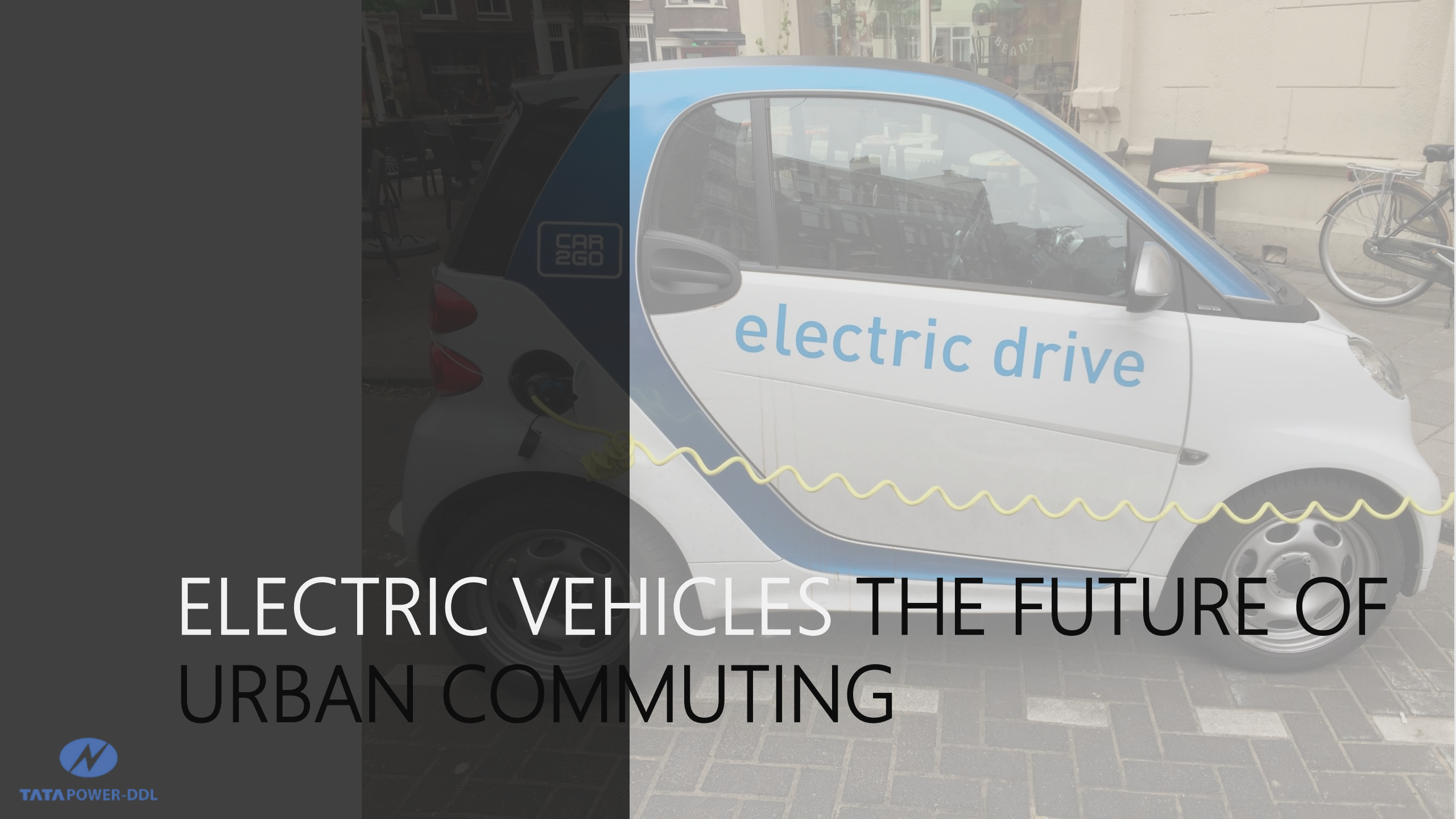

ELECTRIC VEHICLES THE FUTURE OF URBAN COMMUTING

TATA POWER-DDL

What is an ELECTRIC VEHICLE

Consist of an electric motor drive, deriving all or part of their power supply from electricity supplied by the electric grid. They include AEVs and PHEVs.

All Electric Vehicle

Running entirely on electric motors

Plug-in Hybrid Electric Vehicle

Running on electric charge and switching over to ICE.

Why drive an ELECTRIC VEHICLE

- Zero tailpipe emissions (or low emissions in case of hybrids)
- Cost comparable with respect to petrol/diesel vehicles (with government rebates)
- Cost comparable with respect to petrol/diesel vehicles (with government rebates)
- Significantly more long term savings with lower maintenance costs and requirements

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Adoption Drivers for Electric Vehicles

Rapid urbanization-As per report published by Oxford Economics on the global urban landscape scenario in 2030, the list of fastest growing cities shall be dominated by India, and $1.7 trillion will be expenditure on cars.

Advances in renewable energy-The penetration of Renewable Energy sources in India's energy mix has increased from **11 GW in 2008 to 69 GW in 2018** thus signifying the exponential growth of energy from Renewable Energy sources.

Climatic change-As per NASA, the global average surface temperature has risen **by 0.6-0.9^{0}C and the rate of temperature increase has nearly doubled in last 50 years**. India has committed to cutting its GHG emissions intensity by 33% to 35% percent below 2005 levels by 2030.

Data capture and analysis:-Digital revolution has created possibility of a greater utilization of existing transportation assets and infrastructure.

Energy security:-India needs to import oil to cover **over 80 percent of its transport fuel.** That ratio is set to grow as a rapidly urbanizing population demands greater intra-city and

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How Clean is the Electric Vehicle

Gasoline only

Conventional cars run on Gasoline and tend to be dirtier and more expensive to fuel than EVs

Average Emissions nationwide: 381 grams of CO_2

PHEVs

Using both hybrid and electric and can be recharges from an outlet

Average Emissions nationwide: 196 grams of CO_2 emissions

Battery Electric

Vehicles running on electricity and are some of the cleanest and cheapest cars to drive

Average Emissions nationwide: 381 grams of CO_2

(https://www.ucsusa.org/clean-vehicles/electric-vehicles/ev-emissions-tool)

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EV Chargers: AC

Type-1 with Yazaki Socket

Origin and Popular EV Models

Japan, USA (uses separate standard – JSAE 1772 due to 110 Voltage)

Maximum Power Output and Communication Protocols

Up to 7.4 kW (32 Amps, Single Phase)

Type-2 with Mennekes Socket

Origin and Popular EV Models

Europe (Germany) – many European cars

Maximum Power Output and Communication Protocols

Up to 44 kW (63 Amps, 3 Phase)

Type-3 with Le Grand

Origin and Popular EV Models

France and Italy – some European cars

Maximum Power Output and Communication

Up to 22 kW (32 Amps, 3 Phase)

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EV Chargers: DC

CHAdeMO

Origin and Popular EV Models

Japan; used in Japan, Korea and parts of USA and Europe; Nissan Leaf Mitsubhi, Kia etc.

Maximum Power Output and Communication Protocols

Up to 400 kW DC charging (1000 Volts, 400 Amps); Control Area Network (CAN) for communication between EV and EVSE

GB/T

Origin and Popular EV Models

China and as Bharat Chargers in India; Chinese Vehicles and Mahindra Electric in India

Maximum Power Output and Communication Protocols

Up to 237.5 kW DC charging (950 Volts x 250 Amps); CAN for communication between EV and EVSE

Tesla Super Charger

Origin and Popular EV Models

Tesla has its own supercharger. Tesla also sells adapter for connecting to a CHAdeMO charger

Maximum Power Output and Communication

Up to 135 kW DC charging (410 Volt x 330 Amp); CAN for communication between

Comparison: EV Vs Petrol Car

	Electric Car (Mahindra e20 plus)	Petrol Cars
		
Mileage	120 kms	620 kms (approx.)
Energy Consumption Energy Usage	12 units	40 litres (approx.)
	12/120=0.10 units	3.225 litres per day
Cost	Rs..8.50 to Rs.10.00# per unit	Rs. 73.50 per litre
Cost per km	8.50*0.10=0.85 paisa to Rs.1.00	Rs. 4.740 per km
One day expense##	Rs. 42.50 to Rs. 50	Rs. 237
Monthly expenditure	Rs. 1,062.50 to 1,250	Rs. 5,925

#: ABR for domestic customers: Rs.7.49 per unit for consumption of 800-1200 units; Rs 9.03 per unit for >1200 units

##: 50 km average travel and 25 days travel in a month https://www.dqindia.com/electric-vs-petrol-cars-cost-comparison-era-rising-petrol-pr

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Policies & Incentives: Central

Goods and services tax (GST) on electric vehicles to 5% from 12% has been proposed by GoI.
(GST for traditional vehicles : 28 %)

Electric Vehicles (all types) in India to be Exempted from Registration Fees

Additional income tax deduction of

₹ 1.5 lakh

on interest paid on electric vehicle loans

₹ 10000 crore outlay till 2022 for EVs under FAME II Scheme...
₹ 1000 crore for charging Infrastructure

GST rate slashed to 5% on EV chargers from earlier 18 %

Government Proposes No Road Tax For Electric Cars

TATA POWER-DDL

Policies & Incentives: Delhi Draft Policy

Road tax, registration fees and MCD one-time parking fee will be waived for all electric two-wheelers with an 'Advance Battery'.

Existing ICE two wheeler owners will get a scrapping and de-registration incentive of up to ₹15,000 per vehicle for scrapping two wheelers that are not BS [IV] certified

Road tax, registration charges, MCD one-time parking fee and Auto Rickshaw

Individuals with a valid light motor vehicle driving license (DL) and a PSV badge will be eligible to apply for e-auto permits.

Fleet owners, businesses using three wheeler goods carriers and individual owners will be provided an additional purchase incentive equivalent to 50% of the incentive

All existing residential building owners, RWAs and Co-op Group Housing Societies with demarcated parking area of more than 10 ECS will be encouraged to install one EV AC charge. GNCTD will provide a grant of 100% of the purchase

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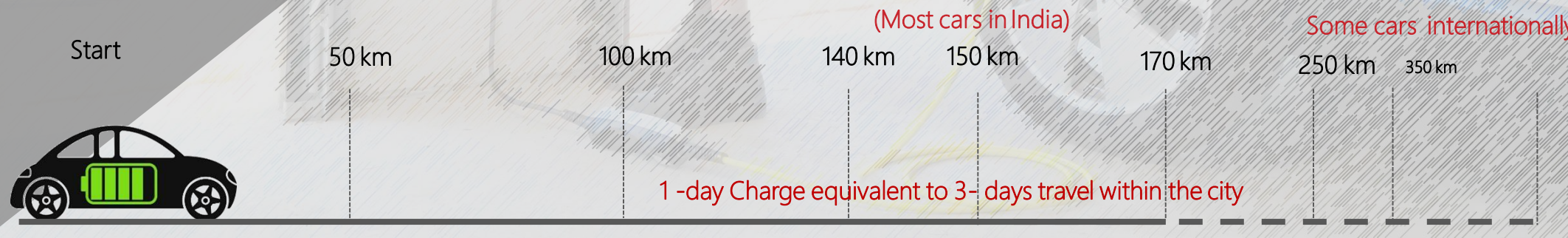
EVs: Frequently Asked Questions

"Where will I charge my EV ? Hardly any Charging Infr

- Only a 15 A Socket at Home is enough
- Charge Over-night, drive throughout the day in peace…
- Just Like your mobile phone…. Charge at Cheap Tariff….INR 4.50/ kWh @ Public Charger & Domestic Tariff @ home

"What will be the Travel Range?"

- 140-170 km in a 'Single Charge, EV stations planned every 25 km on Highways



TATA POWER-DDL

EVs: Frequently Asked Questions

"What about batteries and their replacements?"

Brands promise Battery life of 8-10 yrs.

"Owners today are changing their cars faster: from 7-8 years earlier to 4-5 years now.."

Manufactures now giving warranty of 8 yrs./ 1.6 Lakh kms

"In Kms, an average petrol car can easily be run till 1.10 Lakh Kms and Diesel car can run till 1.5 Lakh kms"

International Brands offer Unlimited-Miles warranty too !!!

"How about maintenance?"

EVs have only 1 % moving parts compared to Conventional Cars

No Spark Plugs, Valves, Fuel Tank, Muffler/Tailpipe, Distributor, Starter, Clutch, Drive Belts, Hoses… EVs don't require regular oil changes or tune-ups

Less Moving parts → Less Wear & Tear → Less Maintenance . Still if required , service

TATA POWER-DDL

EVs: Frequently Asked Questions

"What about safety?"

- Electric vehicles are safer than gasoline/diesel-powered vehicles.
- EVs are less prone to catch fire
- EVs undergo the same rigorous Safety Testing and meet the same Safety Standards required for Conventional Vehicles

"the SPEED...."

- Electric vehicles are generally quicker than their gasoline-powered
- The electric motor in EV generates 100% of its available torque instantly.
- Newer models in India clocking top speed of 135 km/hr with 0-100 km/h in under 11 sec

TATA POWER-DDL

Tata Power initiat

- Launched Mumbai's first public EV charging station at Vikhroli in Aug 2017
- Launched nine EV Charging Stations at an event organized on World Environment Day at Mantralaya
- Operates 12 EV Charging stations across the city and suburbs

- Tata Power Delhi Distribution Limited operates 7 Public Charging stations in Delhi
- Charging stations are located in or around Rohini, Pitampura, Todapur and Delhi University areas

TATA POWER-DDL

Tata Power initiatives

- Tata Power installed captive Charging stations at customer's premises in Hyderabad
- Tata Power is providing its customers end-to-end EV Charging Infrastructure solutions

- 2 Charging stations installed for 2- Wheelers and 5 Stations for 4-Wheelers in association with Hero Electric and Mahindra in Delhi. Tata Power has installed in Mumbai and Hyderabad also.
- 60 E-Scooters for Tata Power DDL Operation Fleet
- Facilitated to set up 100 charging points to charge 3 W (E-rickshaws) operating in its Licensed Area.
- Awareness through free rides given to commuters during odd-even scheme in Delhi

Collaboration

- **Technology Partner – DELTA, Ensto** Charger Manufacturer
- **Fleet Operator – Zoomcar –** Upcoming demand estimated
- **Utility –** MoU has been signed with **HPCL, IGL**, In progress with **IOCL**

TATA POWER-DDL

In The News

Charging points up for electric two-wheelers

TIMES NEWS NETWORK

New Delhi: Discom Tata Power on Thursday inaugurated charging stations for electric two-wheelers in their distribution areas of north and northwest Delhi. Officials said the initiative is expected to benefit over 10,000 vehicle owners. The power utility already has five e-charging stations in north and northwest Delhi for electric cars.

The first station was inaugurated at Netaji Subhash Place (behind PP Jewellers) in Pitampura and the second one has been set up near Maurice Nagar police station, Hudson Lines, Kingsway Camp. "This move will not only contribute towards reduction of vehicular pollution, but will also encourage people to opt for environment-friendly modes of commuting," said discom CEO Praveer Sinha.

People can charge their two-wheelers free of cost for now, but they will have to pay for it later. "The idea is to encourage consumers to opt for e-vehicles and give them incentives. We will approach DERC within a month to make the facilities chargeable," said a senior discom official.

Discom hopes move will help reduce vehicular pollution

The distribution firms have been demanding separate tariffs for charging e-vehicles and regulatory body DERC is expected to announce it in the current fiscal's tariff order later this year. For e-rickshaws, discoms have been demanding they be charged as per commercial tariffs.

Currently, the five charging points for e-cars inaugurated almost a year ago have seen minimal takers.

"Unless the sales of electric cars improve, there won't be a demand for charging stations. Currently there is only one manufacturer, but many more have started entering the market. A huge influx of electric vehicles is expected in the next six months. We also want to use commercial electronic vehicles for our teams, like the metering and breakdown group which has to attend to consumer complaints. This will also encourage consumers to opt for them," said Sinha.

Capital gets its first electric charging point for 2-wheelers

Discom Tata Power launches two points in North and North-West Delhi

SWETA GOSWAMI

NEW DELHI: The Capital on Thursday received its first electric-charging point for two-wheelers. Discom Tata Power on Thursday launched two such points to cater to the eco-friendly motorists in North and North-West Delhi.

This environment friendly initiative is expected to benefit over 10,000 electric two-wheeler owners in the area. "A survey by us revealed that a sizeable number of students use electric bikes in the area of our jurisdiction. This is because Delhi University's North Campus falls here," said a discom official.

The first such station has been inaugurated at Pitampura, Netaji Subhash Place and the second one has been set up near Maurice Nagar Police Station, Hudson Lines, Kingsway Camp.

People can charge their two wheelers free of cost at these two facilities.

Apart from this, North and North-West Delhi also have five separate e-charging stations for electric cars.

"The reason why we launched the facility exclusively for two-wheelers is because they are more in number than electric cars. We are open to initiating such facility for e-rickshaws as well, but that will have to come through a proper regulation by the Delhi Electricity Regulatory Commission," said officials from various power utilities.

The environment friendly initiative is expected to benefit over 10,000 electric two-wheeler owners. PHOTO: SPECIAL ARRANGEMENT

So far, the New Delhi Municipal Council (NDMC) had drafted a proposal for introducing e-charging facilities at its petrol pump. But the project never took off.

Now, the same proposal has been added as a feature in the council's Smart City project.

Delhi finds out commuting options to beat the odds

Soumya Pillai
soumya.pillai@hindustantimes.com

NEW DELHI: Wondering how to get to work without your car during odd-even? You have more options than you imagined. Cars, bikes, auto rickshaws, and even e-vehicles, are ready to ferry you across the city, some even for free.

RAPIDO-FREE BIKE SHARING AND POOLING

Exit gate number 6 of Rajiv Chowk Metro station over the fortnight and you will be greeted by free bike services waiting to drop you around Connaught Place.

Bikes with riders pick up from the station and all you need to do is tell them your destination. The uniformed Rapido riders were a friendly relief from the usually grumpy auto drivers.

After you are comfortably seated as a pillion, the drivers provide you with a helmet.

The ride sharing service will provide free services during the second stint of the odd-even scheme. On Friday, the service started at 11am and continued till 8pm.

The ride was comfortable and over a dozen bikes were available outside the station. After a while the service gained popularity and commuters preferred these over autos.

Rapido riders ready to ferry passengers outside Rajiv Chowk Metro station on Friday. HANDOUT

TATA POWER DELHI DISTRIBUTION (TPDD) — E-SCOOTER SERVICES

On north campus, outside the Vishwavidyalaya Metro station, e-scooters similar to battery-operated rickshaws, ferried passengers. The service was available free of cost.

"During the first phase of odd-even we had a major problem commuting. The autos and the cycle rickshaw pullers started charging extra. This is a convenient service and it would help me save on travel in the next 15 days," said Anushka Kumari, a fellow rider.

These e-scooters, however, were slow and fewer in number. The service only ferried passengers in a 4km radius

IUNIR-AUTO SHARING

iUNIR's newly launched auto sharing scheme is a close competition to the more organised aggregators Ola and Uber.

Within seconds of booking your service for auto sharing and pooling, you receive a call from the service providers confirming your booking along with the number and name of your driver.

Since the service is new, the auto that came in did not have any more bookings. The auto was available as an individual service. The vehicle sharing facility also car, bikes and taxis.

Apart from the regular mobile app, you can also make bookings via social networking websites such as Facebook and LinkedIn.

ODD-EVEN: FREE RIDES TO PEOPLE ON E-SCOOTERS

Tata Power Delhi Distribution (TPDDL) has collaborated with a leading two-wheeler manufacturer to provide free rides to people on e-Scooters during the odd-even period near metro stations. In all 20 such e-scooters will be provided for this purpose near Vishwavidyalaya Metro Station which will also provide free rides to the employees of Tata Power-DDL within a radius of 4 km. Also, the TPDDL recently installed electric charging stations for electric two-wheelers in North and North-west Delhi and this environment friendly initiative is expected to benefit over 10,000 electric two-wheeler owners.

टाटा पावर का ऑड-इवन स्कीम के दौरान मुफ्त राइड की पेशकश

मुफ्त ई-चार्जिंग स्टेशन स्थापित किए, अग्रणी इलैक्ट्रिक दोपहिया वाहन कंपनी के साथ किया गठबंधन

हमारे संवाददाता

नई दिल्ली। टाटा पावर दिल्ली डिस्ट्रिब्यूशन लिमिटेड (टीपीडीडीएल) ने अपने पर्यावरण अनुकूल प्रयासों को जारी रखते हुए हाल में उत्तर एवं उत्तर पश्चिमी दिल्ली में इलैक्ट्रिक दोपहिया वाहनों के लिए इलैक्ट्रिक चार्जिंग स्टेशनों की स्थापना की है। कंपनी की इस पहल से 10,000 से अधिक इलैक्ट्रिक दोपहिया वाहन मालिकों को फायदा मिलेगा।

टीपीडीडीएल ने उपभोक्ताओं के लिए ई-चार्जिंग स्टेशन स्थापित करने के अलावा अब एक और शानदार पहल करते हुए अब एक जाने माने इलैक्ट्रिक दोपहिया वाहन निर्माता के साथ मिलकर 'लास्ट ड्राइव योजना' की अवधि (15 से 30 अप्रैल 2016) के दौरान

उपभोक्ताओं को सुविधा के लिए उनके मेट्रो स्टेशनों के नजदीक ई-स्कूटरों पर मुफ्त राइड दिलाने की सेवाकरा की है। इसके लिए 20 इलैक्ट्रिक स्कूटरों को तैनात किया जाएगा। जो टीपीडीडीएल कर्मचारियों को भी 4 किलोमीटर के दायरे में मुफ्त राइड की सुविधा प्रदान करेंगे।कंपनी को इस पर्यावरण अनुकूल पेशकश के बारे में प्रवीर सिन्हा, सीईओ एवं एमडी, टीपीडीडीएल ने कहा, ''जिम्मेदार कार्पोरेट होने के नाते हम लगातार राजधानी को बेहतर बनाने और यहां के निवासियों के लिए नई पर्यावरण अनुकूल गतिविधियों को लागू करते रहते हैं। मेट्रो स्टेशनों से इलैक्ट्रिक वाहनों पर मुफ्त राइड की पेशकश भी इसी दिशा में बढ़ाया गया कदम है। मुझे पूरा यकीन है कि यह कदम न सिर्फ राजधानी में वायु प्रदूषण में कमी लाने में मददगार साबित होगा बल्कि लोगों को आने-जाने की सुविधा भी प्रदान करेगा।''

इसके अलावा, कंपनी अपने परिचालन क्षेत्र वाली उत्तर एवं उत्तर पश्चिमी दिल्ली में इलैक्ट्रिक कारों के लिए अलग से 2 ई-चार्जिंग स्टेशनों का भी संचालन कर रही है।

FREE RIDES ON E-SCOOTERS

NEW DELHI: TCommuters exiting from north Delhi's Vishwavidyalaya Metro station will now have a new mode of travel. For the second round of the odd-even restriction, Tata Power Delhi Distribution (TPDD) have started free e-scooter rides to anywhere within a 4km radius. Around 20 e-scooters will ferry passengers around the Metro stations from Friday. HTC

TATA POWER-DDL

Thank You

TATA POWER-DDL