CUTS International

Approach Note

Decarbonising Freight in India: Feasibility of Electrification of MDVs and HDVs

Background

The transport sector is the fastest-growing contributor to climate change, accounting for about a quarter (23 percent) of global emissions.[1] It is one of the significant sources of greenhouse gas (GHG) emissions in countries such as the US, the UK and India. Accelerated EV uptake is essential to keep the world on a 1.50 Deg—Celsius pathway.

In India, medium and heavy-duty trucks comprise only 2 percent of the total vehicle population[2] but contribute 30 percent of the overall vehicular road transport emissions.[3] Given this disproportionate share of GHG emissions, there is a critical need for a faster transition for medium and heavy-duty freight vehicles. Accelerated electric vehicle (EV) uptake across industry sectors and vehicle types are essential for India to meet the objectives of the Paris Agreement and ratchet up its ambition on Nationally Determined Contributions (NDCs).

A clear demand for medium and heavy-duty vehicle electrification from businesses in India in key vehicle applications can jumpstart a transition. Being the third-largest truck market after China and the United States, India's early adoption of zero-emission trucks can be instrumental in accelerating its domestic climate imperatives and supporting global climate action.

Objective

Given that the truck sector is a major contributor to air pollution adopting battery-operated vehicles in this sector could be key to decarbonising. With their zero tailpipe emissions, 35 percent less CO2 than ICE vehicles, and significantly lower long-term operational costs, EVs could be a viable alternative to the existing technology.[4]

1 https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter8.pdf
2 https://vahan.parivahan.gov.in/makermodel/vahan/dashboard.xhtml
3 https://www.itf-oecd.org/sites/default/files/docs/decarbonising-india-transport-system.pdf
4 https://rmi-india.org/insight/deliver-electric-delhi/

In March 2022, the Indian government announced the construction of electric highways. EVs would not just be limited to small road vehicles - rather, buses, medium, and heavy-duty trucks shall also be electrified in due time, once the necessary ecosystems are in place. In line with electrifying the public transport and road freight sector, the government has invited foreign investments to construct the first-ever electric highway between Delhi and Jaipur, followed by the Delhi- Mumbai stretch.[5]

However, since EVs and the associated charging ecosystem are in a nascent stage in India, the viability of decarbonisation of HDVs and MDVs remains to be seen. Further, the feasibility of this transition in terms of the cost burden on the vehicle-owners, who in this case are primarily private entities, would also need to be conducted to gauge the operational challenges and strategies.

Thus, the proposed project aims to explore the feasibility of electrification of the HDV and MDV vehicle segments in three corridors of India. Further, it seeks to implement one pilot to understand the gaps in the electrification of freight and freight corridors and two pilots electrifying the corridors (by installing charging infrastructure) and introducing e-HDVs/MDVs. The project aims to strengthen the discourse around introducing mandates for electrification of the logistics and freight sector in the Indian context.

Methodology

The project will adopt a mixed-methods approach to help identify and analyse the challenges and prospects of developing a clean and green logistic regime focusing on MDV/HDV. Over 12 months, the following broad activities will be undertaken in two major segments, i.e. A: Deploying Pilots for Electrification of Freight and B: Strengthening the Discourse around Supply-Side Mandates for e-HDVs/MDVs:

A. Deploying Pilots for Electrification of Freight

Preparatory Research

This will include a review of secondary literature on the logistics sector decarbonisation endeavours, including policies and regulations. It will also have a preliminary assessment of volume and type of freight handling in the potential corridors/locations and selection of a tentative list of project locations based on these findings. This will include:

- Two corridors with existing charging infrastructure and high HDV/MDV movement (for Pilot -Phase I)
- Four corridors with potential for development of EV charging and service ecosystem and high freight movement (for Pilot - Phase II)

Mapping of relevant sector experts and organisations working on these themes will also be done.

[5] https://auto.hindustantimes.com/auto/news/indias-first-electric-highway-likely-to-connect-delhi-and-jaipur-nitin-gadkari-41631853970044.html

Formation of Project Advisory Committee and Meeting

A selection of the PAC will be made. This will include sector experts and government, industry and academia representatives. After the selection, a closed-door meeting with members of the PAC will be done to discuss the following:

- Framework and Approach of the project
- Three Final Project locations
- Potential Project Consortium Members

Stakeholder Mapping and Scoping Visits

Visits to three selected project locations will be conducted to map key stakeholders, conduct Key Informant Interviews, and collect data on the costs and benefits of electrification in the particular corridor/location. The selected corridors will be

- One corridor with existing charging infrastructure and high HDV/MDV movement (for Pilot -Phase I)

  Two corridors with potential for development of EV charging and service ecosystem and high freight movement (for Pilot - Phase II)

Corridor Analysis and creation of Prospectus

Corridor-specific transport needs assessment and Cost-benefit analysis (CBA)/SWOT analysis of electrification strategies for the 03 potential project locations. This will also include an analysis of volume and type of freight handling in the selected corridors/locations. Based on the CBA insights, preparation of a Prospectus document for each of the three locations, including a framework and plan for capturing the impacts of the proposed pilot.

Stakeholder Convention for e-HDV/MDV deployment Pilot

A physical/hybrid meeting will be held with stakeholders from e-HDV/MDV manufacturing OEMs, Charging Infrastructure Manufacturers, Charge Point Operators, Logistics Companies and respective state nodal agencies/authorities concerned with the governance of the selected project corridors. The prospectus documents will then be shared with stakeholders and a pitch will be made for creating a project consortium and implementing the pilots.

Formation of Project Consortium and Pilot Kick-off Meeting

Based on the outcome of the Convention, a Project Consortium will be formed that will include organisations working on the decarbonisation of freight in selected locations, OEMs manufacturing e-HDVs/MDVs, Charge Point Operators/Charging Infrastructure Manufacturers, respective state nodal agencies/authorities concerned with the governance of the selected project location. A meeting with Consortium and PAC members will be held to initiate the Pilots.

Pilot - Phase I (SWOT Analysis)

A pilot will be conducted in collaboration with 01 logistics company, 01 e- MDV/HDV manufacturing OEM and One Charging Infrastructure Manufacturer/Charge Point Operator in the corridor with an existing EV charging and service ecosystem. The objective of this pilot will be to deploy 02 e-HDVs/MDVs and identify the gaps and opportunities in the ecosystem for the operation of e-HDV/MDVs in the selected corridor through SWOT analysis. The research activities will include

- Consultations with stakeholders associated with the pilot regarding the experience, challenges and opportunities for a 'just' decarbonisation
- Periodic data collection and analysis of gaps and costs, benefits and challenges (quantitative)

Learning from National Experiences

An analysis of various national experiences on stakeholder-led decarbonisation of road freight/ truck sector – challenges and best practices will be done. Scoping visits to one national location will be carried out to document best practices that can be adapted and the challenges that need to be addressed for scaling it up.

Pilot Review Meeting

A closed-door meeting with Project Consortium members and PAC will be conducted to share insights from Pilot Phase I.

Pilot- Phase II Deployment of e-HDV/MDV and charging ecosystem

Based on learning from Pilot - Phase I, A pilot will be conducted in collaboration with one logistics company, 01 e-MDV/HDV manufacturing OEM and One Charging Infrastructure Manufacturer/Charge Point Operator in 02 corridors. This will be implemented in corridors with a potential for the development of EV charging and service ecosystem. The implementation of this pilot will involve the electrification of at least 50 percent of corridors through the deployment of charging infrastructure within the project timeline and operation of two e-HDV/MDVs per corridor and trace the impacts. The research activities will include

- Periodic data collection and analysis of impacts and challenges (quantitative)
- Consultations with stakeholders associated with the pilot regarding the experience, challenges and opportunities for a 'just' decarbonisation

Drafting of Final Outputs

Based on Pilot - Phase I and II outputs, a roadmap for electrification of HDVs and MDVs in India will be drafted.

B. Strengthening the Discourse around Supply-Side Mandates for e-HDVs/MDVs

Preparatory Research

A review of national and international literature on mandates for decarbonisation of the logistics sector will be done. This will include the study of current market trends related to the transport and logistics sector for assessing the potential for electrification through mandates.

Stakeholder Consultations

Stakeholder consultations at the National level and in the three selected corridors will be conducted to understand the perspectives, need and scope for accelerating decarbonisation of the logistics sector through diverse interventions, including mandates. This will be done as a part of the Scoping Visits and Pilot – Phase I and II.

Drafting of Outputs

Based on Pilot - Phase I and II, stakeholder consultations and secondary literature review, a policy brief on the need for supply-side mandates for manufacturing e-HDV/MDV fleets will be drafted.

Advocacy Meetings

10-12 meetings with Project Consortium members and relevant government and private players will be conducted in the selected corridors to initiate discussions on supply-side mandates for e-HDVs/MDVs.

National Convention for Promotion of e-HDV/MDVs in India

A stakeholder meeting will be done with representatives of the freight decarbonisation ecosystems from across the country for:

- Dissemination of overall project outcomes and fostering collaborations for scaling this up
- Strengthening the narratives around supply-side mandates for e-HDVs/MDVs

Expected Outputs

The project's primary output will be a Roadmap for the electrification of HDVs and MDVs in India. Additionally, the following outputs will be prepared during the entire course of the project.

- Three Prospectus Documents
- One Case Study on national experiences in decarbonisation of freight
- One Digital Story documenting experiences from the pilot

Expected Outcomes

The overarching outcome of the project will be to inform and facilitate the decarbonisation of the freight sector in India. The project aims to achieve that through pilots and consultations with stakeholders based on the outcomes of the exercise. The specific outcomes for the main stakeholders involved in this process are as follows.

- **Government Stakeholders**: Better informed and sensitised state/district-level authorities about the need and strategies for decarbonisation of e-HDV/MDVs and their key roles and responsibilities in facilitating this transition
- **Supply-Side Stakeholders (OEMs and Charge Point Operators):** Enhanced awareness and traction amongst industry stakeholders involved in manufacturing of e-HDVs/MDVs and charging infrastructure, which can potentially yield better penetration of electric trucks across the country
- **Demand-Side Stakeholders (Aggregators/Users):** Enhanced awareness and capacities amongst users of e-HDVs/MDVs for enhanced adoption and effective policy utilisation for their benefit.