Workshop Proceedings on Sustainable Urban Freight for Bengaluru

17th April 2021

SUSTAINABLE URBAN FREIGHT INITIATIVE
A COLLABORATIVE APPROACH
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PUBLISHED BY
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BACKGROUND

SUSTAINABLE URBAN FREIGHT INITIATIVE

This Workshop is a part of TERI’s Sustainable Urban Freight Initiative Coalition aimed at creating local and national support structures for cost and emission reduction from Urban Freight in India. With this aim, TERI is establishing a consortium of all public and private stakeholders of urban freight including Urban Local Bodies, Vehicle Manufacturers and Civil Society members. This Sustainable Urban Freight (SUF) Coalition aims to share, create and disseminate knowledge to facilitate interventions to reduce emissions and costs from urban freight activities in India. The SUF Coalition will facilitate continuous initiatives through both policy and practice. One of the major objectives of this working group is to facilitate clean technology pilots in various applications of urban freight in Indian cities.

Urban Freight broadly includes all movement of goods within urban areas. This includes a wide range of commodities with varied transportation requirements. Effectively reducing cost and emissions from urban freight, especially through technological transitions like EVs, cannot have a blanket approach for all. Each type of urban freight will have its own mobility pattern with specific load and range requirements. In many cases, the need may even differ based on location.

The city of Bengaluru is one of the fastest growing cities of the India with estimated GDP growth of 8.5% by 2035. The city has been the epi-center of many start-ups and e-commerce businesses. Being the largest FMCG market of India, Bengaluru has experienced a sudden growth in Urban Freight activities of the city resulting into increased congestion and pollution issues. Keeping in view all these aspects, Bengaluru is selected for the pilot studies for sustainable urban freight practices.
WORKSHOP OBJECTIVES

The workshop was jointly organized by TERI and Directorate of Urban and Land Transport (DULT) on 27th of April with the specific objective to

❖ Discuss solutions for sustainable urban freight in Bengaluru

The workshop was aimed at bringing all the city stakeholders on the one platform and discuss the potential of sustainability in Urban Freight of the city. The sub-objectives of the workshop were:

❖ To identify the current status of urban freight and discuss the scope of sustainability with key stakeholders of the city of Bengaluru
❖ To understand the roadblocks in the application of green technologies
❖ To identify and discuss the pathway for implementing the sustainable urban freight

Image 1: Workshop on Sustainable Urban Freight for Bengaluru
AGENDA AND PARTICIPANTS

AGENDA
The virtual workshop was held on 27th April, 2021 from 1130 to 1330 hours. Broadly, the agenda constituted of discussions on the following sections:

❖ Current status of Urban Freight in Bengaluru
❖ Experience of application of Electric Vehicles in Solid Waste Management
❖ Experience of Electrification of last mile delivery
❖ Pathways for electrification of Urban Freight in Bengaluru
❖ The detailed agenda of the workshop is included in the annexure.

PARTICIPANTS
The workshop involved stakeholders from different areas concerning the urban freight in Bengaluru. The detailed list of participants is attached in the annexure.

❖ Public Services
  o Directorate of Urban and Land Transport
  o The Rail Infrastructure Development (Karnataka) Ltd
  o PIU Bengaluru
  o Traffic Planning Department
  o All India Federation of Motor Vehicle Department
  o NHAI

❖ Private Companies, OEMs and Industry Bodies
  o Lets Transport
  o Kinetic Engineering
  o Mahindra and Mahindra
  o Ashok Layland
  o Society of Indian Automobile Manufacturers (SIAM)

❖ Research Organizations
  o Indian Institute of Science (IISc)
  o Rocky Mountain Institute (RMI)
  o Environment Defense Fund (EDF)
  o Shakti Sustainable Energy Foundation
  o Indian Institute Technology – Dhanbad (IITD)
  o The Energy and Resource Institute (TERI)
WELCOME REMARKS AND KEYNOTE SPEECH  
(By Mr Narsimha Raju, Director, TERI SRC)

Highlighting growing e-commerce activities, Mr Raju said that urban freight activities are yet not given enough attention while planning the city transportation. Talking about the recent growth in Bengaluru, he expressed the need of efficient traffic planning as raising freight activities in the city have led to issues like congestion, pollution, noise pollution and parking demands. As EVs have started occupying substantial share in the freight vehicles, it is crucial to provide efficient charging infrastructure. He emphasized on adopting new technologies and planning measures to plan better and efficient systems for urban freight.

OPENING REMARKS  
(By Ms. V Manjula, Commissioner (IAS), DULT)

Looking at the current trends of E-commerce and retail, Ms Manjula mentioned that in near future 20% of all the retail sells will be online resulting into hike in urban freight activities. It also contributes to 6% of total GHG emissions and a better system must be developed to make urban freight trips more efficient and sustainable.

Majority of comprehensive mobility plans (CMP) and master plans pay a little or no attention to urban freight due to lack of data and awareness. She mentioned that last mile deliveries contribute significantly to the congestion and road safety issues. As the trips made are of higher frequency with lesser pay load, it signifies the underutilization of the vehicle while exploiting the same number of resources. Expressing keen interest in planning better system Ms. Manjula highlighted the major focus areas for DULT to plan urban freight: Data collection, Stakeholder Consultation, Integration of Public Transport and Innovation.
NEED AND SCOPE OF ELECTRIFICATION FOR BENGALURU
(Presentation by TERI)

Based on the previous study of TERI, need of sustainability and the scope of electrification for the urban freight in Bengaluru were presented. It was highlighted that the majority of freight vehicles in Bengaluru are light commercial vehicles (LCV) and their number is increasing at the CAGR of 6.5%. The case study of Let’s Transport logistic company also suggested the last mile deliveries for E-commerce have range of 71km and weigh about 702kg on average, EVs can be the more efficient mode of transport for such use cases. As the parking time for the vehicle is around 30 minutes, EVs charging solutions may be appropriately planed at those locations.

Key inferences from EV driver survey

Image 2: Inferences from EV driver survey
(Source: TERI Presentation)
EXPERIENCE SHARING OF REDUCING COST AND EMISSIONS FROM URBAN FREIGHT
(By Ms. Sulajja Motwani, Vice Chairperson, Kinetic Engineering and Mr. Yash Kariwal, Senior Manager, Lets Transport)

The major agenda of this session was to discuss the experience of procuring, adopting and promoting electric vehicles. Ms. Motwani mentioned that e-commerce should lead the way of electrification as better alternative EVs are available, as well as they have capacity to switch.

The experience of deploying EVs of Kinetic Greens for Solid Waste Collection in different cities and the experience of Lets Transport in using EVs for last mile deliveries was discussed.

The major push factors derived from their experience are:
- Amazing cost benefits in terms of operation and maintenance cost as well as total cost of ownership.
- Government incentives.
- Zero air and noise pollution.
- Smaller vehicles with lesser loading capacity are better fit for e-commerce deliveries.

Mr. Kariwal mentioned that for any new purchase EVs are better and cheaper option as their cost is lesser than BS6 vehicles available in the market. The operational cost of EV also goes down as electricity needed is cheaper than BS6 diesel.

The major bottlenecks experienced/expected for the wider adoption of EVs:
- Reliability of technology: Range and Charging time and capacity are not much reliable and there is a wide scope of improvement. Lack of charging infrastructure is also an issue; government shall take necessary steps to incorporate charging stations at public and market places to push wider adoption
- Finances: EMI cost of EV is higher as compared to IC engines; Residual value of EV is counted as zero by financing institutions. Mass adoption of EVs can solve this issue.
- Availability of Infrastructure: Adequate charging infrastructure and parking spaces shall be available at important places.

Talking about the issue of financing, Ms. Motwani suggested that SC/ST Development Cells, Self Help Groups and other welfare schemes can help the marginalized community to buy EVs and they can be given opportunity to work in urban freight sector. Both the panelist also agreed on the fact that better incentives like subsidies and access to infrastructure and services will push more towards adoption of EVs.
PATHWAYS FOR REDUCING COST AND EMISSIONS FROM URBAN FREIGHT IN BENGALURU

The panel discussion included key stakeholders from Karnataka as well as representatives from research and knowledge institutions. The detailed list of panelists is attached in the annexure.

Mr. Shivaraj Patil, Additional Commissioner of State Transport Department mentioned that Karnataka is working on the State Action Plan to reduce the vehicular emissions as directed by National Green Tribunal (NGT) and the strategies are focused on polluters pay principal, establishment of emission testing centers and promoting EVs.

Talking about the focus on urban freight, Ms. V Manjula, Commissioner of DULT mentioned that current CMPs and Master Plans lack the focus on urban freight and DULT is aiming to engage with different stakeholders to plan for sustainable urban freight. Currently DULT is focusing upon the provision of charging and parking infrastructure on Public Private Partnership bases.

Another major issue with planning of urban freight discussed was Lack of Availability of Data. Prof. Ashish Verma from IISC said that urban freight has a more complex system as e-commerce, online food delivery etc are increasing at a greater pace. And due to such reasons, it is difficult to generate the data regarding origin and destination along with their daily run etc. Lack of authentic data is one of the major reasons behind the absence of urban freight in most of the CMPs. Given the data regarding the spread of origin and destination (OD) points, their routes and frequencies is available, efficient models can be developed to manage the urban freight sustainably. The availability of data will not only help to form the polices, but will also help to forecast and understand the impact of the policy.

Mr. Dimpy Suneja from RMI mentioned that EVs are better option from the economic point of view as the total cost of ownership as well as operation and maintenance cost of EVs are lesser than that of IC engines. The sales of electric 2-whleers are increasing in past some years and many start-ups are working on better and efficient designs of EVs. Mr. Saurav Rohilla, Assistant Director of SIAM also added that EV market in India is now established as a proper commercial market and EVs are now not only environmentally sustainable but are also economically viable.

Other important points mentioned during the discussion are:

- The focus should be on making the whole system sustainable, instead of focusing only on the vehicle technology.
- CNG vehicles are still a better option to achieve sustainability if EVs don’t fit in some systems.
- Along with promoting EVs, it is important to focus on the traffic congestion and road safety as well.
❖ EVs have better scope for improvement and various designs and technologies can be explored to generate more sustainable and feasible vehicle.
❖ Scope of NMT can be explored for last mile deliveries.
❖ Logistic companies and e-commerce companies can also think of implementing electric bicycles and bikes for last mile delivery of lighter goods.
❖ The pilots can be run with Postal services also, as they have short distances for last mile delivery and different vehicles can be experimented.

QUESTION AND ANSWER SESSION
❖ Can First Loss Default Guaranty (FLDG) be a good option to avail easy finances for EVs?
  o FLDG is definitely a better way to avail finances, but it is difficult for a start-up to provide this guaranty. For a mass scale solution, it is only possible after 2-3 years when sufficient data and evidence is available that EVs are successful. (Mr. Yash Kariwal)

❖ What is the scope of application of EVs in Municipal Solid Waste Collection? Is Kinetic Greens associated with SWM collection?
  o Yes, EVs perfectly meet the loading capacity required for daily MSW collection. Also, as the trip length is limited and daily hours of working are fixed, charging of EVs can also be taken care of easily. As EVs do not have extensive fuel demand, they can be deployed in villages also easily.
  o Recently Kinetic Greens has supplied 1000 EVs for the SWM collection in Chennai and 5000 EVs for Andhra Pradesh. Almost 20 municipal corporations are currently using EVs from Kinetic Greens for the mentioned use. (Ms Sulajja Motwani)

❖ Thoughts on recycling batteries and reducing environmental risks.
  o Government has issued the draft notification for the guidelines on recycling of used batteries focusing on how the lithium and other metals can be extracted from used batteries. It is still in a draft stage but it will soon be mandatory to process the batteries for the interest of environment and public health. (Mr I V Rao)
WAY FORWARD

This workshop aimed at bringing all the stakeholders on one platform and discuss the potential of sustainability for the city of Bengaluru. It was concluded that the along with the data collection for freight behavior, sensitizing the stakeholders about the available alternate technology and their benefits will help to switch to sustainable freight activities. The following tasks can be taken up:

❖ **The Partnerships with Knowledge and Research Institutes:** It will help to collect the data regarding urban freight activities and need of infrastructure. These partnerships can help to deliver detailed action plan for Urban Freight for the city of Bengaluru.

❖ **Capacity Building Workshops:** These workshops can be a platform to sensitize the FMCG groups, Logistic companies, SWM and Postal and Courier Services about the potential of EVs to achieve environmental and economic sustainability. OEMs can also be invited to such workshops to suggest the best fit EV for given service.

❖ **Partnership with Infrastructure Companies:** Public Private Partnership based models can be developed to facilitate the charging infrastructure in the city.

TERI is looking forward to long partnership with DULT to take forward this discussion and develop the action plans for mentioned activities.
## List of Participants

### Public Services

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Organisation</th>
<th>Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DULT</td>
<td>Ms V Manjula (IAS), Commissioner</td>
</tr>
<tr>
<td>2</td>
<td>DULT</td>
<td>Ms Bhavana Nadagoudar</td>
</tr>
<tr>
<td>3</td>
<td>KRIDE</td>
<td>Ms Bhavana Nadagoudar</td>
</tr>
<tr>
<td>4</td>
<td>PIU Bengaluru</td>
<td>Ms Rajashree M S</td>
</tr>
<tr>
<td>5</td>
<td>All India Federation of Motor Vehicle Department</td>
<td>Mr Ashfaq Ahamed, President, Regional Transport Office</td>
</tr>
<tr>
<td>6</td>
<td>ACP Traffic Planning</td>
<td>Ms Rajashree M S</td>
</tr>
<tr>
<td>7</td>
<td>ACP Traffic Planning</td>
<td>Mr Umashankar B P</td>
</tr>
<tr>
<td>8</td>
<td>NHAI</td>
<td>Mr Umashankar B P</td>
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### Private and OEMs

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Organisation</th>
<th>Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Lets Transport</td>
<td>Mr Yash Kariwal, Senior Manager</td>
</tr>
<tr>
<td>11</td>
<td>Kinetic Engineering</td>
<td>Ms Sulajja Motwani, Vice Chairperson</td>
</tr>
<tr>
<td>12</td>
<td>Kinetic Engineering</td>
<td>Mr Rushabh Sanghvi</td>
</tr>
<tr>
<td>13</td>
<td>SIAM</td>
<td>Mr Saurabh Rohilla, Associate Director</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>Ms Ula</td>
</tr>
<tr>
<td>15</td>
<td>Mahindra and Mahindra</td>
<td>Mr Ganesh Kore</td>
</tr>
<tr>
<td>16</td>
<td>Ashol Leyland</td>
<td>Mr Venktesh</td>
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<tr>
<td>17</td>
<td></td>
<td>Mr Rishabh Singh</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>Mr Shamanth</td>
</tr>
<tr>
<td>19</td>
<td>IISc</td>
<td>Prof Ashish Verma</td>
</tr>
<tr>
<td>20</td>
<td>IITD</td>
<td>Dr Nilanjana De Bakshi</td>
</tr>
<tr>
<td>21</td>
<td>EDF</td>
<td>Mr Kaushik</td>
</tr>
<tr>
<td>22</td>
<td>EDF</td>
<td>Ms Lavanya</td>
</tr>
<tr>
<td>23</td>
<td>Shankti Sustainable Energy Foundation</td>
<td>Mr Vivek Chandran</td>
</tr>
<tr>
<td>24</td>
<td>RMI</td>
<td>Mr Dimpy Suneja</td>
</tr>
<tr>
<td>25</td>
<td>IIT Dhanbad</td>
<td>Ms Leeza Malik, Assistant Professor</td>
</tr>
<tr>
<td>26</td>
<td></td>
<td>Ms Saima</td>
</tr>
<tr>
<td>27</td>
<td>TERI</td>
<td>Mr IV Rao, Senior Visiting Fellow</td>
</tr>
<tr>
<td>28</td>
<td>TERI</td>
<td>Mr Narsimha Raju, Director, TERI SRC</td>
</tr>
<tr>
<td>29</td>
<td>TERI</td>
<td>Mr Shri Prakash, Distinguish Fellow</td>
</tr>
<tr>
<td>30</td>
<td>TERI</td>
<td>Mr Sharif Qamar, Associate Fellow and Area Convener</td>
</tr>
<tr>
<td>31</td>
<td>TERI</td>
<td>Mr Aravind Harikumar, Research Associate</td>
</tr>
<tr>
<td>32</td>
<td>TERI</td>
<td>Mr Promit Mukherjee, Research Associate</td>
</tr>
<tr>
<td>33</td>
<td>TERI</td>
<td>Ms Palak Passi, Research Associate</td>
</tr>
<tr>
<td>34</td>
<td>TERI</td>
<td>Ms Shivangi Kumar, Research Associate</td>
</tr>
<tr>
<td>35</td>
<td>TERI</td>
<td>Mr Santosh Kumar</td>
</tr>
<tr>
<td>36</td>
<td>TERI</td>
<td>Ms Viral Joshi, Research Intern</td>
</tr>
<tr>
<td>37</td>
<td>TERI</td>
<td>Mr Santosh Kumar</td>
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</tbody>
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## AGENDA
### 11:30-13:15, April 27th, 2021
### Click Here to Join Meeting

### WORKSHOP | Sustainable Urban Freight In Bengaluru

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>11:30 – 11:40</td>
<td><strong>Welcome Address and Keynote Speaker</strong>&lt;br&gt;Mr. Narainima Raju D N&lt;br&gt;Director, South Regional Centre, TERI</td>
</tr>
<tr>
<td>11:40 – 11:50</td>
<td><strong>Opening Remarks</strong>&lt;br&gt;Mrs. V Manjula, IAS&lt;br&gt;E/o Additional Chief Secretary to Government, Commissioner Directorate of Urban Land and Transport (DULT), GoK</td>
</tr>
<tr>
<td>11:50 – 12:00</td>
<td><strong>Presentation on urban freight case studies in Bengaluru</strong>&lt;br&gt;TERI</td>
</tr>
<tr>
<td>12:00 – 12:20</td>
<td><strong>Experience sharing of reducing cost and emissions from Urban Freight</strong>&lt;br&gt;1. <strong>Solid Waste Management:</strong> Ms. Sulajja Motwani, Vice Chairperson, Kinetic Engineering&lt;br&gt;2. <strong>E-Commerce Logistics:</strong> Mr. Yash Karival, Senior Manager – Corporate Development, Lets Transport</td>
</tr>
<tr>
<td>12:50 – 13:10</td>
<td><strong>Open Q&amp;A Session</strong></td>
</tr>
<tr>
<td>13:10 – 13:15</td>
<td><strong>Thank You Remarks</strong>&lt;br&gt;Mr. Shahnuf Qamar, Fellow and Area Convenor, TERI</td>
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</tbody>
</table>
E-Urban Freight Study

Aim: Techno-economic potential of EVs in various urban freight applications
Overview of growth of freight vehicles in Bengaluru

- The total registered freight vehicles grew at a CAGR of 4.8% between 2009 and 2019.
- The LCV grew at a CAGR of 6.5%.

![Graph showing growth of freight vehicles in Bengaluru](image)

- Freight vehicles account for 34% of total CVs in the city.
- Amongst the freight vehicles, LCVs have a share of 55%.

![Graph showing number of registered vehicles](image)

Overview of growth of freight vehicles in Bengaluru

- Within the LCV segment in Bengaluru the share of 4W is higher than 3W.
- The share of 4W increased from 62% in 2015 to 66% in 2019.

![Graph showing trend in LCV 3W and 4W](image)

- Newly registered LCV increased by 35% from 2018 to 2019 as compared to 9% in previous year.
- Key reasons for this surge: Change in tax regime (GST), increased demand for LCVs/SCVs by the e-commerce segment, and increase in discretionary consumption.
Case Study - Organised Freight movement in Bengaluru

<table>
<thead>
<tr>
<th>Company</th>
<th>Udaan</th>
<th>LetsTransport</th>
<th>India Post</th>
<th>Porter</th>
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</thead>
<tbody>
<tr>
<td>Fleet size operational in Bengaluru (&lt;3.5 tonnes)</td>
<td>1,000+</td>
<td>2,900</td>
<td>70</td>
<td>-</td>
</tr>
<tr>
<td>Commodity Type</td>
<td>Groceries, FMCG</td>
<td>E-commerce, Groceries, FMCG</td>
<td>Parcels</td>
<td>All types of commercial operations</td>
</tr>
<tr>
<td>Vehicle Types</td>
<td>Tata Ace, Tata 407 and Bolero</td>
<td>TATA Ace, TATA 407, Xemon Yodha</td>
<td>Mini Trucks</td>
<td>Tata Ace, Tata 407 and pick-up truck</td>
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<tr>
<td>Outsourced Component</td>
<td>Vehicle and drivers (on contract)</td>
<td>3PL</td>
<td>Vehicle and drivers (on contract)</td>
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<tr>
<td>Fuel Type</td>
<td>Diesel and CNG</td>
<td>Diesel and CNG</td>
<td>Diesel and Petrol</td>
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<tr>
<td>Electric Vehicles (Pilot)</td>
<td>Electric Rickshaws</td>
<td>Pilot with retrofitted vehicle</td>
<td>Not Done</td>
<td>Not Done</td>
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<tr>
<td>Willingness to Switch</td>
<td>Not very keen</td>
<td>Keen to use</td>
<td>Keen to use</td>
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Key inferences from India Post case Study

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<thead>
<tr>
<th>Parameter</th>
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<th>Postal Services</th>
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<tbody>
<tr>
<td>Ownership</td>
<td>% of vehicles owned by drivers themselves</td>
<td>0%</td>
</tr>
<tr>
<td>Vehicle Type</td>
<td>3w</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>4w</td>
<td>100%</td>
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<tr>
<td>Energy</td>
<td>Major fuel used</td>
<td>Diesel</td>
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<tr>
<td>Fleet Emission</td>
<td>Characteristics</td>
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<tr>
<td>Utilisation</td>
<td>Average distance per day (km)</td>
<td>68-136</td>
</tr>
<tr>
<td></td>
<td>Average payload carried (kg)</td>
<td>500</td>
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Key inferences from *Lets Transport* Case Study

<table>
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<th>Parameter</th>
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<th>E-Commerce, Groceries, FMCG</th>
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<tr>
<td><strong>Bengaluru</strong></td>
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<tr>
<td>Ownership</td>
<td>% of vehicles owned by drivers themselves</td>
<td>74%</td>
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<tr>
<td>Vehicle Type</td>
<td>3w</td>
<td>10%</td>
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<tr>
<td></td>
<td>4w</td>
<td>90%</td>
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<tr>
<td>Energy</td>
<td>Major fuel used</td>
<td>Diesel</td>
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<tr>
<td>Fleet Emission Characteristics</td>
<td>% of BS-IV vehicles</td>
<td>39%</td>
</tr>
<tr>
<td>Utilisation</td>
<td>Average distance per day (km)</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Average payload carried (kg)</td>
<td>702</td>
</tr>
</tbody>
</table>

Average loading time per vehicle at the pick-up hub is 5 min.

Average unloading time at single drop location is 10 min.

Clean average a vehicle remains idle for 16 min during business operations hours.

66% of the drivers park their vehicles for more than 30 min at a single location for once in a day.

Key inferences from EV driver survey

- More than 50% of the drivers claimed that vehicle performance has not compromised.
- Drivers feel that charging facilities are not available adequately.
- 27% of the drivers are not satisfied with the time taken for charging.
- All except one of the drivers said that they will continue using EV in future.

Positive Feedback
- Good for local and short run travel
- No noise and less environmental pollution
- Low maintenance requirements and costs
- Comfortable and consistent with the services provided by e-commerce firms
- Like slating to new models and new technologies

Concerns
- Battery backup
- Pickup, Range and Speed
- Long-run travel
Sustainable Urban Freight Coalition

Aim: A guidance facility for Cost and Emission Reduction from Urban Freight in India

Activities in Phase-I
- Engagement with partners
- Capacity Building Workshops
- SUF Coalition Platform
- Pilot Implementation (EVs)

Thank you