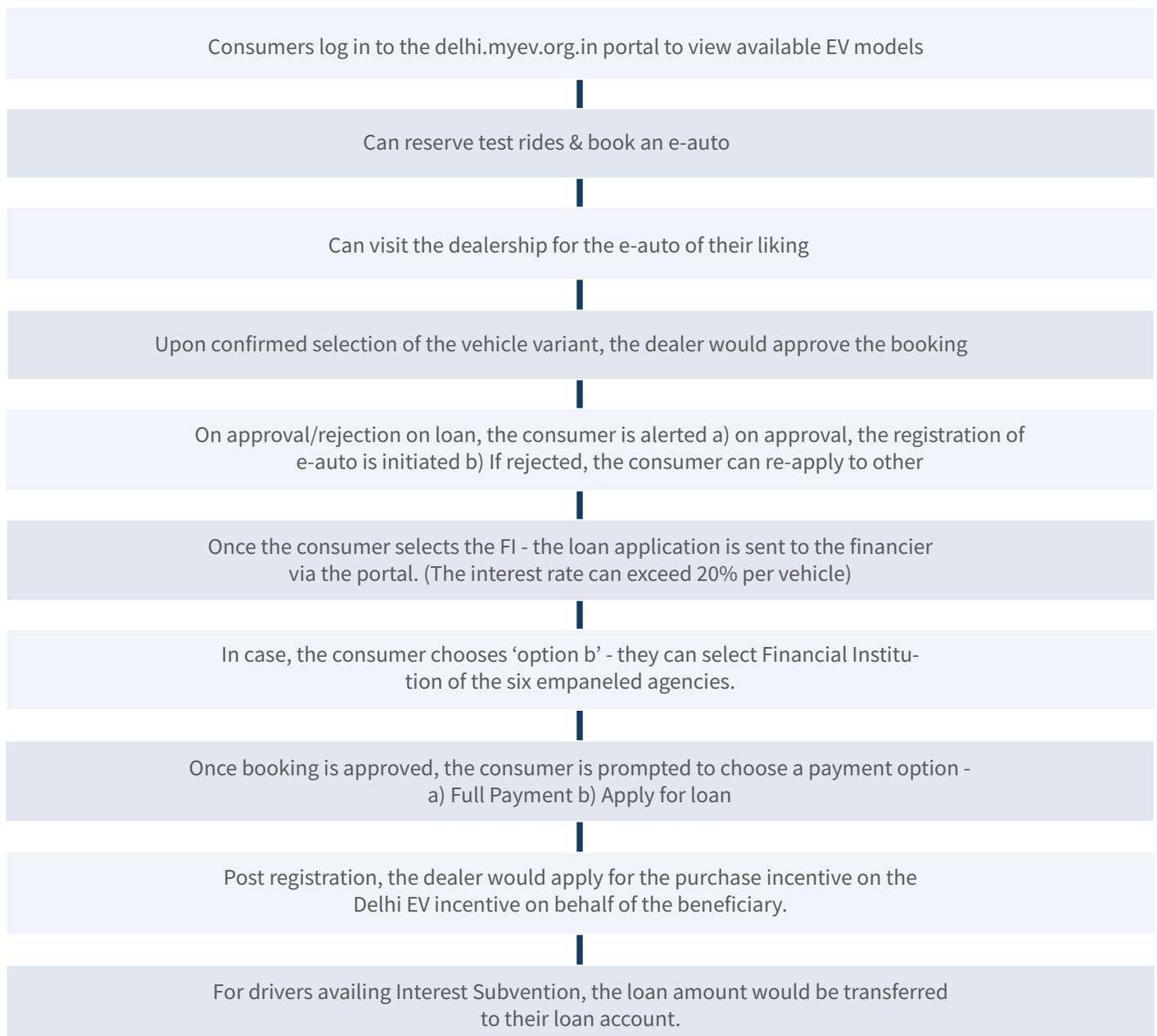
minimum performance criteria in terms of speed, range, battery chemistry, and warranty. The certainty of vehicle performance was expected to be the key motivator for FIs to provide interest rates at attractive terms.

3. Adjustment of purchase incentive:

Currently, the Delhi EV Policy provides purchase incentive on EVs through reimbursements. For buyers obtaining loans through empaneled FIs, the purchase incentive is adjusted to their loan accounts. The adjusted purchase incentive, in turn,

reduces the principal amount to be paid by the consumer. To ensure these aspects during implementation, Delhi, in collaboration with CESL, developed the My EV portal to facilitate claiming these incentives. Although the 5 percent interest subvention is currently operationalised only for e-autos on loans, it would soon be extended for e-LCVs, e-rickshaws, and e-carts. The online portal (**Exhibit 11**) is designed to enable consumers to purchase e-autos and claim all applicable incentives along with interest subvention on loans through a single-window process.

Exhibit 11 Process flow of My EV portal for consumers to claim interest subvention incentive



3.2 Charging Infrastructure Deployment

Leading EV cities in India and globally have announced ambitious targets for EV adoption. However, one factor that separates cities and countries that lived up to their promise and those that did not is their ability to fix the Achilles' heel of EV adoption — charging infrastructure. One of the key reasons for Delhi's success is the widespread installation of charging points across the city. In Delhi, EV charging use cases are broadly divided into public EV charging, semi-public and private EV charging, and battery swapping.

1. Public EV Charging Stations (EVCSs) refer to charging points with unrestricted and unfettered access for the public.

2. Semi-public EV charging stations are charging points in spaces with restricted access for the public. This includes commercial buildings such as workplaces, malls and theatres, and institutional buildings such as government offices and hospitals.

3. Private EV charging station refers to charging points in spaces with no access for the public and where charging is reserved for an individual or a household (e.g., single-dwelling houses, parking spots in group housing societies, etc.).

4. Battery Swapping Facility (BSF) is a station where a discharged or partially charged battery of an EV (primarily two- and three-wheelers) can be swapped for a fully charged batte

3.2.1 Charging infrastructure landscape of Delhi

The Delhi EV Policy has 13 clauses pertaining to EV charging infrastructure, of which 10 have been completely operationalised, two have been partially operationalised, and one is yet to be operationalised. Some of the key highlights of Delhi's efforts in ensuring widespread deployment of EV charging stations are:

1. The Delhi government has set up a high-level Working Group (WG) for the accelerated rollout of charging infrastructure, which is responsible for developing a holistic EV charging strategy for Delhi and resolving any issues pertaining to the coordinated rollout of charging stations in the city. It comprises the heads of all relevant Delhi government departments, municipal corporations, DISCOMs, and external experts, and is chaired by the Dialogue and Development Commission (DDC), the government's think tank.

2. Delhi Transco Limited (DTL), which is the state nodal agency for charging infrastructure, floated India's biggest tender for deploying public charging and swapping station across 100 locations (**Exhibit 12**). Nearly 900 charging points and 103 battery swapping stations are being installed under this tender and will be operationalised within the next three months (**Exhibit 13**). The tender aggregated 100 land parcels from different land-owning agencies in Delhi and floated a common tender to set up charging and battery swapping stations on these land parcels on concessional basis. Seventy percent of these land parcels are carved out of Delhi Metro parking stations, and service charge was kept as the bidding criteria.

Exhibit 12 100 locations identified by Delhi government to set up public charging stations, along with land-owning agencies

Land-Ownning Agency	No. of Sites
Delhi Metro Rail Corporation (DMRC)	71
Delhi Transport Corporation (DTC)	11
Transport Department	4
BSES Rajdhani (BRPL)	3
BSES Rajdhani (BRPL)	3

Land-Ownning Agency	No. of Sites
Tata Power Delhi Distribution (TPDDL)	3
Delhi State Industrial & Infrastructure Development Corporation Ltd. (DSIIDC))	3
Delhi Jal Board (DJB)	1
Irrigation and Flood Control (I&FC)	1
Total	100

Exhibit 13 Distribution of charging and swapping stations based on charging capacity, concessionaire, and location

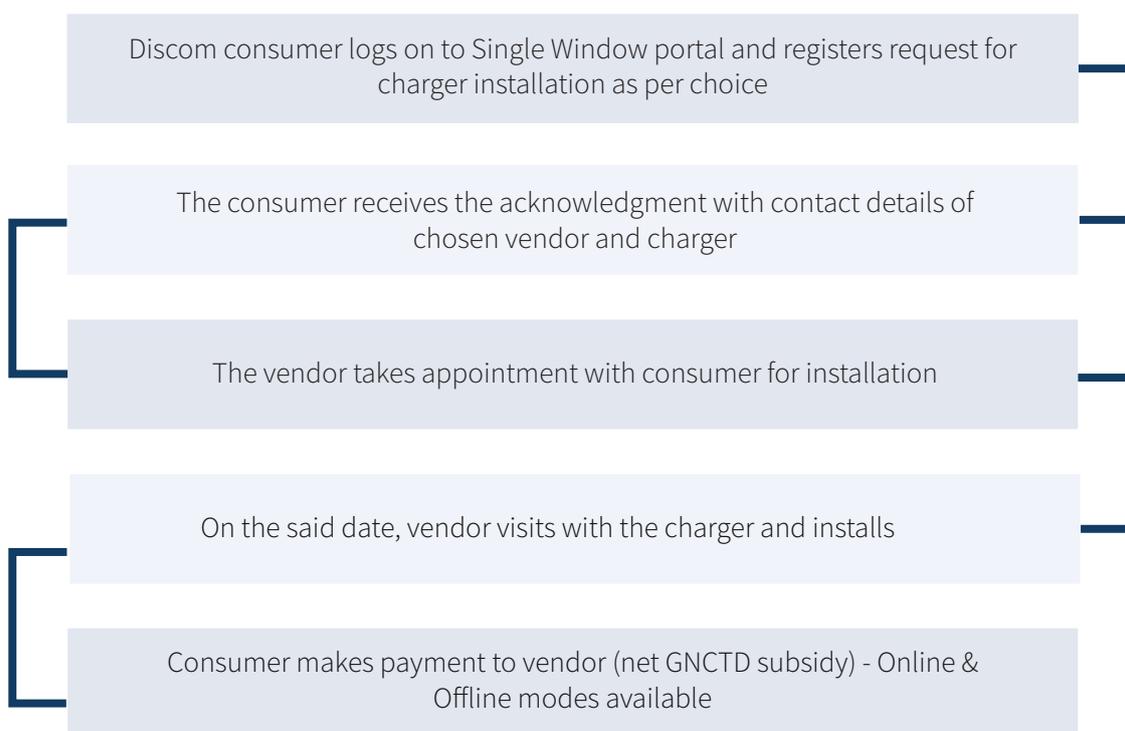
Charger Type (Capacity)	Parameters	Suchi Anant Virya	Sun Mobility	Blu Smart	Jio-BP	Total
Slow Chargers	Locations	28	31	30	11	100
	Chargers	59	31	131	14	235
	Charging Points	177	93	393	42	705
Moderate/Fast Chargers (15-22kW)	Loactions	10	31	15	5	61
	Chargers	19	62	15	5	101
Non Mandated Chargers (>22kW)	Loactions	23	15	0	8	46
	Chargers	59	15	0	16	90
Battery Swapping Stations	Loactions	0	31	30	11	72
	Swapping Stations	0	62	30	11	103

3. The Delhi government launched a unique single-window process for installing and maintaining 30,000 charging points at private and semi-public sites, with the provision of availing INR 6,000/charging point (**Exhibit 14**). The single-window process ensures a one-stop solution to select EV chargers/vendors, obtaining new electrical connection, installing charging points, and availing subsidy for chargers. The cost of the charger available under this process is inclusive of the cost of the EV charger (net of subsidy and

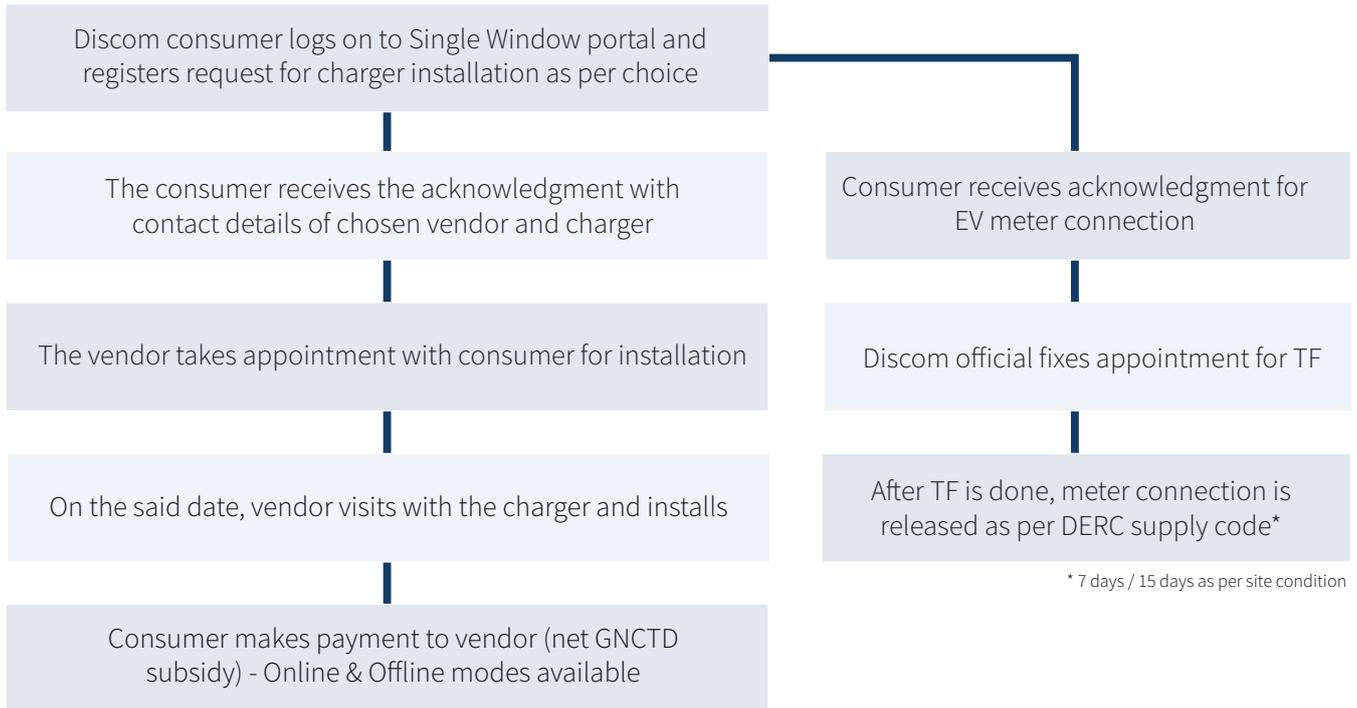
inclusive of GST), charger installation cost (including cost of wiring up to 5 metres), and annual maintenance cost for three years. The incentives reduced the cost of chargers by up to 70 percent and will potentially provide additional revenue-generating opportunity for thousands of kirana store owners. 594 charging points have been installed and 304 installations are ongoing under the single-window mechanism as of July 31, 2022.

Exhibit 14 Process flow for installing chargers through single-window portal

Option 1: Without Separate EV Meter connection



Option 2: With Separate EV Meter connection



Installation of EVC within 7 days of registration subject to appointment confirmation

4. The Department of Transport has nominated Convergence Energy Services Limited (CESL) to set up charging stations on bus depot lands. Under the Memorandum of Understanding (MoU), the Department of Transport will provide land while CESL bears the responsibility of installing and operating the charging stations. Additionally, the MoU mandates that 20 percent of the area on each charging station should be used

for installing slow chargers and service charge on all slow chargers to be less than lowest service charge discovered through the DTL tender. So far, under this agreement, 45 charging points have been installed on seven depots. The break-up of the charger types on these depots is provided in **Exhibit 15**. Under a similar model, charging stations will be installed on 14 more depots.

Exhibit 15 Number of charging points at the bus depots in Delhi

Sr. no.	Depot Name	Charging Points	Details
1	Dwarka Sec 6	6	Combo Fast: 3, AC001: 3
2	Dwarka Sec 8	6	Combo Fast: 3, AC001: 3
3	Kalkaji Depot	6	Combo Fast: 3, AC001: 3
4	Mehrauli	6	Combo Fast: 3, AC001: 3
5	Nehru Place Terminal	6	Combo Fast: 3, AC001: 3
6	Rajghat	8	Combo Fast: 3, AC001: 3
7	IP Estate	7	Combo Fast: 3, AC001: 3, DC001: 1



5. To enable accelerated deployment of charging infrastructure in Delhi, several regulatory changes have been enacted in Delhi, including special EV tariff, allowing separate EV meters in buildings with an existing connection for availing EV tariff, adopting minus metering, and allowing hardwiring of chargers with EV meters to prevent misuse.

6. The building bye-laws were amended to mandate the inclusion of EV charging provision in new buildings, and a separate order for mandatory installation of charging stations in existing buildings with a minimum parking space of 100 vehicles was issued.

Delhi also made significant strides in operationalising a public database for sharing static and dynamic information pertaining to EV charging stations anywhere in Delhi. As the first step, Delhi developed a data sharing mechanism through APIs to access live information pertaining to charging stations on the Delhi EV website and “One Delhi” app. To ensure interoperability, Delhi initiated the process to create Delhi-specific open protocols, which can ensure discovery, booking, queueing, and payment for EV charging across CPOs.

3.2.2 Delhi’s approach to deployment of charging infrastructure

Typically, EV charging across the world follows four models: utility-led, automaker-led (with “walled gardens” of chargers), government-led, and business-led (independent entities offering customers charging as a service). However, Delhi’s approach to EV charging is guided by its unique needs, enabling it to develop novel strategies to serve the charging requirements of existing and potential EV users across different vehicle segments. For instance, land is a scarce and costly resource in Delhi, and paying fixed rentals for land despite low capacity utilisation adversely affects the economic viability of operating charging stations. In addition, several land-owning agencies exist in Delhi and navigating a complex maze of ownership patterns to obtain parcels of land for setting up charging stations is challenging for charging station operators seeking to scale operations across the city. Delhi challenged the conventional wisdom that majority of the EV charging would take place in homes as most vehicle owners in Delhi do not have designated parking spots. Delhi took the lead in developing innovative, rigorous, and replicative solutions to address challenges related to EV charging, including sighting charging stations, ensuring interoperability, defraying costs pertaining to electrical network augmentation, dealing with technological obsolescence, being solution agnostic, resolving regulatory

impediments, ensuring hassle-free installation of charging points, and making operation of charging stations a viable business. This was achieved by adhering to the following **guiding principles** in developing solutions and decision-making:

1. Identifying priority vehicle segments and aligning incentives with charging solutions for priority vehicle segments (two- and three-wheelers).

2. Establishing use cases based on charging requirements for different population/market segments, namely, passenger vehicles, fleet owners for passenger and freight, delivery service providers, and public transport vehicles. Additionally, Delhi residents do not necessarily have designated parking spaces. This requires setting up public charging stations to address range anxiety and provide accessible and viable charging options to EV owners.

3. Identifying statutory, regulatory, and market impediments to setting up EV charging and swapping stations to determine the policy and market-level action points for installing charging points at scale.

4. Determining the sighting criteria for charging and swapping stations. It includes key features such as easy accessibility, electrical infrastructure feasibility, high dwell time for vehicles, and access to the EV charging market. Ensuring adequate geographical distribution and installation in unserved/underserved areas.

5. Minimising the limiting conditions (such as government determining the service charge or combination of chargers for any site) for the private sector as the economic viability of EV charging/swapping stations is site-specific. Providing maximum possible flexibility to charge point and swapping operators in determining the business model.

6. Ensuring flexibility in defining charger types to be installed to enable the adoption of new charging standards to the largest extent possible as and when they are notified and approved.

7. Operationalising charging and swapping stations within a fixed period to avoid the possibility of land grab.

8. Allowing a wide range of stakeholders, including CPOs, battery swapping operators, EV/EVSE/advance chemistry battery manufacturers, delivery service providers, fleet owners, and DISCOMs to participate in the location allocation process for setting up EV charging and swapping stations.

9. Implementing digital systems that facilitate the discovery of EVs at any public EV charging and swapping station in Delhi.

10. Implementing facilitative systems to easily install charging points at any feasible location in Delhi. Designing schemes that leverage existing civic infrastructure such as government buildings, bus depots, municipal parking, and private parking.

3.2.3 Challenges, solutions, and innovations

I. Public charging and battery swapping stations

a. Inter-agency coordination and standardisation

The deployment of EV charging and swapping stations in Delhi requires the Department of Power, Department of Transport, DISCOMs, and different land-owning agencies to work in tandem. Additionally, each of these agencies have their own rules regarding land use, leasing criteria, and revenue sharing.

In April 2019, GNCTD formed a WG for the accelerated rollout of charging infrastructure in Delhi. It includes the heads of all relevant Delhi government departments, municipal corporations, DISCOMs, and external experts, and is chaired by the DDC, the government's think tank. This WG led the process of developing a holistic EV-charging strategy for Delhi and actively resolved issues pertaining to the coordinated rollout of charging stations in the city. This is a unique innovation in governance in the context of developing charging infrastructure anywhere in the country. Several states envisaged to set up similar mechanisms, with NITI Aayog recommending all states to form a State Charging Infrastructure Committee (SCIC). The functions of SCIC are modelled on those of WG in Delhi.

b. Availability of feasible and affordable sites

Land is one of the most critical elements of charging and swapping infrastructure deployment. Deploying charging stations across Delhi requires a CPO to navigate a complex maze of land-ownership patterns and regulations to access these parcels of land. Additionally, it is critical for the identified sites to be feasible in terms of space, access, load availability, and business potential for setting up charging stations. These factors act as a huge impediment in setting up charging stations in Delhi.

To facilitate the setup of charging stations by the private sector, the Delhi government aggregated land parcels from

different land-owning agencies, assessed their technical and economic feasibility, and developed a unified city-wide tender for the land parcels. This involved rigorous analysis of each land parcel through site visits,^{iv} followed by a GIS-based evaluation of potential coverage and utilisation.^v The government also clubbed the land parcels into packages of 7–11 sites each based on geographical contiguity, technical feasibility, economic viability, and minimisation of overlaps in administrative jurisdictions (of revenue districts, MCDs, land-owning agencies, and DISCOMs.) to the largest extent possible. It also ensured each package had a combination of prime sites and sites in unserved areas. For optimal use of parking space, it provided concessionaires the option to levy time-based penalty for keeping a vehicle plugged beyond 80 percent State of Charge (SOC) or parking in the space allocated for EV charging while not connected to a charger.

c. Economic viability of operating charging stations

In Delhi, the capital and operational costs of setting up charging stations are high. Additionally, in the initial years of developing the EV ecosystem, the capacity utilisation of chargers is low. This negatively affects the economic viability of operating EV charging stations with zero to no returns in the initial years of operation.

The Delhi government recognised that the two biggest cost components associated with setting up charging stations are the costs associated with leasing/purchasing land and those for augmenting electrical infrastructure. To solve for this, the Delhi government decided to defray the costs through the following:

- i. Linking lease to revenue (INR 0.70/unit of electricity used for charging/swapping).
- ii. Providing 100 kW of electrical connection on each site^{vi}.

Delhi was the first state government to develop and incorporate both these innovations in its tender for public charging and swapping stations. In its guidelines on charging infrastructure published in January 2022, the Ministry of Power recommended the revenue sharing model and leveraging of public funds for upstream network augmentation.¹⁰ Additionally, as mentioned before, Delhi expanded the pool of entities eligible to participate in the tender to encourage business model innovation and ensure maximum competition in bidding for the charging and swapping stations tender.

^{iv} A checklist for site assessment is provided in Annexure C.

^v Parameters used to assess coverage and utilisation are proximity to existing charging stations, proximity to metro stations, catchment population density, and catchment density of commercial activity.

^{vi} The Delhi government will bear the costs pertaining to service line development, road cutting and restoration, and network augmentation.

Furthermore, as the economic viability of operating charging and swapping stations is site-specific, business model flexibility was provided to all concessionaires by the Delhi government. Only 30 percent of the space in each package and chargers for priority vehicle segments were brought under the price mandates while allowing operators the flexibility to decide the charging and swapping combination and their respective service charges on the remaining 70 percent of the space. This is in stark contrast to the approach for the rest of the country where a combination of chargers is predecided by the government.

d. Incorporating battery swapping and EV charging in the same tender

To ensure EV users can access a portfolio of options, the Delhi EV Policy takes a technology agnostic approach by providing equivalent incentives to charging and swappable vehicle models. To extend this approach to EV charging, the Delhi government floated a unified tender for charging and swapping. This is again a unique approach with no precedence anywhere in the country.

The challenge in ensuring battery swapping and EV charging are incorporated in the same tender was to provide a level playing field for both the solutions in terms of incentives and adherence to mandates. To develop a solution for this, the government analysed the two businesses from different perspectives, including capital costs, space requirement, load requirement, and number of vehicles serviced in equal amounts of time. Based on this, battery swapping was excluded from the price mandate and operators were provided 60 additional days in the tender for operationalising the swapping stations.

e. Ensuring new technology is incorporated in the tender's tenure

As EV charging is a rapidly evolving technology, chargers or swapping solutions installed today are at a risk of getting obsolete in the tender's tenure. The flexibility provided in determining the combination of charging and swapping solutions on 70 percent of the space solved for part of the challenge as operators could change the chargers or swapping solutions installed in this space over time. However, mandated chargers cannot be changed any time in the tender's tenure.

To solve for this, the Delhi government defined the mandated chargers in terms of power levels (based on the capacity of

o-board chargers in priority vehicle segments) and provided flexibility with regard to power supply (AC or DC) and charger specifications.

f. Interoperability

Lack of interoperability among charging stations is a key impediment to accessing charging stations for EV users. The Delhi government took the initiative to develop a publicly available open database on which all charging and swapping operators under the tender are mandated to share data. The tender defines the data parameters that must be shared for charging and swapping stations, and the communication protocols to be used for developing an interoperable network of charging and swapping stations.

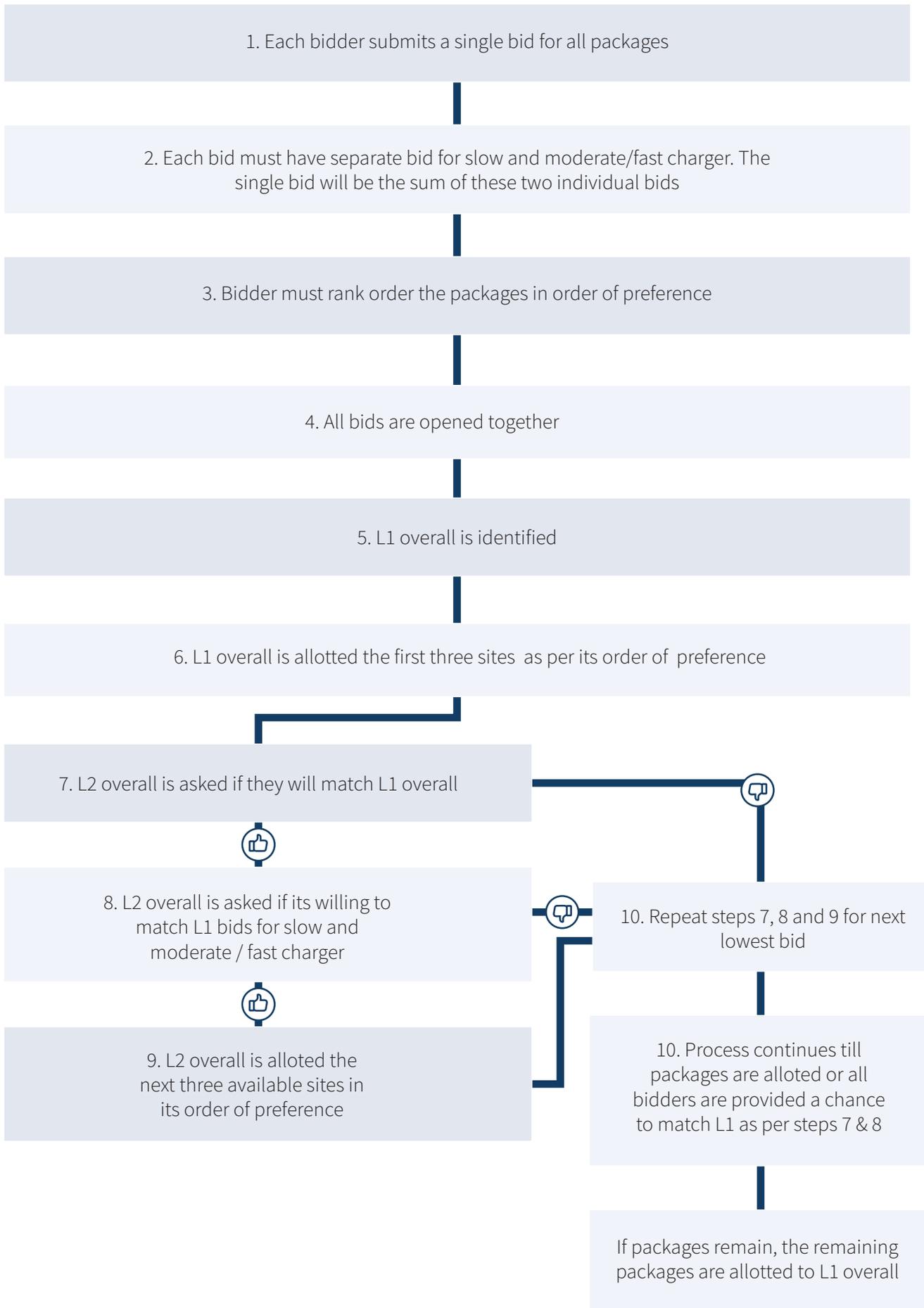
g. Determining bidding criteria

Typically, when the government leases out land, the criteria for bidding is decided with revenue maximisation as the objective. In contrast, Delhi determined the service charge for the end consumer as a criterion for bidding. The strong appeal of the land parcels aggregated by the government combined with a model conducive to business success intensified the competition among private bidders to quote a low service charge. As a result, the Delhi government received negative service charge bids and Delhi's EV users can now charge vehicles at just INR 2 per unit, perhaps the lowest cost in the world.

h. Balancing between ensuring common service charge and competition

The Delhi government wanted to ensure the service charge for all mandated slow chargers is the same across sites in the tender. Separately, it sought the same service charge for all mandated moderate/fast chargers across sites in the tender. This was particularly challenging as the government was determined to award the tender to multiple operators to ensure competition from the perspectives of cost and service quality. For this, it restricted the number of packages that can be allocated to operators to three. Under this condition, it developed a bidding mechanism to allow for matching of the lowest price, avoid the possibility of a bidder quoting an injudicious bid, and restrict the number of packages per operator to three to the largest extent possible. Exhibit 16 provides the process flow of bidding followed by the public charging and swapping stations tender. The tender was won by four separate operators, with three winning three packages each and one winning one package.

Exhibit 16 Process flow of L1 price matching



II. Semi-public and private charging

a. Lack of awareness about and incentives to install EV chargers

To make EV chargers truly ubiquitous in Delhi, it is indispensable to leverage parking infrastructure in existing civic and private spaces such as workplaces, malls, and theatres; institutional buildings such as government offices and hospitals; and parking spots in group housing societies. However, owners of these parking spaces face a key challenge in that their understanding of EV chargers related to identifying quality chargers, trustworthy vendors, and compatibility with different vehicle segments is limited. Additionally, there is little clarity on the incentives provided for EV chargers and the process to access these incentives.

To resolve this issue, the Delhi government sought the help of DISCOMs to empanel vendors for selling chargers that adhere to the official technical specifications. This provided a platform for Delhi residents to order a quality charger from a trustworthy vendor either online or through a phone call. The customers only need to pay net of subsidy, with the vendor claiming the subsidy from the government. Through this process, Delhi residents can avail EV chargers for less than INR 2,500. The price is inclusive of the installation and maintenance costs for three years, and customers can either pay the cost upfront or opt for a subscription model. Additionally, the Delhi government released three guidebooks, one each for installing charging points in shopping centres, workplaces, and housing societies. These guidebooks elaborate the method to identify the suitability of chargers, process to install chargers, and potential business models through which charging can be turned into an additional revenue stream.

b. Complex process to install EV chargers and access EV tariff

Once a customer purchases an EV charger, installation can be tedious, especially if the customer wishes to access special EV tariff. To counter this, the Delhi government implemented the single-window process for installing EV chargers in semi-public and private spaces. This process includes application for EV connection, selection and ordering chargers, coordinated installation of EV chargers, payment (net of subsidy, wherever applicable), and energising EV meters.

c. Regulatory impediments to install EV chargers in semi-public and private spaces

EV meters could not be installed in premises with an existing connection owing to regulatory constraints. Additionally, there were no regulatory directions for incorporating “minus metering” and preventing the misuse of EV connection for

non-EV charging needs. The Delhi government worked with DISCOMs to petition the regulatory commission to iron out these anomalies in the regulations. Basis this petition, DERC allowed for a separate EV charging connection in domestic settings, minus metering, and hardwiring of EV chargers with meters to avoid the misuse of special EV tariff.

The Unified Building Bye-Laws for Delhi were amended in February 2020 to mandate 20 percent of the parking space of all new buildings must be EV-ready. In addition, the Delhi government issued an order for existing commercial and institutional buildings with parking space for more than 100 vehicles to ensure at least 5 percent of the total parking space is EV-ready and fitted with at least a slow charger of minimum 3.3 kW output.

d. Alignment of chargers with upcoming standards

Technological obsolescence of EV chargers impedes long-term planning of EV charging strategy, including incentive targets and determination of mandates. The Delhi government keeps a close track of the developments in EV charging standards and aligns its approach to accommodate for the adoption of the latest ones. This approach enabled it to incorporate the empanelment of low-cost and light smart AC chargers for EVs.



3.3 Electrification of Public Transport

The transition of public transport to EVs is critical to decarbonise urban mobility in Indian cities. Electric buses currently contribute approximately 2 percent of the total bus fleet in the city. For the past several years, Delhi has had to overcome unique challenges in finalising the procurement of any bus, irrespective of fuel type. However, in 2020, Delhi

procured 300 e-buses under the Gross Cost Contract (GCC) model. This has paved the way for Delhi Government to procure over 6000 e-buses by 2025. As the first step to realise this target, Delhi put forth a requirement of 1,500 e-buses under the e-bus Grand Challenge for cities conducted by CESL.

E-bus Grand Challenge: Under the mandate of the FAME-II scheme, CESL organised the e-bus grand Challenge to aggregate demand to float a homogenised tender for 5,585 e-buses across nine cities: Ahmedabad, Bengaluru, Chennai, Delhi, Hyderabad, Kolkata, Mumbai, Pune, and Surat. The requirement put forth by Delhi is approximately 26 percent of the total aggregated demand under the Grand Challenge. Moreover, the e-buses procured by Delhi under this initiative are expected to be operational by 2023. All these e-buses will be 12m, low-floor buses from Tata Motors Limited.

In addition to these 1800 e-buses, GNCTD is committed to procure about 6380 e-buses under the Grand Challenge Phase-II which is scheduled to be conducted early next year by CESL. Out of these 6380 e-buses, Delhi Transport Corporation(DTC) and Delhi Integrated Multi-Modal Transit

System (DIMTS) collectively will procure 4100 nos. 12m e-buses, 2080 nos. 9m e-buses and 200 double-decker e-buses (Exhibit 17). With this, the percentage of e-buses in Delhi's fleet will increase from 2 percent in 2022 to 70 percent in 2025 (Exhibit 18).

Exhibit 17 Planned procurement of e-buses in Delhi

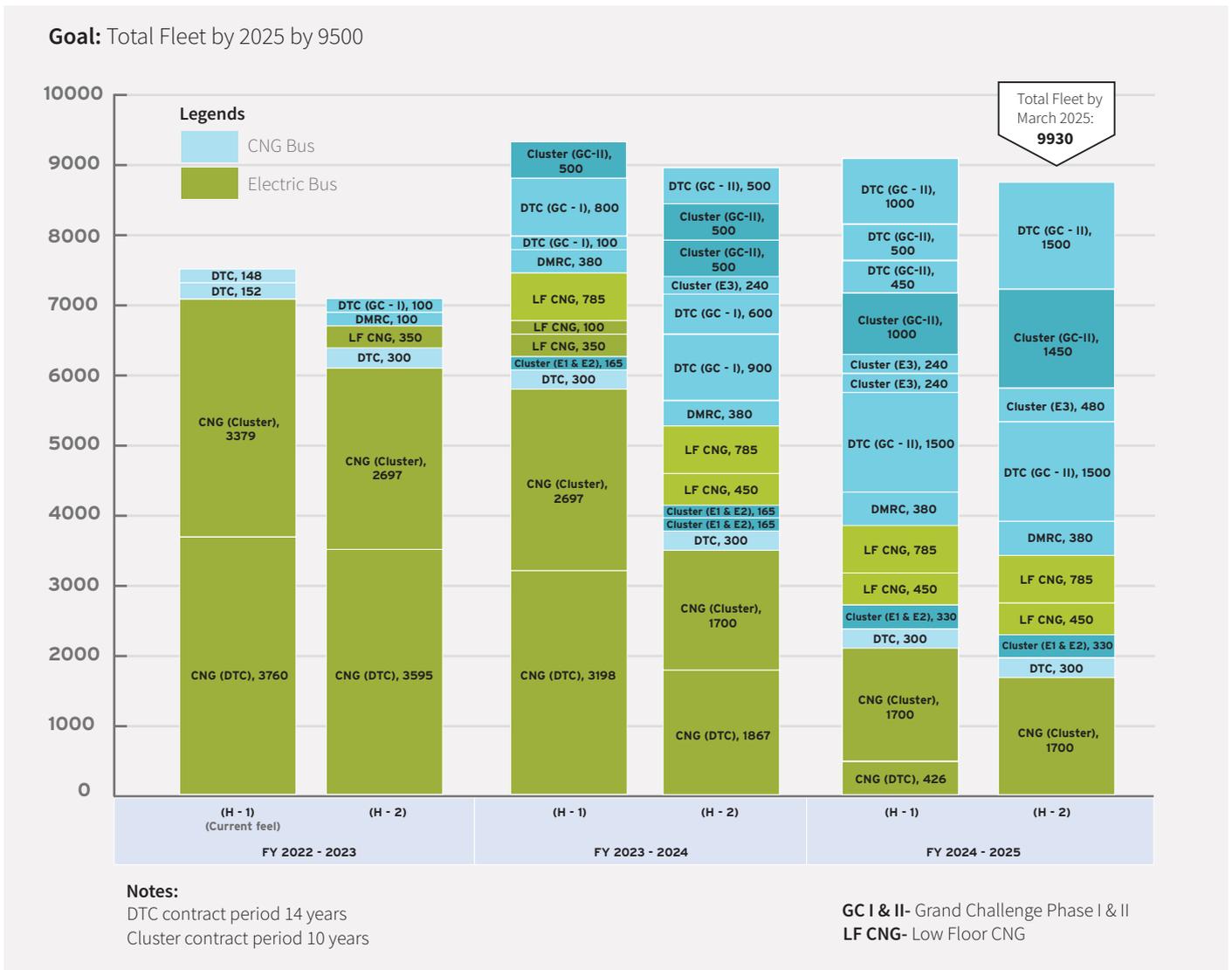
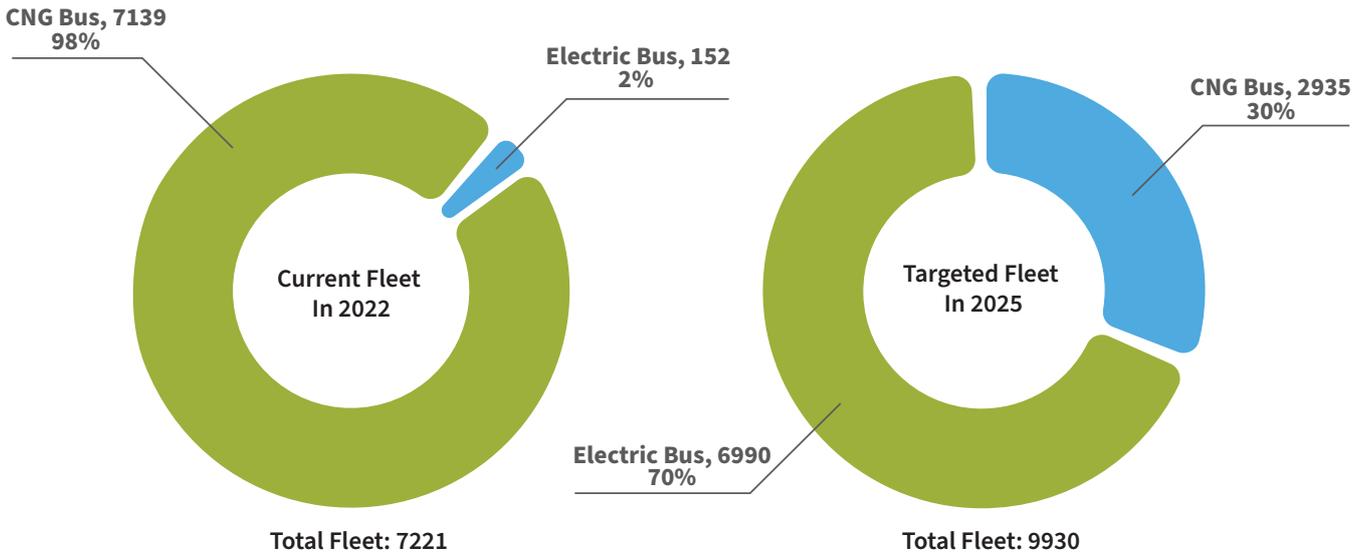


Exhibit 18 Planned transition in Delhi’s bus fleet from CNG to electric



To achieve the ambitious targets for the electrification of Delhi’s public transport, a project management unit (PMU) comprising sector experts was set up by the Department of Transport. The PMU will ensure uniformity in the tendering process of DTC and DIMTS (cluster scheme). Additionally, a dedicated expert group will help accelerate the on-ground work of electrifying the depots

3.4 Strengthening Institutional Mechanism

The implementation of Policy required mechanisms that institutionalise the processes operationalising the policy. To achieve this, the policy envisages a three-tier system ensuring daily implementation, monitoring, and evaluation at the apex level. The system creates a collaborative approach to active and citizen-centric policy implementation.

3.4.1 State EV board

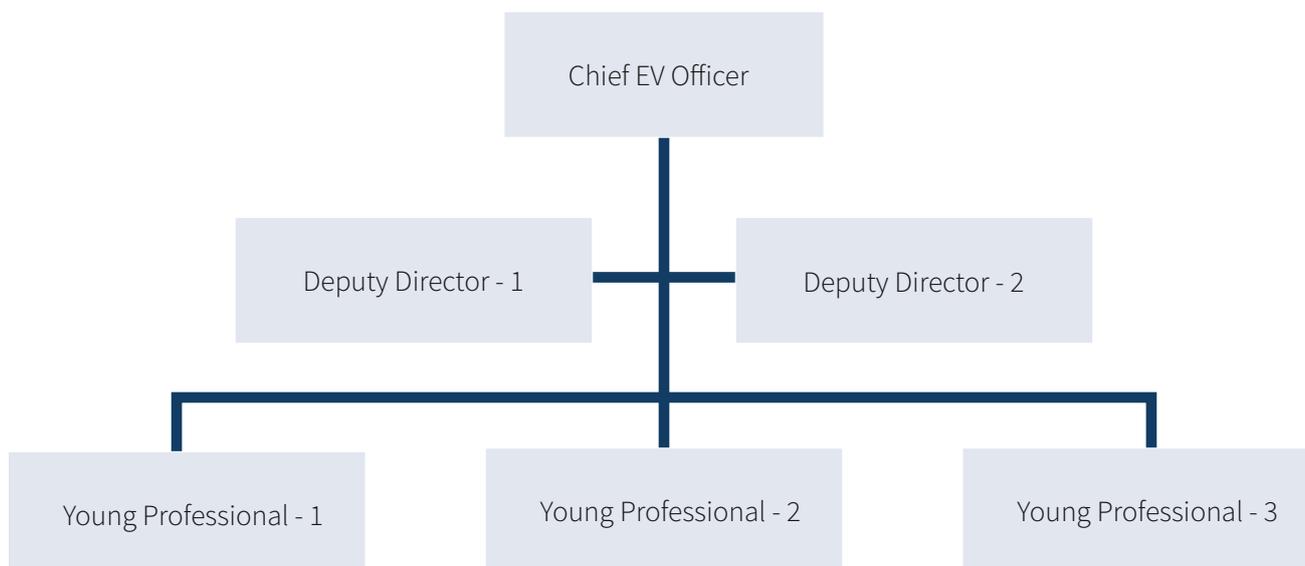
The policy mandates the formation of a State EV Board for effective implementation of the policy. The Delhi government envisaged the board will be chaired by the Hon’ble Minister (Transport), Principal Secretary (Transport), Principal Secretary (Environment), and Principal Secretary (Power) to ensure inter-departmental coordination on all matters related to the Delhi EV Policy. The board is expected to meet quarterly to assess the progress of implementation and review the proposals recommended by the State EV Cell. The Hon’ble Minister for Transport, along with the State EV Cell and WG for accelerated rollout of charging infrastructure in Delhi, conduct regular quarterly reviews at the apex level, ensuring effective inter-departmental coordination.

3.4.2 State EV cell

To facilitate its day-to-day implementation, the policy mandates the establishment of a dedicated State EV Cell. The EV Cell would include professionals with technical expertise and be housed under the Department of Transport, GNCTD. The Cell currently comprises a chief EV officer (or CEO, EV Cell) supported by two deputy directors and three young professionals (**Exhibit 19**).



Exhibit 19 Structure of Delhi EV Cell



The State EV Cell was set up to perform the following functions of the Delhi EV Policy:

- Facilitating the disbursement of demand incentives on vehicle segments and charging stations through a transparent and quick platform.
- Facilitating deployment of EV charging infrastructure in collaboration with stakeholder departments.
- Identifying measures to prepare recommendations for further policy intervention to accelerate EV adoption in Delhi.
- Any other matters that may be necessary for driving EV adoption in Delhi.

In addition, the cell engages with decision makers across multiple departments (e.g., transport, power, finance) to deliver outcomes as outlined in the Delhi EV Policy and act as a single point of contact for stakeholders such as OEMs, mobility service providers, and charging service providers.

3.4.3 Working group for EV charging

The Delhi government constituted a WG for the accelerated rollout of charging infrastructure in Delhi to obtain a holistic view of charging infrastructure in the region and recommend strategies to accelerate its deployment. It is chaired by the vice chairperson of the Dialogue and Development Commission of Delhi (DDC-D), a position of ministerial rank, and has representations from the most senior officials of the Department of Transport, Department of Power, commissioners of the three municipal corporations, chairperson of the New Delhi Municipal Council, director (Operations) of Delhi Transco Limited — the State Nodal Agency (SNA) for charging infrastructure in Delhi, CEOs of all DISCOMs, and managing director of EESL. The WG ensures

continuous and timely coordination between various departments and agencies of the Delhi government, local bodies, DISCOMs, and Indian government agencies.

3.5 Fleet Electrification

The transition of vehicle fleet to electric is a key priority of GNCTD. This includes the government fleet used to transport government officials and commercial fleet used for passenger mobility (taxis and ride-sharing aggregators) and last-mile delivery of goods and services by the e-commerce, courier, food, and retail industries. In line with this priority, the Delhi EV Policy mandates the time-bound transition of the entire GNCTD fleet and the fleet used by delivery service providers to electric.

3.5.1 Government fleet

In February 2021, GNCTD issued an order to transition all its existing hired petrol, diesel, and CNG vehicles to EVs within six months. The order applied to all departments, autonomous bodies, and grantee institutions under the purview of GNCTD. To operationalise this, the State EV Cell designed EV-specific service level agreements (SLAs) for Delhi government agencies and integrated them into GeM, which is used to procure goods and services (including hiring and leasing of vehicles) by governments across the country. EV-specific SLAs are essential because hiring and leasing EVs requires consideration of several additional parameters compared with hiring and leasing ICE vehicles. These parameters include the following:

- Provision of space and electrical connection exclusively for EV charging.
- Inclusion of operating costs in the scope of service as EVs have high upfront costs but low operating costs. This brings

the cost of lease and hire of EVs at par with that of ICE vehicles.

- Lack of information on second use and resale value of vehicles and, therefore, its incorporation in the calculation of bid amounts.
- Design of charger usage policy and billing process.

These differences also require officials in all hiring and leasing departments to be well informed about the associated specifics. To ensure this, the State EV Cell and GeM organised training sessions for officials across Delhi government agencies and created a standard operating procedure (SOP) document listing the step-by-step process to float a tender on GeM for hiring and leasing EVs in Delhi. Additionally, the State EV Cell aggregated the demand from different departments and floated a unified bid for 225 EVs on GeM. The bids received thus far were significantly lower (up to 50 percent) compared with leasing and hiring from nominated public entities. Additionally, 28 EVs were purchased by the Delhi Pollution Control Board and at least 131 more by other Delhi government departments, including for the entire council of ministers of GNCTD.

Two key issues impeding the transition of government fleet in Delhi are huge delays in delivery of orders and lack of equivalent EV replacements for ICE vehicles used by the government.

3.5.2 Commercial fleet

Commercial vehicles used for last-mile delivery, e-commerce logistics, and on-demand mobility service providers have lesser idle time with privately owned vehicles. This high utilisation translates into TCO of EVs (due to reduced operational costs) being lesser than that of conventional vehicles. This positively influences fleet operators' return on investment (RoI).

In December 2021, the Delhi government announced the draft Motor Vehicle Aggregator Scheme mandating a phased transition of vehicles operated by aggregators to EVs. The scheme is applicable to any aggregator with at least 25 motor vehicles (except buses) in its fleet. The scheme is in the draft stage where the comments and suggestions received from the industry are being reviewed.

The proposed regulatory framework created to implement the scheme will ensure compliance and effective monitoring of the EV transition targets set under the scheme. This includes the provision restricting the onboarding of more vehicles to the platform/fleet unless the EV targets are met. Under the current draft, two- and three-wheeler fleet is expected to onboard only EVs after the fourth year, while the four-wheeler fleet is expected to onboard only EVs after the fifth year of the notification of the scheme (**Exhibit 20**).

Exhibit 20 Phased electrification mandates of vehicles operated by aggregators in Delhi under Motor Vehicle Aggregator Scheme

Timeline	The target for adoption of EVs in new fleet for 2 - W and 3 - W	The target for adoption of EVs in new fleet for 4 - W
Within the first 6 months from the day of notification of the scheme	10%	5%
Within One year from the day of notification of the scheme	25%	15%
Within Two years from the day of notification of the scheme	50%	25%
Within Three years from the day of notification of the scheme	75%	50%
Within Four years from the day of notification of the scheme	100%	75%
Within Five years from the day of notification of the scheme	-	100%

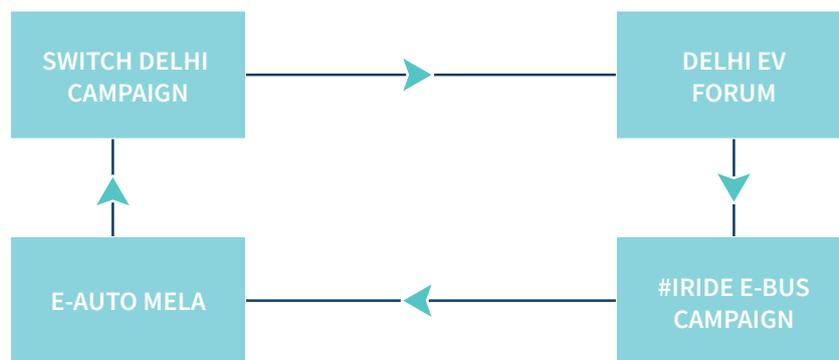
The targets for the first five years only apply to vehicles onboarded after the announcement of the scheme, and aggregators shall be allowed to operate conventional vehicles. However, the scheme mandates all commercial vehicles operated and owned by aggregators to be electric starting April 1, 2030.

3.6 Public Awareness and Stakeholder Engagement

Public outreach and communication campaigns focused on economic and environmental benefits of EVs are crucial to enable its accelerated adoption. Consumer exposure to the environmental and economic benefits of EVs can positively influence their decision to adopt the technology, and there is a positive correlation between consumer knowledge and purchase of EVs. To ensure better consumer awareness, the Delhi government took several measures to encourage and motivate consumers to switch from conventional vehicles to EVs (**Exhibit 21**). These measures include targeted and continuous awareness drives and stakeholder engagement programmes, chatbots to answer queries pertaining to EVs in Delhi, campaigns to encourage use of e-buses, and forums to resolve the challenges faced by the EV industry and potential consumers.



Exhibit 21 Campaigns and activities undertaken by Delhi government for awareness and public outreach

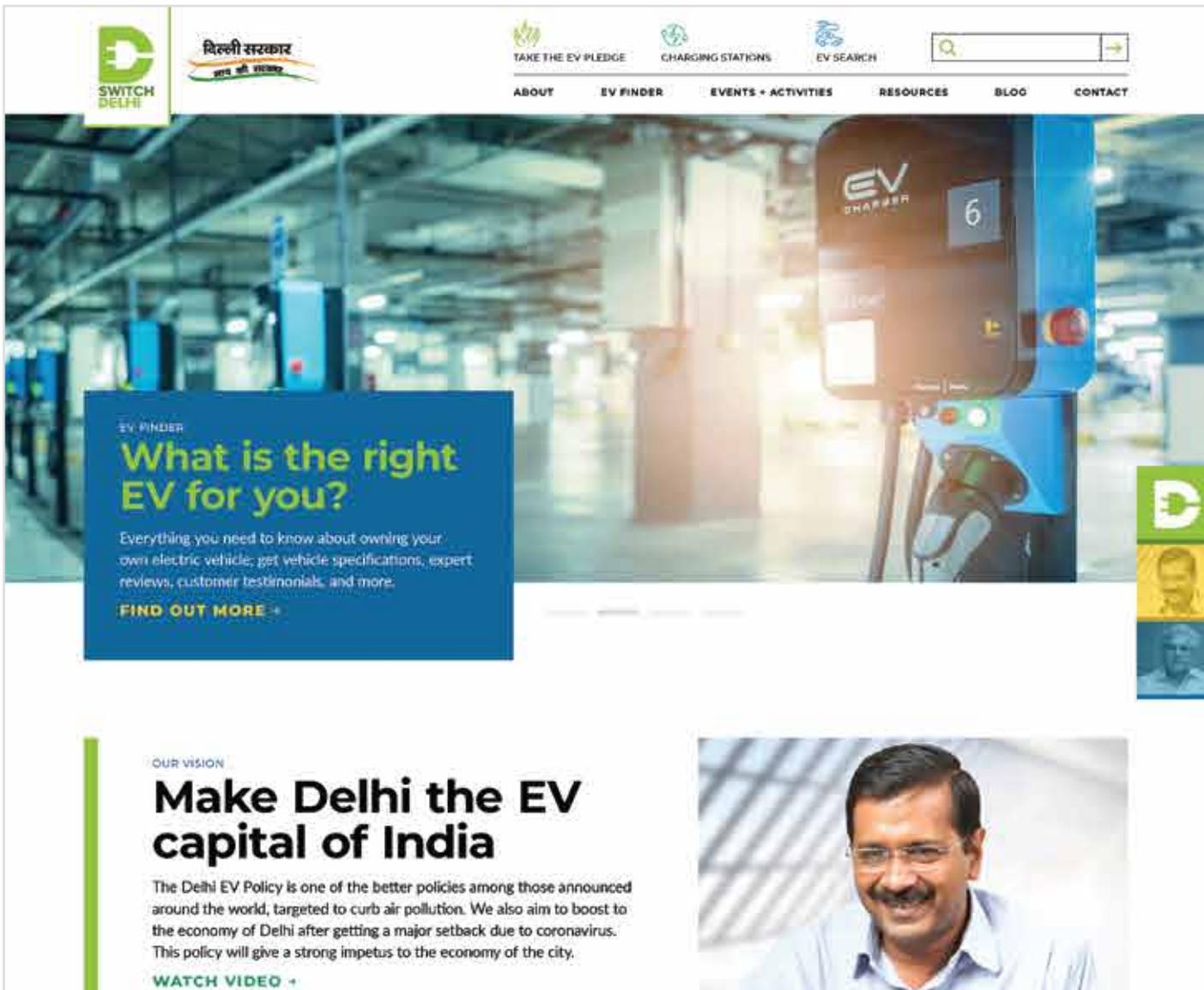


3.6.1 Switch Delhi campaign

In February 2021, the Delhi government launched the Switch Delhi campaign focusing on increasing awareness of EVs among Delhi residents. The first campaign was two-month long, with each week focusing on specific themes such as two-wheelers, three-wheelers, four-wheelers, and charging. Dedicated social media handles were assigned to share updates on policy implementation, provide information about incentives, resolve grievances, and answer queries pertaining to EVs.

The campaign used social media and communication workshops to spread awareness about the following aspects:

- Economic benefits of EVs by comparing the TCO of EVs with that of conventional vehicles.
- Environmental benefits, particularly their contribution to reducing pollution.
- Information pertaining to EV charging and charging stations for EVs.
- Reducing the concerns of consumers over the safety and performance of EVs.
- Engagement with schools and colleges to encourage EV adoption.



The public outreach under the Switch Delhi campaign continued beyond eight weeks, with constant engagement through dedicated social media platforms. Furthermore, a one-stop destination website (<https://ev.delhi.gov.in/>) was launched to provide information about EVs, including costs, savings, charging and swapping stations, and financing in Delhi.

3.6.2 Delhi EV Forum

The Delhi EV forum was established to facilitate continuous engagement with a broad set of stakeholders to implement the Delhi EV Policy. The forum is jointly organised by DDC-D and RMI India Foundation on half-yearly basis. Thus far, three forums have been organised, with the Delhi government's senior leadership (including ministers), industry stakeholders, consumers, civil society organisations, multilaterals, and think tanks participating in each. The last meeting of the forum was held on April 19, 2022, and over 150

stakeholders participated. As the EV ecosystem is still in the initial stages of development, stakeholder discussions have proved crucial in the implementation of the Delhi EV Policy. The inputs received from stakeholders during focused discussions at the forum are translated to policy actions by the Delhi government.



3.6.3 E-Auto Mela

In October 2021, Delhi conducted a week-long E-Auto Mela promoting the adoption of e-autos and simultaneous replacement of existing CNG autos with e-autos. Prospective e-auto drivers participating in the mela were able to see and drive all the available models of e-autos at the fair and explore the loan terms.

The e-auto mela was conducted in the backdrop of the Delhi government's decision to implement an open permit system for e-autos, wherein the remaining unallocated 4,261 permits (out of 1,00,000) would be issued only for e-autos. The permits were given on first-come-first-serve basis and 33 percent (i.e., 1,406) of the total permits were reserved for women applicants to promote their inclusion in this drive.



3.6.4 #IrideEbus Campaign

The Delhi government launched the **#IrideEbus** campaign to promote maximum adoption of e-buses by the people of Delhi for their daily commute. Under the campaign, the Delhi government organised a public contest until June 30, 2022, to promote its e-buses and encourage people to travel and experience these noiseless emissions-free buses. Along with free rides for three days after the launch (May 24–26, 2022), the Delhi government urged the public to post their pictures while riding e-buses in Delhi on their social media handles, with the top 3 entries standing the chance to win an iPad.

3.7 Inclusion of E-Cycles in Delhi EV Policy Incentive Framework

Electric bicycles (e-cycles) were initially not included in the Delhi EV Policy. In April 2022, demand incentives on e-cycles were included through an amendment to the policy. The segment has the potential to be a game changer, especially for entities and individuals engaged in last-mile delivery services.



Source: Switch Delhi #IrideEbus Campaign

In addition to the positive impact of shifting from completely motorised vehicles to e-cycles on health and wellbeing, the segment carries the following benefits:

Increased payload-carrying capacity for long distances

In the context of daily travel, e-cyclists can cover longer distances than conventional cyclists.¹¹ A survey of 28 e-bike users in the Netherlands reported e-cyclists made trips totalling 9.8km as against 6.3km by conventional bike commuters on average.¹²

Access to the best of both technologies

Despite the electrical assistance that e-cycles provide, e-cycling involves significant levels of exertion. These vehicles are pedal-assisted with a throttle support to help the rider cover a distance of approximately 45km in a single charge.¹³

Potential to appeal to commuters of all age groups

In the Netherlands, where e-cycle use is relatively well-established, 81 percent of e-bike kms in 2016 were ridden by those aged 50 and above (although usage by younger age groups is growing).¹⁴ For Delhi, while e-bikes are expected to be popular among all age groups, young children (for their daily school commute) and adults seeking an alternate mode for commute and exercise are expected to be the first movers.

Price range and use-case

E-cycles are cost-effective and generally carry half the price of an electric high-speed scooter. With low cost of operation and maintenance, e-cycles present a potential case for last-mile delivery runners to transition from polluting two-wheelers to e-cycles. Cargo e-cycles can operate up to 40km in a single charge with a carrying capacity of over 60kg.¹⁵

The demand incentives offered on the first 10,000 e-cycles (passenger and cargo) by the Delhi government can reduce the upfront cost by up to 33 percent. For the cargo segment, the policy offers a scrapping incentive of up to Rs 3,000 per vehicle for scrapping and deregistering old ICE two-wheelers registered in Delhi. An early indicator of its popularity is that e-cycle sales crossed over 100 units in less than a month of the operationalising the provision in the Delhi EV Policy.

3.8 Gender inclusive mobility system in Delhi

The Delhi government made significant strides in addressing gender issues in Delhi's mobility system. The first path-breaking initiative was the free bus ride scheme for women rolled out in October 2019. In 2021-22, more than three crore female passengers availed the facility of free travel in public buses in Delhi.¹⁶

Additionally, DDC-D constituted a task force in 2019 to work toward strengthening women's safety and improving their experience of public transport in Delhi.¹⁷ The task force advised and monitored the implementation of several initiatives such as the bus marshals programme; complaint redressal system; SOPs for bus drivers, conductors, bus marshals, and depot managers in preventing and addressing incidents of sexual harassment in public transport; and gender sensitisation training.

The Delhi government took the following initiatives recently to enable a just and inclusive e-mobility transition:

- The government decided to relax the norms to recruit female drivers for its buses, including reducing the minimum height needed from 159cm to 153cm and bringing down the experience criteria to a month for women applicants.¹⁸
- The government decided that women qualifying for the post of drivers will initially be deployed in low-floor buses.
- The government reserved 1,406 (33 percent) of the 4,261 new permits for new e-autos in the city exclusively for women.
- In April, the Department of Transport kicked off Mission Parivartan, an initiative to train women to obtain their heavy motor vehicle (HMV) licenses at the Society for Driving Training Institute (SDTI) in Burari.
- In July 2022, in its endeavour to create employment opportunities for women in the public transportation sector, the Delhi government announced a plan to provide 50 percent of the financial assistance required to train women willing to take up commercial driving.

Delhi is undoubtedly one of the most progressive states in India to build the foundation of an all-inclusive mobility system by taking these pivotal initiatives.

4. Learnings from Implementation of Delhi EV Policy

The finest of policies fail to achieve their targets due to several loose ends in terms of their implementation approach. A progressive policy also requires the right institutional and procedural mechanisms to comprehend and realise its vision efficiently. The Delhi EV Policy is an example of what can be achieved when the government and other stakeholders collaborate to bring transformation.

The policy could create such an impact as it is supported by a set of operating guidelines for implementing different clauses in the policy. In addition, a dedicated team of experts and professionals has been built, which is responsible for day-to-day implementation of the policy. Finally, the progress of implementation is regularly monitored at the highest levels of the government. The following section provides a summary of key learnings from the implementation of the Delhi EV Policy.

1. Time-bound operationalisation of policy

Delay in operationalising the policy's key provisions will lead to consumer dissonance and erode market confidence. Therefore, work on operationalising them (such as incentive disbursement) should start before the policy notification. This approach allowed the Delhi government to initiate incentive disbursement within two months of the policy announcement.

2. Timely disbursement of incentives requiring minimal effort from consumer

The consumer should be able to easily access the incentives within the promised time frame. To ensure incentives are disbursed within two weeks of the purchase of an EV, the Delhi government introduced a completely digital process to disburse incentives. In addition, the system design ensured the burden to apply for incentives does not fall on the consumer by situating the responsibility for incentive application with the dealer. EV dealers across Delhi were provided capacity buildings and system logins to apply for incentives on consumers' behalf.

3. Actively identify and address delays

System design should ensure delays are actively identified and addressed. For instance, the Delhi government established systemic checks to identify delays and ensure nudges at the specific levels where approvals are stuck. Additionally, a grievance registration mechanism was created to monitor delays that persist despite systemic nudges.

4. Ensuring adequate fund stream to support various policy provisions

It is critical to ensure an adequate corpus for all expenses to incentivise charging infrastructure, ensure consumer

awareness, and demand incentive under the policy. Delhi created a dedicated, non-lapsable State EV Fund sourced through the Air Ambience Fund (collected on per litre of diesel consumption) and ECC. The remaining deficit is met through budgetary allocation. Additionally, the day-to-day balance of account is monitored by the Delhi EV Cell.

5. Leveraging existing procedures and mechanism

Although policies to promote e-mobility is neoteric for most states and cities, learning and building upon the nodal department's existing procedures is essential to operationalise the various interventions under the policy. Instead of reinventing the wheel, developing existing procedures and processes ensures smooth transition for existing regulators, approving authorities, and decision makers. Setting up new processes can cause confusion and delays, which, in turn, can lead to consumer dissonance.

6. Training and capacity building

Although the nodal departments should ensure minimal deviation from existing processes, continuous capacity building sessions are required for all new processes. For these sessions, it is imperative to develop SOPs and frequently asked questions (FAQs), and video-record training sessions for all departments that may require it. Several queries and clarifications are addressed in these documents, making it easy for the coordinating/nodal department to focus only on major challenges, if any.

7. Institutional reforms

EVs are an evolving technology and require a dedicated team of professionals and experts in the field to operationalise and implement the policy provisions. Although Delhi envisioned to set up a dedicated EV cell for this purpose, the same was reciprocated by other departments/bodies responsible for implementation. For instance, DTL and other DISCOMs formed dedicated teams to ensure coordination with the Department of Transport and among other stakeholders and realise the targets envisaged under the Delhi EV policy. Notably, although there were delays in hiring dedicated staff under the Delhi EV Cell, the nodal agency created an interim arrangement to ensure work progressed as expected.

8. Charging and swapping infrastructure

The exhaustive process of developing an EV charging and swapping ecosystem in Delhi has generated the following key learnings for cities in India and other parts of the world:

- The often stated "chicken and egg" issue with EV charging can be resolved by providing facilitative business opportunity for EV charging and swapping. Instead of waiting

for EV penetration to increase before developing the charging and swapping infrastructure, cities should evolve mechanisms encouraging the private sector to invest in deploying charging and swapping stations and providing simplified means to install charging points.

- It is important to not consider charging as a standalone business and expand its scope to businesses wherein charging is not the primary aspect but one that is critical to their core business. In Delhi, the best example of this is allowing fleet operators to participate in the charging and swapping tender. Notably, two of the winners of the tender are EV fleet operators. Since EV charging is fundamental to their fleet operations, these entities were able to offer extremely competitive bids for service charge, which would be extremely difficult to match for any entity with charging as the only source of revenue.

- The importance of providing business model flexibility cannot be overstated. The technological and economic feasibility of operating charging and swapping stations is site-specific. Therefore, instead of the government mandating the combination of chargers to be installed on each site, the private operator should be authorised to best assess the site specifics and determine the appropriate solutions and combination of chargers.

- A scientific approach to sighting forms the cornerstone of successful public charging and swapping station deployment. Rigorous sighting exercise comprising primary and secondary analyses is key to the success of Delhi's public charging station tender.

- Incentives must be well targeted. This translates to thinking beyond subsidising the cost of the electrical vehicle supply equipment and extending the scope of incentives to defray other major costs associated with installing charging and swapping stations. Additionally, incentives must benefit priority vehicle segment users the most while deregulating prices for non-priority vehicle segments. The revenue from the latter can be used by private operators to cross-subsidise priority vehicle segment users. For instance, in Delhi, fast charging (power level >22kW) is excluded from the price mandate.

- The provision to allow private operators to raise additional revenue opportunities in public charging and swapping tenders can be tricky. The possibility of using land parcels provided for charging and swapping for other core business activities needs to be mitigated. A good practice is to allow raising of revenue only through advertisement other than charging and swapping. However, aggregating land parcels

from multiple agencies requires the development of standardised revenue sharing arrangements.

- It is important to ensure the coverage of public charging and swapping stations is extended to underserved and unserved areas. In Delhi, this was executed by clubbing prime and non-prime sites to create a package of sites and mandating private operators to bid for packages instead of sites.

- Aggregation of sites or demand is an excellent way to increase the viability of operating charging and swapping stations for the private sector. This aggregation can be done for public and semi-public sites. In Delhi, a key learning was that implementing a facilitative single-window mechanism and providing attractive subsidy encouraged vendors to undertake aggregation and support customers in installing charging points in their premises.

- Cities would do well to take a technology and solution agnostic approach to charging. This would encourage technological and business model innovation and provide users a portfolio of solutions to choose from.

- The best way to scale charging and swapping infrastructure deployment is to leverage existing public assets. This includes leveraging municipal parking, on-street parking with lamp posts, parking in offices for public dealing, and public land parcels. In leveraging these public assets, the objective must be to lower service charge instead of maximising revenue.



5. Impact and Results

5.1 Electric Vehicle Adoption

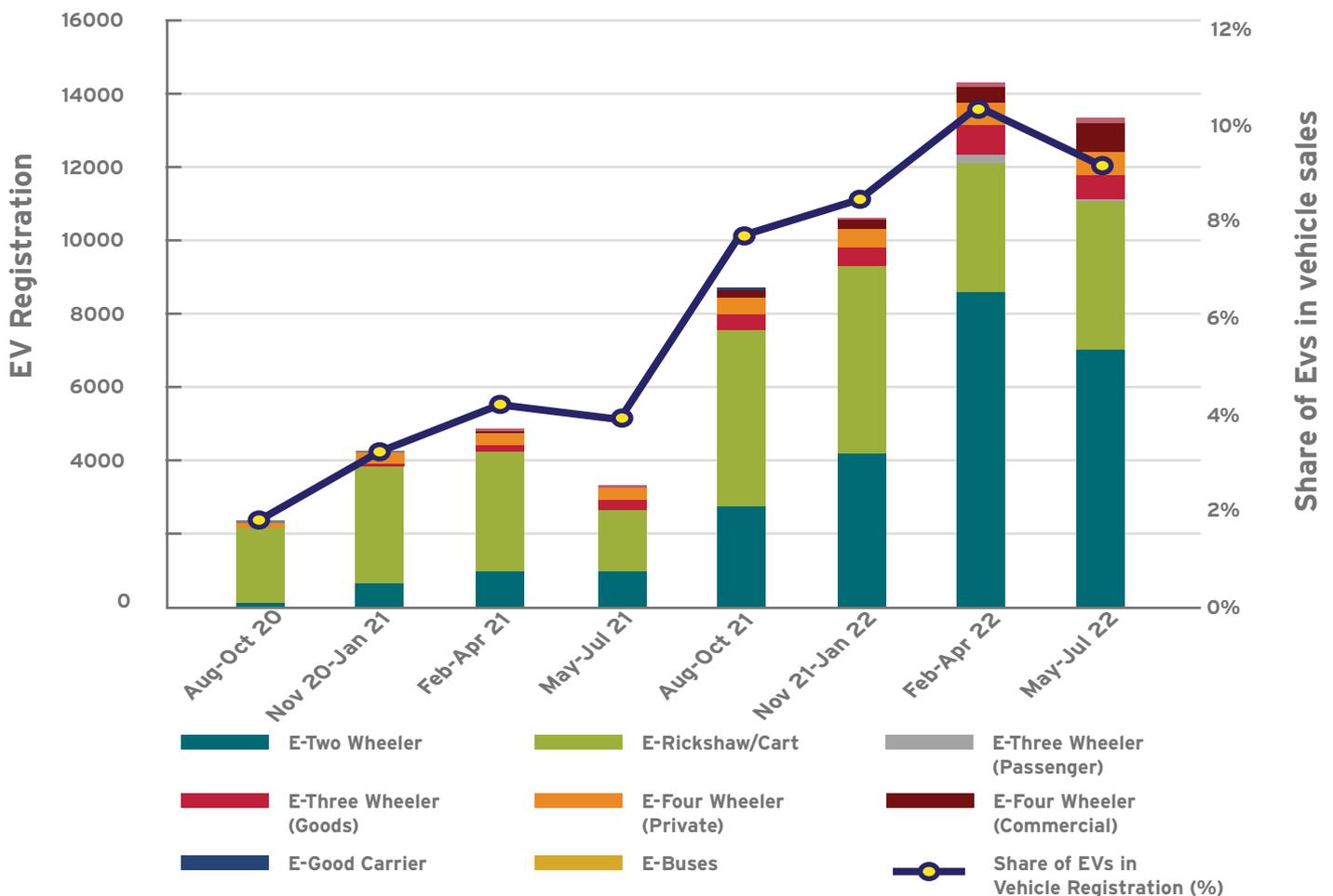
Key Takeaways

- More than 62,000 EVs were registered since the launch of the policy.
- Delhi had the highest monthly EV sale penetration of 12.5 percent in March 2022 across Indian states.
- Thus far, purchase incentives of nearly INR 94 crore have been disbursed to incentivise over 34,000 vehicles, with all EVs receiving road tax and registration fee exemption.
- EVs' contribution to the total vehicle registration in Delhi is averaging almost 10 percent in 2022.

Delhi's EV policy by far presents itself as the most comprehensive subnational policy that adopts a systemwide approach to promote the adoption of EVs. It puts equal emphasis on instilling confidence in consumers and industry while ensuring that a public scheme like this invests in modes and assets that will have equitable benefits for all.

The policy accelerated the transition to EVs, particularly in the two- and three-wheeler vehicle segments. Over 62,000 EVs were sold in Delhi within two years of the policy implementation. Delhi has witnessed 10 percent EV contribution to the total vehicle sales in Delhi in the past six months compared with 2–3 percent between August 2020 to January 2021, the initial phase of the policy (**Exhibit 22**).

Exhibit 22 EV registration and its share in all vehicle sales since Delhi EV Policy was notified



The share of EV sales in Delhi in the past year (Aug 21–July 22) was more than thrice the national average of approximately 3 percent. **Exhibit 23** presents the annual segment-wise sale of EVs before and after the policy notification. Overall EV sales increased 224 percent between the first and second years of the policy implementation.

Electric two-wheeler sales have been the most promising segment since the notification of the policy. The sales of e-two-wheelers have grown over twenty times from 1,016 vehicles between August 2019 – July 2020, to 22,974 in the last one year.

Similarly, the Delhi Government announced the progressive step to issue permits to only e-autos in the future. Based on this decision, 4,261 permits were disbursed on a first-come-first basis to applicants for electric autos boosting the e-auto registrations in the state. Since the launch of the scheme, 295 e-autos have been registered in Delhi.

The Delhi EV Policy provided for a demand incentive of INR 30,000 to both e-rickshaws and e-carts. These incentives helped sustain the market during COVID-19 pandemic when e-rickshaw/cart drivers were in particular need of fiscal support. Since the launch of the policy more than 28,000 e-rickshaws and carts have been added to the market.

Additionally, the electrification of last-mile delivery services has been a thrust area of the Delhi EV Policy. The market for these vehicles was non-existent before the announcement of

the Delhi EV policy. However, since the notification of the policy, 2621 e-three-wheeler goods vehicles have been registered in Delhi; which is almost a quarter of national sales of these vehicles.

Lastly, the policy provided incentives of up to INR 1,50,000 to the first 1,000 adopters of e-four-wheelers (M1 vehicle category upto INR 15 lakhs as price). In addition, all e-four wheelers continue to get exemption from road tax and registration fees. Since the notification of the policy, electric four-wheeler sales have grown more than four times compared to the annual registration during the pre-policy period.

In 2022, thus far, EVs account for 10 percent of the total sales in Delhi, which is at par with some of the leading EV cities in the world such as California and New York.¹⁹

Exhibit 23 Annual mode-wise EV registration and percentage change in Delhi

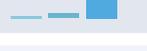
Vehicle segment	Aug 19–Jul 20 (Pre-policy)	Aug 20–Jul 21 (Post-policy year 1)	Aug 21–Jul 22 (Post-policy year 2)	Percent change from Aug–Jul 19–20 to Aug–Jul 20–21	Percent change from Aug–Jul 20–21 to Aug–Jul 21–22	Growth trend in EV Registration
 Electric 2-Wheeler	1,016	2,838	22,974	179%	710%	
 E-Rickshaw/Cart	16,989	10,443	17,677	-39%	69%	
 Electric 3-Wheeler Passenger	0	0	295			
 Electric 3-Wheeler Goods	0	212	2,409	-39%	1,036%	
 E-Car	816	1,147	3,936	41%	243%	
 E-Bus	1	30	272	2900%	807%	
Total	18,822	14,670	47,563	-22%	224%	

Exhibit 24 illustrates the EV penetration in leading EV states of Delhi, Maharashtra, Karnataka, and Uttar Pradesh, which announced EV policies around the same time or before the Delhi EV Policy. Delhi is a clear leader among these states with

its share of EVs in vehicle sales averaging at 9 percent. Similarly, compared with the top metropolitan cities in India, Delhi leads with EV penetration of 10 percent on average between July 2021 and June 2022 (**Exhibit 25**).

Exhibit 24 Share of EVs in vehicle sales in leading Indian states with highest EV penetration in past year

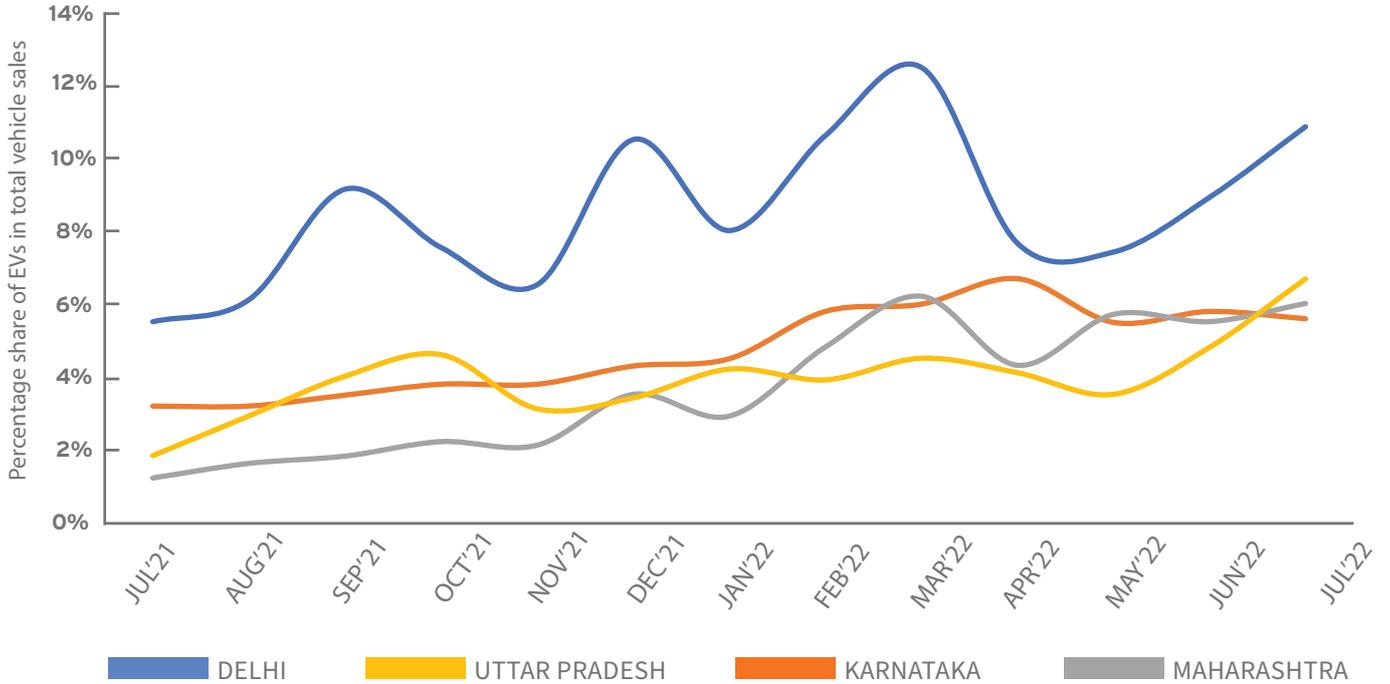
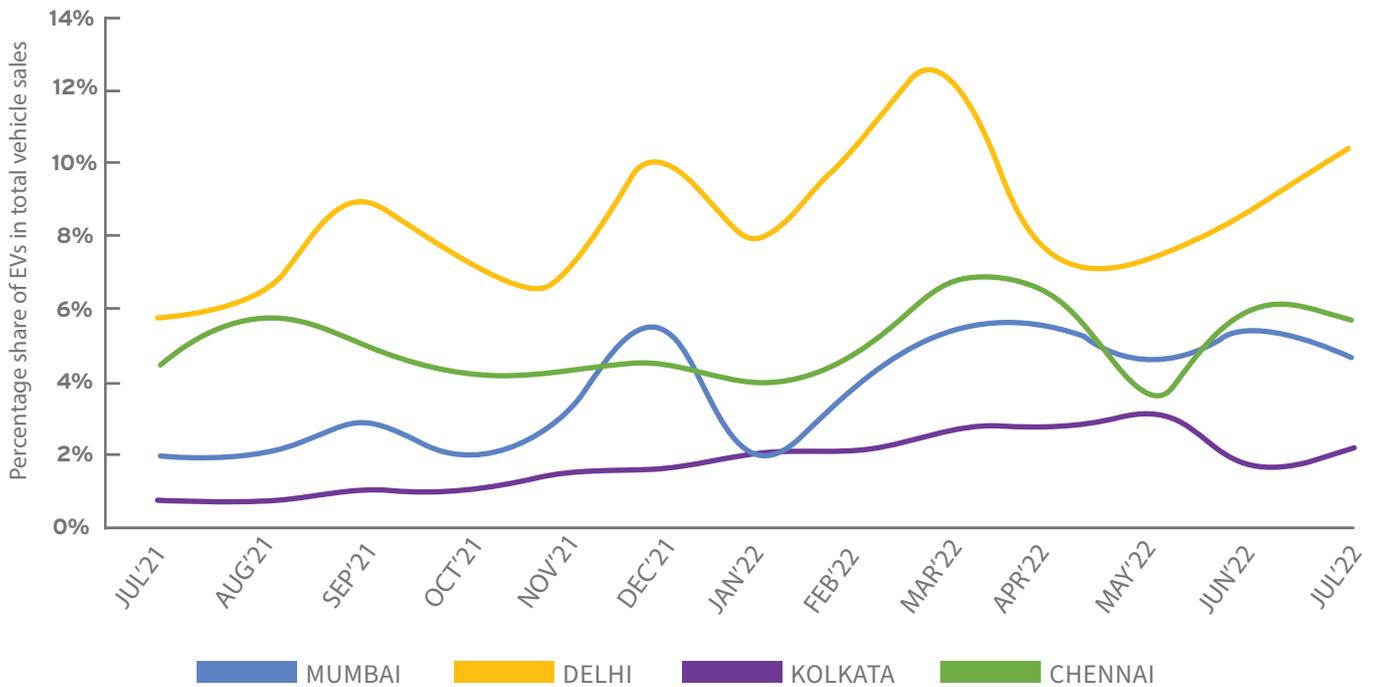


Exhibit 25 Share of EVs in vehicle sales in top metropolitan cities



5.2 Deployment of Charging Infrastructure

Key Takeaways

- Delhi has 2452 operational public and semi-public charging points (1919 locations) and 234 battery swapping stations.
- Delhi established India's first single-window clearance mechanism to set up semi-public and private charging points with the provision of availing INR 6,000/charging point and more than 594 charging points.
- The EV-to-public-charger ratio in Delhi is close to 25:1, which is at par with that of Oslo and Helsinki.

Two- and three-wheelers are considered the priority vehicle segments in Delhi. This translates to prioritising light EV AC/DC chargers and encouraging battery swapping. Delhi already has 2452 public/semi charging points and 234 battery swapping stations, which indicates 28x growth since the policy was launched in August 2020. 594 charging points have already been installed and 304 are in pipeline for the single-window mechanism as of July 31, 2022. 98 percent

of these chargers are the Light Electric Vehicle (LEV) AC chargers, based on the latest Power Level 1 charging standard published by the Bureau of Indian Standards, Government of India (**Exhibit 26**). **Exhibit 27** and **Exhibit 28** represent spatial distribution of existing and upcoming charging and battery swapping points in Delhi. With accelerated expansion of charging points, the EV-to-public-charger ratio in Delhi has reached 25:1^{vii}, which is comparable with that of cities such as Oslo and Helsinki.²⁰

Most of these charging and swapping stations are live on the Delhi EV website/One Delhi app.²¹ In addition, the process to install 896 more charging points and 103 swapping stations across highly visible locations, such as Delhi Metro parking and bus depots, will be completed in the next two months.

The mandate of the Delhi EV Policy related to charging infrastructure is holistic as it covers public, semi-public, and private charging; development of payment infrastructure; interoperability; favourable EV tariff; and regulatory changes. The policy mandates a charging point must be available within 3km of travel anywhere in Delhi.

Exhibit 26 Disaggregated information of charging points installed under the Single-Window mechanism

Single Window Installations		
DISCOM	Total Sites	Charging Points
BRPL	226	429
TATA	25	74
BYPL	53	91
Total	304	594

Charger-wise Break Up		
Charger Type	Chargers	Charging Points
LEV AC- CAPEX	579	579
AC001- CAPEX	3	15
Total	582	594

Installation Type		
Installation Type	Total Sites	Charging Points
Private	207	209
Semi public	97	385
Total	304	594

Exhibit 27 Spatial distribution of existing and upcoming charging stations in Delhi

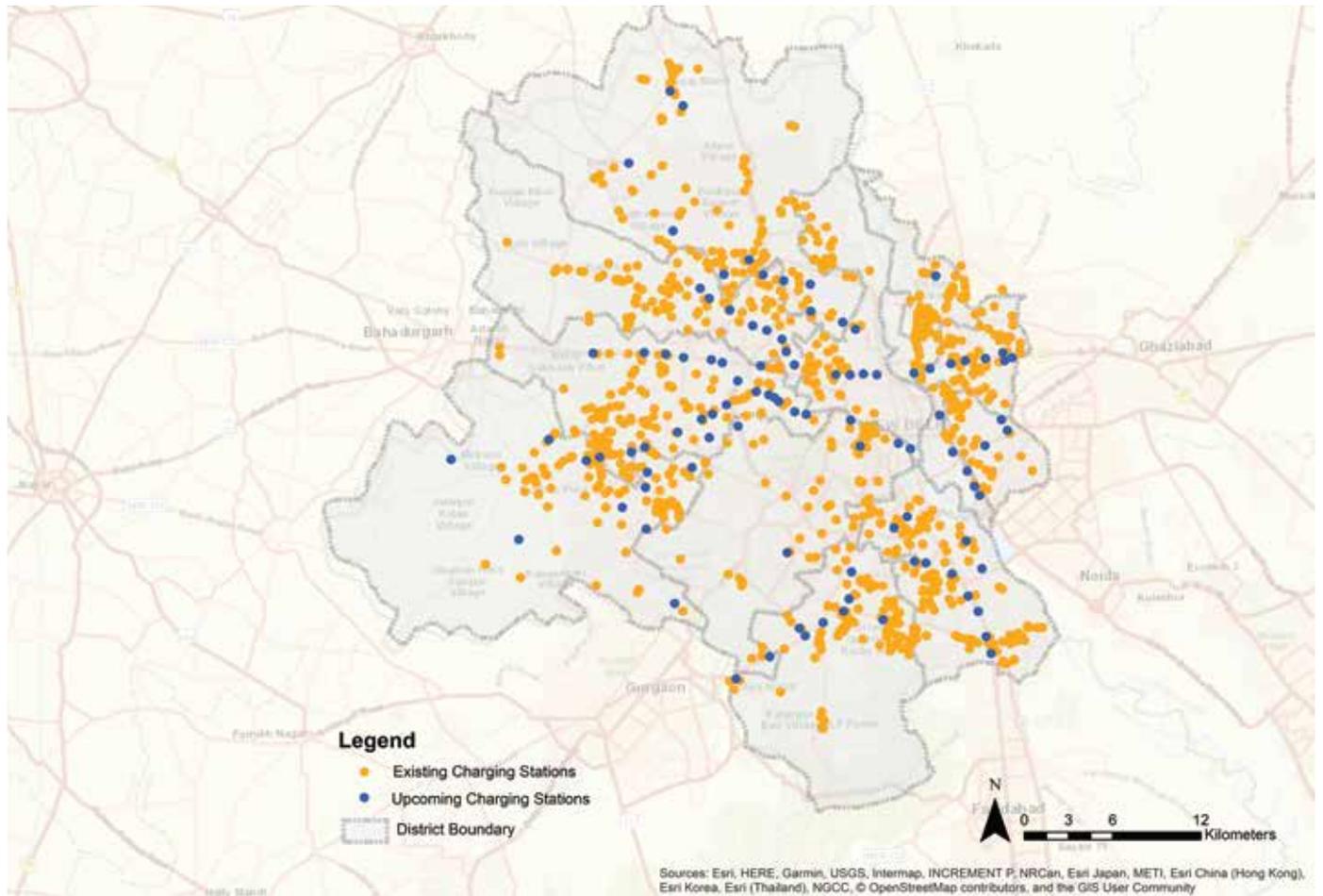
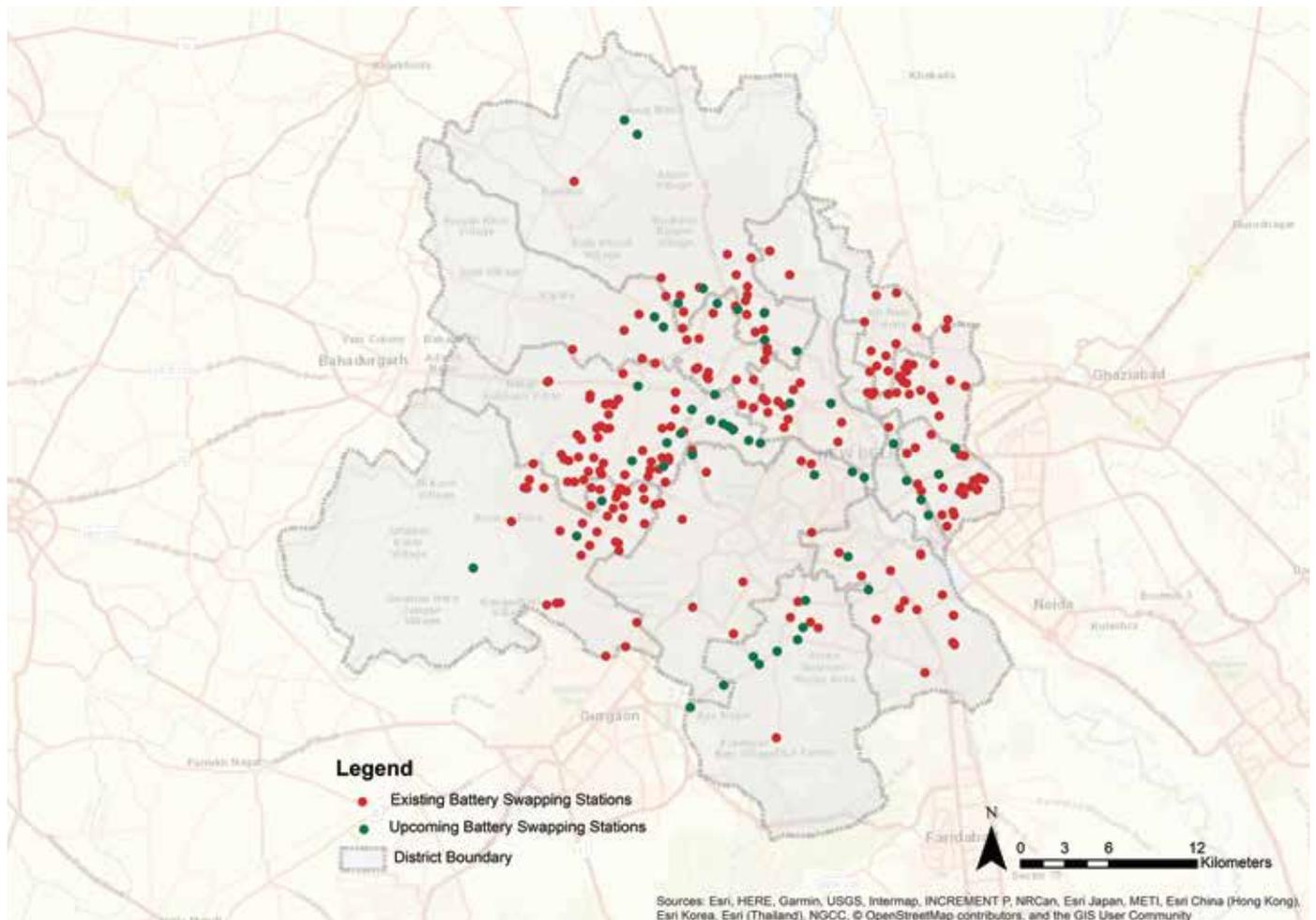


Exhibit 28 Spatial distribution of existing and upcoming battery swapping stations in Delhi



5.3 Deployment of E-Buses

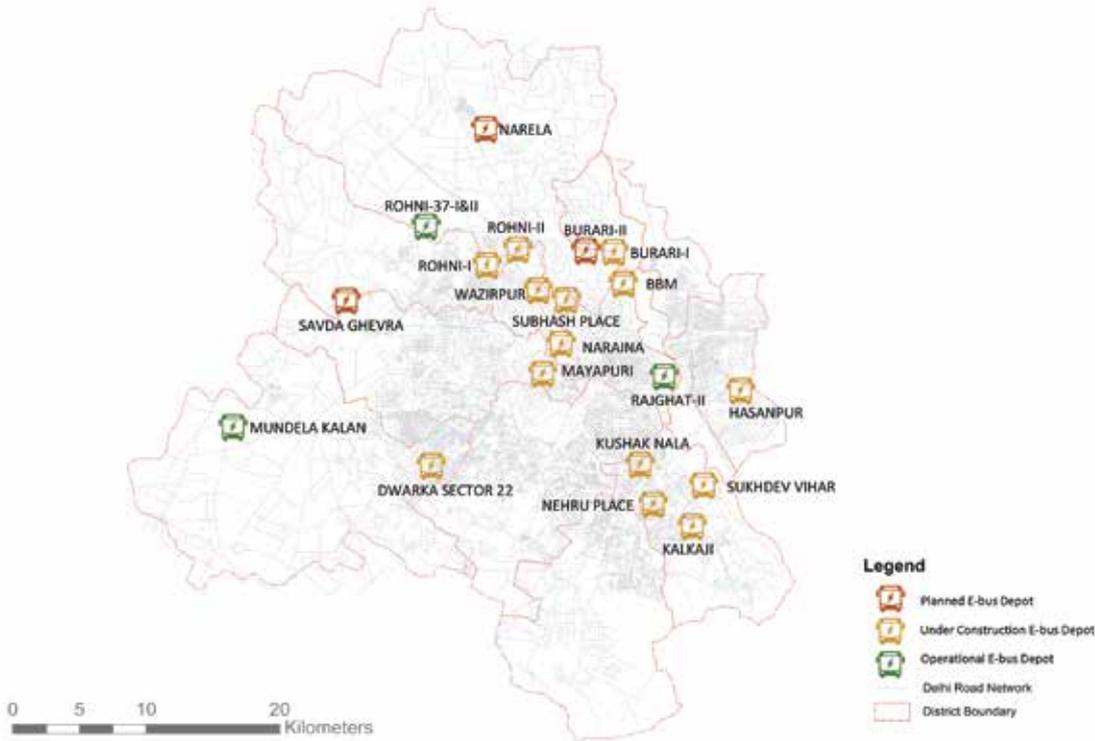
Key Takeaways

- Delhi Transport Corporation is currently operating 152 e-buses with an additional 150 buses to be deployed by August 2022.
- With the induction of e-buses, the city’s public bus fleet crossed the 7,200 mark — the highest ever. Delhi plans to deploy 6,380 e-buses in the city, taking the e-bus contribution to 70 percent of the overall fleet by 2025.
- Delhi plans to electrify all bus depots in a phased manner. Currently, e-buses are accommodated at the bus depots of Mundela Kalan and Rohini Sector-37, and Rajghat.

The Delhi EV Policy aims to ensure e-buses constitute at least 50 percent of the new public transport vehicles (with 15 seats or more) since the policy notification. Since August 2020, the Delhi government has procured 644 buses, of which 152 are e-buses. This constitutes 24 percent of the total new buses procured since the policy was launched.

These 152 e-buses in Delhi are operated from the Mundela Kalan and Rohini Sec-37 depots and Rajghat-II, all of which are equipped with the required charging infrastructure. Electrification of 18 other depots is underway to accommodate the charging requirements of approximately 2,600 e-buses that Delhi aims to procure by 2025 (Exhibit 29).

Exhibit 29 Spatial distribution of operational, under-construction and planned e-bus depots in Delhi



5.4 Clause-wise Status of Implementation of Delhi EV Policy

The implementation of the Delhi EV Policy signalled a new era of mobility. Exhibit 30 highlights the domain-wise status of implementation of all the measurable clauses of the policy, resulting in accelerated EV adoption in the state. Delhi implemented 83 percent of the policy based on the analysis of 54 measurable clauses.

The primary focus has been on the disbursement of demand incentives (89 percent), deployment of charging infrastructure (89 percent), and in the next two years of the policy implementation, Delhi will continue the ongoing initiatives, would focus on battery recycling, and expand the charging network and skill development. Refer Annexure A for further details.

Exhibit 30 Delhi EV policy clause-wise implementation scores

EV Policy Domains	Score
Disbursement of incentives and fee waivers	89%
Charging infrastructure	89%
Battery recycling ecosystem development	63%
State EV fund	50%
Creating jobs — vocational training and R&D	70%
Policy implementation	88%
Delhi EV Policy Score	83%

6. Road Ahead

The Delhi EV Policy is enabling Delhi to leapfrog from conventional fuel vehicles to EVs and thereby reducing the environmental impact of the transport sector. Moving ahead, GNCTD, with support from all stakeholders will work together to support the government and industry in their efforts to achieve its 25 percent EV penetration target by 2024 and establish Delhi as India's EV capital. The path forward will focus on the following:

Building a robust charging infrastructure network

Delhi has prepared a three-year action plan to deploy charging and swapping stations. The action plan includes targets for deployment, strategy for implementing the action plan, and agency-wise mapping of responsibility. Some key aspects of the action plan are as follows:

- Floating the next phase of tender for public charging and swapping stations, which incorporates the learnings from the first phase.
- Undertaking the next round of empanelment for the single-window process. The light EV AC charger standard published by the Government of India became a reality on the ground because it was included for empanelment by the Delhi government. The product was exclusively developed by manufacturers to be deployed in Delhi. A similar approach is envisaged for deploying the light EV DC charging standard by considering it for the next round of empanelment.
- Conducting a pilot for leveraging lamp posts to develop kerbside charging on roads with on-street parking. Floating a unified tender for setting up charging points on civic parking lots.
- Aggregating demand for charging in all government or institutional buildings to float a unified tender.

Consumer awareness campaign

To ensure citizens are informed and continuously encouraged to transition to EVs from existing ICE vehicles, GNCTD will conduct a Switch Delhi 2.0 campaign for an evolved market such as Delhi. This campaign will focus on motivating potential consumers to switch to EVs by disseminating testimonials of existing consumers. As part of the campaign, Delhi will continue to arrange workshops with RWAs in addition to continuous online campaigns.

Operationalising remaining policy provisions

GNCTD is committed to operationalising the remaining clauses of the Delhi EV Policy. In this regard, to operationalise the incentive disbursement mechanism to swappable battery models, a discussion with OEMs and battery swapping facility operators will be arranged and the web application shall be

developed to support the ecosystem. In addition, GNCTD shall focus on the following:

- Hosting job fairs and workshops to build capacity of drivers, mechanics, and other professionals that can support after-sales services of EVs.
- GNCTD, through Delhi Skills and Entrepreneurship University (DESU), will work toward updating the curriculum for driver and mechanic training of the existing diploma programme to suit the needs of the evolving ecosystem.
- The interest subvention, which is currently applicable on e-autos, shall be extended to lithium-ion-based e-rickshaws and e-carts along with electric light goods vehicles to support accessible financing for EVs.

Electrification of fleet operated by GNCTD

GNCTD is committed to transition all of its fleet to EVs. The transport department shall be the nodal department to monitor the demand and uptake of vehicles across various departments of GNCTD. To this end, the Department of Transport already aggregated the demand for over 200 e-cars across government departments, autonomous bodies, and grantee institutions, and have floated an e-bid on GeM. Moving forward, the department of transport shall continue to support GNCTD's other departments to ease the process of hiring and leasing EVs.

Promoting last-mile connectivity through EVs

To promote e-autos and public e-bike sharing in Delhi, GNCTD is developing a pilot with DMRC in Dwarka. In the first phase of the pilot, 136 e-autos will be made operational across 10 DMRC metro stations and supported by 19 battery swapping stations to be installed at 10 locations. In the second phase of this pilot, 20 e-feeder buses and approximately 150 e-cycles and 100 e-bikes would be operational for providing first- and last-mile connectivity at DMRC metro stations.

GNCTD will continue to share its learnings from its e-mobility journey with cities globally. It will work towards creating an action plan that goes beyond the tenure of the Delhi EV Policy. The action plan will be developed to align with the needs of a mature EV ecosystem.

Annexures



Annexure A: Clause-wise implementation score of the Delhi EV Policy

The first table below illustrates the scoring matrix through which the implementation status of each policy clause is analysed. The second table below highlights the clause-wise status of the implementation of the policy's measurable

clauses, resulting in accelerated EV adoption in the state. These scores can be used to monitor Delhi's implementation curve over time (in months/years) and compare it with other states.

Different stages of clause implementation	Score
a. No initiative toward implementation.	0%
b. Implementation is underway with preliminary discussion on its methodology.	25%
c. The government planned the methodology of the implementation and is undertaking stakeholder consultation to understand the market perspective.	50%
d. The implementation plan of the clause is finalised and is with the approving agencies.	75%
e. The implementation plan of the clause is approved but yet to be implemented.	90%
f. The clause is implemented.	100%

Delhi implemented 83 percent of the policy based on the analysis of 54 measurable clauses. The table below highlights

the score of each measurable policy clause along with explanations wherever required.

EV Policy clause	Score	Remarks	
Disbursement of incentives and fee waivers	89%		
Two-Wheelers	Demand generation incentives for battery capacity for two-wheelers (4.1.2)	100%	
	Registration and verification of two-wheeler OEMs (4.1.5)	100%	
	Purchase incentives for two-wheelers (4.1.6)	100%	
	Scrapping incentive (Clauses 4.1.7)	100%	
	Electrification of ride-hailing two-wheelers (4.1.8)	100%	
	Electrification of delivery service providers (Clause 4.1.9)	100%	
E-Autos	Registration and verification of three-wheeler-L5M OEMs (4.2.1)	100%	
	Open permits for e-autos (4.2.2)	100%	
	Purchase incentive and interest subvention (4.2.3)	100%	
	Scrapping incentive (Clauses 4.2.4)	100%	
	Exchanging ICE auto permit with e-auto permit (4.2.5)	100%	

E-Rickshaw /E-Carts	Purchase incentive and interest subvention (4.3.2)	50%	The purchase incentives are operationalised, whereas the interest subvention scheme needs to be operationalised.
E-Buses	GNCTD committed e-buses to constitute at least 50% of all new stage-carriage buses procured, starting with the induction of 1,000 e-buses by 2020 (4.4.1)	50%	24 percent of the new buses registered are e-buses and procurement of 1,650 e-buses is currently underway.
E-Goods carrier	Purchase incentive and interest subvention (4.5.2)	75%	The purchase incentives are operational, whereas the interest subvention for e-goods carrier has not been operationalised.
	Exempted from the prohibition on plying and idle parking of light goods vehicles on identified roads of the NCT of Delhi during specified timing (4.5.3)	100%	
	Scrapping incentive (Clauses 4.5.4)	100%	
E-Cars	Purchase incentive (4.6.1)	100%	
	Transitioning government fleet to electric	50%	
Provisional applicable across vehicular segments	The registration fee and road tax exemption (5.1)	100%	
	Disbursement of incentive directly to vehicle owners (5.2)	100%	
	Distribution of purchase incentive for battery swapping models (5.3)	75%	
	Operational guideline for delivery of all demand incentive (5.4)	100%	
	Interest subvention of 5 percent offered in the vehicle categories of e-autos, e-rickshaws, e-carts and goods carriers (5.5)	75%	Interest subvention for e-autos has been operational.
	Green number plate for all EVs	100%	
	EV stickers on EVs availing incentive	50%	

Charging infrastructure		89%	
Deployment of Charging Infrastructure	All new home and workplace parking “EV-ready” with 20 percent of all vehicle holding capacity/parking required to be EV ready (Clause 6.1.2)	100%	
	Installation of private charging points (PCPs) and subsidy for first 30,000 PCPs (Clause 6.1.3)	100%	
	Facility to purchase PCPs online, net of subsidy (6.1.4)	100%	
	Providing accessible public charging facilities within 3km of travel from anywhere in Delhi and creation of a charging infrastructure working group	100%	
	Selection of energy operators (Clause 6.2.3)	100%	
	Capital subsidy (Clause 6.2.4)	100%	
	Reimbursement of SGST (6.2.5)	0%	
	Special EV tariff (Clause 6.3.1)	100%	
	Tariff concession to all private charging points that are BEVC-AC001-compliant and connected to the Central Management System (CMS) (6.3.2)	100%	
	GNCTD shall endeavour to provide (a) open access without the condition of having a contract demand of 1 MW and above and (b) power banking (6.3.3)	75%	
	Payments through multiple modes such as cash, cards, mobile wallets, and UPI. Option for payments through the common mobility card payment system shall also need to be offered. (6.4.1)	100%	
	An open, publicly owned database on charging infrastructure (6.4.2)	90%	

Battery recycling ecosystem development		63%	
Battery recycling ecosystem	Batteries that reached their end of life shall have to be either reused or recycled (7.1)	75%	
	Setting up of recycling businesses in collaboration with battery and EV manufacturers (7.2)	50%	
State EV fund		50%	
Funding	Pollution cess (Clause 8.2)	100%	
	Additional road taxes (Clause 8.3)	0%	
	Congestion fee (Clause 8.4)	0%	
	Air Ambience Fund and Environment Compensation Charge (Clause 8.5)	100%	
Creating Jobs – Vocational Training and R&D		70%	
Skill development	New jobs for e-auto and e-cab drivers, charging station operators, and EV service mechanics; vocational courses delivered through world-class skill centres (WCWSs) (9.1)	75%	
	Auto OEMs and energy operators shall be allowed to conduct their own captive staff training at WCSCs (9.2)	100%	
	WCSCs shall offer short re-training courses for ICE mechanics who would like to be trained in repairing and servicing EVs (9.3)	100%	
	Regular recruitment fairs at WCSCs for private sector recruiters seeking to hire trained personnel (9.4)	50%	
	A centre for excellence shall be set up at one of the central or state universities within Delhi and shall be funded by GNCTD (9.5)	25%	
Policy Implementation		88%	
Policy implementation and governance	A dedicated EV cell shall be established within the Department of Transport for effective day-to-day implementation of the Delhi EV Policy (10.1)	100%	
	GNCTD shall design and implement an intensive public outreach and communication campaign (10.2)	100%	
	A State EV Board shall be constituted by GNCTD (10.3)	100%	
	Regularly review the performance of various measures under the policy and take additional measures, as necessary (10.4)	100%	
EV Policy Score		83%	

Annexure B: Detailed analysis of the Delhi EV Policy

Policy Vertical	Provisions (with clause/s)	Expected Timeline	Status of Implementation	Deviations (if any)	Suggested Course Correction
Fiscal incentives	Purchase incentives for passenger two-and four-wheelers(Clauses 4.12-4.17, 4.6.1)	Completed	Purchase incentives for two- and four-wheelers are operationalised. As of August 10, 2022, 15,456 passenger two-wheelers and 864 four-wheelers received incentives amounting to INR 34.63 Cr. of purchase incentives under the Delhi EV Policy.	-	-
	Purchase incentives for e-autos and e-rickshaws are operationalized. As of August 10, 2022, 244 e-autos and 14,391 e-rickshaws received incentives amounting to INR. 43.9 Cr. of purchase incentives under the Delhi EV Policy.	Completed	Purchase incentives for e-autos and e-rickshaws are operationalized. As of August 10, 2022, 244 e-autos and 14,391 e-rickshaws received incentives amounting to INR. 43.9 Cr. of purchase incentives under the Delhi EV Policy.	-	-
	Purchase incentives for e-carts, L5N, and N1 (e-carriers) category vehicles are operationalised. As of August 2022, 3,065 e-carts and 2,074 e-carriers received incentives amounting to INR. 15.41 Cr. of purchase incentives under the Delhi EV Policy.	Completed	Purchase incentives for e-carts, L5N, and N1 (e-carriers) category vehicles are operationalised. As of August 2022, 3,065 e-carts and 2,074 e-carriers received incentives amounting to INR. 15.41 Cr. of purchase incentives under the Delhi EV Policy.	-	-

Policy Vertical	Provisions (with clause/s)	Expected Timeline	Status of Implementation	Deviations (if any)	Suggested Course Correction
	Scrapping incentive (Clauses 4.1.7, 4.2.4)	Completed	Scrapping incentives for two- and three-wheelers are operationalised.	-	Although the scrapping incentive is operationalised, due to the complicated mechanism for claiming scrapping incentives, no consumer claimed scrapping incentive. Delhi needs to develop more consumer-friendly guidelines for claiming these incentives.
	Interest subvention (Clauses 4.3.2.b, 4.5.2.b, 4.5.4, 5.5)	Completed	The operationalisation of the interest subvention scheme was initially planned in collaboration with Delhi Finance Corporation (DFC); however, owing to administrative challenges, CESL is onboarded to operate and administer 5% interest subvention to EVs under the policy. The scheme was successfully implemented with support from CESL.	The deviation from the initial plan and decision to administer the interest subvention through CESL was primarily because of CESL's existing web application for EV transactions.	-
	Road tax and registration fees waiver (Clause 5.1)	Completed	Waivers of road tax and registration fee are operationalised. As of August 10, 2022, 36,112 vehicles received these exemptions.	-	-

Policy Vertical	Provisions (with clause/s)	Expected Timeline	Status of Implementation	Deviations (if any)	Suggested Course Correction
	Incentive to EOs (Clause 5.3)	Partially Completed	The incentives for EOs are operationalised and all the necessary updates made on the incentive disbursement platform.	In addition to the incentive to EOs, deliberations are also underway to identify measures that can promote the deployment of a network of BSSs. These deliberations also involve an alternate way of incentive disbursement.	Course correction suggested; a detailed stakeholder holder interaction is being planned.
Charging Infrastructure – Private Charging Points	Change in building bye-laws (Clause 6.1.2)	Completed	Building bye-laws are amended to make all new home and workplace parking “EV-ready” with 20 percent of all vehicles holding capacity/parking required to be EV ready.	The building bye-laws only cover new buildings. Therefore, additional measures are taken to mandate 5 percent of the parking space in all existing buildings with a parking capacity of more than 100 vehicles to be EV-ready and have the provision of at least a 3.3kW power output charging point.	Course correction already implemented

Policy Vertical	Provisions (with clause/s)	Expected Timeline	Status of Implementation	Deviations (if any)	Suggested Course Correction
Charging Infrastructure – Public Charging Infrastructure	Installation of (PCPs) and subsidy for first 30,000 PCPs (Clause 6.1.3)	Completed	The DICOMs, through an RFP, empaneled 12 vendors of AC charging and 7 vendors for DC charging. As of July 31, 594 charging points are installed.	-	-
	Facility to purchase PCPs online, net of subsidy	Completed	A single-window process to purchase PCPs online is developed and operationalised.	-	-
	Identifying concessional locations for public charging stations at bare minimum lease rentals (Clause 6.2.2) Identifying concessional locations for public charging stations at bare minimum lease rentals (Clause 6.2.2)	Completed	Nearly 200 locations were identified to be tendered out on a concessional basis. All the locations were assessed for technical and economic feasibility.	-	-
	Selection of Energy Operators (Clause 6.2.3)	Completed	The tender for installation of 500 public charging stations at 100 locations across Delhi was floated and Letter of Award (LoA) awarded to four concessionaires.	The expected timelines are extended because of the second wave of COVID-19.	Course correction already implemented

Policy Vertical	Provisions (with clause/s)	Expected Timeline	Status of Implementation	Deviations (if any)	Suggested Course Correction
				on the feedback received from the new leadership of the Department of Power and Department of Transport. This committee's report is finalised and submitted.	-
	Capital Subsidy (Clause 6.2.4)	Complete (October 2021)	<p>The working group decided to provide capital subsidy in the form of the following:</p> <ol style="list-style-type: none"> Subsidy for upstream electrical infrastructure for up to 100 kW. Subsidy for slow chargers installed on public charging stations. <p>Both these clauses are added in the public charging tender. The process flow for subsidy transfer for upstream electrical infrastructure is developed and officially approved.</p>	-	-
	Reimbursement of SGST	-	-	The clause is not implemented because there is no clarity yet on whether GNCTD has the administrative powers to implement the clause.	GNCTD should obtain legal clarity on its power to implement the clause. As the process for registration of EOs is initialised, GNCTD should provide clarity to registered EOs on the reimbursement of SGST.

Policy Vertical	Provisions (with clause/s)	Expected Timeline	Status of Implementation	Deviations (if any)	Suggested Course Correction
EV Charging – other clauses	Special EV tariff (Clause 6.3.1 – 6.3.2)	Complete	GNCTD obtained approvals from DERC to allow for special EV tariff for all EV charging stations irrespective of use case. Additionally, it received approval for installing separate EV meters in all locations (including domestic use cases) irrespective of sanctioned load or presence of existing meters.	-	-
Payment infrastructure and information sharing	Payments through multiple modes such as cash, cards, mobile wallets, and UPI. The option for payments through the common mobility card payment system shall also need to be offered. (6.4.1) Payments through multiple modes such as cash, cards, mobile wallets, and UPI. The option for payments through the common mobility card payment system shall also need to be offered. (6.4.1)	Complete			
	An open, publicly owned database on charging infrastructure (6.4.2)	Ongoing			

Policy Vertical	Provisions (with clause/s)	Expected Timeline	Status of Implementation	Deviations (if any)	Suggested Course Correction
Policy Administration	State EV cell (Clause 10.1)	Complete	The interim state EV cell is operationalised and the proposal for creating permanent positions at the Cell is submitted to the Services Department, GNCTD. The interim state EV cell is operationalised and the proposal for creating permanent positions at the Cell is submitted to the Services Department, GNCTD.	Considering the budget cuts due to the pandemic, approval from the services department was delayed. However, to expedite institutionalising of EV Cell, it will now be housed under DTIDC, Department of Transport, and long-term contractual posts will be created.	-
	State Electric Vehicle Board (Clause 10.3)	Complete	The State EV Board is in the process of approval.	-	-
	Outreach program for public awareness (Clause 10.2)	Phase – 1 complete Phase – 2 September 2021	<ul style="list-style-type: none"> Delhi launched an eight-week long Switch Delhi campaign to inform, encourage, and motivate citizens to switch from polluting vehicles to EVs. In addition, the Delhi government developed a dedicated Switch Delhi website that has information on EV sales, charging infrastructure points, TCO calculator and compendium of all the publications related to Delhi's EV journey. It can be accessed at https://ev.delhi.gov.in/ 	-	These engagements may be made periodical to ensure maximum outreach to citizens.
	Plying and idle parking of e-goods carriers (4.5.3)	Complete	The clause is operationalised in more than 100 corridors within the city limits.	-	-

Policy Vertical	Provisions (with clause/s)	Expected Timeline	Status of Implementation	Deviations (if any)	Suggested Course Correction
Policy Administration	Government fleet transition (Clause 4.6.2)	Ongoing	The Department of Finance of the Delhi government mandated the conversion of government fleet to EVs.	Although the policy envisaged the entire fleet conversion by the first year of the policy (i.e., August 2021); however, the conversion is delayed primarily because of the pandemic.	-
	EV sticker (Clause 5.7)	Ongoing	This aspect of the policy has not been operationalised yet.	-	The Delhi government should expedite the design and approval of EV stickers to help increase awareness about government incentives and EVs, in general.
	All delivery service providers shall be expected to convert 50% of their fleet operating in Delhi to electric by 31 March, 2023, and 100% by 31 March, 2025. (4.1.9)	Ongoing (August 2022)			GNCTD introduced the aggregator guidelines and mandated phased electrification of delivery vehicles. Under this scheme, all new two- and three-wheelers onboarded by last-mile delivery aggregators after completion of three years of the notification of the scheme shall only be EVs.

Policy Vertical	Provisions (with clause/s)	Expected Timeline	Status of Implementation	Deviations (if any)	Suggested Course Correction
	The auto-rickshaw permits linked to the deregistered ICE vehicle can be surrendered and exchanged for an e-auto permit at no additional cost. (4.2.5)	Complete (October 2022)	Operationalised in October 2022 Operationalised in October 2022		
Setting up skill centres	Vocational courses & re-training courses for ICE mechanics (Clause 9.1 & 9.3)	Ongoing (September 2022)	The design of the vocational courses is underway through stakeholder consultations with fleet operators and delivery service providers. These courses will be provided through existing ITIs as academic partners and industry stakeholders as partners for course development. Two streams, namely, driver training and repair/maintenance, and their industry partners are identified.	-	-
	Centre for Excellence (Clause 9.5)	Ongoing (January 2022)	GNCTD is currently undertaking review of a detailed proposal for setting up a centre for excellence on a PPP basis.	-	-
	Recruitment fairs (Clause 9.4)	-	No work is done toward the implementation of this clause as the market has not reached the required level of maturity in Delhi, which would justify conducting recruitment fairs.	-	-
Recycling ecosystem for batteries	Reuse and recycling of batteries (Clauses 7.1-7.2)	Ongoing	The draft of the operational guidelines for the reuse and recycle of batteries is developed and undergoing official review.	The Draft Battery Waste Management Rules published by the Government of	-

Policy Vertical	Provisions (with clause/s)	Expected Timeline	Status of Implementation	Deviations (if any)	Suggested Course Correction
State EV fund	Air Ambience Fund (Clause 8.5)	Complete	The State EV Fund was credited with 50% of the Air Ambience Fund (at the time of the policy notification) and receives monthly funds from the Air Ambience Fund.	-	-
	Additional road taxes (Clause 8.3)	Not initiated	The Delhi government has not levied additional road tax on conventional fuel-based luxury cars as envisaged under the policy yet.	-	-
	Pollution cess (Clause 8.2)	Not initiated	Considering the funds received from the Air Ambience Fund, in addition to those allocated under the planned expenditure of the Delhi government, no additional cess is levied thus far on conventional vehicles.	-	-
	Congestion fee (Clause 8.4)	Not initiated	Considering the funds received from the Air Ambience Fund, in addition to funds allocated under the planned expenditure of the Delhi government, no additional fee is levied thus far.	-	-
	Environment Compensation Charge (ECC), (clause 8.5)	Under consideration with the Hon'ble Supreme Court	The Delhi government filed an application with the Hon'ble Supreme Court to grant permission to utilise INR. 100Cr. to implement various provisions of the Delhi EV Policy.	-	-

Annexure C: Checklist for evaluation of EV charging sites

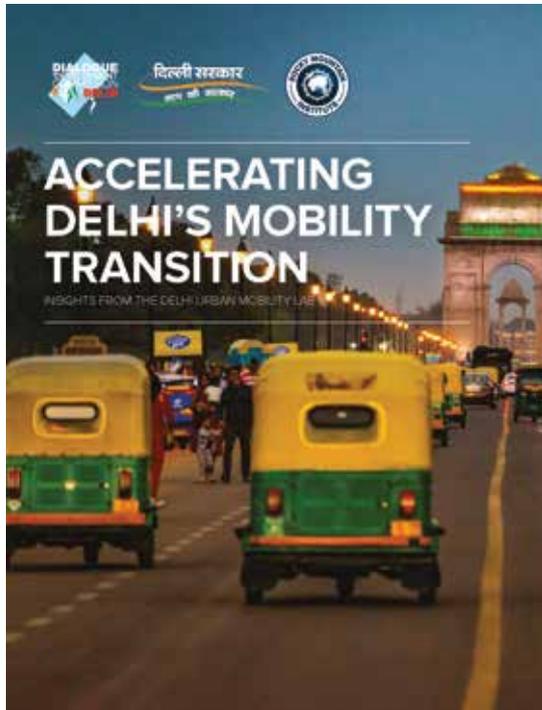
Sr. No.	Criteria	Measure	Scoring
1.	Space	ECS (1 ECS = 23 sqm for open parking)	<ul style="list-style-type: none"> • >5 ECS - High • 3-5 ECS - Medium • <3 ECS - Low
2.	Access	Easy entry to and exit from the EV charging area	<ul style="list-style-type: none"> • Direct, quick, and easy entry to and exit from access road - High • Moderate ease of entry and exit, no obstructions - Medium • Difficult entry and exit with some obstructions - Low
3.	Electrical load availability	Load that can provided by DISCOM at the site without any significant investment	<ul style="list-style-type: none"> • >100 kW - High • 50-100 kW - Medium • <50 kW - Low
4.	Distance from nearest source of power connection	Distance from the nearest transformer, feeder pillar, or substation to the site	<ul style="list-style-type: none"> • <50m - High • 50-100m - Medium • >100m - Low
5.	Requirement for additional civil works	Requirement for site levelling, surface cutting or construction to enable cabling, installation of charger, or preparing site for parking EVs.	<ul style="list-style-type: none"> • Minimal requirement for civil works (e.g., only for installation of chargers) - High • Moderate civil works required, e.g., surface cutting - Medium • Significant civil works required, e.g., large-scale road cutting, levelling, construction - Low
6.	Footfall and dwell time	Footfall around the site (presence of a market, shopping complex, offices, etc.). Average dwell time less than or greater than an hour.	<ul style="list-style-type: none"> • High footfall area with typical dwell time of more than an hour - High • Moderate footfall with dwell time greater than one hour - Medium • Low footfall with short dwell time of less than one hour - Low

Sr. No.	Criteria	Measure	Scoring
7.	Visibility	Visibility of site for vehicle owners and pedestrians	<ul style="list-style-type: none"> • Site clearly visible from main access road and surrounding pedestrian areas - High • Site visible for drivers but poor visibility from surrounding pedestrian areas - Medium • Site not visible from access road - Low
8.	Approvals required prior to commissioning	Approvals/NOC required prior to commissioning from entities other than the site owner or GNCTD departments (e.g., PESO approval, NOC/approval from RWA/market association, etc.)	<ul style="list-style-type: none"> • No additional approvals required - High • Approvals required but arranged by site owner - Medium • Multiple approvals required from third parties - Low

Annexure D: Compendium of publication on Delhi's electric mobility journey

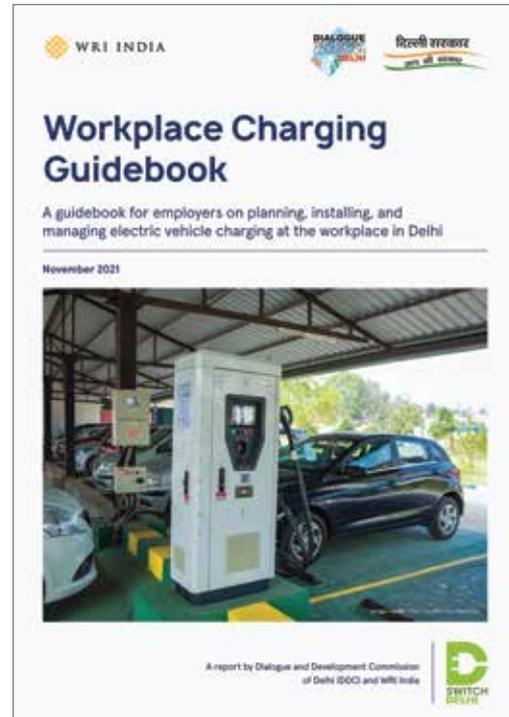
Accelerating Delhi's Mobility Transition

Published in 2019



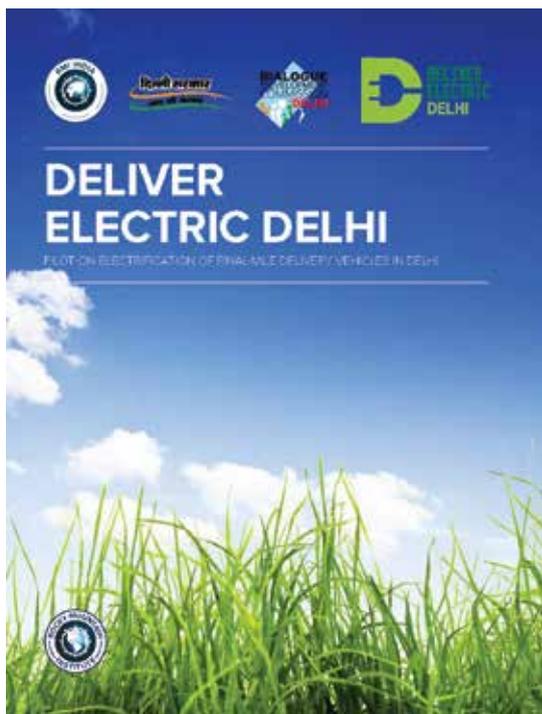
Workplace Charging Guidebook

Published in 2021



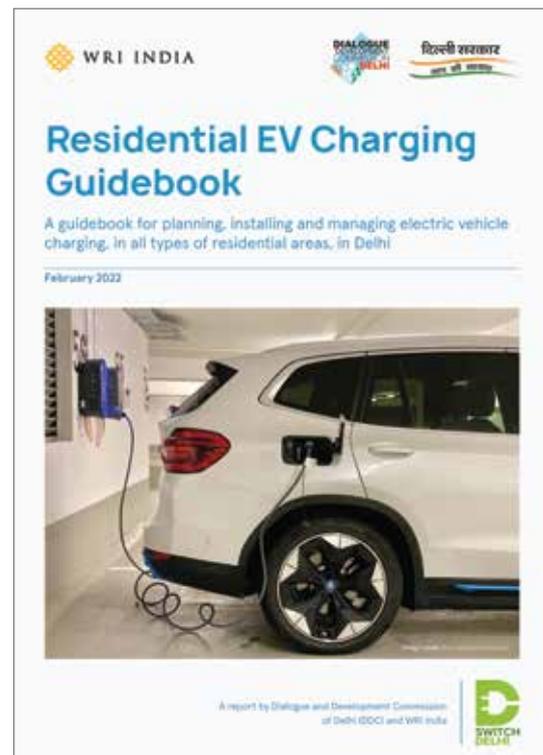
Deliver Electric Delhi

Published in 2020



Residential EV Charging Guidebook

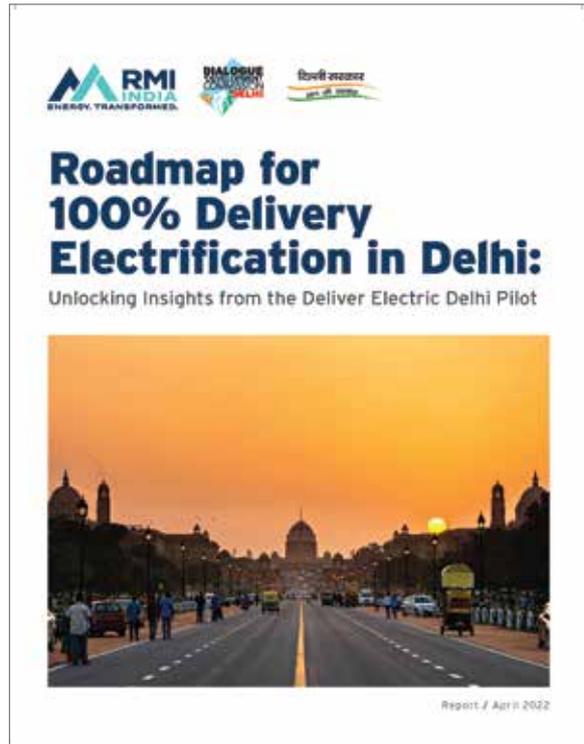
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