Analysis of policies for electrifying India’s four-wheeler ride-hailing fleet

ICCT
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India

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Zero emission ride-hailing is the best way to achieve “Green Vehicle Kilometers” in India

The Indian ride-hailing market is growing fast, with a compound annual growth rate (CAGR) of 19%

To achieve India’s EV mission, it is crucial to electrify Ride hailing car fleets

CO\textsubscript{2} emission avoided by 100% electrification of ride hailing cars – Year 2030

Source: WBCSD, 2019, https://www.wbcsd.org/contentwbc/download/10238/153424/1
Discussion agenda

• Analysis of impact of fiscal incentives on TCO of electric cars in India’s ride-hailing fleet
  ◦ Baseline scenario analysis – 2020
  ◦ Comparing baseline scenario of 2020 to 2019
  ◦ Sensitivity analysis of additional policies
  ◦ Policy recommendations

• Analysis of non-fiscal policies to drive adoption of EVs in India’s ride-hailing fleet

• Q&A
Research methodology

Step 1 – Analysis of Total Cost of Ownership 5-year (TCO) 2020
- Selected cities: Delhi City, Hyderabad City, Bangalore City
  - Selected vehicle models: Mahindra eVerito D2 (BEV), Tata Nexon (BEV), Maruti Suzuki Dzire LXI (gasoline), Hyundai Aura S (diesel), Maruti Suzuki Tour S (CNG)

Step 2 – Comparison of costs per km 2020 versus 2019
- Selected cities: Delhi City, Hyderabad City
  - Selected vehicle models: Mahindra eVerito D2 (BEV), Maruti Suzuki Dzire LXI (gasoline)

Step 3 – Effects on costs per km 2020
- Selected cities: Delhi City, Hyderabad City, Bangalore city
  - Selected vehicle models: Tata Nexon (BEV), Mahindra eVerito D2 (BEV), Maruti Suzuki Tour S (CNG)

Step 4 – Analysis of Non-fiscal policies for ride-hailing electrification in India and abroad
Key assumptions on *purchase cost* – Baseline scenario

**BEV Purchase and Finance cost**

- Purchase based on ex-showroom prices
- Interest rates for BEVs 0.2% lower than conventional cars
- Vehicle finance costs are estimated based on a 5-year loan

**Applicable BEV Purchase incentives from Central & State Government for 2020**

- FAME II from the central Government of India
- Upfront purchase incentive from the Delhi Government
- No purchase incentive from the state governments of Telangana and Karnataka

Key assumptions on taxes, fees & insurance—Baseline scenario

Taxes and fees considered for BEVs

- National one-time goods and service tax (GST), the compensation cess, and the tax collected at source (TCS) for vehicles
- GST for BEVs less than conventional cars and are exempted from compensational cess
- BEVs exempted from registration fee and road tax

Applicable insurance premium for BEVs

- Covers mandatory third-party damage policy, personal-accident policy, and an own-damage cover
- Discounted rates on third-party damage policy applicable for private electric cars only

Key assumptions on **fueling and re-fueling cost** - Baseline scenario

- **Fueling Cost**
  - 6-month average price in respective cities for gasoline, diesel and CNG cars
  - A 25% increase over the certified energy consumption value per km of use
  - BEV Home charging – Over night charging for BEV Tata Nexon and BEV Mahindra eVerito D2

- **Re-fueling / Recharging time and *Opportunity Cost***
  - Gasoline car - 5 minutes, Diesel car – 5 minutes, CNG car - 30 minutes
  - BEV Tata Nexon – 68 minutes (avg.), BEV Mahindra eVerito D2 – 101 minutes (avg.)
  - Wage- INR 112 per hour (sedan drivers) & INR 89 per hour (compact car drivers)
  - Vehicle utilization – average 200 kms/day, 67% on trips, 12-hour workday

*Opportunity cost* - Potential revenue loss due to idle time spent during vehicle re-fueling/recharging
TCO for BEV adoption in ride-hailing is competitive in India (Delhi city) but has some challenges.

Challenges to Adoption:
- High Vehicle upfront cost (53%-69%)
- High Vehicle finance cost (10%-14%)
- High opportunity cost due to loss of business (2%-16%)

High upfront and finance cost in Hyderabad too!!

Challenges to Adoption

- High Vehicle upfront cost (48%-62%)
- High Vehicle finance cost (8%-12%)
- High opportunity cost due to loss of business (2%-13%)

Bangalore also has the same trend!!

Challenges to Adoption

- High Vehicle upfront cost (49%-62%)
- High Vehicle finance cost (9%-12%)
- High opportunity cost due to loss of business (2%-14%)

Baseline Scenario Analysis
(2020 versus 2019)
Ride-hailing BEVs are getting cost-attractive in Delhi – 2020 vs 2019

- **Representative BEV car**: Mahindra eVerito D2
  - 2019: Increase in vehicle ownership cost (TCO) 5%
  - 2020: Increase in vehicle ownership cost (TCO) 5%

- **Representative Gasoline car**: Maruti Suzuki Dzire (LXI)
  - 2019: Drop in vehicle ownership cost (TCO) 34%
  - 2020: Drop in vehicle ownership cost (TCO) 34%

Blog source: https://theicct.org/blog/staff/electric-4w-ride-hailing-india-may2021
Similar trend in Hyderabad too! – 2020 vs 2019

Representative BEV car
Mahindra eVerito D2

2019
2020
21% drop in vehicle ownership cost (TCO) in 1 year

Representative Gasoline car
Maruti Suzuki Dzire (LXI)

2019
2020
1% increase in vehicle ownership cost (TCO) in 1 year

Blog source: https://theicct.org/blog/staff/electric-4w-ride-hailing-india-may2021
Baseline analysis shows that BEVs are comparative to diesel and gasoline cars in terms of Total Cost of Ownership (TCO)

- With the current cost and incentive structures in place, BEV cars are either as costly as or cheaper than the Diesel and Gasoline cars in three cities over a 5-year holding period.

- In terms of upfront purchase cost, BEVs are still more expensive than conventional cars.

- However, CNG cars are still cheaper than the BEV car models in terms of 5-year TCO.

- We further analyze additional policies that could bring down the cost per-km difference b/w BEV-CNG cars.
Additional Policy Analysis- Sensitivity analysis
Key assumptions under the hypothetical additional policy scenario

- Deployment of DC fast charging infrastructure @50kW, example USA and Europe
- States matching FAME II incentive for Hyderabad and Bangalore (INR 10,000 /kWh), example-Delhi EV Policy 2020
- Interest rate subvention on electric vehicle loan financed amount @5%, example-Delhi EV policy 2020
- Tax collected at source (TCS) waiver in electric vehicle purchase @0.75%, possible tax exemption
- Discount on IRDAI insurance rates for commercial BEVs @15%, example-insurance discount to private EV car owners
- Parking fee waivers on electric vehicles, fee exemptions
- Rebates on trip taken to electric vehicle ride-hailing cab drivers (INR 5 per trip), example-Uber green, London
- Bulk purchase discount for electric ride-hailing vehicles (INR 60,000), example-bulk discounts to CNG drivers in Delhi, Ola platform
- Opportunity cost rebate to electric ride-hailing vehicle drivers (INR 50 per hour), example-compensation to BEV drivers, OMI
Policy Recommendation 1: Central purchase incentives matched by state funding will reduce cost gap and drive electric vehicle adoption in India’s ride-hailing fleet.

Policy Recommendation 2: Investment in Fast charging infrastructure will reduce opportunity cost and motivate drivers to transition to BEVs

Policy Recommendation 3: Waiver on annual interest payments towards loans taken for electric vehicle purchase would help to further attract electric vehicles in ride-hailing operation

Additional policy analysis shows that BEVs are getting competitive to CNG cars in terms of Total Cost of Ownership (TCO)

- Including **state incentives of the same value as FAME II** can substantially bridge the gap between the BEV and the conventional vehicles

- **Discount on the interest rate** could bring down the **vehicle finance cost, second highest cost component** in the 5-year TCO after procurement cost

- **Fast charger technology deployment** could further reduce the cost per kilometer difference because it would mean less charging time and thus **less opportunity cost**
Discussion agenda

• Analysis of impact of fiscal incentives on TCO of electric cars in India’s ride-hailing fleet
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• Analysis of non-fiscal policies to drive adoption of EVs in India’s ride-hailing fleet

• Q&A
Analysis of Non-Fiscal policies
Monetary policies should be supplemented with non-monetary policy measures to drive fast adoption of EVs in ride-hailing fleets.

Revenues from ride-hailing and taxi Top 4 (2020) in million US$:

1. China 79,100
2. United States 35,100
3. Europe 22,400
4. India 21,200

Ride-hailing companies are increasingly committed to electrify their 4-wheeler fleets in key markets such like U.S., China, and Europe

**Europe**
- Uber: 100% by 2030
  - Uber: 50% by 2025

**United States**
- Uber: 100% by 2030
- Lyft: 100% by 2030

**Global**
- Uber: 100% by 2040

**China**
- Didi: 10 million by 2028

**India**
- Uber and Ola: no commitments for 4-wheelers

National, state, and local government in Europe, China, and the U.S. have set various non-monetary policies to electrify ride-hailing platforms.

<table>
<thead>
<tr>
<th>Example policy action</th>
<th>Actor</th>
<th>Example city, state, county</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrification goals and strategies for ride-hailing companies</td>
<td>National government</td>
<td>France</td>
</tr>
<tr>
<td></td>
<td>Local government</td>
<td>Shenzhen, Guangzhou, Zhengzhou, Wuhan, Xi’an (China)</td>
</tr>
<tr>
<td>Emission standards for ride-hailing fleets</td>
<td>State government</td>
<td>California (United States)</td>
</tr>
<tr>
<td>Green standards for ride-hailing companies for access to transportation hubs</td>
<td>Local government</td>
<td>Seattle-Tacoma International Airport (Washington State, United States)</td>
</tr>
<tr>
<td>Licensing requirements for ride-hailing companies</td>
<td>Local government</td>
<td>London (United Kingdom), New York (United States)</td>
</tr>
</tbody>
</table>
Beyond, non-monetary policies to electrify the passenger car fleet overall support these actions

<table>
<thead>
<tr>
<th>Example policy action</th>
<th>Actor</th>
<th>Example city, state, county</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrification of passenger car fleet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase-out sale or registration of new combustion engine cars</td>
<td>National government</td>
<td>Canada, Cape Verde, Denmark, France, Iceland, Ireland, Netherlands, Norway, Singapore, Slovenia, Spain, Sweden, United Kingdom</td>
</tr>
<tr>
<td></td>
<td>State government</td>
<td>British Columbia (Canada), California (United States), Massachusetts (United States), Quebec (Canada)</td>
</tr>
<tr>
<td>Zero-emission vehicle regulations</td>
<td>National government</td>
<td>China, South Korea</td>
</tr>
<tr>
<td></td>
<td>State government</td>
<td>British Columbia (Canada), California (United States)</td>
</tr>
<tr>
<td>Labelling of electric vehicles and access to benefits</td>
<td>National government</td>
<td>France, Germany, Spain, United Kingdom</td>
</tr>
<tr>
<td></td>
<td>State government</td>
<td>California (United States)</td>
</tr>
<tr>
<td>Urban vehicle access regulations</td>
<td>Local government</td>
<td>Amsterdam (Netherlands), London (United Kingdom), Oslo (Norway), Oxford (United Kingdom), Paris (France)</td>
</tr>
<tr>
<td>Non-fiscal registration benefits for electric vehicles</td>
<td>Local government</td>
<td>Beijing (China), Shanghai (China)</td>
</tr>
</tbody>
</table>
In India, similar non-monetary policy actions and their enforcements on ground are still inadequate

<table>
<thead>
<tr>
<th>Policy action</th>
<th>Notification status</th>
<th>Implementation status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrification of ride-hailing fleet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting targets for the uptake of ZEVs in shared mobility</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>Electrification targets in motor vehicle aggregators</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>guidelines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrification of passenger car fleet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO₂ emission standards for passenger cars</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Green tax exemption for BEVs in upcoming Vehicle Scrappage Policy</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Green coloured registration plate with yellow font</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Permit requirement exemption for electric vehicles</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>plying as transport vehicle</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

 ✓ - Notified without specification  ✓ - Notified but not stringent  ✓ - Notified  ✗ - Not notified or implemented
Conclusions

Driving the electric 4-wheeler ride-hailing market requires governments a system of regulation, fiscal and non-fiscal policies, charging infrastructure, and local action.

Electrification of the passenger car fleet

- Regulation: Long-term CO₂ and electric vehicle regulations ensure investment, model availability
- Fiscal incentives: Address short-term (~5 year) market cost barrier
- Charging infrastructure: Provide convenience, consumer confidence, education
- Cities: Promote electric vehicles locally (urban restrictions, preferential access)
Conclusions (continued)

Driving the electric 4-wheeler ride-hailing market requires governments a system of regulation, fiscal and non-fiscal policies, charging infrastructure, and local action.

Electrification of the ride-hailing fleet specifically

- Regulation: Set emission standards for ride-hailing fleets
- Targets: Commit to electrification goals for ride-hailing companies/aggregators
- Non-fiscal policies: Set licensing requirements
Thank you!

“Glad that riding an environment friendly electric car is possible today at the same cost of riding the fossil-fuelled cars. It is a win-win for commuters as they get to contribute their part in cleaner cities.”

- A ride hailing commuter
## Vehicle Models considered in the study

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
<th>Fuel type</th>
<th>Ex-show-room price with tax (INR)</th>
<th>Peak power (kW)</th>
<th>Tailpipe CO₂ emissions (g/km)</th>
<th>Length (mm)</th>
<th>Battery capacity (kWh)</th>
<th>Certified fuel consumption (per 100 km)</th>
<th>Adjusted fuel consumption (per 100 km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahindra</td>
<td>eVerito D2</td>
<td>BEV</td>
<td>9,12,515</td>
<td>31</td>
<td>0</td>
<td>4,247</td>
<td>21.2</td>
<td>14.6 kWh</td>
<td>18.3 kWh</td>
</tr>
<tr>
<td>Tata</td>
<td>Nexon</td>
<td>BEV</td>
<td>13,99,000</td>
<td>95</td>
<td>0</td>
<td>3,993</td>
<td>30.2</td>
<td>10.6 kWh</td>
<td>13.3 kWh</td>
</tr>
<tr>
<td>Maruti Suzuki</td>
<td>Dzire LXI</td>
<td>Gasoline</td>
<td>4,45,000</td>
<td>66</td>
<td>111.8</td>
<td>3,995</td>
<td>N/A</td>
<td>4.3 Liter</td>
<td>5.4 Liter</td>
</tr>
<tr>
<td>Hyundai</td>
<td>Aura S</td>
<td>Diesel</td>
<td>7,73,800</td>
<td>55</td>
<td>104.5</td>
<td>3,995</td>
<td>N/A</td>
<td>3.9 Liter</td>
<td>4.9 Liter</td>
</tr>
<tr>
<td>Maruti Suzuki</td>
<td>Tour S</td>
<td>CNG</td>
<td>5,99,000</td>
<td>61</td>
<td>103.0</td>
<td>3,995</td>
<td>N/A</td>
<td>3.7 kg</td>
<td>4.7 kg</td>
</tr>
</tbody>
</table>

## Current central and state policy incentives for EV considered in the study

<table>
<thead>
<tr>
<th>Central Government Incentive - Fame 2</th>
<th>BEV Tata Nexon</th>
<th>BEV Mahindra eVerito D2</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-time purchase incentive for electric 4-wheeler commercial passenger cars</td>
<td>10,000 INR per kWh of battery capacity capped at 20% of cost of vehicle</td>
<td>10,000 INR per kWh of battery capacity capped at 20% of cost of vehicle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State Government Incentives</th>
<th>Delhi</th>
<th>Telangana</th>
<th>Karnataka</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road tax waiver for electric 4-wheeler commercial passenger cars</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Registration Fee waiver for electric 4-wheeler commercial passenger cars</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>One-time Purchase Incentive</td>
<td>10,000 INR per kWh of battery capacity subject to maximum 1,50,000 INR</td>
<td>10,000 INR per kWh of battery capacity subject to maximum 1,50,000 INR</td>
<td></td>
</tr>
</tbody>
</table>

Baseline scenario analysis results at a glance
- TCO per km values

<table>
<thead>
<tr>
<th></th>
<th>Delhi</th>
<th></th>
<th>Bangalore</th>
<th></th>
<th>Hyderabad</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BEV</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>BEV</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Tata Nexon</strong></td>
<td>Average cost per km</td>
<td><strong>Tata Nexon</strong></td>
<td>Average cost per km</td>
<td><strong>Tata Nexon</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Mahindra eVerito</strong></td>
<td>5.8</td>
<td><strong>Mahindra eVerito</strong></td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td><strong>Gasoline</strong></td>
<td><strong>Dzire LXI</strong></td>
<td>7.3</td>
<td><strong>Dzire LXI</strong></td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td><strong>Diesel</strong></td>
<td><strong>Aura S</strong></td>
<td>7.3</td>
<td><strong>Aura S</strong></td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td><strong>CNG</strong></td>
<td><strong>Tour S</strong></td>
<td>5.2</td>
<td><strong>Tour S</strong></td>
<td>6.2</td>
<td></td>
</tr>
</tbody>
</table>

## Electrification goals and actions of Leading ride-hailing entities

<table>
<thead>
<tr>
<th>Company</th>
<th>Markets</th>
<th>Target</th>
<th>Target year</th>
<th>Key milestones and actions</th>
</tr>
</thead>
</table>
| Uber        | Worldwide, U.S., Canadian, European cities, and major global cities | Fully zero-emission platform               | 2040        | • $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 |
|             | London                                            | 100% of rides in BEVs                      | 2030        |                                                                                                                                             |
|             | Amsterdam, Berlin, Brussels, Lisbon, London, Madrid and Paris | 100% all-electric passenger service        | 2025        |                                                                                                                                             |
|             | India                                             | No specific target for India               | NA          | • Although, previously Uber India made announcements regarding collaboration with other entities towards electrification of its fleet, the results on ground were not promising |
| Lyft        | United States                                     | Transition 100% vehicles to all-electric or other zero-emission technologies | 2030        | • Negotiations with auto manufacturers to increase the selection and supply of affordable long-range electric vehicles  
• Engagement with regulators, utilities, local governments, charging partners  
• Providing electric vehicles at the same or lower weekly rental price as comparable gasoline vehicles |
| Didi Chuxing| Operational markets                                 | 10 million electric cars                   | 2028        | • Launch of co-designed electric ride-hailing electric car in cooperation with BYD in November 2020  
• Joint venture with British Petroleum to provide electric vehicle charging stations in China for both Didi and non-Didi car owners |
| Ola         | India                                             | No specific commitments towards electrifying 4-wheeler ride-hailing fleet | NA          | • Not much action and EV adoption happened beyond the EV project in Nagpur in 2017 with 200+ BEV Mahinda eVerito cars |
Select non-fiscal government policies to promote electrification in ride-hailing platforms in India

<table>
<thead>
<tr>
<th>Policy action</th>
<th>Implementation Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green registration plate with yellow font for battery operated transport vehicles including ride-hailing vehicles for distinct identity</td>
<td>Notified by the central government to all states. However, no benefits like priority parking, waiver on toll-fee and parking fee etc are passed on to electric vehicles by the state and local governments</td>
</tr>
<tr>
<td>Exemption of electric vehicles from the permit requirement for plying as transport vehicle</td>
<td>Notified by the central government to all states. However, state governments have not stopped asking for permits from electric transport vehicles</td>
</tr>
<tr>
<td>Increase the share of zero emission electric vehicles (ZEV) in shared mobility</td>
<td>Notified by the central government to all states. However, no time-based targets for inducting ZEVs have been specified by the central government. As a result, there is no effect of this policy measure on ground</td>
</tr>
<tr>
<td>Electrification targets in motor vehicle aggregators guidelines</td>
<td>The guideline was released by the central government in November, 2020. However, it does not specify anything about environmental standards or electrification targets to be achieved by the vehicle aggregators in India</td>
</tr>
<tr>
<td>CO₂ emission standard</td>
<td>This policy is in effect. But, India’s emission standards are not as stringent as that of EU. Therefore, manufacturers in India are not pushed enough to deploy electric vehicles in market</td>
</tr>
<tr>
<td>Green tax exemption for BEVs in the upcoming voluntary vehicle scrappage policy</td>
<td>Upcoming policy from the central government. This is not in effect yet. Also, in the draft policy there is no mechanism linking scrappage of conventional vehicle and replacing it with BEV</td>
</tr>
</tbody>
</table>