BRIEFING

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Electrifying India's four-wheeler ride-hailing vehicles: Policy experiences from abroad

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Ride-hailing services like Ola and Uber have gained popularity in India in recent years, and 32% of consumers use ride-hailing services at least once a week. This is significantly higher than in other large ride-hailing markets; in the United States it is 11% and in Germany it is 4%. In India, 57% of ride-hailing users prefer ride-hailing over their own vehicle; this same figure is 29% in the United States and 32% in Germany.[1] However, the rapid growth in ride-hailing services can have negative environmental impacts such as an increase in the "deadhead" kilometers traveled, and this has been observed in the United States.[2] For example, ride-hailing trips in California, which are mostly made by conventional internal combustion engine (ICE) vehicles, emitted 69% more carbon dioxide (CO_2) than the trips they displaced.[3]

The electrification of ride-hailing vehicles, particularly a switch to battery electric vehicles (BEVs), would reduce CO_2 emissions and improve air quality in cities. In addition, the adoption of BEVs could reduce maintenance and fuel costs for drivers and encourage a faster roll-out and higher utilization of charging infrastructure. The current challenges in the Indian market include a limited choice of electric vehicle models available, higher upfront purchasing costs compared to ICE cars, and a sparsely distributed public charging infrastructure network.[4] Building from a recent ICCT study of the 2020 costs associated with BEVs compared to ICE cars operated as ride-hailing

1 Deloitte, "Global Automotive Insights, 2020 Global Automotive Consumer Study, India," (2020), https://www2.deloitte.com/content/dam/Deloitte/in/Documents/consumer-business/in-consumer-global-automotive-india-final-noexp.pdf; Deloitte, "2020 Global Automotive Consumer Study, Is consumer interest in advanced automotive technologies on the move?, Global focus countries," (2020), https://www2.deloitte.com/content/dam/Deloitte/us/Documents/manufacturing/us-2020-global-automotive-consumer-study-global-focus-countries.pdf

2 Fehr & Peers, " What are TNCs Share of VMT?" accessed May 14, 2021, https://www.fehrandpeers.com/what-are-tncs-share-of-vmt/

3 Maria Cecilia Pinto De Moura, Don Anair, Jeremy Martin, Joshua Goldman, *Ride-Hailing's Climate Risks: Steering a Growing Industry toward a Clean Transportation Future*, (UCS: Washington, DC, 2020), https://www.ucsusa.org/sites/default/files/2020-02/Ride-Hailings-Climate-Risks-Methodology_0.pdf

4 Nibedita Dash, Sandra Wappelhorst, Anup Bandivadekar, *Update on the electrification of India's ride-hailing fleet*, (ICCT: Washington, DC, 2021), https://theicct.org/publications/update-electrifying-india-ride-hailing-fleet-apr2021

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vehicles in three Indian cities, this paper reviews how select additional policies adopted by the Indian central and state governments could help further bridge the gap between BEVs and ICE cars. The focus here is on non-monetary policies and policies adopted in other key ride-hailing markets: the United States, China, and Europe. Also, policies discussed here focus on incentives that push electric vehicle adoption rather than disincentives for ICE cars.

COSTS FOR ELECTRIC VEHICLES IN FOUR-WHEELER RIDE-HAILING FLEETS IN INDIA

ICCT recently compared the total cost of ownership (TCO) differential between BEVs and comparable gasoline, diesel, and compressed natural gas (CNG) vehicle models if used for ride-hailing in 2020 over an operating period of 5 years in the cities of Delhi, Hyderabad, and Bangalore.[5] The TCO considered existing policy measures at national, state, and local levels in place by the end of 2020 and highlighted additional policy interventions that could supplement the existing policies to reduce the cost differential between BEVs and conventional ICE vehicles. Vehicle models selected are shown in Figure 1, which has results for Delhi.

In terms of cost per km value in Delhi, both the BEV Tata Nexon and BEV Mahindra eVerito D2 have a cost advantage over the selected diesel and gasoline cars but a disadvantage against the CNG car. However, the upfront purchase and financing costs for the BEV models are still higher compared to the three conventional cars, even with the state and central government incentives. For the BEV Tata Nexon and BEV Mahindra eVerito D2, the purchase and financing costs add up to INR 14.5 Lakh and INR 8.9 Lakh, respectively. In contrast, for the conventional fuel vehicles, the acquisition costs range between about INR 5.8 Lakh and INR 7.6 Lakh.

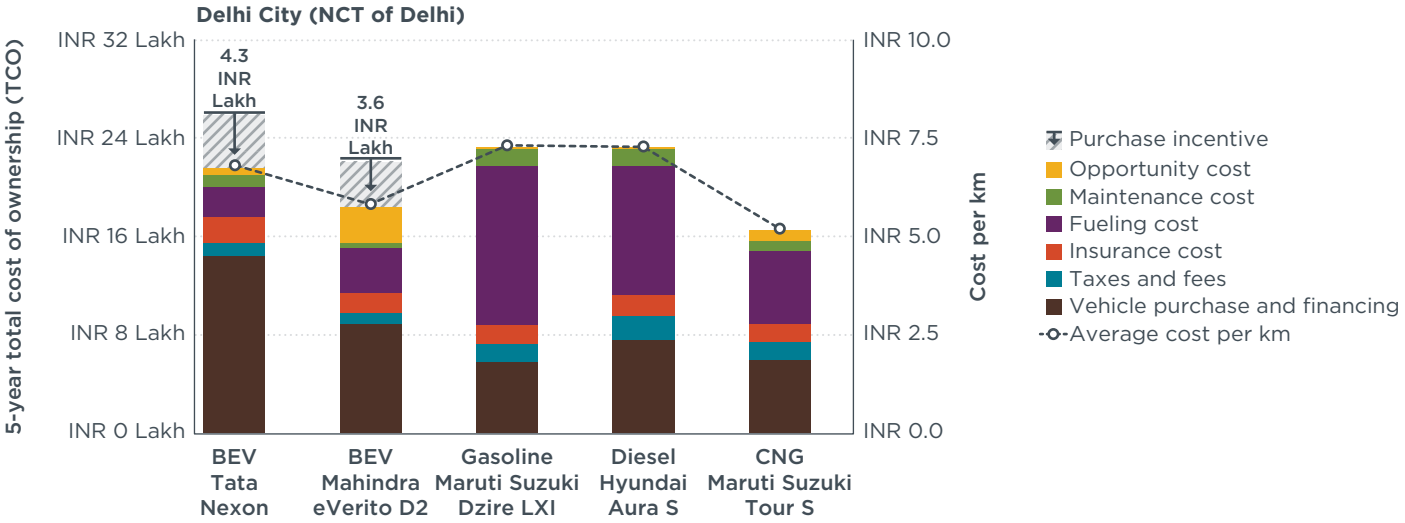

Figure 1. Comparison of 5-year TCO of select vehicles for full-time ride-hailing drivers in Delhi city in 2020.

In the cities of Hyderabad and Bangalore, the study found that both BEVs are costlier than the conventional vehicle models in terms of upfront purchase cost in the absence of a one-time purchase incentive from their respective state governments in fiscal year (FY) 2020–21. However, in terms of per-kilometer cost over a 5-year operating period, the analysis showed that the BEV Tata Nexon costs almost the same as the gasoline and diesel vehicles while the BEV Mahindra eVerito D2 is cheaper than the gasoline and diesel

5 Ibid.

vehicle models if operated as a ride-hailing vehicle. The conventional CNG car model was the least costly option in terms of per-kilometer cost in these two cities, as well.

The study found that additional policy measures, if implemented, would reduce the cost disadvantage of the BEV Tata Nexon over the CNG car in all three cities. For instance, in Delhi, under current policies plus suggestive measures, the cost disadvantage of the BEV Tata Nexon would reduce to INR 0.42 per km compared to INR 1.59 without additional measures. Under the same assumptions and vehicle models compared, the average per km cost gap would reduce from INR 1.38 to INR -0.68 in Hyderabad and from INR 1.98 to INR -0.10 in Bangalore. Similarly, the BEV Mahindra eVerito D2 would become cheaper than the CNG vehicle by INR 1.34 per km in Delhi, INR 1.24 per km in Bangalore, and INR 1.63 per km in Hyderabad in 2020 with the effect of additional policies. Based on the analysis, we made the following suggestions for additional incentives in India:

- Central purchase incentives matched by state funding in all states in the early market.
- Waiver on annual interest payments toward loans taken for electric vehicle purchase.
- National-level fast charging infrastructure investment policy.

NON-MONETARY POLICY ACTIONS TO ELECTRIFY FOUR-WHEELER RIDE-HAILING VEHICLES

Europe, China, and the United States, which have seen faster BEV adoption in ride-hailing fleets than India, also have suitable non-monetary policy actions in place that supplement the fiscal incentives. There are also non-monetary policy actions currently in place in India that could be enhanced to support faster adoption of electric vehicles as part of ride-hailing fleets.

NON-MONETARY POLICIES THAT ALREADY EXIST IN INDIA

In India, in the absence of a national law specifically tailored to regulate ride-hailing entities, state government authorities hold the power to issue and enforce rules to regulate taxis and ride-hailing fleets. The central Ministry of Road Transport and Highways (MoRTH) can issue non-binding guidelines for the states, and the central government of India has some non-financial policy measures in place which are outlined below. Each of these could be altered or improved to promote the electrification of cars, including in ride-hailing fleets.

Targets and environmental standards for the uptake of zero-emission vehicles (ZEVs) in shared mobility.[6] In mid-2019, the central government notified all state governments to set zero-emission targets for shared mobility services. However, currently there are no clear regulatory bindings on the extent of electrification ride-hailing companies need to achieve within a certain time frame. In addition, the Motor Vehicle Aggregator Guidelines released in 2020 from the central government do not mention electrification targets or environmental standards to be achieved by vehicle aggregators.[7] This is a missed opportunity.

CO_2 emission standards for passenger cars. Even though India has a CO_2 emission standard for passenger cars, it is not as stringent as the emission standards elsewhere,

6 Ministry of Road Transport and Highways, Government of India, "Incentivization of Electric Vehicles," 23018 (24)/2019-T, (2019), https://morth.gov.in/sites/default/files/circulars_document/Incentivisation_of_Electric.pdf

7 Ministry of Road transport and Highways, Government of India, "Motor Vehicle Aggregators Guidelines-2020," (2020), https://morth.gov.in/sites/default/files/notifications_document/Motor%20Vehicle%20Aggregators27112020150046.pdf

including the European Union.[8] In India, the CO_2 emission target, normalized to the New European Driven Cycle (NEDC), is 130 grams per kilometer (g/km) for passenger cars until 2022 and 113 g/km for new cars thereafter. In contrast, the European Union's average fleet CO_2 emission target for passenger cars is 95 g/km (NEDC), phasing in for 95% of cars in 2020 and with 100% compliance required in 2021. According to current adopted regulation, the average EU CO_2 emission fleet target would need to be reduced by -15% (~83 g/km, NEDC) in 2025 and by -37.5% (~59 g/km, NEDC) in 2030.[9] In mid-July 2021, however, the European Commission proposed more ambitious targets from 2030 as part of the European Green Deal. Average CO_2 emissions from new passenger cars registered in 2025 and 2030 would have to decrease by -15% (thus no change from currently adopted policy) and -55% (more than the current regulation, which specifies -37.5%), respectively, compared to the 2021 baseline. The proposal also suggests that new cars will be required to be zero-emission by 2035, a de-facto phase-out of the internal combustion engine.[10] The future targets set for 2025 and 2030 will be translated into Worldwide Harmonized Light Vehicles Test Procedure (WLTP) terms based on the average ratio of the WLTP and NEDC CO_2 emission values in 2021.[11]

Other countries with stringent average CO_2 emission targets for passenger car fleets include Canada and China, where targets are 99 g/km and 93 g/km, respectively, beyond 2025. South Korea has also set its target for CO_2 emission for passenger cars at 70 g/km by 2030. While the emission standards in these markets have pushed manufacturers to deploy electric vehicles and this drove the demand, particularly in 2020 in Europe,[12] there is no such urgency in India.

Green tax exemption for BEVs in the upcoming vehicle scrappage policy. The central government presented in March 2021 an outline of the upcoming voluntary vehicle scrappage policy that discourages the use of commercial vehicles that are more than 15 years old. The scrappage policy has a provision of green taxes and other levies on old polluting vehicles[13] and BEVs are exempt.[14] Tentatively, this policy is to be rolled out in a phased manner from April 2022 onward.[15] However, at present there is no mechanism linking the scrappage of conventional vehicles to replacing them with BEVs, nor is there a clear pathway or follow-up targets for implementation of these tax exemptions for BEVs at the state and local levels.

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8 International Council on Clean Transportation, "Light-duty vehicle fuel consumption standards factsheet India," (September 20, 2020), https://theicct.org/sites/default/files/India-FC-Standards%20Fact-Sheet-2020.pdf; ", CO_2 emission performance standards for cars and vans" European Commission, accessed August 27, 2021, https://ec.europa.eu/clima/policies/transport/vehicles/regulation_en

9 "Chart library: Passenger vehicle fuel economy," International Council on Clean Transportation, accessed May 16, 2021, https://theicct.org/chart-library-passenger-vehicle-fuel-economy

10 European Commission, "Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EU) 2019/631 as regards strengthening the CO_2 emission performance standards for new passenger cars and new light commercial vehicles in line with the Union's increased climate ambition," (2021), https://ec.europa.eu/info/sites/default/files/amendment-regulation-co2-emission-standards-cars-vans-with-annexes_en.pdf

11 The European Union (EU) started transitioning from the New European Driving Cycle (NEDC) to the Worldwide Harmonized Light Vehicles Test Procedure (WLTP) for new vehicle emissions certification in September 2017. The percentage reduction targets in the CO_2 regulation are fixed while the absolute CO_2 emission level to be met in 2025 and 2030 depends on the fleet average WLTP starting point of all manufacturers in 2021. This starting point, in turn, depends on the NEDC-WLTP adjustment factor, which is determined for the 2020 new vehicle fleet for each manufacturer individually.

12 European Alternative Fuels Observatory, "On the electrification path: Europe's progress towards clean transportation," (2021), https://www.eafo.eu/sites/default/files/2021-03/EAFO%20Europe%20on%20the%20electrification%20path%20March%202021.pdf

13 "Vehicle Scrappage Policy: Rebate on road tax, discounts and scrap value: All you need to know," News18, March 18, 2021, https://www.news18.com/news/auto/vehicle-scrappage-policy-rebate-on-road-tax-discounts-and-scrap-value-all-you-need-to-know-3547187.html

14 Sergius Barretto, "Scrappage policy for Government vehicles approved," *Autocar India*, January 26, 2021, https://www.autocarindia.com/industry/scrappage-policy-for-government-vehicles-approved-419762

15 "Vehicle Scrappage Policy details and incentives announced," *Autocar Pro*, March 18, 2021, https://www.autocarpro.in/news-national/vehicle-scrappage-policy-details-and-incentives-announced-78759

Green registration plates with yellow font. The central government introduced green-colored license plates bearing numbers in white fonts for private electric vehicles and in yellow fonts for commercial transport electric vehicles across India. However, this distinct identification of commercial electric vehicles has not yet helped the vehicle drivers earn incentives like priority parking or waivers on toll fees and parking fees from any state or local government.[16]

Exemption of BEVs from the permit requirement for plying as goods or passenger transport vehicles.[17] The central government has exempted BEVs from the requirements of obtaining a passenger transport permit. This measure may help promote BEVs in ride-hailing platforms. However, in terms of implementation at the state level, there are no mechanisms to monitor the progress of this policy. For instance, most of the states have not implemented the notification and still insist on the permit requirement for both ICE and electric passenger transport vehicles.

Table 1 summarizes key non-monetary government policies by the Indian government and their implementation status.

Table 1. Summary of key non-monetary government policies to electrify passenger cars in India.

	Policy action	Actor	Implementation status
Electrification of shared mobility, including ride-hailing fleets	Setting electric vehicle targets and environmental standards for the uptake of ZEVs in shared mobility	National government, state governments	Notified by the central government to all states but no time-based targets for ZEVs have been specified by the central government Also, no specific targets or environmental standards were set as part of the Motor Vehicle Aggregator Guidelines from 2020
Electrification of passenger car fleets	CO_2 emission standards for passenger cars	National government	This policy is in effect but not stringent enough to increase electric vehicle supply
	Green tax exemption for BEVs in upcoming vehicle scrappage policy	National government	Voluntary vehicle scrappage policy includes no mechanism linking the scrappage of an ICE car to replacing it with a BEV, and no clear pathway or follow-up targets on implementation of tax exemptions for BEVs at the state and local levels
	Green colored registration plate with yellow font	National government, state governments	Notified by the central government to all states but benefits like priority parking, and waiver on toll fee and parking fee have not been passed on to electric vehicle drivers by state and local governments
	Exemption of electric vehicles from the permit requirement for plying as transport vehicle	National government, state governments	Notified by the central government to all states, but state governments have not stopped asking for permits from electric transport vehicles

NON-MONETARY POLICY ACTIONS ADOPTED BY GOVERNMENTS OUTSIDE INDIA

Outside India, the electrification of ride-hailing vehicles has been primarily driven by policy from cities, states, or national governments that have also implemented strong electric vehicle measures. Such cities and regions are seeing more participation and commitments from ride-hailing companies and drivers to move toward electric vehicles. Ride-hailing companies are also setting their sights on a long-term transition to electric, with near-term market-specific goals that are aligned with partner cities that

16 Notification on Colour for Registration Mark of Battery Operated Vehicles, Ministry of Road Transport and Highways, Government of India, D. L.-33004/99, August 7, 2018, https://www.morth.nic.in/sites/default/files/notifications_document/Notification_no_G_S_R_749E_dated_07_08_2018_regarding_Background_colour_of_registration_plates_for_Electric_vehicles_0.pdf

17 Notification on exemption of Battery Operated Vehicles from the permit requirement, Ministry of Road Transport and Highways, Government of India, D. L.-33004/99, October 18, 2018, https://morth.nic.in/sites/default/files/notifications_document/Notification_no_S_O_5333E_dated_18_10_2018_regarding_exemption_to_Battery_Operated_Transport_Vehicles_and_Transport_0.pdf

have national, state, or city-specific zero-emission vehicle goals, and associated non-monetary policies and regulations in place. Through select examples, we show in the following sections how targeted policies can facilitate a faster transition to electric.

Electrification goals and strategies integrated with strategic planning. France has set a requirement that 10% of private hire vehicles (PHVs) and taxi fleets be low emission by 2020, and they can emit no more than 60 gm per km CO_2.[18] In China, the city of Shenzhen requires ride-hailing fleets to be 100% electric by the end of 2021.[19] The city of Shanghai mandates that by 2025, more than 50% of the newly purchased vehicles by individuals be purely electric and more than 50% of all vehicles in the online car-hailing fleet be either of plug-in hybrid electric vehicles (PHEVs), BEVs, and fuel cell electric vehicles (FCEVs).[20] The cities of Guangzhou, Zhengzhou, Wuhan, and Xi'an will also only allow electric vehicles to be newly registered on ride-hailing platforms starting in 2021, with the aim to convert the fleet to 100% electric by 2028.[21]

Emission standards for ride-hailing fleets. The State of California was the first and the only state in the United States thus far to enact a law setting regulations to reduce emissions from transport network companies (TNCs) such as ride-hailing platforms like Uber and Lyft. California's Clean Miles Standard, approved in May 2021, sets greenhouse gas emission (GHG) and electric vehicle miles travelled targets for TNCs along with increasing electrification targets. The program requires that rideshare companies start electrification of their California fleets starting in 2023. The rideshare companies are also required to achieve a level of zero greenhouse gas emissions and ensure 90% percent of their vehicle miles are fully electric by 2030.[22] The regulation establishes a compliance metric of annual grams-CO_2-per-passenger mile modeled after the 2018 base-year emissions inventory report, and increasing targets for electric vehicle miles travelled through 2030.[23]

Green standards for access to transportation hubs. The Port of Seattle, a government agency that oversees the seaport and airport of Seattle (Washington State, United States) implemented a 1-year pilot program in 2016 which set environmental standards for ride-hailing companies servicing the Seattle-Tacoma International Airport. Based on the Port's Environmental Key Performance Indicator, ride-hailing companies had to comply with a threshold for emissions based on a fleet's weighted average mile-per-gallon performance, deadheading statistics, and pooling of passengers. Non-compliance incurred an additional $5 (INR 362, €4) in fees per trip. To pick up passengers, ride-hailing vehicles were required to meet the fuel efficiency standard

18 Dale Hall, Mike Nicholas, Marie Rajon Bernard, *Guide to electrifying ride-hailing vehicles for cities*, (ICCT: Washington, DC, 2021), https://theicct.org/sites/default/files/publications/Ride-hailing-cities-guide-mar2021.pdf

19 Notice of the General Office of the Shenzhen Municipal People's Government on Issuing the 2018 "Shenzhen Blue" Sustainable Action Plan, General Office of Shenzhen Municipal People's Government, 010100-02-2018-091081, May 5, 2018, http://www.sz.gov.cn/gkmlpt/content/7/7786/post_7786646.html#749

20 Notice of the General Office of the Shanghai Municipal People's Government on Printing and Distributing the Implementation Plan of Shanghai to Accelerate the Development of New Energy Automobile Industry (2021–2025), Shanghai Municipal People's Government, February 25, 2021, http://service.shanghai.gov.cn/sheninfo/newsdetail.aspx?Id=2cfff21e-862b-468b-bcf1-c5d25c0f8e5f

21 Dale Hall, Hongyang Cui, Marie Rajon Bernard, Shuyang Li, Nic Lutsey, *Electric vehicle capitals: Cities aim for all-electric mobility*, (ICCT: Washington, DC, 2020), https://theicct.org/sites/default/files/publications/ev-capitals-update-sept2020.pdf; "From October 1st, Zhengzhou's new online car-hailing must be pure electric," *china-nengyuan.com*, accessed May 15, 2021, http://www.china-nengyuan.com/news/146191.html; "All units in Guangzhou must accelerate the comprehensive promotion of new energy car-hailing applications," *gev.org.cn*, accessed May 15, 2021, http://www.gev.org.cn/news/2899.html; Notice of the Municipal People's Government on Several Policies to Promote the Development of the New Energy Automobile Industry, Municipal People's Government of Wuhan, K28044908/2020-799904, December 10, 2019, http://www.wuhan.gov.cn/zwgk/xxgk/zfwj/gfxwj/202003/t20200316_973431.shtml

22 "Clean Miles Standard," California Air Resources Board, accessed May 24, 2021, https://ww2.arb.ca.gov/news/california-requires-zero-emissions-vehicle-use-ridesharing-services-another-step-toward

23 "Clean Miles Standard," California Air Resources Board, accessed April 21, 2021, https://ww2.arb.ca.gov/our-work/programs/clean-miles-standard/about

of 45 miles per gallon or greater.[24] Continuing on this momentum in 2021, the Port of Seattle is working on a new agreement with TNCs like Uber and Lyft to further reduce carbon emissions by increasing the number of EVs in their fleets. To help charge these EVs, the port is installing 10 fast-charge EV charging stations at the airport.[25]

Licensing or permit requirements. London, United Kingdom sets emission requirements for PHVs, which include ride-hailing vehicles. Since 2020, PHVs under 18 months old must be zero-emission capable (i.e., vehicles that emit up to 50 g CO_2/km and have a minimum range of 16 km or emit up to 75 g CO_2/km and a minimum range of 32 km) and meet Euro 6 emissions standard (mandatory for all new passenger cars from September 2015) when licensed for the first time; vehicles older than 18 months must have a Euro 6 (gasoline or diesel) engine. From 2023, all PHVs licensed for the first time must be zero-emission capable and meet the Euro 6 emissions standard.[26] In New York City (United States), only electric vehicles can be registered on ride-hailing platforms after July 2019, with the exception of wheelchair-accessible vehicles.[27]

There are also policies in place which target the electrification of passenger car fleets as a whole, consequently to the benefit of ride-hailing fleets:

Targets for phasing out the sale or registration of new combustion engine cars. A number of countries and states worldwide have announced to phase out the sale or registration of new ICE passenger cars, in other words, to only allow the sale of new PHEVs, BEVs, and FCEVs in future years. Almost 20 countries, states, and provinces worldwide, mostly in Europe and North America, have announced their respective plans up to 2040.[28] British Columbia in Canada is the only jurisdiction so far which has adopted a binding regulation (see next paragraph).

Zero-emission vehicle regulations. These regulations help push car manufacturers to bring advanced technology vehicles to market and increase their market availability.[29] One example is China's new energy vehicle (NEV) policy 2021–2035, which requires that each vehicle manufacturer and importer make or import at least 20% electric vehicles by 2025.[30] This applies to any company that manufacturers or imports more than 30,000 vehicles in China. Companies that fail to achieve the required percentages may purchase credits from companies that over-comply.[31] Additionally, in British Columbia (Canada), the Zero-Emission Vehicles Act requires automakers to meet annually growing percentages for new light-duty zero-emission vehicle sales and leases, 10% by 2025, 30% by 2030, and 100% by 2040.[32] In California (United States), an executive order from September 2020 tasks the Air Resource Board with

24 "Pilot Program Announced to Bring Transportation Network Companies to Sea-Tac Airport," Port of Seattle, accessed May 16, 2021, https://www.portseattle.org/news/pilot-program-announced-bring-transportation-network-companies-sea-tac-airport

25 "The Green Guide to Sustainable Travel," Port of Seattle, accessed August 10, 2021, https://www.portseattle.org/blog/green-guide-sustainable-travel

26 "Emissions standards for PHVs," Transport for London, accessed May 16, 2021, https://tfl.gov.uk/info-for/taxis-and-private-hire/emissions-standards-for-phvs#on-this-page-1

27 Dale Hall, Mike Nicholas, and Marie Rajon Bernard, *Guide to electrifying ride-hailing vehicles for cities*, (ICCT: Washington, DC, 2021), https://theicct.org/sites/default/files/publications/Ride-hailing-cities-guide-mar2021.pdf

28 Sandra Wappelhorst, *Update on government targets for phasing out new sales of internal combustion engine passenger cars*, (ICCT: Washington, DC, 2021), https://theicct.org/sites/default/files/publications/update-govt-targets-ice-phaseouts-jun2021_0.pdf

29 Peter Slowik, Nic Lutsey, *The continued transition to electric vehicles in U.S. cities*, (ICCT: Washington, DC, 2018), https://theicct.org/publications/continued-EV-transition-us-cities-2018

30 The General Office of the State Council on the issuance of the New Energy Vehicle industry development plan (2021–2035) notice, State Council Office of the People's Republic of China, 000014349/2020-00104, November 2, 2020, http://www.gov.cn/zhengce/content/2020-11/02/content_5556716.htm

31 Hongyang Cui, *China's New Energy Vehicle mandate policy (final rule)*, (January 2018), https://theicct.org/sites/default/files/publications/China-NEV-mandate_ICCT-policy-update_20032018_vF-updated.pdf

32 "Zero-Emission Vehicles Act," British Columbia Government, accessed May 16, 2021, https://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/transportation-energies/clean-transportation-policies-programs/zero-emission-vehicles-act

developing regulations that require 100% zero-emission passenger vehicle sales by 2035.[33] The environment ministry of South Korea has proposed to set a zero-emission vehicle supply target at 12% of annual automobile sales in 2022.[34]

Labeling of electric vehicles and preferential access to benefits for electric vehicles. Special number plates or stickers for electric vehicles could help local governments implement policies that benefit electric vehicle drivers by giving them preferred access to restricted areas such as congestion charging zones or low emission zones (LEZs). Additional benefits could include preferential access to carpool lanes, discounts on toll roads, and beneficial parking policies in the form of reduced or cost-free parking. Special number plates or stickers identifying electric vehicles have been introduced nationally in France,[35] Germany,[36] Spain,[37] and the United Kingdom,[38] and at the state level in California (United States).[39]

Urban vehicle access regulations with implemented or planned preferential access for electric vehicles. Vehicle access regulations that apply to certain parts of a city, or entire cities, which restrict access and/or apply fees for ICE vehicles to enter while providing preferential access for electric vehicles can further advance electrification. Typical urban access regulations applied in European cities are LEZs or congestion charging zones (CCZs). Cities with preferential access regulations for electric vehicles include London (United Kingdom) which has a congestion charge in the central city in place, requiring a daily charge of £15 (INR 1,495, $21, €17). Vehicles including ride-hailing vehicles that do not emit more than 75 g CO_2/km, have a minimum 20 mile zero emission capable range, and meet Euro 6 standards are exempt from paying the charge. From October 2021, only BEVs or FCEVs will be exempt, and from December 2025, all vehicle owners regardless of the fuel type will need to pay to enter the congestion charge zone during charging hours.[40] Other European cities are planning to only allow BEVs and FCEVs in future years as part of Zero Emission Zones (ZEZs). The metropolitan area of Paris (France)[41] and the city of Amsterdam (the Netherlands)[42] intend to only allow BEVs and FCEVs from 2030. Other cities with street-based, pilot, or planned ZEZs include London (United Kingdom), Oslo (Norway), and Oxford (United Kingdom)[43]. Via the global C40 Cities Climate Leadership Group initiative, 35 cities across Africa, Asia, Europe, New Zealand, and North and South America have pledged to ensure a major area of these cities would be ZEZs by 2030 as part of the Fossil Fuel Free Streets Declaration.[44]

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33 "Governor Newsom's Zero-Emission by 2035 Executive Order," California Air Resources Board, N-79-20, (January 19, 2021), https://ww2.arb.ca.gov/resources/fact-sheets/governor-newsoms-zero-emission-2035-executive-order-n-79-20

34 Ministry of Environment, Republic of Korea, "2020 annual low-emission vehicle supply target," (2020), https://www.law.go.kr/LSW/conAdmrulByLsPop.do?dguBun=DEG&lsiSeq=211533#AJAX; Ministry of Environment, Republic of Korea, "Administrative notice of partial revision of the 2020 annual low-emission vehicle supply target (draft)," (2021), https://opinion.lawmaking.go.kr/gcom/admpp/34307?announceType=TYPE6&mappingAdmRulSeq=2000000283891

35 Republique Francaise, Order of 29 June 2016 relating to the methods of issuing and affixing air quality certificates, accessed August 27, 2021, https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000032795657?r=o6FqJPDJbk

36 "Benefits for electric cars," the federal government of Germany, accessed May 20, 2021, https://www.bundesregierung.de/breg-de/suche/vorteile-fuer-elektroautos-336442

37 "Consultation of the environmental distinctive of a vehicle," The Directorate-General for Traffic, Spain, accessed May 20, 2021, https://sede.dgt.gob.es/es/vehiculos/distintivo-ambiental/#

38 "Green number plates get the green light for a zero-emission future," UK Government, accessed March 25, 2021, https://www.gov.uk/government/news/green-number-plates-get-the-green-light-for-a-zero-emission-future

39 "Current Clean Air Vehicle Decal," California Air Resources Board, accessed April 22, 2021, https://ww2.arb.ca.gov/resources/fact-sheets/current-clean-air-vehicle-decal

40 "Discounts and exemptions," Transport for London, accessed May 15, 2021, https://tfl.gov.uk/modes/driving/congestion-charge/discounts-and-exemptions

41 "Breathe better to live better," Métropole du Grand Paris, accessed May 15, 2021, https://www.zonefaiblesemissionsmetropolitaine.fr/

42 The Clean Air Action plan, City of Amsterdam, accessed May 20, 2021, https://www.amsterdam.nl/en/policy/sustainability/clean-air/

43 Hongyang Cui, Pramoda Gode, Sandra Wappelhorst, *A global overview of zero-emission zones in cities and their development progress*, (ICCT: Washington, DC, forthcoming 2021).

44 "Fossil Fuel Free Streets Declaration," C40 Cities, accessed May 15, 2021, https://www.c40.org/other/green-and-healthy-streets

Non-fiscal registration benefits for electric vehicles. Providing incentives for electric vehicles in terms of license plates access could also enhance their adoption in ride-hailing fleets. In Beijing, China, it takes months to obtain license plates for electric vehicles while it takes years to obtain conventional vehicle license plates.

Table 2 summarizes these select non-monetary policies outside India. None of these listed measures are in place in India so far, except for electrification targets for shared mobility and ride-hailing, and that is only at the notification stage.

Table 2. Summary of key non-monetary government policies to electrify passenger cars outside India

	Policy action	Actor	Example city, state, country
Electrification of ride-hailing fleets specifically	Electrification goals and strategies for ride-hailing companies	National government	France
		Local government	Shenzhen, Guangzhou, Zhengzhou, Wuhan, Xi'an (China)
	Emission standards for ride-hailing fleets	State government	California (United States)
	Green standards for ride-hailing companies for access to transportation hubs	Local government	Seattle-Tacoma International Airport (Washington State, United States)
	Licensing or permit requirements for ride-hailing companies	Local government	London (United Kingdom), New York (United States)
Electrification of passenger car fleets overall	Phase-out sale or registration of new combustion engine cars	National government	Austria, Canada, Cape Verde, Costa Rica, Denmark, France, Iceland, Ireland, Netherlands, Norway, Singapore, Slovenia, Spain, United Kingdom
		State government	British Columbia (Canada), California (United States), Quebec (Canada)
	Zero-emission vehicle regulations	National government	China, South Korea
		State government	British Columbia (Canada), California (United States)
	Labeling of electric vehicles and access to benefits for electric vehicles	National government	France, Germany, Spain, United Kingdom
		State government	California (United States)
	Urban vehicle access regulations with implemented or planned preferential access for electric vehicles	Local government	Amsterdam (Netherlands), London (United Kingdom), Oslo (Norway), Oxford (United Kingdom), Paris (France), 35 C40 cities across Africa, Asia, Europe, New Zealand, and North and South America
	Non-fiscal registration benefits for electric vehicles	Local government	Beijing (China)

ELECTRIFICATION TARGETS SET BY RIDE-HAILING COMPANIES

Ride-hailing companies such as Uber, Lyft, and DiDi have announced intentions to increase the share of electric vehicles in major markets such as the United States, China, and Europe.

Uber aims to become a fully zero-emission platform globally by 2040 and it has an earlier target to have 100% of rides be delivered by EVs in the cities of the United States, Canada, and Europe by 2030.[45] There are additional specific targets in selected countries and cities. In France, Uber's target is that all diesel vehicles will be removed from the platform by 2024 and that by 2025, 50% of vehicles on the platform shall be BEVs and hybrids.[46] In London, Uber aims to have 50% of its vehicle fleet fully electric

45 Dara Khosrowshahi, "Driving a Green Recovery," *Uber*, September 8, 2020, https://www.uber.com/en-AE/newsroom/driving-a-green-recovery/

46 "Nos engagements pour une mobilité durable," *Uber*, September 8, 2020, https://www.uber.com/fr/blog/mobilite-durable/

by 2021 and 100% by 2025; this also complies with London's policy measures such as licensing policies and access to congestion charging zone. Uber has also pledged to electrify 50% of kilometers driven collectively across seven European capitals (Amsterdam, Berlin, Brussels, Lisbon, London, Madrid) by 2025.[47]

Lyft, a ride-hailing company that primarily operates in the United States, has committed to shift to 100% electric vehicles in the United States by 2030.

In China, DiDi had more than 969,000 electric vehicles registered in its platform by the end of 2019 and is planning for 100,000 more units in 2021.[48] It also proposes to have 10 million electric cars on its platform by 2028.[49]

There have been comparably fewer activities in India. In 2018, Ola announced a plan to bring 1 million electric vehicles by 2021 through a collaborative platform focused on all vehicle segments but mainly on electric three-wheelers. Toward its electrification goal, Ola launched a project in the city of Nagpur in 2017 with 100 electric cars running on Ola's app platform. Ola invested in setting up charging stations and partnered with Mahindra for supply of electric cars.[50] However, not much progress has happened since then in terms of encouraging adoption of electric four-wheelers. In 2020, Ola changed its focus to electric two-wheelers. Uber, the other big ride-hailing company in India, has yet not declared any specific electrification goals for India. Although Uber India previously made announcements regarding collaboration with other entities toward electrification of its fleet[51], the results were lackluster. Uber has recently announced a partnership with Lithium Urban Technologies to deploy 1,000 electric vehicles on its platform.[52]

Some small entities like Lithium and BluSmart started doing business in the passenger transport space in India with all-electric car fleets in 2014 and 2019, respectively. Lithium operates in the business-to-business (B2B) space with its own fleet of more than 850 electric vehicles only,[53] and BluSmart Mobility[54] provides all-electric car ride-hailing services in the cities of Delhi, Noida, Ghaziabad, Gurgaon, Jaipur, and Mumbai. The company operates 870 electric cars on its platform through a third-party leasing model and manages vehicle charging through strategically placed captive electric charging stations.[55] A combination of high vehicle utilization, a better charging infrastructure strategy that reduces deadhead kilometers, and sharing charging costs with other electric vehicle users is helping BluSmart to scale its operations. While these two companies manage a relatively small fleet and do not follow the marketplace model like Uber and Ola, they are proving that it is possible to run an all-electric vehicle aggregator business in India.

47 Matthew Richardson et al., "SPARK! Partnering to Electrify in Europe," (Uber: San Francisco, 2020), https://www.uber.com/us/en/about/reports/spark-partnering-to-electrify-europe/

48 Ma Si, "Didi Chuxing to boost efficient use of charging piles," *China Daily*, April 23, 2020, https://www.chinadaily.com.cn/a/202004/23/WS5ea0fec6a3105d50a3d1842f.html#:~:text=Chinese%20ride%2Dhailing%20platform%20Didi,vehicles%20running%20on%20its%20platforms

49 New Energy Vehicle (NEV) Mandate Policy of China, iea.org, accessed May 16, 2021, https://www.iea.org/policies/3335-new-energy-vehicle-nev-mandate-policy

50 "Mission: Electric," Ola, accessed March 16, 2021, https://www.mission-electric.in/

51 Promit Mukherjee, "Uber to partner with Mahindra to pilot electric vehicles in India," *Reuters*, November 24, 2017, https://www.reuters.com/article/us-uber-mahindra-india/uber-to-partner-with-mahindra-to-pilot-electric-vehicles-in-india-idUSKBN1DO0MQ

52 "Uber partners with Lithium Urban Technologies to onboard 1,000+ electric vehicles in five cities," *The Economic Times*, October 9, 2020, https://energy.economictimes.indiatimes.com/news/power/uber-partners-with-lithium-urban-technologies-to-onboard/78550471

53 "Sustainable Urban Transportation Solutions for Corporates," Lithium, accessed May 16, 2021, https://project-lithium.com/services/

54 Jasmeet Khurana et al., "Advancing electrification of ride-hailing in India: A BluSmart case study," (wbcsd: New Delhi, 2020), https://blu-smart.com/assets/ev-report.pdf

55 Captive charging stations are charging stations exclusively meant for electric vehicles owned or under the control of the owner of the charging station.

Table 3 summarises the electrification targets and related actions by leading ride-hailing companies across the world.

Table 3. Summary of ride-hailing company electric vehicle goals and selected actions with a focus on four-wheelers.

Company	Target	Target year	Markets	Key milestones and actions
Uber	Fully zero-emission platform	2040	Worldwide	$800 million funding to help drivers transition to electric vehicles by 2025 Partnering with local governments like London and Paris, electric vehicle manufacturers, charging service providers, advocacy groups Incentives to drivers and riders for electric vehicle adoption Expanding Uber Green to more cities
	100% of rides in BEVs	2030	U.S, Canadian, European cities, and major global cities	
	100% all-electric passenger service	2025	London	
	Electrify 50% of rides	2025	Amsterdam, Berlin, Brussels, Lisbon, London, Madrid and Paris	
Lyft	Transition 100% vehicles to all-electric or other zero-emission technologies	2030	United States	Engagement with regulators, utilities, local governments, charging partners Providing electric vehicles at the same or lower weekly rental price as comparable gasoline vehicles
DiDi	10 million electric cars	2028	Unspecified	Joint venture with British Petroleum to provide electric vehicle charging stations in China for both DiDi and non-DiDi car owner
BluSmart Mobility	100% electrified ride-hailing fleet platform	Unspecified	Delhi, Noida, Ghaziabad, Gurgaon, Jaipur and Mumbai in India	Scaled from 145 EVs in October 2019 to 870 EVs in January 2020 Plans to procure EVs from other OEMs in the future Plans to create a comprehensive charging community network with chargers available at least every 2 km

Note: BEV = Battery electric vehicle

In India, even though the central and state governments have put forward various monetary incentives to promote vehicle electrification, there have been no clear non-fiscal regulatory bindings on electric ride-hailing businesses and no strong fleet electrification commitments or subsequent actions have been observed from ride-hailing companies like Ola and Uber.

SELECT INITIATIVES AND PARTNERSHIP EFFORTS

Ride-hailing companies and other stakeholders including energy providers and utilities, charging infrastructure providers, and car manufacturers have implemented a variety of additional measures individually or in co-operation that promote electrification of ride-hailing fleets. A selection of these is presented below.

Purchase incentives for electric ride-hailing drivers. Uber is helping drivers on its platform with some financial assistance to purchase electric vehicles. A purchase incentive is financed through a Clean Air Fee for every ride-hailing trip booked through the Uber app, paid by the rider. In London, the fee amounts to £0.03 (INR 3) per mile in May 2021. Uber uses the money collected to both provide a purchase incentive to drivers who purchase an electric vehicle and to support drivers who have already made the switch to electric vehicles with ongoing vehicle costs. In London, drivers are also offered discounts on electric vehicle costs and a low interest rate of less than 5% to finance the vehicle purchase. [56]

56 "The next phase of Uber's Clean Air Plan in London," *Uber*, May 4, 2021, https://www.uber.com/en-GB/newsroom/the-next-phase-of-ubers-clean-air-plan-in-london/

Partnerships between car manufacturers and ride-hailing fleets. Partnering with car manufacturers could help ride-hailing companies to negotiate reduced purchase or leasing prices for electric vehicles to be passed on to the drivers. At the same time, car manufacturers can benefit from further electric vehicle sales to meet their CO_2 or zero emission standards. An example is the collaboration between Nissan and Uber. In 2020, both companies signed a deal to support the introduction of 2,000 all-electric Nissan Leafs for drivers using the Uber app in London, as part of Uber's Clean Air Plan mentioned above. As part of the deal, Nissan provides Uber with dedicated transaction prices as well as an electric vehicle education program and marketing for zero-emission vehicle adoption in Uber London's ride-hailing fleet.[57] Another example is Volkswagen, which in late 2020 launched a pilot project for the use of BEVs in Berlin's Uber Green all-electric vehicle fleet. The cooperation aims to offer e-Golf cars.[58] In May 2021, electric vehicle start-up Arrival announced that in collaboration with Uber, it has been building an electric vehicle custom designed for ride-hailing applications.[59] Keeping with the national goal of electrification, DiDi has been working toward electrification by collaborating with manufacturers like BYD to co-design electric vehicles specifically for the ride-hailing segment.[60] In India, BluSmart has partnered with Mahindra, Hyundai Motors, and Tata Motors to procure electric vehicle fleets on its platform with the aim to scale its operation in India by 2022.

Partnership for access to fast and discounted charging. At the end of 2019, in collaboration with Electrify America, the largest open DC fast charging network in the United States, Lyft announced a joint agreement to provide renters of an electric vehicle of Lyft's Express Drive program with captive charging on Electrify America's DC fast charging network in Denver, Colorado.[61] In Portland, Oregon, the utility Portland General Electric provides free public charging to Lyft drivers. Similarly, EVgo, the largest public fast charging network for electric vehicles in the United States, launched a discounted electric vehicle charging program in November 2020 for Uber drivers, and drivers can charge their cars at lower cost at more than 800 EVgo fast charging locations across the nation.[62] In Europe, Uber has agreements with Power Dot and EDF in France and British Petroleum (BP) in the United Kingdom to ensure exclusive access to charging hubs for its drivers.[63]

Partnership to enhance information sharing and education about electric vehicles. Information can help increase the acceptance of electric vehicles among communities and ride-hailing drivers. One example is a strategic partnership between Uber and Duquesne Light Company (DLC), an energy service company, which joined forces in 2018 with the goal to raise awareness of electric vehicles and promote the benefits

57 "Nissan and Uber partner in London: 2,000 LEAFs," *Green Car Congress*, January 27, 2020, https://www.greencarcongress.com/2020/01/20200127-nissan.html

58 "Volkswagen and Uber launch pilot project with electric vehicles in Berlin," Volkswagen, accessed May 16, 2021, https://www.volkswagenag.com/en/news/2020/09/volkswagen_uber_berlin.html

59 Colin McKerracher, "Hyperdrive Daily: Uber, Arrival and the architecture of ride-hailing EVs," Bloomberg, May 11, 2021, https://www.bloomberg.com/news/newsletters/2021-05-11/hyperdrive-daily-uber-arrival-and-the-architecture-of-ride-hailing-evs

60 "BYD & Didi Chuxing reveal electric car for ride-sharing," *electrive.com*, November 18, 2020, https://www.electrive.com/2020/11/18/byd-didi-chuxing-reveal-electric-car-for-ride-sharing/

61 "Electrify America and Lyft collaborate on electric vehicle rideshare charging to help decrease emissions by increasing miles traveled by EVs," *Electrify America*, November 19, 2019, https://media.electrifyamerica.com/en-us/releases/85

62 "Uber and EVgo launch partnership to electrify on-demand rides and accelerate zero-emission transportation," *EVgo*, November 12, 2020, https://www.evgo.com/press-release/uber-and-evgo-launch-partnership-to-electrify-on-demand-rides-and-accelerate-zero-emission-transportation/

63 Dale Hall, Mike Nicholas, Marie Rajon Bernard, *Guide to electrifying ride-hailing vehicles for cities*, (ICCT: Washington, DC, 2021), https://theicct.org/sites/default/files/publications/Ride-hailing-cities-guide-mar2021.pdf

for Uber drivers, DLC customers, and the entire Pittsburgh region (Pennsylvania, United States).[64]

An overview of these measures is given in Table 4.

Table 4. Summary of select initiatives and partnerships by ride-hailing companies and other stakeholders to electrify ride-hailing fleets.

Policy action	Actor	Example cities, states, countries
Purchase incentives for electric ride-hailing drivers	Uber	London (United Kingdom)
Partnership with vehicle manufacturers towards electric vehicles for ride-hailing fleets	Uber and Nissan	London (United Kingdom)
	Uber and Volkswagen	Berlin (Germany)
	Uber and Arrival	United Kingdom
	DiDi and BYD	China
	Blusmart and Mahindra	Delhi (India)
	Blusmart and Tata Motors	
Access to fast and discounted charging	Lyft and Electrify America	Denver (Colorado, United States)
	Lyft and Portland General Electric	Portland (Oregon, United States)
	Uber and EVgo	United States
	Blusmart and Exicom	Delhi (India)
Information and education about electric vehicles	Uber and Duquesne Light Company	Pittsburgh region (Pennsylvania, United States

CONCLUSIONS

In the last few years, the central and some state governments in India have announced and implemented consumer financial incentives that have reduced the cost gap between electric and conventional gasoline and diesel vehicles if looking at the 5-year TCO for ride-hailing vehicles. However, CNG vehicles are still more cost attractive than BEVs, and the uptake of electric vehicles has still not picked up in India, especially among the four-wheelers used for ride-hailing. Additionally, none of the leading ride-hailing platforms have taken up initiatives toward decarbonizing their four-wheeler fleets the way they have in European markets and the United States.

Introducing non-fiscal policy measures that supplement the fiscal policies could help to drive electrification in ride-hailing businesses in India. Table 5 summarizes select governmental actions outside India and compares these non-monetary policies and their implementation action toward electrifying ride-hailing fleets across countries and regions compared to India. The first four policies concern the non-fiscal actions adopted toward electrifying ride-hailing fleets specifically, and the next five policies pertain to non-fiscal actions toward electrifying overall passenger car fleets. Additionally, we indicate for India if the policy has been notified in its entirety or partially.

64 "Duquesne Light Company and Uber announce electric vehicle partnership," Duquesne Light Company, accessed May 15, 2021, https://www.duquesnelight.com/company/about/newsroom/2018/duquesne-light-company-and-uber-announce-electric-vehicle-partnership

Table 5. Summary of select non-monetary policy actions implemented by select national, state, and local governments towards electrification in ride-hailing fleets specifically and passenger car fleets overall in Asian, North American, and European markets compared to India.

			Electrification of ride-hailing fleets specifically				Electrification of passenger car fleets overall				
			Electrification goals and strategies for ride-hailing companies	Emission standards for ride-hailing fleets	Green standards for ride-hailing companies for access to transportation hubs	Licensing or permit requirements for ride-hailing companies	Phase-out sale or registration of new combustion engine cars	Zero-emission vehicle regulations	Labeling of electric vehicles and access to benefits for electric vehicles	Urban vehicle access regulations with implemented or planned preferential access for electric vehicles	Non-fiscal registration benefits for electric vehicles
Asia	India		✓					✓	✓		
	China	Shanghai									
		Beijing									
		Shenzhen									
		Guangzhou									
		Zhengzhou									
		Xi'an									
		Wuhan									
	Singapore										
North America	United States	California									
		Seattle									
		New York									
	Canada										
		British Columbia									
		Quebec									
Europe	United Kingdom	London									
		Oxford									
	France	Paris									
	Netherlands	Amsterdam									
	Norway	Oslo									
	Germany										
	Spain										
	Denmark										
	Iceland										
	Ireland										
	Slovenia										
Number of select policy actions outside India			**7**	**1**	**1**	**2**	**16**	**9**	**6**	**5**	**1**

Note: Action by national government, Action by state government, Action by local government, ✓ Action by national government of India without specific targets

Of the nine select non-fiscal policy measures implemented in markets outside India, only labeling of electric vehicles has been adopted in India so far. However, even that does not help in getting preferential access to any relevant benefits currently. Based on this analysis, we make the following suggestions for action at the national, state, and local government levels:

- Time-based, non-fiscal measures specifically targeted at the electrification of the ride-hailing fleet at the regional or local levels can push the Indian market. Setting specific goals for electric vehicle adoption in respective regional passenger or ride-hailing transport fleets has been successful in cities like Shenzhen, Guangzhou, Zhengzhou, and Wuhan in China. In comparison, no policy actions to drive the electrification of ride-hailing fleets have been effectively implemented in India. Electrification goals have been notified by the central government but no targets have been specified. For example, electrification goals and strategies for ride-hailing companies announced by the national government in India in July 2019 through notification from the Ministry of Road Transport and Highways does not mention any specific time-based electrification targets or percentage of fleet electrification required from ride-hailing aggregators. Since a major part of the ride-hailing and taxi market in India exists in the big cities, mandatory local or regional-level targets could be particularly effective in electrifying ride-hailing fleets.
- Emissions-based licensing and environmental standards for ride-hailing companies in India could help push ride-hailing fleet electrification. Policy measures such as emission-based licensing restrictions in London and New York and emission standards for ride-hailing companies in California have pushed ride-hailing companies to plan and act toward electrification in these regions. In India, so far no time-based specific targets or environmental standards are set as part of the Motor Vehicle Aggregator Guidelines in 2020 by the government. Therefore, having national-level environmental targets and setting regional or local emission-based licensing measures could effectively push electrification adoption of ride-hailing fleets in India. Such measures could be piloted in metropolitan cities like Delhi and Bangalore that have a fair share of ride-hailing fleets to weigh the extent of effectiveness before large-scale implementation.
- Urban access regulation benefits at the local or regional level for already labeled commercial vehicles in Indian cities could aid quicker adoption of electric vehicles among ride-hailing fleets. Regulations toward labeling of electric vehicles have been adopted in India, but these have not yet been linked with non-fiscal benefits. Local or regional level measures regulating access to certain parts of a city with preferential access to distinctly labeled BEVs while restricting entry of ICE vehicles can motivate ride-hailing drivers to switch to electric cars. Many cities, including London, Paris, and Amsterdam, are adopting this policy and experiencing the benefits. Piloting such access regulations in major metropolitan cities affected by repeated congestion problems could drive ride-hailing fleets toward EV uptake to ensure no loss in ridership. Also, offering exclusive benefits to electric cars like preferred access to certain parts of the city or entire city areas, and beneficial parking policies, could incentivize drivers to adopt electric ride-hailing vehicles sooner in India.

A multi-pronged policy approach at different government levels will likely be needed to spur the electrification of ride-hailing vehicles in India. Stringent CO_2 and electric vehicle regulations can ensure investment from manufacturers and model availability, fiscal incentives can address consumer cost barriers, and charging infrastructure deployment can provide convenience and confidence for consumers. Non-fiscal policies as recommended here can provide complementary support, and targeting these actions specifically for ride-hailing vehicles could enhance their electrification. Such a multi-policy approach would also be more likely to result in commitments from ride-hailing aggregators toward electric transition in India, and increased cooperation between aggregators and private stakeholders, as has been observed in other markets.