Prioritising Decarbonisation Sectors for Transporters in Cities

June 06, 2024

ASIA CLEAN ENERGY FORUM 2024
ADB Headquarters, Manila
Climate Group
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Founded in 2004, Climate Group is an NGO with offices in UK, USA, India, Netherlands and China.
Climate Group is an international NGO with a goal of net-zero carbon emissions globally by 2050, with greater prosperity for all. Founded in 2004.

EV100 is a global campaign designed to bringing together companies committed to switching their owned and contracted fleets up to 7.5t to electric vehicles and installing charging infrastructure for employees and customers by 2030.

EV100+ is a global campaign focusing on trucks with GVW above 7.5 T, designed to create a strong corporate demand signal to the market and help unlock a revolution in both zero-emission trucking and other heavy-duty vehicles, by creating a platform for knowledge sharing, and joint policy engagement.
Need for transitioning freight transportation
Need for transitioning freight transportation

Among vehicle categories across the Indian automotive industry, **goods vehicles** form a crucial part of the transport ecosystem as they are relatively small in volume but account for a much larger share of fuel consumption and emissions.

### Classification of on-road vehicles in India

<table>
<thead>
<tr>
<th>Vehicle category</th>
<th>GVW</th>
<th>Passengers</th>
<th>% Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWO WHEELER (NT)</td>
<td>2WN</td>
<td>≤ 2</td>
<td>72.8%</td>
</tr>
<tr>
<td>TWO WHEELER (T)</td>
<td>2WT</td>
<td>≤ 2</td>
<td>0.0%</td>
</tr>
<tr>
<td>TWO WHEELER (INVALID CARRIAGE)</td>
<td>2WIC</td>
<td>≤ 2</td>
<td>0.0%</td>
</tr>
<tr>
<td>THREE WHEELER (NT)</td>
<td>3WN</td>
<td>≤ 5</td>
<td>0.1%</td>
</tr>
<tr>
<td>THREE WHEELER (T)</td>
<td>3WT</td>
<td>≤ 1.5 T</td>
<td>2.7%</td>
</tr>
<tr>
<td>LIGHT MOTOR VEH.</td>
<td>LMV</td>
<td>≤ 9</td>
<td>17.5%</td>
</tr>
<tr>
<td>FOUR WHEELER (INVALID CARRIAGE)</td>
<td>4WIC</td>
<td>≤ 9</td>
<td>0.0%</td>
</tr>
<tr>
<td>LIGHT PASSENGER</td>
<td>LPV</td>
<td>≤ 9</td>
<td>1.2%</td>
</tr>
<tr>
<td>LIGHT GOODS</td>
<td>LGV</td>
<td>≤ 3.5 T</td>
<td>2.9%</td>
</tr>
<tr>
<td>MED. MOTOR</td>
<td>MMV</td>
<td>≤ 5 T</td>
<td>0.0%</td>
</tr>
<tr>
<td>MED. PASSENGER</td>
<td>MPV</td>
<td>≤ 5 T</td>
<td>0.1%</td>
</tr>
<tr>
<td>MED. GOODS</td>
<td>MGV</td>
<td>≤ 12 T</td>
<td>0.3%</td>
</tr>
<tr>
<td>HEAVY MOTOR</td>
<td>HMV</td>
<td>&gt; 9</td>
<td>0.0%</td>
</tr>
<tr>
<td>HEAVY PASSENGER</td>
<td>HPV</td>
<td>&gt; 9</td>
<td>0.3%</td>
</tr>
<tr>
<td>HEAVY GOODS</td>
<td>HGV</td>
<td>&gt; 12 T</td>
<td>1.7%</td>
</tr>
<tr>
<td>OTHERS</td>
<td>OTH</td>
<td></td>
<td>0.3%</td>
</tr>
</tbody>
</table>

Source: ARAI; [Vahan Dashboard](https://vahanmajdatrasn.gov.in) by Ministry of Road Transport and Highways (Govt. of India) till Sep ’21

90% of road freight movement in India (VKT) uses diesel as a fuel. India is the world’s third-largest automotive market in terms of sales.

The medium- and heavy-duty trucks (MHDT) sector is particularly energy intensive and pollutes disproportionately.

- 45% of on-road emissions by MHDT
- 35% of on-road fuel consumption by MHDT
- 15% of on-road VKT are of MHDT
- 2% of on-road fleet are MHDT

India GHG emissions from MHDT are projected to increase by 100% by 2040 from 700 to 1,500 million T.

Electrification presents an opportunity not only in terms of emission reduction but also in terms of energy security, domestic manufacturing competitiveness, and efficient supply chain.
Creating sectoral focus for decarbonisation
EV100 Campaign in India

Companies driving market demand for EVs
Flipkart, zomato

Last mile delivery fleet electrification
India-specific project to accelerate last-mile EV deliveries in India

EV100 Campaign
Global campaign focusing on vehicles below 7.5 T

Last-mile delivery fleet electrification

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Global campaign focusing on vehicles below 7.5 T

Companies driving market demand for EVs
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Last mile delivery fleet electrification
India-specific project to accelerate last-mile EV deliveries in India

Facilitating demand-supply discussion through consumer surveys and data collection across geographies
Promote knowledge sharing among stakeholders by building a platform of subnational govs. & businesses; global knowledge exchange sessions
Create industry voice on market & policy developments through partnerships with state governments on EV policies

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Last-mile delivery fleet electrification

Why electrification of Last Mile Deliveries
Suitability for urban duty cycles
Conducive policy scape
Significant fuel-cost reductions on roughly 4,00,000

Urban Air Pollution and Zero Emission Transport

• Road transport: over 90% of transport emissions in India
12% of India’s energy-related CO2 emissions
key contributor to urban air pollution
• In Delhi, transport stands as the biggest source of PM2.5 at 35%, including vehicle tail-pipe emissions 20%
• Emissions from the transportation sector are growing rapidly from 78% from 1990 to 2019 could double by 2050.

• The project intends to create greater opportunity for electrification in last-mile delivery through dialogue, knowledge exchange as well as policy push.
• Partnership with multiple stakeholders and network partners as part of the Sustainable Mobility Network
The report spotlights India’s supportive government policy for EV adoption giving businesses confidence to commit and transition to electric fleet vehicles.

Testimony to an electric transition momentum in the 2- and 3-wheeler segments in India.

The commitments and action from these companies are inspiring competing businesses to take the steps for transitioning their fleets.

Top ten corporate fleet commitments

1. Zomato
2. Flipkart
3. EDF Group
4. Siemens
5. Rentokil
6. BT Group
7. Bayer
8. E.ON
9. AstraZeneca
10. Novartis

Top 2 of 10 businesses globally with the largest corporate electric fleet commitments are major e-commerce and food delivery businesses.

2 & 3-wheelers constitute majority of the commitments.

Impact of EV100 demand signalling on Last-mile delivery electrification in India

390k+ Indian corporate fleet vehicles committed to go electric

19k+ vehicles deployed in India under EV100

309,323 EVs already operated are those by delivery businesses in India

India HQ’ed businesses

companies globally with India operations
Impact of Last-mile delivery electrification on local policy

DELHI

Most polluted city in India and 4th globally.

The transport sector accounts for 51% of its air pollution.

Last-mile delivery and passenger vehicles account for 43% of total road transport emissions.

Commitments from new-age companies involved in last-mile logistics have created denser demand for EVs in cities like Delhi

DECARBONISING VEHICLE AGGREGATOR ECONOMY

- **Delhi EV Policy** aims to encourage 100% electric delivery fleets by March 31, 2025.

- **Delhi Motor Vehicle Aggregator and Delivery Service Partner Scheme** was drafted in 2023 and issued 2024.

  Aims to license, regulate and electrify fleets

  Directives for Aggregators, Delivery service providers, E-commerce companies

  Focus on Sustainability, Quality and safety, Compliance

  Applicable on net new onboarded vehicles

  Stringent penalty framework for non-compliance

  All entities required to switch to an all-electric fleet by April 1, 2030

  Targets set for 6 months, and 1, 2, 3, 4, and 5 years
Identifying sectoral applications within Indian trucking
Segmentation of Logistics Applications for Trucking in India

Out of the broadly categorised 13 applications, parcel/FMCG/market load has the largest on-road truck fleet share (45%) followed by perishable goods (18%) and milk/edible oil tanker (9%)

Source: Based on analysis by Climate Group and PManifold as part of the Early Market Outlook Report – Electrification of medium and heavy-duty trucks in India

Early Market Outlook Report
Electrification of medium- and heavy-duty trucks in India

- Landscape of Indian trucking industry
- Need for transitioning of MHDTs in India
- Key factors & operational complexities
- Examining & identifying trucking use case applications
- Policy framework & business actions
- Possible switch-overs in the segment
### MHDT in India – Use cases (Segment-Application Matrix)

| Parcel/Market Load | LDT 1 |\| GVW ≤ 7.5 T |Rigid | IDT |\| 7.5 ≤ GVW ≤ 12 T |Rigid | MDT 1 |\| 12 ≤ GVW ≤ 18.5 T |Rigid | MDT 2 |\| 18.5 ≤ GVW ≤ 25 T |Rigid | MDT 2 |\| 18.5 < GVW ≤ 31 T |TT | HDT 1 |\| 25 ≤ GVW ≤ 40 T |Rigid | HDT 2 |\| >40 T GVW|Rigid |
|-------------------|-------|----------------|-------|------|-------------------|-------|-------|-------------------|-------|-------|-------------------|-------|-------|-------------------|-------|
| Perishable (Edibles) | | | | | | | | | | | | | | | | |
| Tanker (petrol/water/milk/oil) | | | | | | | | | | | | | | | | |
| Bulker (cement/LPG) | | | | | | | | | | | | | | | | |
| Construction material | | | | | | | | | | | | | | | | |
| On-road tipper (garbage/ready-mix) | | | | | | | | | | | | | | | | |
| Steel/Finished product | | | | | | | | | | | | | | | | |
| Mineral (off-site) | | | | | | | | | | | | | | | | |
| Port | | | | | | | | | | | | | | | | |

- Parcel/Market Load: 
  - Steel/Finished product
  - Mineral (off-site)
  - On-road tipper (garbage/ready-mix)
  - Construction material
- Perishable (Edibles): 
  - Tanker (petrol/water/milk/oil)
- Bulker (cement/LPG): 
  - HDT 1
  - HDT 2
- Port: 
  - LDT 1
  - IDT
  - MDT 1
  - MDT 2
  - HDT 1
  - HDT 2

- GVW: Gross Vehicle Weight
- Rigid: Rigid Axle
- TT: Tractor-Trailer

- LDT 1: Light Duty Truck 1
- IDT: Inter-Duty Truck
- MDT: Medium Duty Truck
- HDT: Heavy Duty Truck
- Port: Commercial Port

- Parcel/Market Load: 
  - Parcel
  - Market Load
- Perishable (Edibles): 
  - Perishable Goods
- Tanker (petrol/water/milk/oil): 
  - Tanker
- Bulker (cement/LPG): 
  - Bulker
- Construction material: 
  - Construction Material
- On-road tipper (garbage/ready-mix): 
  - On-road Tipper
- Steel/Finished product: 
  - Steel
  - Finished Product
- Mineral (off-site): 
  - Mineral
- Port: 
  - Commercial Port

- GVW: Gross Vehicle Weight
- Rigid: Rigid Axle
- TT: Tractor-Trailer
Identification of prioritized use cases

On the basis of the indicative techno-commercial feasibility, impact in terms of CO2 emissions, and the corporate influence, we zeroed in on the three most favorable use cases for electrification in the MHDT segment i.e., parcel load, organized part of the perishables, and mineral loads (inbound).

<table>
<thead>
<tr>
<th>Corporate Influence</th>
<th>Impact in terms of CO2 share</th>
<th>Expected Growth (CAGR)</th>
<th>Average distance travel/day</th>
<th>Typical energy consumption (kWh/km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parcel Load</td>
<td>High 15%</td>
<td>400 to 800 kms (only ≤ 500 km considered)</td>
<td>0.7 to 1.3 kWh/km</td>
<td></td>
</tr>
<tr>
<td>Perishables</td>
<td>High 2%</td>
<td>300 to 800 kms (only ≤ 400 km considered)</td>
<td>0.6 to 1 kWh/km</td>
<td></td>
</tr>
<tr>
<td>Minerals</td>
<td>Medium 3%</td>
<td>≤ 100 kms considered (&gt; 100 kms transported by rail)</td>
<td>1 to 1.3 kWh/km</td>
<td></td>
</tr>
</tbody>
</table>

Partner: Flipkart
Partner: WayCool
Partner: JSW Steel

1. e-Commerce industry witnessing a boom with increase in CAGR of 18.2% between 2021 and 2025.
2. Expected growth particularly in cold-chain with neo liberation of farming. Indian cold chain logistics likely to grow 20% annually by 2025.
3. India's coal demand could grow by up to 30% by 2030, and henceforth witnessing increased traction.
Steps for systematic e-Truck Fleet Planning

**Key learnings (from a company roadmap)**

**Charging requirement**
- Charge at source can cater to 90 km range; charging at source and destination can service 90–120 km ops.
- Estimated energy consumption is between 1.2 – 1.5 KWH/Km.

**Regeneration**
- Slope profiles are gradual & loaded trucks mostly go downhill which increases regeneration opportunity to 12–15%.

**Pilots**
- E-truck requirements – 10 (at start) and 50 (end) [18-24 months timeframe]
- Logistics contract at competitive rates; Guarantors for financing; Demand aggregation are key requirements.

**Emission reduction**
- 900 Ton CO2e reduction per truck over lifetime (1530 Ton CO2e with 100% RE by 2050).

**TCO**
- The short route (railway sliding) use case seems to achieve TCO parity for e-MHDT without any fiscal interventions.
- Ø 86 (ICE) vs 76 (e-truck) INR/Km.

**IMPACT:** JSW Steel will be deploying 50 e-trucks for pilot projects in the next couple of years; Flipkart is looking to transition its fleet base of the associated partners (ranging from 1 MT to 16 MT payload) into 100% Electric Vehicles over the next couple of years.
The Technical Roadmap on Development of ZE Trucking in India, 2023, Government of India has provided steps for highway/corridor level, while we are considering them at the company level.

**E-truck Pilot Project and Approach**

**Techno – Commercial Feasibility of Identified Route**

**Design of Pilot**

**Procurement**

**Pilot Monitoring & Learning**

**Pilot Deployment**

**PHASE-I**

**PHASE-II**

**PHASE-III**

Engaging with sub-national governments for local policy

**Delhi**
- MoU with Transport Dept for accelerating EV adoption
- Supporting vehicle aggregators with Delhi EV Policy targets
- Customised Market assessment of ZETs for e-commerce sector

**Maharashtra**
- MoU for corporate EV adoption
- Public workshop with companies on challenges & incentives
- Action group for regular policy conversation

**Telangana**
- Stakeholder workshop on MHDT electrification
- Roadmap for short, mid-term & long-term action
- Electric trucking market analysis, challenges
- Expectations from state policy & regulation initiatives to create market for electric trucks

**Kerala**
- Largely urban state
- Innovation in charging infrastructure
- Supporting sections on MHDVs & freight in upcoming EV Policy

**Stakeholder consultation with transporters – preparing national roadmap for electric trucks**

- Public charging infrastructure in key priority corridors
- Interoperability of chargers
- Long-tenure shipper contracts
- Leveraging central motor vehicle rules (CMVR) to favour e-truck design/loads
- Carbon trading and CSR to fund the transition
- Onus of the green premium
- Repowering through retrofitments
- Affordable transition for small operators
Let’s Drive Climate Action  FAST!

Thank you

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