

ADB GEF PROJECT IMPLEMENTATION REPORT (PIR)

(This report covers implementation period from July1,2024 to June30,2025)

ADB Official Project Title: Scaling Up Demand-Side Energy Efficiency Sector Project: India¹
ADB Project Number: 52196-001

I. GEF PROJECT SUMMARY

Project Ratings:

Development Objective Rating (DO): Satisfactory (S)

Implementation Progress Rating (IP): Satisfactory (S)²

Risk Rating: Low Risk (M)

Information on Progress, challenges and outcomes on project implementation activities

The Asian Development Bank (ADB) and United Nations Environment Project (UNEP) has secured a grant from the Global Environment Facility (GEF) for India electric mobility (e-mobility) project to enable the Government of India and relevant stakeholders to make the transformative shift to de-carbonize transport systems, catalyze access to finance for a large-scale adoption of EV across vehicle segments and reduce air pollution in cities by promoting scale-up of electric mobility in India.

The GEF-7 funded India e-mobility project has 4 components.

UNEP administered Component 1,2 and 4

UNEP is administering Components 1, 2 and 4, the activities of which are being executed by WRI India under the guidance of **NITI Aayog**. After securing the necessary government clearances, UNEP and WRI entered into a project cooperation agreement in June 2024, and the work eventually started under these components in July 2024. The project would be implemented over a period of 4 years from July 2024 to June 2028. Due to dynamic changes in the EV ecosystem in India, a mid-term review (MTR) of the project was commissioned by ADB in July-August 2024 to analyze persistent gaps in ongoing initiatives in the electric vehicle (EV) sector. These gaps were further discussed with EV industry stakeholders at the UNEP-led project's inception workshop on 11th September 2024, held in Delhi. Based on stakeholder consensus, the following activities will be undertaken under the components administered by UNEP.

¹ The GEF grant is part of TA-9874-IND associated with ADB project 52196-001 Scaling Up Demand-Side Energy Efficiency Sector Project: India. It is processed as additional financing to the on-going TA-9874-IND aligned with ADB loan to EESL, India.

² Under Component 3 — which includes pilot demonstrations, development of business models, preparation of city-level EV charging infrastructure plans and national level workshop— the majority of the activities have been successfully completed. Two pilot projects have been implemented, and city-level reports for Varanasi and Shimla have been launched. The report for Shillong is complete and scheduled for release in July 2025. Around 70% of the component's objectives have been achieved, with only the Pilot Impact Studies, two City Reports, and the national-level workshop on micromobility pending finalization. Accordingly, the overall progress under this component has been rated as *satisfactory*.

Component 1:

- Developing Financing/Business Models for Accelerating the Adoption of Zero-Emission Trucks (ZETs - e-LCVs and e-MHDVs) in India.
- Accelerating the widespread adoption of ZETs by addressing two major roadblocks in the adoption of ZETs: the lack of finance and insufficient charging infrastructure.

Component 2:

- Building a Sustainable Battery Ecosystem: Enabling a Resource-Efficient Transition.
- Development and operationalization of a policy framework and implementation strategy to optimize the viability of the reuse and recycling ecosystem for lithium-ion batteries (LIBs) in India.

Component 4:

- Development of Pathways for a Just, Equitable and Inclusive Transition of the Automotive sector to Electric Mobility.
- Developing a framework for policies and mechanisms to ensure gender inclusion in e-mobility, enhancing the capacities of government and industry stakeholders for its implementation. It also includes upskilling workers (with a focus on women and informal workers) for e-mobility jobs and designing/supporting infrastructural and financial mechanisms to enable a just and inclusive EV transition for micro, small and medium enterprises (MSMEs) in the automotive sector.

ADB-administered Component 3:

For Component 3, which is administered by ADB, Energy Efficiency Services Limited (EESL) is the Executing Agency (EA) and Convergence Energy Services Limited (CESL), a wholly owned subsidiary of EESL is the Implementing partner. ADB appointed a consulting firm (EY LLP) to work in conjunction with CESL/ EESL to implement and deliver TA outputs under Component 3. The project inception meeting was held on 18th January 2023 for Component 3.

The component covers the following outputs:

- Develop business models for scaling up electric mobility pilot initiatives
- Develop charging infrastructure plans at city level for 5 cities across the country
- Provide recommendations that would improve and enhance market conditions for e-mobility investments in the country

Component 3:

- Enabling scale-up of e-vehicle markets through pilot demonstrations
- Enabling conditions for e-mobility investments created, new business models and charging infrastructure plans developed at city level

Information on Progress, challenges and outcomes on Environment and Social Safeguards

GEF funds have provided technical support and capacity development for the pilot project activities. The technical assistance is not anticipated to generate any adverse environmental impacts during operation.

For ADB administered component, the project team has taken due measures to ensure the same. The project team has also obtained Environment Health Safety (EHS) certificates from the vendor while signing a contract for solar carport pilot execution. Similarly, in the electric bicycle tender, successful bidder has developed and submitted roadmap for safe disposal of battery at end of life. The project does not involve any adverse impact on social safeguard measures, so no GEF funds are being used for the same.

For the UNEP administered part of the work, the project has adhered to all the minimum requirements of UNEP, and GEF set policies and measures for environment and social safeguards (ESS). The project will take all precautionary measures to ensure that there is no risk of harm to the people or the environment during its activities. The project will try to include representatives from vulnerable groups of stakeholders in the decision-making process as much as possible. The project is taking every approach to ensure maximum women representation during the project events, even though automotive industry is highly male dominant and there are fewer women representatives in the industry.

Information on Progress, challenges, and outcomes on stakeholder engagement

As part of the new workplan for the UNEP-led components, a revised **Stakeholder Engagement Plan (SEP)** has been developed to engage effectively with key stakeholders, including policymakers, the private sector, and civil society.

For UNEP led components, below are the details of the stakeholder engagement during the reporting period:

Component 1: The project team is conducting structured and semi-structured one-on-one consultations with key stakeholders including electric truck OEMs, financiers, and logistics service providers (LSPs) to better understand financing barriers to e-freight adoption and explore potential solutions. These discussions are helping validate and refine findings from secondary research. Stakeholders engaged so far include Eqaro Guarantees, HDFC Bank, SBI, cKers Finance, IEEFA, Vaultus Green Funding, etc. A roundtable discussion was conducted on 'Financing of e-trucks in India' on 23rd May 2025. The discussion was attended by 25+ stakeholders including NITI Aayog, OEMs, LSPs, financiers and transport associations. Only two women attended the discussion, even though the invite was sent to about ten women stakeholders. The component team has also launched a pilot for e-SCV and e-LCVs in Surat (Gujarat) in collaboration with Surat Municipal Corporation (SMC) and Federation of Surat Trade and Textile Associations (FOSTTA). As the component transitions to solution design and pilot implementation, the team will continue to co-develop context-specific financing/business models. There are no major challenges experienced so far.

Component 2: During the reporting period, the project team has engaged with various government, industry, and academic stakeholders for successful execution of project activities which included development of battery data

framework and successfully conducting Battery Summit 2025. From the government, project team has engaged in one-on-one discussions with the Ministry of Science and Technology (MST), Department of Science and Technology (DST), the Ministry of Environment, Forest and Climate Change (MoEFCC), NITI Aayog, Automotive Research Association of India (ARAI), Ministry of New and Renewable Energy (MNRE) and Anusandhan National Research Foundation (ANRF).

The team also organized a roundtable discussion on Battery Data Management in December 2024, which saw participation from the DST, MoEFCC, and over 25 other industry stakeholders. Subsequently, the Battery Summit 2025 was held on 28th May 2025 in collaboration with NITI Aayog, DST, and ARAI. The event featured over 30 speakers from industry, academia, and government, who contributed to panel and roundtable discussions. Government participation included delegates from MST, MNRE, ANRF, and the Council of Scientific & Industrial Research (CSIR) - Central Electrochemical Research Institute (CECRI). Academic institutions such as IIT Hyderabad, IIT Tirupati, and IIT Bombay were also actively involved in the discussions. The Battery Technologies Showcase featured participation from 26 stakeholders, including government research organizations like the International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI) and CSIR – Advanced Materials and Processes Research Institute (AMPRI), alongside four academic institutions that presented their research initiatives. Battery Summit 2025 witnessed an overall attendance of over 450 participants.

Component 4: The project team has engaged with select stakeholders from the electric vehicle manufacturing sector during the initial phase of the reporting period to understand their workforce development needs and skill requirements for the transition to electric mobility. A specific focus has been on understanding current practices regarding gender mainstreaming. As the project advances, more extensive stakeholder engagement is planned, including broader consultations with industry representatives, associations, and government skilling agencies. As part of these engagement efforts, a successful panel discussion on "Towards a gender-inclusive electric vehicle (EV) transition for the automotive workforce in India" was conducted in March 2025. The event included representation from the government, industry, and the skilling ecosystem. and the skilling ecosystem.

For ADB led components, below are the details of the stakeholder engagement during the reporting period:

Component 3: Output 3.1 - To identify suitable cities for electric vehicle (EV) demand assessment and charging infrastructure planning, detailed consultations were held with stakeholders such as UNEP, ADB, EA, and relevant national and local agencies. These discussions helped to refine the activity components and define expected outcomes. Initially, five cities—Varanasi, Shimla, Pune, Panaji, and Chennai—were shortlisted. However, despite several rounds of discussions and follow-ups, limited traction was observed in Pune, Panaji, and Chennai. Consequently, additional cities such as Guwahati, Shillong, Bengaluru, Mysuru, Kochi, Trivandrum, Puducherry, Gurugram, and Jaipur were explored as alternatives.

Based on a comprehensive assessment of readiness, stakeholder engagement, and city-level interest, the final five cities selected for the project were Varanasi, Shimla, Shillong, Trivandrum, and Kochi. These cities were chosen considering their strategic importance, willingness of local stakeholders, and alignment with national EV ambitions.

Work in Varanasi and Shimla has already been completed. In Varanasi, extensive consultations were held with agencies including the Smart City Mission, DISCOM, Urban Local Bodies (ULBs), and the Energy Department. The EV

demand assessment and EVCI planning report was submitted following the workshop conducted in July 2024 and has been formally adopted by the Municipal Commissioner. In Shimla, the city-level workshop was conducted in September 2024. The report, adopted by the Transport Department, included recommendations not only on EV demand and infrastructure planning but also detailed potential business models around electric bicycles, retrofitting of three-wheelers, battery swapping, battery leasing, solar carports integrated with battery energy storage systems (BESS), and EV charging as a service. It also provided a go-to-market strategy for scaling up deployment of e-2Ws, e-3Ws, and e-4Ws in India. The Shimla reports have been acknowledged by city authorities as a strategic enabler for expanding EV initiatives.

In Shillong, the city-level EV charging infrastructure report has been finalized through extensive consultations with key stakeholders including OEMs, CPOs, Transport Department, Urban Affairs Department, Tourism Department, and the Shillong Municipal Board. The location assessment for EV charging has been completed, and around 22 strategic locations have been finalized for setting up Electric Vehicle Charging Infrastructure (EVCI). Based on these findings and stakeholder inputs, the final report has been submitted to the Secretary, Transport Department, Government of Meghalaya. A city-level workshop is being planned in coordination with the Transport Department to present key findings from the policy advocacy efforts, location assessment, and business models to enable the scale-up of electric mobility.

In Trivandrum, the draft report is at finalization stage. The project team is actively engaging with government departments, local CPOs, battery swapping players, and OEMs. A comprehensive location assessment is currently underway to identify optimal sites for public charging infrastructure. The report has made substantial progress and is expected to be finalized by the end of September 2025. A city-level workshop will be planned thereafter based on the availability and confirmation from city-level stakeholders. In Kochi, work will be initiated soon to develop the EV demand assessment and EVCI Action Plan 2025-35.

For reference, the final city reports for Varanasi and Shimla can be accessed at the following links:

- (i) Varanasi: https://www.convergence.co.in/public/images/electric_bus/Varanasi-EV-demand-assessment-&-EVCI-network-planning.pdf
- (ii) Shimla: https://www.convergence.co.in/public/images/electric_bus/Shimla%20city%20wide%20EV%20Demand%20Planning%20and%20EVCI%20Netwo_250602_113722.pdf

Component 3: Output 3.2- A comprehensive stakeholder analysis was undertaken during the preparatory phase of the TA related activities focusing on potential pilots for 3-Wheeler Retrofit, Solar Carport with Battery Energy Storage System, Electric bicycles to promote micromobility and a potential pilot on electric trucks. The project team interacted with the below mentioned stakeholders and discussions were held on the proposed activities for the project including pilot programs. Their valuable suggestions for implementation of the project activities have been duly incorporated in designing the technical specifications, business models and related documentation including bid documents.

Pilot Program	Stakeholders Consulted		
	Government	Private	Associations
3-Wheeler retrofit	• State Transport	OEMs	• Automotive Research

Pilot Program	Stakeholders Consulted		
	Government	Private	Associations
	Departments • RTOs	• Zero 21 • Konvert Motors • Omega Seci Mobility • Volta EV • Enviro Smart • Piaggio • E-blu Financial Institutions and NBFCs • HDFC, • State Bank of India • PFC • ICICI etc Battery Swapping Players • Sun Mobility • Battery Smart	Association of India (ARAI) • International Centre for Automotive Technology (ICAT).
Solar carport with BESS	• State Governments	OEMs • JBM • Servotech Battery Players • Lohum, • Sun Mobility EV Charger manufacturer • Exicom • Delta • Magenta	• Automotive Research Association of India (ARAI) • International Centre for Automotive Technology (ICAT)
Electric Bicycles	• Ministry of Road Transport and Highways • Ministry of Heavy Industry and Public Enterprises	OEMs • Hero Cycles • Motovolt • Aurita • E-Motorad • Geekay Bikes	• All India Cycle Manufacturers Association • Automotive Research Association of India (ARAI)

Pilot Program	Stakeholders Consulted		
	Government	Private	Associations
	• NITI Aayog • Ministry of Housing and Urban Affairs, • Ministry of Women and Child Development • Ministry of Rural Development • National Rural Livelihood Mission • State Rural Livelihood Mission • Bureau of Energy Efficiency • Department of Posts • Power Finance Commission (PFC), • NTPC, • PowerGrid Corporation of India Limited (PGCIL)	• Nexzu • Yulu • Zypp Battery Players • Lohum,	• International Centre for Automotive Technology (ICAT).
Electric Trucks	• Ministry of Heavy Industry and Public Enterprises • Container Corporation of India	OEMs • Ashok Leyland • Tata Motors • Volvo Eicher • IPL Tech • iBoard	• Automotive Research Association of India (ARAI) • International Centre for Automotive Technology (ICAT)

Information on Progress on gender-responsive measures

For the UNEP-led components, i.e. component 1,2 and 4, an updated **Gender Action Plan (GAP)** was prepared to ensure significant gender representation across all activities under the three UNEP components. The plan mandates that all events (e.g., workshops, roundtables, panel discussions) conducted under this project achieve at least 40% representation of women. The project GAP also includes actions such as inclusion of gender perspective in capacity building sessions with stakeholders, collecting and maintaining gender-disaggregated data for all

project's activities, and developing a state-level gender-inclusive skilling framework. It also ensures that policies developed at the national and subnational levels incorporate a gender perspective from the planning stage of policy development. Gender sensitive capacity development and awareness raising for scaling up e-mobility is covered under Component 4 of the project.

In addition to the dedicated Gender Action Plan, all UNEP-led components incorporate a broader social inclusion lens by systematically embedding considerations for the Elderly, Women, Children, and Persons with Disabilities (EWCD) across their activities. Below is the summary of progress on EWCD aspects across components:

- **Inception Workshop:** The UNEP project's inception workshop was convened on 11 September 2024 in New Delhi, with participation from over 40 stakeholders, including policymakers, original equipment manufacturers (OEMs), battery recyclers, fleet operators, and think tanks. As part of the project's commitment to gender inclusivity, invitations were extended to more than 35 women representatives, of whom 15 attended the workshop. In addition, 11 women participants from WRI India were present.
- **Component 1:** A roundtable discussion was held on 23rd of May 2025 to discuss the financing of e-trucks in India. Out of the 20 attendees at the event, 2 were women. The freight segment in India is a male dominated space. To overcome this issue, the project team is developing a database of women representatives in the freight segment. This database will be leveraged to reach larger number of women for participation in events. In addition, the project is connecting with women stakeholders to examine barriers to e-LCV financing for female borrowers, women-led shipping companies, and women-led vehicle manufacturers.
- **Component 2:** For the Battery Data workshop in December 2024, invitations were sent to 50 stakeholders, including 11 women representatives. Five women participated in the roundtable (excluding WRI India) out of the 25 participants. Including WRI India representatives, women constituted 25% of the total event participants. For the Battery Summit in May 2025, invitations were sent to around 95 stakeholders, including 16 women representatives as speakers in panel and roundtable discussions. Six women participated as speakers across all the discussions. Out of the total 450+ attendees 30% women representation was witnessed during the Summit.
- **Component 4:** Component 4 of the project focuses on developing pathways for a Just equitable, and inclusive transition of the automobile sector to electric mobility. This includes developing framework for policies and mechanisms for gender responsiveness in e-mobility and upskilling workers (with a focus on women and informal workers) for e-mobility jobs. The component team organized a panel discussion on "Towards a gender-inclusive electric vehicle (EV) transition for the automotive workforce in India" in March 2025. The panel had 3 women representatives as speakers, representing industry and ecosystem enabling initiatives. The event had 235 participants with 57% female participation.

For the ADB-led components, i.e. **Component 3** the project promotes women's economic empowerment through the S.T.R.E.E. (Sustainable Transport and Rural Empowerment through E-Mobility) pilot, which targets rural women entrepreneurs. Under this initiative, approximately 1,800 electric bicycles are being deployed to Self-Help Group (SHG) women across Bihar, Andhra Pradesh, Kerala, and Madhya Pradesh, with the rollout beginning in January 2025. The electric bicycles are being used for transporting agricultural produce, handicrafts, and managing delivery

and logistics services—thus improving income opportunities and market access for rural women. Alongside the distribution of bicycles, comprehensive training programs have been conducted to familiarize beneficiaries with e-bicycle operation and benefits. The initiative has also fostered the development of "energy champions" among SHG members to support demand aggregation and long-term adoption beyond the pilot. Anchored through an MoU with the Ministry of Rural Development (MoRD) and supported by state-level partnerships, the pilot demonstrates a scalable and sustainable rural mobility model to accelerate the uptake of electric bicycles by women.

Further, gender mainstreaming efforts have been undertaken through ADB loan, scaling up demand side energy efficiency sector project, which is aligned with this GEF grant, through provisioning of training for women commercial drivers to expand their existing businesses or start new businesses besides sensitizing EESL project staff on gender issues. As on date, 228 women drivers were enrolled for training, out of which 206 women drivers have successfully completed the training.

In addition, all ADB-led components emphasize gender and social inclusion by embedding considerations for the Elderly, Women, Children, and Persons with Disabilities (EWCD) across their activities. Below is the summary of progress on EWCD aspects across components:

- City-level reports developed under the project explicitly focus on promoting gender equality within urban transport planning. The reports provide tailored recommendations for incorporating EWCD-friendly features in electric vehicle (EV) charging infrastructure and broader urban mobility frameworks. An illustration of this commitment is the Solar Carport pilot at the Statue of Unity in Kevadia, Gujarat, which has been designed with an EWCD lens to enhance accessibility, safety, and convenience for vulnerable user groups.

Knowledge activities/ Products

While the execution of activities under Components 1, 2, and 4 remains in its initial phase, with extensive research underway across all components, the key modalities for achieving effective knowledge dissemination will be social media campaigns, blogs/articles, research publications, capacity building workshops and stakeholder consultations. Below are the details of knowledge dissemination activities undertaken during the reporting period of this report: activities undertaken during the reporting period of this report:

- **Social Media Campaigns:** The project will leverage social media platforms (such as LinkedIn and X) to provide regular updates on the project's progress and activities. A detailed communication plan has been developed to schedule posts highlighting key developments across UNEP's project components. Below are the links to some of the recent social media activities for the project:
 - Roundtable discussion on 'Data Frameworks for Battery Circularity in India' (Component 2) - [\(6\) Post | LinkedIn](#)
 - Panel discussion on 'Towards a Gender-Inclusive Transition for India's E-Mobility Workforce' (Component 4) - [\(6\) Post | LinkedIn](#)

- Roundtable discussion on ‘Financing of e-trucks in India’ (Component 1) - [\(6\) Post | LinkedIn](#)
- Battery Summit 2025 (Component 2) - [\(6\) Post | LinkedIn](#)
- Surat e-SCV/LCV pilot (Component 1) - [\(6\) Post | LinkedIn](#)
- **Stakeholder Convenings:** Stakeholder convenings, such as panel discussions and roundtables, will be organized and the findings from some of these will be published as conference proceedings. Below are the details of stakeholder convenings held during the first year of the project:
 - **Data Frameworks for Battery Circularity:** The roundtable discussion brought together 25 stakeholders across government, industry, academia to discuss the policy, regulations, and best practices for battery data management, enabling battery circularity in India. A conference proceeding was published to disseminate the findings from the discussion (link below).
[Development of data frameworks for battery circularity in India | WRI India](#)
 - **Panel discussion held as a part of Uddeshya 2025:** The panel titled ‘Towards a Gender-Inclusive Transition for India’s E-Mobility Workforce’ discussed the challenges and opportunities for women in the traditionally male dominated automotive industry, particularly in the context of e-mobility’s growth. It also addressed the necessary industry and policy guidelines to create a more conducive work environment for current women workers and attract new female talent to the sector.
 - **Roundtable discussion on financing of e-trucks in India:** The roundtable brought together 25+ experts to discuss the challenges in financing of e-trucks, feasible business and financing models for e-trucks, and potential states and corridors for e-truck pilots.
 - **Battery Summit 2025:** The summit hosted over 450 stakeholders from across the battery value chain, featuring panel discussions and roundtables on India’s pathway towards localization, research commercialization, and circularity, while also showcasing battery innovations through the Battery Technologies Showcase.

ADB led Component 3 focuses on the generation and dissemination of key knowledge products to support electric vehicle (EV) infrastructure planning and business model development across India. These outputs aim to inform city authorities, private stakeholders, and policymakers on pathways for effective EV deployment.

- As part of Outputs 3.1 and 3.2, detailed city-specific reports assessing EV charging infrastructure needs and identifying optimal charging locations have been prepared. Reports have already been completed and launched in Varanasi and Shimla, while the report for Shillong has been finalized through extensive consultations with key stakeholders including OEMs, CPOs, Transport Department, Urban Affairs Department, Tourism Department, and the Shillong Municipal Board and has been submitted to the Secretary, Transport Department, Government of Meghalaya. Activities in Trivandrum and Kochi are currently underway, with completion expected by September and October 2025 respectively. Another key deliverable under **Component 3 Output 4.1** is a comprehensive report analyzing scalable business models for electric two-, three-, and four-wheelers. Approved by the Executing Agency (EA) and the Asian Development Bank (ADB) in June 2024, the report explores innovative approaches such as electric bicycle adoption, three-wheeler retrofitting, battery swapping and leasing, solar carports with Battery Energy Storage Systems (BESS), and EV Charging-as-a-Service. The report offers go-to-market strategies and practical business proposals for mass-scale implementation. This document has been formally

acknowledged by city officials in Shimla and has also been shared and discussed with stakeholders from the Shillong Transport Department. The report can be accessed via the following link:

https://www.convergence.co.in/public/images/Potential_business.pdf

Dissemination of these knowledge products has been a key priority to promote awareness and uptake. Reports have been actively shared through targeted media coverage, professional forums, and stakeholder workshops. In Varanasi, a dedicated workshop held on 19th July 2024, facilitated the formal adoption of the city-level EV readiness report by the Municipal Commissioner. In Shimla, a significant move towards promoting sustainable transportation, a diverse group of stakeholders convened on 20th September 2024 for a workshop aimed at accelerating electric mobility (E-Mobility). In Shillong, the workshop is being planned which will bring together a diverse set of participants including government departments, OEMs, charge point operators (CPOs), last-mile service providers, and think tanks to deliberate on EV adoption pathways. The finalized city reports can be accessed via the following links:

- Varanasi: https://www.convergence.co.in/public/images/electric_bus/Varanasi-EV-demand-assessment-&-EVCI-network-planning.pdf
- Shimla: https://www.convergence.co.in/public/images/electric_bus/Shimla%20city%20wide%20EV%20Demand%20Planning%20and%20EVCI%20Netwo_250602_113722.pdf
- The city-level workshops conducted under **Component 3** brought together more than 40 stakeholders at each event, drawing participation from both public and private sectors. These included electric vehicle (EV) manufacturers, charge point operators (CPOs), financial institutions, policymakers, and environmental experts. The workshops served as platforms for in-depth discussions on developing a comprehensive roadmap for electrifying transportation systems at both the city and state levels.
- The workshops primarily focused on the formulation of a state-level roadmap for E-Mobility in the cities outlining strategies for the large-scale deployment of electric vehicles (EVs), while also highlighting the importance of developing city-specific action plans beyond the focussed cities. The objective was to create a coordinated and scalable approach to EV adoption that would address the unique geographical, economic, and social challenges of the cities.
- Key areas covered during the workshops included the establishment of citywide EV charging networks based on location assessments presented in the reports, development of policy incentives for electric public transport systems, and integration of e-mobility into key local sectors such as tourism and municipal operations. The city reports and technical findings have been well received by local authorities, who acknowledged them as practical tools for guiding future investments and actions toward scaling up electric mobility initiatives.

Further, under Output 3.2, the Executing Agency (EA) is planning to organize a dedicated workshop around December 2025 to disseminate the results of the electric bicycle pilot demonstration. The primary objective of the workshop is to facilitate stakeholder interaction and encourage brainstorming on strategies to scale up the adoption of electric bicycles across India. Key discussion points will include improving affordability through demand-side incentives, innovative financing mechanisms, and integrating e-bicycles into broader urban and rural mobility ecosystems. The event is expected to witness participation from a diverse group of stakeholders, including representatives from Central and State Government departments, Public Sector Undertakings (PSUs), financial

institutions, original equipment manufacturers (OEMs), think tanks, and other relevant partners engaged in advancing clean mobility solutions.

The Government of India may consider designing a dedicated policy framework for e-bicycles, akin to the FAME scheme managed by the Department of Heavy Industries. This proposed pilot can serve as a proof of concept, demonstrating the socio-economic benefits of e-bicycles in rural areas—particularly in enhancing access, mobility, and livelihoods. It could also act as a catalyst for a national scheme focusing on affordable and sustainable mobility solutions tailored to rural needs.

At the state level, similar initiatives could be integrated into existing or upcoming schemes that prioritize sustainability in sectors such as health, education, and livelihoods. Several state governments have previously launched welfare schemes targeting these sectors, and the inclusion of e-bicycles would further reinforce their objectives.

Additionally, financial inclusion schemes like ‘Swayam Siddha Loan’, which empowers women by providing personal loans up to ₹5 lakhs for members of Self-Help Groups (SHGs), can be leveraged. The e-bicycle pilot has the potential to stimulate demand among rural women, enabling them to access these vehicles through such financing mechanisms, thereby enhancing mobility, reducing drudgery, and supporting income-generating activities.

Grievances

N/A

GEO LOCATION INFORMATION COMPONENT 1, 2 AND 4

Location Name Required field	Latitude Required field	Longitude Required field	Geo Name ID Required field if the location is not an exact site	Location Description Optional text field	Activity Description Optional text field
India	20.5937	78.9629	1269750	India is actively promoting EV adoption through policy incentives, public-private partnerships, pilot projects etc.	India is the selected country for the implementation of all project components
Maharashtra, India	19.7514	75.7138	1269750	The project is exploring opportunities in this state for work across components	The project has signed a strategic MoU with the Maharashtra Transport Department.

Surat textile market, Surat, Gujarat, India	21.1884	72.8414	NA	Location for e-LCV/SCV pilot	Under component 1 of the project, an e-LCV/SCV pilot is planned, and Surat has been selected for the implementation of the pilot.
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GEO LOCATION INFORMATION FOR COMPONENT 3

Location Name (Name of the geographic locations in which the activity is taking place.)	Latitude (WGS84 Format)	Longitude (WGS84 Format)	Location Description (Text description that qualifies in a sentence or so the location in which an activity is taking place, such as for example “mini-grid energy system” or “park ranger site”).)	Activity Description (Text description that qualifies in a sentence or so the activity taking place at the location, for example, “Installing a mini-grid energy system”).)
Statue of Unity, Kevadia	21.8790	73.6948	Location for Solar Carport	Location for Solar Carport
Varanasi	25.3166	83.0102	Area under respective municipal city limit	City Level Assessment for EV demand and network plan for Charging infrastructure
Shimla	31.1041	77.1663		
Shillong	25.5688	91.8830		
Trivandrum	8.4852	76.9491		
Kochi	9.939	76.2600		
Vaishali	25.7500	85.4166	Districts in Bihar, Kerala, Madhya Pradesh and Andhra Pradesh	Deployment of Electric Bicycles in various districts in India
Muzaffarpur	26.1225	85.3905		
Patna	25.5938	85.1355		
Pallakad	10.7730	76.6536		
Kannur	11.8675	75.3575		
Vidisha	21.5258	77.8108		
Sehore	22.9911	77.1283		
Kuppam	12.7491	78.3416		

PROJECT MINOR CHANGE IN SCOPE/MINOR AMMENDMENTS

For UNEP-led components

- ☒ Results framework
- ☒ Components and cost
- ☐ Institutional and implementation arrangements
- ☐ Financial management
- ☐ Implementation schedule
- ☐ Executing Entity
- ☐ Executing Entity Category
- ☐ Minor project objective change
- ☐ Safeguards
- ☐ Risk analysis
- ☐ Increase of GEF project financing up to 5%
- ☐ Co-financing
- ☐ Location of project activity
- ☐ Other

For ADB-led components

- ☒ Results framework

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- ☐ Components and cost
- ☐ Institutional and implementation arrangements
- ☐ Financial management
- ☒ Implementation schedule
- ☒ Executing Entity
- ☒ Executing Entity Category
- ☐ Minor project objective change
- ☐ Safeguards
- ☐ Risk analysis
- ☐ Increase of GEF project financing up to 5%
- ☐ Co-financing
- ☒ Location of project activity³
- ☐ Other

FOR SCCF/LDCF INDICATORS: N/A

CORE INDICATOR 1: Total Number of Direct Beneficiaries	
CORE INDICATOR 2: Area of land managed for climate	

³ To identify suitable cities for electric vehicle (EV) demand assessment and charging infrastructure planning, detailed consultations were held with stakeholders such as UNEP, ADB, EA, and relevant national and local agencies. These discussions helped to refine the activity components and define expected outcomes. Initially, five cities—Varanasi, Shimla, Pune, Panaji, and Chennai—were shortlisted. However, despite several rounds of discussions and follow-ups, limited traction was observed in Pune, Panaji, and Chennai. Consequently, additional cities such as Guwahati, Shillong, Bengaluru, Mysuru, Kochi, Trivandrum, Puducherry, Gurugram, and Jaipur were explored as alternatives. Based on a comprehensive assessment of readiness, stakeholder engagement, and city-level interest, the final five cities selected for the project were Varanasi, Shimla, Shillong, Trivandrum, and Kochi. These cities were chosen considering their strategic importance, willingness of local stakeholders, and alignment with national EV ambitions.

resilience (ha)	
CORE INDICATOR 3: Total no. of policies/plans that will mainstream climate resilience	
CORE INDICATOR 4: Total number of people trained	

II. Project Profile

1. General Information	1	GEF ID: 10276		
	2	Focal Area(s): Climate Change		
	3	Region: Asia		
	4	Country: India		
	5	GEF Project Title: Electrifying Mobility in Cities: Investing in the Transformation to Electric Mobility in India		
	6	Project Size (FSP; MSP) : FSP		
	7	Trust Fund (GEFTF; SCCF; LDCF) : GEFTF		
2. Milestone Dates	8	GEF CEO Endorsement Date (mm/dd/yy)	06/03/2021	
	9	ADB Approval Date if the GEF Fund (mm/dd/yy)	09/21/2021	
	10	GEF Grant Signing of the GEF Fund (mm/dd/yy)		
	11	Implementation Start Date of the Project and of the GEF Component (mm/dd/yy)	11/30/2021	
	12	Date of 1st GEF Grant Disbursement (mm/dd/yy)	04/18/2022 UNEP – 06/25/2024	
	13	Final date of GEF Grant Disbursement (mm/dd/yy)	TBA	
	14	Proposed/Revised (mm/dd/yy)	Implementation	End 31/03/2026 ⁴
	15	Actual/Proposed (mm/dd/yy)	Implementation	End N/A
	16	Actual/Proposed (mm/dd/yy)	Financial Closure	Date TBA
	17	Actual/Proposed (mm/dd/yy)	Financial Closure	Date TBA
3. Funding	18	PPG/PDF Funding (USD)	USD 68,808	
	19	GEF Grant (USD)	USD 5,366,976	
	20	Total GEF Fund Disbursement as of 30 June 2025(USD)	ADB - USD 750,000 UNEP-USD 250,000	
	21	Confirmed Co-Finance at CEO Endorsement (USD)	USD 162,780,000	

⁴ ADB part of the GEF project is aligned with ADB TA-9874-IND which in turn is associated with ADB project loan (52196-001) to EA. The current end date of TA is 31st March 2026 and therefore the proposed implementation end date of GEF project is slated to be the same. The TA end date is not likely to be extended further however if it gets extended, correspondingly the implementation end date for ADB part of the GEF project would also get extended and the same will be communicated. UNEP part of the GEF project implementation has started in July 2024 and is likely to continue for next four years until June 2028.

	21	Materialized Co-Finance at project mid-term (USD)	N/A
	22	Materialized Co-Finance at project completion (USD)	N/A
4. Evaluations	23	Proposed Mid-term date (mm/dd/yy)	10/30/2024
	24	Actual Mid-Term date - if applicable (mm/dd/yy)	12/09/2024
	25	Proposed Terminal Evaluation date (mm/dd/yy)	TBA
	26	Actual Terminal Evaluation Date (mm/dd/yy)	N/A

III. Project Implementation

A. Project Description:

The total GEF financing for India e-mobility project: \$5.36 million

For Components 1,2 and 4 - Executing agency is WRI India under the guidance of NITI Aayog and the GEF fund of \$2.14 million is administered by UNEP⁵

For Component 3 – Executing Agency is EESL and Implementing Agency is CESL⁶ and the GEF fund of \$3.22 million is administered by ADB

The updated project design is based on the MTR findings and feedback.

1. Component 1: Developing financing/business models for accelerating adoption of ZETs (e-LCVs and e-MHDVs)

Outcome 1: Developing strategy, facilitating pilot and enabling implementation of innovative financing/business models to accelerate the widespread adoption of ZETs (e-LCVs and e-MHDVs) and enabling systemic transformation towards a sustainable, low-carbon road freight transportation

Output 1.1: Develop financing/business models and facilitate their pilot for e-LCVs.

Output 1.2: Develop financing/business models for accelerating the adoption of e-MHDVs.

Output 1.3: Develop charging infrastructure to accelerate the adoption of ZETs.

2. Component 2: Developing a sustainable battery ecosystem: Enabling resource efficient transition

Outcome 2: Policy framework and implementation strategy developed and operationalized for optimizing the viability of the reuse and recycling ecosystem for LIBs in India.

Output 2.1: Market assessment and policy advisory framework development to enable second-life applications (SLA) of retired electric vehicle (EV) batteries with endorsement by government stakeholders.

Output 2.2: Develop a data management framework for EV batteries in India and facilitate its operationalization with relevant line ministries.

Output 2.3: Develop strategy for an efficient EV battery recycling ecosystem at sub-national level and build capacities and raise awareness among relevant stakeholders for its effective implementation.

⁵ A thorough assessment of the activities and their current relevance, changes to be brought in the design, etc. would be captured as part of the planned mid-term review of the project (led by ADB). The key recommendations from this study would support the crystallization of the revised work plan to be presented in the inception workshop for the UNEP components.

⁶ CESL is a 100% wholly owned subsidiary of EESL which deals with Electric Mobility and Charging Infrastructure.

3. Component 3: Enabling scale up of e-vehicle markets through pilot demonstrations

Outcome 3.1: Enabling conditions for e-mobility investments created, new business models and charging infrastructure plans developed at city level (ADB).

In terms of implementation activities of the TA in India, the whole TA consists of following two interrelated Outputs with other components administered by UNEP

Output 3.1: *Market assessment, charging infrastructure plans, business models and financing applications developed and disseminated to city authorities and public and private entities*

Output 3.2: *Pilot sub- projects implemented establishing business model (2W, 3W & 4W) for further investments by public and private entities and financing institutions.*

4. Component 4: Development of pathways for a just, equitable and inclusive transition of the automotive sector to electric mobility

Outcome 4: Testing of financial, infrastructural and skilling solutions undertaken and scalable policies and implementation models developed for a more inclusive, equitable and just transition to e-mobility among workers and automotive enterprises, with endorsement from government.

Output 4.1: Develop a framework for policies and mechanisms for gender responsiveness in e-mobility and enhance capacities of government and industry stakeholders for its implementation.

Output 4.2: Upskilling workers for e-mobility jobs to accelerate the EV transition, with a focus on women and informal workers.

Output 4.3: Design and support Infrastructural and financial mechanisms for enabling a just and inclusive EV transition among micro, small and medium enterprises (MSMEs) in the automotive sector.

B. Implementation Progress (IP) Rating:

Updates on UNEP led components

- **Output 1.1:** Under this output, the project has completed a comprehensive assessment of financing barriers to e-LCV adoption through Primary and Secondary research and analysis and developed refined business/finance models. The team has also Identified women owned and women led LSPs to understand barriers in financing from their perspective. A roundtable discussion on 'financing of e-trucks in India' was organized on 23rd May 2025. The session brought together 25+ stakeholders including OEMs. The project team is also prepared to launch an e-SCV/LCV pilot in the Surat Textile Market, following detailed primary research conducted to understand the market's freight transportation needs. The OEMs have been shortlisted for the pilot after one-on-one discussions with several e-truck OEMs in India. The pilot aims to deploy 50 e-LCV/SVC after a vehicle trial of 15 days. A challenge that the project team faced in execution of e-SCV/LCV pilot is that due to norm of heavy overloading (up-to 2X) in petrol and diesel trucks, it is becoming

challenging to prepare an equivalent revenue model for electric trucks which do not allow equivalent overloading. On 24th June 2025, the project team also signed a strategic MoU with the Office of the Transport Commissioner, Government of Maharashtra track and we do not foresee any major roadblock in the implementation of activities under this component. and we do not foresee any major roadblock in the implementation of activities under this component.

- **Output 1.2:** The project team has undertaken a comprehensive assessment of financing barriers to the adoption of electric Medium- and Heavy-Duty Vehicles (e-MHDVs), drawing on both primary and secondary research. This process has encompassed stakeholder consultations, market analyses, and an in-depth review of existing financing structures. In parallel, the team has mapped and engaged with women-owned and women-led logistics service providers (LSPs) to capture financing challenges from a gender perspective. Concurrently, work is in progress to develop a sectoral use-case matrix that will identify the top ten operational use cases across diverse regions at the sub-national level. This matrix will serve as the foundation for tailored business and financing models that reflect the operational realities of specific sectors.
- **Output 1.3:** Secondary research is currently underway to assess the charging infrastructure requirements for e-LCVs, including mapping existing assets, evaluating operational suitability, and identifying critical infrastructure gaps. In parallel, the team is facilitating a strategic meeting at the Office of the Transport Commissioner, Government of Maharashtra, with CXOs of leading Charging Point Operators (CPOs) such as Statiq, Glida, Tata Power, and Jio Bp, etc. along with MAHADISCOM, to strategize and address charging infrastructure gaps across Maharashtra to enable large-scale adoption of e-LCVs and e-MHDVs.
- **Output 2.1:** The project team is developing an understanding around scope of second life battery application in India with secondary literature review. A Battery Summit was successfully conducted in May 2025 under Deliverable 2.1.2. Battery Summit 2025 brought together over 450 stakeholders from government, industry, academia, and research organizations. Some of the key takeaways from the Summit were:
 - Need to bridge the gap between battery research and industry to accelerate battery technology commercialization.
 - There is a need to leverage public procurement as a market-creation tool to derisk early-stage innovation and guarantee demand for India-developed battery technologies.
 - To provide more support to startups, there is a need for risk sharing mechanisms tools like technology risk underwriting and patent collateralization.

Scoping, stakeholder mapping, and the development of a research plan are in progress to support the creation of a policy advisory framework for second-life batteries. Planning and collateral development for a webinar on 'Designing a Technical Blueprint for Battery Aadhaar in India' is also ongoing and it is tentatively scheduled for 6th August 2025.

- **Output 2.2:** A roundtable on 'Data Frameworks for Battery Circularity in India' was organized in December 2024 and a conference proceeding with key takeaways from the roundtable was published. Remaining activities are progressing on schedule, with stakeholder mapping currently underway to inform the development of a battery data management framework for India.
- **Output 2.3:** The work on this output is yet to be initiated.

- **Output 4.1:** Successfully conducted a panel discussion on "Towards a gender-inclusive electric vehicle (EV) transition for the automotive workforce in India" in March 2025. Post panel discussion a summary document comprising key insights from the panel discussion was prepared. Secondary research is being undertaken to compile global and national insights. Exploratory primary research has been undertaken to gather field insights, and a field engagement plan is being created for further research.
- **Output 4.2:** The project team is undertaking a comprehensive mapping of the EV value chains to identify key job roles, both current and emerging, across upstream and downstream parts of the value chain. Parallely, the project team is analyzing core skills associated with these job roles, including qualifications, certifications, and training requirements relevant to the EV transition. Preparatory steps have also begun for the validation of identified job roles and skill sets with relevant stakeholders. A proposal for skill-gap assessment has been submitted to the Tamil Nadu EV Task Force, UNDP-SDG Coordination Centre, and MSME Department, GoTN.
- **Output 4.3:** An engagement strategy is being developed to propose the establishment of a state-level forum across multiple states. The final state will be selected following stakeholder consultations. Presentation decks have been prepared to pitch the concept of the forum aimed at accelerating the transition to EVs. The pitch will be made to government agencies in at least three states (currently planned as Maharashtra, Karnataka and Andhra Pradesh), with the final selection contingent upon the interest expressed by the respective agency. The execution of the state-level forum is tentatively planned by December 2025.

Updates on ADB led component 3:

Output 3.1: Market assessment, charging infrastructure plans, business models and financing applications developed and disseminated to city authorities and public and private entities

Significant progress has been achieved under Component 3 during the reporting period, marked by the successful development and dissemination of critical knowledge products and tools. Key deliverables include comprehensive market assessments, city-specific charging infrastructure plans, innovative business models, and financing applications tailored for electric mobility. These outputs have been actively disseminated to relevant city authorities, public entities, and private sector stakeholders.

Under **Output 3.1**, a pivotal report synthesizing national and international best practices was finalized and approved. The report provides in-depth case studies across five key areas essential for scaling India's EV transition:

- Electric Bicycles
- 3-Wheeler Retrofitting
- Battery Swapping Markets
- Solar Carports with Battery Energy Storage Systems (BESS)
- EV Charging-as-a-Service

The report can be accessed via the following link:

https://www.convergence.co.in/public/images/Potential_business.pdf

The report directly supports the Executing Agency in delivering two core, interlinked activities funded by the GEF:

Knowledge & Tool Development: the project focuses on creating and disseminating a suite of critical knowledge products—including market assessments, infrastructure planning documents, viable business models, and financing frameworks—that empower cities, policymakers, and investors to make informed decisions in scaling up electric mobility

Pilot Implementation & Model Demonstration: The project aims to establish replicable and scalable business models for electric 2-, 3-, and 4-wheelers. These pilot subprojects are designed to act as proof-of-concept initiatives, helping to catalyze larger public and private sector investments in the clean transportation sector.

Strategic studies have been launched to guide city-level EV adoption and charging infrastructure planning. In Varanasi, the study titled *“Electrifying Transport in Varanasi & EVCI Network Planning 2025–35”* was launched in July 2024, followed by the launch of *“Electrifying Transport in Shimla & EVCI Network Planning 2025–35”* in September 2024. These reports present tailored roadmaps for electric vehicle deployment and charging infrastructure development in alignment with local needs and national priorities. A similar study for Shillong has been completed and the workshop is being planned in consultation with the Transport Department. Additionally, dissemination workshops to present city-specific findings and recommendations are planned for Trivandrum and Kochi in September 2025, further supporting informed planning and stakeholder engagement at the city level.

- (i) **"Electrifying Transport in Varanasi & EVCI Network Planning 2025-35,"**
- (ii) **"Electrifying Transport in Shimla & EVCI Network Planning 2025-35,"**

The finalized city reports can be accessed via the following links:

- Varanasi: https://www.convergence.co.in/public/images/electric_bus/Varanasi-EV-demand-assessment-&-EVCI-network-planning.pdf
- Shimla: https://www.convergence.co.in/public/images/electric_bus/Shimla%20city%20wide%20EV%20Demand%20Planning%20and%20EVCI%20Network_250602_113722.pdf

The completion of these city assessments and the adoption of their recommendations mark a significant milestone in advancing sustainable urban transport. By outlining optimal pathways for electric vehicle adoption and developing tailored EV charging network plans, the project is driving meaningful change at the city level. This transition is expected to result in substantial reductions in urban transport-related emissions, contributing to improved air quality, public health, and long-term climate resilience in the target cities—Varanasi, Shimla, Shillong, Trivandrum, and Kochi. Moreover, the knowledge products, methodologies, and planning frameworks developed through this initiative offer a replicable model for other Indian cities, thereby catalysing national-scale progress toward electric mobility.

As a direct outcome of the Shimla City Report, the Executing Agency has submitted a detailed proposal for setting up EV charging stations at the locations identified through the study. Consultations have been held with the Secretary, Transport Department, and officials from the Urban Development Department, Government of Himachal Pradesh. The proposal is currently in the final stages of review and finalization. These efforts aim to

translate the report's recommendations into on-ground implementation and accelerate the city's EV infrastructure deployment.

Output 3.2: Pilot sub- projects implemented establishing business model (2W, 3W & 4W) for further investments by public and private entities and financing institutions.

- 1) Solar Powered Charging Station integrated with Battery Storage
- 2) S.T.R.E.E: Sustainable Transport for Rural Entrepreneurs through E-bicycles

Pilot Project Overview

1) Solar Powered Charging Station integrated with Battery Storage

As part of the project's commitment to demonstrating clean energy integration within the electric mobility ecosystem, a pilot initiative was undertaken to evaluate the feasibility of deploying solar-powered carports integrated with Battery Energy Storage Systems (BESS) and dual-mode (fast and slow) EV chargers across ten identified locations in India. The project was divided into two lots—each comprising four 25 kWp and one 50 kWp solar installations. The primary objective was to showcase a replicable model for renewable energy-powered EV charging infrastructure and to contribute to decarbonization by reducing dependence on grid electricity. The estimated annual CO₂ emissions reduction through this intervention is approximately 49,000 tons (detailed calculations provided in Annexure D).

Implementation Status and Performance

Under Lot I, bids were received, and one 50 kWp solar carport was successfully commissioned at Kevadia, Gujarat, in proximity to the Statue of Unity. This installation became operational on 31st October 2024. However, under Lot II, no bids were received, indicating possible market or procurement constraints that may require further analysis.

Solar Carport at Kevadia:

The solar carport at Kevadia has generated approximately 12,000 kWh of clean electricity over the past six months. Of this, about 4,400 kWh (or ~37%) has been utilized for electric vehicle charging. A comprehensive impact assessment study, scheduled for August 2025, will further quantify the actual CO₂ reduction, system performance, and operational efficiencies achieved at the site.

One of the key challenges contributing to the lower utilization of EV chargers at the solar carport is the billing structure disparity. In administrative offices, EV charging through in-house chargers is integrated into the overall building electricity consumption. This means users are not required to make separate payments or maintain distinct accounting for EV charging, making it more convenient and cost-neutral.

In contrast, the solar carport facility operates under a separate billing mechanism, requiring users to follow a distinct payment process for EV charging. This administrative and financial disconnect has acted as a disincentive, discouraging potential users from shifting to the solar-powered infrastructure—even though it offers clean,

renewable energy. Addressing this structural barrier is critical to improving utilization rates and realizing the full environmental and operational benefits of the solar carport.

Insights and recommendations:

The pilot at Kevadia validates the technical feasibility of deploying solar-powered EV charging infrastructure integrated with Battery Energy Storage Systems (BESS). However, it also reveals critical systemic and administrative challenges that must be addressed for future scalability. Key insights emerging from the pilot include:

- The need for policy-level interventions and targeted incentives to promote the integration of renewable energy within EV charging infrastructure.
- The importance of ensuring public accessibility to such infrastructure to maximize energy utilization and increase charger throughput.
- The requirement for stronger inter-agency coordination, particularly in aspects such as land allocation, utility connections, and timely infrastructure deployment.

Further, with the objective to demonstrate end to end clean charging the Executing Agency approached India's most prominent government locations like the Prime Minister's Office (PMO), Parliament Secretariat, and Rashtrapati Bhavan (President's House), however due to significant space limitations and the critical challenge of persistent shading from surrounding trees and heritage structures rendered these iconic sites unsuitable for effective solar generation, preventing installation.

Subsequently, the flagship pilot demonstration site has successfully garnered substantial national and international attention, serving as a vital showcase for off-grid EV charging technology. The site has been attracting diverse visitors including tourists, newly recruited civil service officers, and numerous national and international Original Equipment Manufacturers (OEMs). These stakeholders come specifically to observe, understand, and assess the system's operational use cases, its technical viability for off-grid charging, and its potential for replicability across diverse Indian contexts.

Building on this successful demonstration, the executing agency has proactively developed tailored business models to ensure wider adoption. These models specifically target locations facing high commercial electricity tariffs, areas with limited or unreliable grid availability (e.g., Rajasthan, Ladakh and Andaman and Nicobar Island), and strategic points along major national highways – offering a comprehensive, emissions-free green charging solution for the evolving EV ecosystem.

2) S.T.R.E.E: Sustainable Transport for Rural Entrepreneurs through E-bicycles

In the latter half of 2023, the project team launched a pioneering pilot focused on promoting electric bicycles as a sustainable mode of transport for rural women entrepreneurs. Given the absence of established technical standards for electric bicycles in India, the team initiated a series of stakeholder consultations with key OEMs—including Hero, Motovolt, Nexzu, Aurita, and E-Motorad—and the All-India Cycle Manufacturers Association (AICMA). These consultations saw significant interest from manufacturers, recognizing the untapped potential of

the low-speed electric two-wheeler market. Multiple demonstrations were organized across India to familiarize end users with the utility and benefits of electric bicycles. To facilitate the project's implementation, CESL entered into MoUs and agreements with various partner organizations.

Based on the feedback received during stakeholder consultations, a bid document was finalized for the procurement and deployment of electric cargo bicycles across four states—Bihar (500 units), Kerala (800 units), Andhra Pradesh, and Madhya Pradesh (500 units). Following the competitive process, the work order for deploying a total of 1,800 electric cargo bicycles for Self-Help Group (SHG) women was awarded to Motovolt Mobility Pvt. Ltd. In addition to the delivery of the bicycles, the vendor is also responsible for facilitating training sessions for SHG women in coordination with the Executing Agency (EA), ensuring proper usage, safety, and maintenance of the vehicles.

The deployment has now been successfully completed. Early feedback from beneficiaries underscores the significant socio-economic impact of the initiative. The e-bicycles have reduced travel time and physical strain for SHG women, particularly for transporting goods such as agricultural produce and handicrafts to local markets. This enhanced mobility has increased market access and income-generating opportunities, while also improving the overall well-being of the beneficiaries.

To ensure long-term benefits, comprehensive training programs were conducted across all states, equipping women with the necessary skills for safe e-bicycle operation, basic maintenance, and understanding the broader economic and environmental benefits of micromobility. A key innovation of the pilot was the development of a cadre of 50 “Energy Champions” selected from among the SHG women. These champions are now serving as local advocates, aggregating demand, and supporting the replication and scale-up of the model within their communities.

An impact assessment study of the pilot is planned for September 2025 to quantify and document its outcomes and learnings.

Initiatives on Electrification of other modes of Transport

In addition to the e-bicycle initiative, the Executing Agency (EA) has undertaken several efforts to explore electrification of other transport modes to support broader decarbonization of mobility systems in India.

One such initiative focused on the pilot deployment of electric trucks to reduce emissions from urban freight. Building on prior experience with electric buses, the EA conceptualized a pilot demonstration model under the GEF 7 program, wherein electric trucks would be provided to businesses at zero-interest financing, removing the significant barrier of high upfront capital costs. This approach was aimed at enabling logistics operators to adopt clean technologies without financial burden.

The EA under discussion with the Container Corporation of India (CONCOR) developed detailed technical specifications for the deployment of heavy-duty electric trucks at CONCOR's terminal in the National Capital Region (NCR) as a pilot demonstration under the GEF 7 program. However, implementation could not proceed as the models available in the market did not meet the specific requirements of CONCOR, particularly in terms of performance, payload capacity, and operational suitability. CONCOR, leveraging the technical groundwork laid by

EA, is now independently engaging with OEMs and is expected to float a tender in the coming months for the pilot deployment of electric trucks.

Beyond this, the EA is also expanding into new sectors such as electric tractors and e-boats, recognizing their potential to contribute to rural and inland waterway decarbonization. Discussions have been initiated with various state governments for the demonstration and pilot deployment of these electric alternatives, with the goal of enabling cleaner, cost-effective, and locally relevant mobility solutions.

a. GEF Grant Disbursement

For ADB led component, total disbursement of USD 750,000 has taken place and contract has been awarded for another USD 743,650. The plan is to disburse the pilot amount of USD 743,650 on e-bicycle pilot in the next four months period.

For UNEP led components, total disbursement of USD 250,000 has taken place.

b. Stakeholders Engagement

For UNEP led components, below are the details of the stakeholder engagement:

Component 1: The project team is conducting structured and semi-structured one-on-one consultations with key stakeholders including electric truck OEMs, financiers, and logistics service providers (LSPs) to better understand financing barriers to e-freight adoption and explore potential solutions. These discussions are helping validate and refine findings from secondary research. Stakeholders engaged so far include Eqaro Guarantees, HDFC Bank, SBI, cKers Finance, IEEFA, Vaultus Green Funding, etc. A roundtable discussion was conducted on 'Financing of e-trucks in India' on 23rd May 2025. The discussion was attended by 25+ stakeholders including NITI Aayog, OEMs, LSPs, financiers and transport associations. The component team has also launched a pilot for e-SCV and e-LCVs in Surat (Gujarat) in collaboration with Surat Municipal Corporation (SMC) and Federation of Surat Trade and Textile Associations (FOSTTA). As the component transitions to solution design and pilot implementation, the team will continue to co-develop context-specific financing/business models. There are no major challenges experienced so far.

Component 2: During the reporting period, the project team has engaged with various government, industry and academic stakeholders for successful execution of project activities which included development of battery data framework and successfully conducting Battery Summit 2025. From the government, project team has engaged in one-on-one discussions with the Ministry of Science and Technology (MST), Department of Science and Technology (DST), the Ministry of Environment, Forest and Climate Change (MoEFCC), NITI Aayog, Automotive Research Association of India (ARAI), Ministry of New and Renewable Energy (MNRE) and Anusandhan National Research Foundation (ANRF).

The project also organized a roundtable discussion on Battery Data Management in December 2024, which saw participation from the DST, MoEFCC, and over 25 other industry stakeholders. Subsequently, the Battery Summit 2025 was held on 28th May 2025 in collaboration with NITI Aayog, DST, and ARAI. The event featured over 30 speakers from industry, academia, and government, who contributed to panel and roundtable discussions. Government participation included delegates from MST, MNRE, ANRF, and the Council of Scientific & Industrial Research (CSIR) - Central Electrochemical Research Institute (CECRI). Academic institutions such as IIT Hyderabad, IIT Tirupati, and IIT Bombay were also actively involved in the discussions. The Battery Technologies Showcase featured participation from 26 stakeholders, including government research organizations like the International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI) and CSIR – Advanced Materials and Processes Research Institute (AMPRI), alongside four academic institutions that presented their research initiatives. The Battery Summit 2025 witnessed an overall attendance of over 450 participants.

Component 4: The project has engaged with select stakeholders from the electric vehicle manufacturing sector during the initial phase of the reporting period to understand their workforce development needs and skill requirements for the transition to electric mobility. A specific focus has been on understanding current practices with respect to gender mainstreaming. As the project advances, more extensive stakeholder engagement is planned, including broader consultations with industry representatives, associations, and government skilling agencies. As part of these engagement efforts, a successful panel discussion on "Towards a gender-inclusive electric vehicle (EV) transition for the automotive workforce in India" was conducted as part of Uddeshya 2025 which included representation from the government, industry and the skilling ecosystem.

For ADB led component 3, below are the details of the stakeholder engagement:

For Outcome 3.1 and 3.2, the project team has carried out extensive stakeholder engagement activities with regular meetings and campaigns/ demonstrations and consultations with key government officials from various ministries and departments as tabulated in earlier sections.

The project team has also consulted with private sector entities, associations and thinktanks through stakeholder consultations and seminars to bring greater efficiency, innovation, and practices that can improve project outcomes and enhance savings. Several challenges were faced during interaction with stakeholders at city level due to change in management/ leadership. However, the overall stakeholder support for the project has been positive.

c. Gender Action Plan Implementation Status

For the UNEP-led components (i.e., Components 1, 2, and 4), a Gender Action Plan (GAP) has been developed to ensure meaningful gender representation across all activities. The plan requires that all project events—such as workshops, roundtables, and panel discussions—achieve at least 40% participation of women. In addition, the GAP outlines measures including integrating gender perspectives into stakeholder capacity-building sessions; collecting and maintaining gender-disaggregated data across project activities; and developing a state-level gender-inclusive skilling framework. It also emphasizes the incorporation of gender considerations from the earliest stages of policy design at both national and subnational levels. Gender-sensitive capacity development and awareness-raising for

scaling up e-mobility are addressed primarily under Component 4 of the project. Below are the updates on gender-responsive measures during the first year of the UNEP-led components:

- **Inception Workshop:** The UNEP project's inception workshop was convened on 11 September 2024 in New Delhi, with participation from over 40 stakeholders, including policymakers, original equipment manufacturers (OEMs), battery recyclers, fleet operators, and think tanks. As part of the project's commitment to gender inclusivity, invitations were extended to more than 35 women representatives, of whom 15 attended the workshop. In addition, 11 women participants from WRI India were present.
- **Component 1:** A roundtable discussion was held on 23rd of May 2025 to discuss the financing of e-trucks in India. Out of the 20 attendees at the event, 2 were women. The freight segment in India is a male dominated space. To overcome this issue, the project team is developing a database of women representatives in the freight segment. This database will be leveraged to reach larger number of women for participation in events. In addition, the project is connecting with women-led LSPs to understand the financing challenges that they face.
- **Component 2:** For the Battery Data workshop in December 2024, invitations were sent to 50 stakeholders, including 11 women representatives. Five women participated in the roundtable (excluding WRI India) out of the 25 participants. Including WRI India representatives, women constituted 25% of the total event participants. For the Battery Summit in May 2025, invitations were sent to around 95 stakeholders, including 16 women representatives as speakers in panel and roundtable discussions. Six women participated as speakers across all the discussions. Out of the total 450+ attendees 30% women representation was witnessed during the Summit.
- **Component 4:** In March 2025, a panel discussion was held on "Towards a gender-inclusive electric vehicle (EV) transition for the automotive workforce in India" to discuss strategies for mainstreaming women's participation in the electric mobility workforce. The panel had 3 women representatives as speakers, representing industry and ecosystem enabling initiatives. The event had 235 participants with 57% female participation.

Under ADB led component 3:

Gender mainstreaming efforts have been undertaken through ADB loan, Scaling up demand side energy efficiency sector project, which is aligned with this GEF grant, through provisioning of training for women commercial drivers to expand their existing businesses or start new businesses besides sensitizing EESL project staff on gender issues. As on date, 228 women drivers were enrolled for training, out of which 206 women drivers have successfully completed the training. Some of the key inclusive features implemented under component 3 are listed below:

Elderly, Women, Children and Disabled (EWCD) features

The city-level electric mobility assessment places a strong emphasis on gender equality and inclusive urban transport. Recognizing the unique mobility needs of elderly individuals, women, children, and persons with disabilities (EWCD), the study includes specific recommendations for incorporating EWCD-friendly features in the planning and deployment of EV charging infrastructure.

The solar carport pilot, implemented at the Statue of Unity in Gujarat, has actively integrated gender inclusion considerations. This pilot serves as a model for how EV infrastructure can be designed to be not only sustainable but also safe, accessible, and user-friendly for all segments of society.

Key EWCD design features adopted at the Kevadia site include improved physical accessibility, adequate lighting, clear signage, and secure and shaded waiting areas. These elements contribute to a safer and more comfortable charging experience, particularly for women and the elderly, and promote greater confidence and independence in using electric mobility solutions.

By embedding EWCD principles into both planning and implementation, the project aims to ensure that the transition to electric mobility is equitable, inclusive, and responsive to the needs of all urban residents.

Women Centric Electric Bicycle Pilot Program- Program for Sustainable Transport for Rural Entrepreneurs through E-bicycles (S.T.R.E.E.)

With a dedicated focus on empowering rural communities—particularly women—the Executing Agency (EA) launched the S.T.R.E.E. pilot program, deploying approximately 1,800 electric bicycles to Self Help Group (SHG) women across four Indian states. The initiative is designed not only to enhance sustainable rural mobility but also to foster women’s entrepreneurship and economic resilience.

A cornerstone of the program was comprehensive training and capacity building of women beneficiaries. A tailored gender-responsive training module was developed to familiarize the participants with the functionality, usage, and periodic maintenance of electric bicycles. Training components included battery charging optimization, tool kit usage, warranty and spares management, and safe riding practices. These sessions were delivered through a mix of in-person workshops, online sessions, and user manuals, ensuring accessibility for diverse learner needs.

Beyond usage, the EA also focused on developing long-term technical skills by equipping SHG women with the capacity to set up and manage local repair and maintenance hubs within their communities. This element of the program aims to create sustainable livelihood opportunities, promote self-reliance, and enable ongoing skill upgradation, ensuring that women remain at the forefront of the transition to low-emission rural mobility.

d. Social and Environmental Safeguard Plan Implementation Status

Overall supervision of the GEF funds is subject to the ADB due diligence and safeguards system and all environmental and social safeguards will be ensured through this system. GEF funds are used to provide associated technical support and capacity development to the project. There are no additional risks or concerns associated with the GEF funds. The GEF administered funds will not be involved in the parts of the project related to involuntary resettlement and will not be involved with activities related to involuntary resettlement.

C. Global Environmental Benefits (GEB) Objective/ Development Objective (DO) Rating:

For the UNEP-led components, i.e. Component 1,2 and 4, below are the highlights of key achievements towards achieving the overall objectives of the project:

- **Component 1:** Preparations are currently underway for the **first e-LCV/SCV pilot** under the project. This is one of the key outcome indicators for Component 1. Following a rigorous screening process, two OEMs have been finalized as partners for the pilot. The pilot design has been tailored to address the specific needs of customers in the Surat textile market, based on comprehensive primary research conducted in the area. The pilot aims to facilitate the deployment or adoption of 50 or more e-LCV/SCVs, following a 15-day vehicle trial period.
- **Component 2:** Scoping, stakeholder mapping, and the development of a research plan are in progress to support the creation of a **policy advisory framework for second-life batteries**, which is one of the outcome indicators in Component 2. Similarly, work is in progress for **operationalization of battery data management framework**. A successful roundtable on battery data management was organized in December 2024, followed by the publication of a conference proceedings document that captured the key takeaways. Additionally, stakeholder mapping is currently underway for the development of a battery data management framework for India.
- **Component 3:** Towards the achievement of the outcome indicator ‘Number of automotive/transport enterprises in the e-mobility sector that are sensitized to promote gender-inclusive employment policies’, a panel discussion was held on ‘**Gender mainstreaming framework for the electric mobility**’ in March 2025. Additionally, secondary research is being undertaken to compile global and national insights on gender mainstreaming strategies for the electric mobility industry. Similarly, for **skilling for e-mobility jobs**, the project is undertaking a comprehensive mapping of the EV value chains to identify key job roles, both current and emerging, across upstream and downstream parts of the value chain. Parallely, the [project team is analyzing core skills associated with these job roles, including qualifications, certifications, and training requirements relevant to the EV transition.

For ADB led Component 3:

All pilot projects under this program are currently in the implementation stage, and no measurable benefits have accrued to date. Formal impact assessment studies are scheduled for completion in the next two-three months. However, based on projections outlined in the GEF CEO Endorsement Document, the estimated direct GHG emission reductions across the project lifecycle are expected to be around 201,000 tCO₂e through pilots on e-2W, (500 nos.), e-3W (500 nos.) and deployment of 2000 e cars.

As part of the pilot program on e-2W, EA has conducted pilot demonstration by deploying 1,800 electric bicycles to Self Help Group Women in four states in India. Based on the primary consultations conducted by EA during the deployment of 1,800 electric bicycles under the S.T.R.E.E. pilot program, it was informed by the stakeholders that their existing modes of travel include personal two wheelers, autos, buses and walking to their work destinations. Accordingly, it is estimated that deployment of electric bicycles will contribute an estimated ~5000 tCO₂e in GHG emission reductions over a period of 10 years.

Since the e-3W pilot program could not be implemented due to constraints related to limited OEM availability and safety issues, EA proposed to implement an alternate pilot on integrating RE with EV charging and Battery Storage Systems by setting up stand-alone off grid solar carports.

A preliminary analysis indicated that the successful deployment of a fully off-grid, green end-to-end EV charging ecosystem—comprising five solar carports (four of 25 kW capacity with 100 kWh BESS and one of 50 kW capacity with 200 kWh BESS)—could result in an estimated reduction of ~247,689 tCO₂e over a period of 10 years.

The EA approached high profile locations such as the PMO, Parliament Building, President’s House etc for setting up off grid solar carports for demonstration purpose. These locations were approached to increase visibility of the pilot program and develop scalable models post pilot demonstrations.

However, due to challenges related to uptake of solar carport related to land availability, delay in administrative approvals and supply chain issues in battery procurement, only one 50 kW solar carport could be successfully commissioned at the Statue of Unity, Kevadia. This single installation is expected to lead to CO₂ emission reductions of approximately 82,000 tons over a period of 10 years.

D. Risk Rating:

Risk and Description	Probability	Severeness	Current Status/ Parameters	Update Countermeasures/Management response
Delayed implementation of Component 1,2 and 4 of project	Moderate	Low	After internal discussions and stakeholder consultations including the MTR findings, an updated 4-year workplan has been prepared for the UNEP-led components.	The initial delays have resulted in the updated workplan based on the MTR findings and recommendations. The project execution is underway based on the updated workplan.
Adoption of City Reports	Low	Moderate	The proposed city plan includes collaborative discussions/decisions with key stakeholders (including Govt., Public & Private Sectors, OEMs, Service providers, Institutes, etc.) and the list of locations	The project team has consulted with city governments on adoption of recommendations of the report/locations finalized for setting up charging infrastructure. EA has also offered to provide support in tendering for any such requirements from the City authorities

Risk and Description	Probability	Severeness	Current Status/ Parameters	Update on Countermeasures/Management response
			identified for setting up charging infrastructure in the city.	
Frequent changes in staff and leadership at subnational level may disrupt the alignment of the project with government priorities, potentially hindering the timely achievement of project outcomes.	Moderate	Low	No major risk faced so far. An MoU has been signed with Maharashtra Transport Department.	To mitigate disruptions caused by frequent changes in staff and leadership at the subnational level, the project would institutionalize its engagement by anchoring it within permanent government structures and processes rather than with individuals. This is being done through institutional anchoring (through MoUs, wherever possible) and multi-level engagements within the organization.
Lack of stakeholder support in providing essential information on financing/business models, battery data and gender-disaggregated data may hinder effective gap analysis and the development of tailored solutions, limiting progress in e-truck financing, battery repurposing and gender mainstreaming in e-mobility.	Moderate	Low	No major risk faced so far	The project team is conducting one-on-one discussions with multiple stakeholders to gather data and will organize group convenings to validate data authenticity and build consensus within the ecosystem.

E. Overall Rating of the Project:

Overall Rating: Satisfactory

F. Good Practices And Lessons Learned:

Below are some of the learnings from implementation of component 1, 2 and 4 activities during the year:

- **Learning from planning of e-truck pilot in Surat:** Due to the prevalent practice of heavy overloading (often up to 2X) in conventional diesel and petrol trucks, establishing a financially viable and comparable revenue model for electric trucks has become increasingly challenging. Unlike their ICE counterparts, electric trucks are constrained by stricter payload limitations due to battery weight and regulatory compliance. When designing business models for e-trucks, this inherent disadvantage

- must be accounted for. To bridge this gap, it is essential to focus on enhancing operational efficiency—such as route optimization, increased vehicle utilization, efficient turnaround times, and integration with digital logistics platforms—to offset the revenue loss from lower payload capacity. Secondly, the freight industry has low readiness for adoption of electric vehicles due to concern regarding higher upfront cost of the e-trucks, uncertainty about performance of the vehicle, impact on revenue etc. The pilot aims to address some of these concerns.
- **Learning from data frameworks for battery circularity in India:** Commercialization of domestic battery technology research faces financing as a major bottleneck. Lenders are hesitant to provide funding due to a lack of revenue streams, while equity investors perceive it as risky because of technology uncertainty and long gestation periods. A national framework is required for battery data management, ensuring compliance and enforcement of circularity provisions in the battery value chain. The framework will improve data transparency about battery performance and residual value, leading to unlocking potential for financing and insurance service providers. Adoption of the battery-as-a-service (BaaS) model can be significantly expanded through a shared data framework that enables service providers and users to monitor battery movement, usage, State of Health (SoH), and other parameters through a neutral platform. However, costs associated with data collection (including hardware such as sensors and software), storage, and processing need to be accounted for and business models related to shared battery data needs to be developed.
 - **Insights from research and stakeholder dialogues** point to the need for structural reforms to enable women's full participation in the EV ecosystem: Gender inclusion in the EV ecosystem requires moving beyond token representation to systematic integration across the entire value chain - from design and manufacturing to skill development and entrepreneurship. Success depends on collaborative frameworks between government, private sector, and civil society that address structural barriers like workplace infrastructure, flexible working conditions, and targeted skill development programs tailored for women.

Below are some of the learnings from implementation of component 3 activities during the year:

- **Learning from City Finalization:** Securing the commitment of city governments' to kickstart the project proved to be a lengthy process, as extensive negotiations and deliberations were required to align with their priorities and regulatory frameworks. This substantial effort caused delays in finalizing the selection of the five cities for the initiative. Despite the challenges, these discussions were crucial to ensuring strong local support and successful project implementation.
- **Learning from City Level Location Assessment:** During location assessment for setting up charging infrastructure at the selected cities, it was found that some of the locations have been randomly selected by city departments without proper assessment. The project team along with city departments officials conducted thorough assessment and proposed alternate/ new locations.
- **Learnings from 3W Pilot Initiative:** Retrofitting three-wheelers (auto-rickshaws) with electric drivetrains is a promising way to reduce emissions and modernize transportation. However, during the pre-implementation phase of the 3W pilot, the project team faced several issues such as technical

challenges, limited OEMs/ startups and lack of regulatory and policy guidelines for retrofit in India. Even the FIs were not aware of such technology and were reluctant to fund the startups/ vehicle owners. Through extensive stakeholder meetings, the project team briefed the FIs and other stakeholders on the technology and its benefits. However, the market is still in a nascent stage and will grow over the next few years.

- **Insights from e-truck initiative:** As part of efforts to decarbonize the freight sector, the project team explored the deployment of electric trucks on a pilot basis. Leveraging EA's previous experience with electric bus deployments, a zero-financing model was proposed—enabling end-users to access electric trucks without any upfront capital expenditure or interest burden. This approach was aimed at removing financial barriers that typically hinder businesses from adopting electric heavy-duty vehicles (HDVs).

While the concept offers substantial potential to accelerate freight electrification, limited availability of models and low OEM participation in the electric HDV space currently present a bottleneck. However, this segment is expected to witness exponential growth in the next 2–3 years, driven by growing policy support and market readiness—especially with the anticipated rollout of central government schemes such as PM e-Drive. The groundwork laid through this initiative positions the EA to capitalize on future opportunities in the freight electrification ecosystem.

- **Learnings from electric bicycle pilot:** The lack of defined standards for electric bicycles (e-bikes) in India presented several challenges, from safety and performance issues to market confusion. However, through extensive stakeholder consultations with OEMs and All India Cycle Manufacturers Association (AICMA), field surveys, adoption of global practices and use cases the project team was able to define the technical specifications of the electric bicycle. The women beneficiaries were not keen on participating in the pilot program, due to high upfront cost of the electric bicycle. Considering their low paying capacity, the electric bicycles were offered at subsidized rates for demonstration impact and government to assess its benefit and subsequently intervene through policy framework. Besides these impacts, the pilot has led to reduction of ~25-30% in the upfront cost of electric bicycles through bulk procurement. The hands-on training provided to SHG women shall support them in venturing into new revenue streams for their households.

G. Knowledge activities / products:

While the execution of activities under Components 1, 2, and 4 remains in its initial phase, with extensive research underway across all components, the key modalities for achieving effective knowledge dissemination will be social media campaigns, blogs/articles, research publications, capacity building workshops and stakeholder consultations. Below are the details of knowledge dissemination activities undertaken during the reporting period of this report: **Social Media Campaigns:** The project will leverage social media platforms (such as LinkedIn and X) to provide regular updates on project's progress and activities. A detailed communication plan has been developed to schedule posts highlighting key developments across UNEP's project components. Below are the links to some of the recent social media activities for the project:

- Roundtable discussion on 'Data Frameworks for Battery Circularity in India' (Component 2) - [\(6\) Post | LinkedIn](#)
- Panel discussion on 'Towards a Gender-Inclusive Transition for India's E-Mobility Workforce' (Component 4) - [\(6\) Post | LinkedIn](#)
- Roundtable discussion on 'Financing of e-trucks in India' (Component 1) - [\(6\) Post | LinkedIn](#)
- Battery Summit 2025 (Component 2) - [\(6\) Post | LinkedIn](#)
- Surat e-SCV/LCV pilot (Component 1) - [\(6\) Post | LinkedIn](#)
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- **Stakeholder Convenings:** Stakeholder convenings, such as panel discussions and roundtables, will be organized and the findings from some of these will be published as conference proceedings. Below are the details of stakeholder convenings held during the first year of the project:
 - **Data Frameworks for Battery Circularity:** The roundtable discussion brought together 25 stakeholders across government, industry, academia to discuss the policy, regulations, and best practices for battery data management, enabling battery circularity in India. A conference proceeding was published to disseminate the findings from the discussion (link below).
[Development of data frameworks for battery circularity in India | WRI India](#)
 - **Panel discussion held as a part of Uddeshya 2025:** The panel titled 'Towards a Gender-Inclusive Transition for India's E-Mobility Workforce' discussed the challenges and opportunities for women in the traditionally male dominated automotive industry, particularly in the context of e-mobility's growth. It also addressed the necessary industry and policy guidelines to create a more conducive work environment for current women workers and attract new female talent to the sector.
 - **Roundtable discussion on financing of e-trucks in India:** The roundtable brought together 25+ experts to discuss the challenges in financing of e-trucks, feasible business and financing models for e-trucks, and potential states and corridors for e-truck pilots.
 - **Battery Summit 2025:** The summit hosted over 450 stakeholders from across the battery value chain, featuring panel discussions and roundtables on India's pathway towards localization, research commercialization, and circularity, while also showcasing battery innovations through the Battery Technologies Showcase.

For **component 3**, as part of output 3.1, the report on infrastructure readiness to cater to EV demand in cities has been adopted in Varanasi and Shimla City. The workshop was held in Varanasi and Shimla with support from City Authorities. Similar reports are being developed for cities of Shillong, Trivandrum and Kochi and the same are expected to be adopted by the respective city departments in the months of July and September 2025 respectively.

- (i) "Electrifying Transport in Varanasi & EVCI Network Planning 2025-35,"
- (ii) "Electrifying Transport in Shimla & EVCI Network Planning 2025-35,"

The finalized city reports can be accessed via the following links:

- Varanasi: https://www.convergence.co.in/public/images/electric_bus/Varanasi-EV-demand-assessment-&-EVCI-network-planning.pdf

- Shimla: https://www.convergence.co.in/public/images/electric_bus/Shimla%20city%20wide%20EV%20Demand%20Planning%20and%20EVCI%20Netwo_250602_113722.pdf

Further, as part of **Component 3**, Output 3.1, a report on potential business models on electric bicycles, 3W retrofitting, battery swapping, battery leasing, solar carport with BESS and EV charging as a service covering go to market strategy and business proposal for mass scale-up of e-2, e-3 and e-4 wheelers in India has also been developed. The same has been acknowledged by Shimla City Authorities and the findings of this report shall be shared with Shillong, Trivandrum and Kochi City authorities as well. The report can be accessed via the following link:

https://www.convergence.co.in/public/images/Potential_business.pdf

Under Component 3, output 3.2, the following knowledge products are envisaged post successful completion of the pilot activities:

- Report on the integration of renewable energy for EV charging solutions and support required from government agencies in scaling up use of renewable energy for meeting charging needs
- Report on impact assessment of e-bicycles in the country and subsequent support and policy intervention required from the Government for scale up and mass adoption

The objective through this pilot is to demonstrate a working model for mobility in rural context especially for women and accelerate adoption of e-bicycles. This will also raise awareness of electric bicycles as a clean, sustainable and affordable mobility option. The result of this pilot is likely to be good communication piece that can be disseminated across projects.

. The following initiatives are part of this pilot that will create visibility and scale up of e-bicycles adoption:

- Media and Social media coverage
- MoRD is taking up initiative to sensitize officials. SRLM officials of various states are being invited to the sites to understand the model and benefits.
- Impact assessment study to be conducted to measure the benefits of the pilot.

Moreover, as part of Output 3.2, the EA is planning a workshop to disseminate the findings of the electric bicycle pilot program. The objective of the workshop is to facilitate interaction and brainstorming on strategies for scaling up the use of electric bicycles and making them more affordable through demand incentives and financing options. The event will see participation from Central and State government entities, including PSUs, financing institutes, original equipment manufacturers (OEMS), think tanks and other relevant stakeholders.

This collaborative environment is intended to develop creative and sustainable solutions that will foster strong support for the adoption of electric bicycles. Significant focus areas of the workshop shall be:

- Introduction of subsidy schemes similar to FAME (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles) designed for electric bicycles and low-speed electric vehicles.
- Assigning nodal agency for Low-Speed Electric Vehicles including electric bicycles
- Mobilizing micro-financing options for low-speed electric vehicles including electric bicycles

The proposed pilot will measure the benefits through impact assessment study for the rural economy focusing on women. The outcomes of the pilot will feed the policy makers to design programs/ schemes focused on rural and sustainable mobility.

Government of India may mull on designing a specific policy for e-bicycle (similar to the FAME scheme by Department of Heavy Industries). We believe this pilot will help demonstrate the benefits to the rural economy and a will be an anchor point for any specific Government of India scheme focusing on promoting affordable and sustainable mobility in the rural economy.

Similar to Central government, states may also design specific schemes on affordable and sustainable mobility. Various state governments in the past have announced schemes focused on promoting sustainable initiatives in health, education and livelihoods. The e-bicycle product can be included in their ongoing or new scheme in the priority sectors of the state government.

In the rural economy, there are schemes such as ‘Swayam Siddha loan’ with an aim to empower women by providing financial support in the form of personal loan. The lup to are provided to women in Self Help Group (SHGs) with a loan upto INR 5 lakhs. CESL believes that this pilot will help encourage women avail these e-bicycle under the Swayam Siddha loan and increase the demand of these e-bicycles.

H. Location Data:

GEO LOCATION INFORMATION COMPONENT 1, 2 AND 4

Location Name Required field	Latitude Required field	Longitude Required field	Geo Name ID Required field if the location is not an exact site	Location Description Optional text field	Activity Description Optional text field
India	20.5937	78.9629	1269750	India is actively promoting EV adoption through policy incentives, public-private partnerships, pilot projects etc.	India is the selected country for the implementation of all project components
Maharashtra, India	19.7514	75.7138	1269750	The project is exploring opportunities in this state for work across components	The project has signed a strategic MoU with the Maharashtra Transport Department.
Surat textile market, Surat, Gujarat, India	21.1884	72.8414	NA	Location for e-LCV/SCV pilot	Under component 1 of the project, an e-LCV/SCV pilot is planned, and Surat has

					been selected for the implementation of the pilot.
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GEO LOCATION INFORMATION COMPONENT 3

Location Name (Name of the geographic locations in which the activity is taking place.)	Latitude (WGS84 Format)	Longitude (WGS84 Format)	Location Description (Text description that qualifies in a sentence or so the location in which an activity is taking place, such as for example “mini-grid energy system” or “park ranger site”.)	Activity Description (Text description that qualifies in a sentence or so the activity taking place at the location, for example, “Installing a mini-grid energy system”.)
Statue of Unity, Kevadia	21.8790	73.6948	Location for Solar Carport	Location for Solar Carport
Varanasi	25.3166	83.0102	Area under respective municipal city limit	City Level Assessment for EV demand and network plan for Charging infrastructure
Shimla	31.1041	77.1663		
Shillong	25.5688	91.8830		
Trivandrum	8.4852	76.9491		
Kochi	9.939	76.2600		
Vaishali	25.7500	85.4166	Districts in states such as Kerala, Madhya Pradesh, Andhra Pradesh and Bihar	Deployment of Electric Bicycles in various districts in India
Muzaffarpur	26.1225	85.3905		
Patna	25.5938	85.1355		
Pallakad	10.7730	76.6536		
Kannur	11.8675	75.3575		
Vidisha	21.5258	77.8108		
Kuppam	22.9911	77.1283		
Sehore	12.7491	78.3416		

For Projects that have conducted Midterm Review Mission (from 1 July 2023 to 30 June 2024)

IV. Midterm Review

Midterm Project Ratings

Development Objective Rating at MTR (IP): Satisfactory (S)

Implementation Progress Rating at MTR (DO): Satisfactory (S)

Risk Rating at MTR: Low Risk (L)

Information on Progress, challenges and outcomes on stakeholder engagement (based on the description of the Stakeholder engagement plan included at CEO Endorsement/Approval)

During July and August 2024, a mid-term review (MTR) of the GEF project was commissioned by ADB (as the lead GEF agency for the project) to analyze the status of project, challenges, and identify corrective actions required to ensure that the project achieves its intended outcomes efficiently and in a sustainable manner.

For the UNEP components, the MTR reassessed the project baseline, status of the project activities / deliverables in the approved project design, and suggested the revised set of project outputs, deliverables, and activities. The evaluation involved consultations with 20+ stakeholders. Based on the inputs from stakeholders, the review performed a segment-wise analysis and provided rankings for different barriers (charging, financing, awareness, inclusiveness etc.) to the growth of these segments. The ADB mid-term review also provided recommendations for the UNEP components of the project. Some of the key takeaways from the review are highlighted below:

- The 2W and 3W market is more mature and stable while the freight segment clearly needs a lot more attention.
- Policies at the subnational level score lower than national policies, indicating challenges in implementation at the state and city levels.
- Lack of financing and charging infrastructure continue to be significant barriers that need to be addressed urgently.
- The industry needs to work towards making the transition inclusive (there seems to be some progress in 2W and 3W segments).
- There are gaps in the existing battery ecosystem, such as the lack of comprehensive policy frameworks for second life applications and lack of implementation of recycling regulations in sync with manufacturing requirements.

The suggestions from the mid-term review clearly highlighted the need to focus on the freight segment as the overall maturity level of this segment is the lowest when compared with others. Within the freight segment, the study highlighted the need for ecosystem development through policy roadmaps, charging infrastructure,

financing, inclusive transition, product reliability and awareness generation. Out of these, policy roadmap and awareness work will be covered under e-FAST initiative spearheaded by NITI Aayog. Charging infrastructure and product reliability are likely to develop with gradual maturity of the market. Hence, component 1 of the UNEP project will primarily focus on **building the finance ecosystem for freight segment**.

The mid-term review highlighted the **need to focus on the inclusiveness of the transition across all vehicle segments**. Some progress on enabling an inclusive transition has been observed in the 2W and 3W segments, with some vehicle manufacturers focusing on women employment on shop floors and a greater industry focus on women's driver training. The review recommends an evaluation of the gender aspect in the skilling, entrepreneurship and employment programs in one or two states. The need to address the inclusion of vulnerable groups during the electric mobility transition will be addressed in Component 4 of the UNEP project.

The review also highlighted gaps in the existing battery ecosystem, such as a lack of comprehensive policy framework for second life applications and lack of implementation of recycling regulations in sync with manufacturing requirements. Component 2 of the UNEP project will address these roadblocks.

For the ADB components, the MTR assessed the status of the project activities / deliverables in the approved project design, and suggested the revised set of project outputs, deliverables, and activities.

The evaluation involved consultations with ADB, EESL, CESL and its appointed consultants. Based on the inputs from the stakeholders, the reviewer performed a segment-wise analysis and provided rankings for different barriers (pilot programs, city level assessments, awareness, inclusiveness etc.) for the growth of these segments. The ADB mid-term review also provided recommendations for the ADB components of the project. Some of the key takeaways from the review are highlighted below:

- The 3W retrofit market is still nascent but holds significant growth potential with the development of clearer regulatory and policy guidelines to attract OEM and startup participation.
- EA should engage with city administrations to leverage and implement the EVCI plans for the five cities, ensuring dedicated funding and city-wide infrastructure deployment.
- The E-bicycle program must be linked to existing schemes like Beti Bachao Beti Padhao, with an incentive scheme developed to reduce high upfront costs and promote girl education in rural areas.
- Learnings from the STREE project should be applied to gender-sensitive capacity development and awareness campaigns to integrate gender inclusion into e-mobility policies and solutions.
- At the state level, e-bicycle initiatives should be integrated into sustainability-focused schemes within health, education, and livelihoods to reinforce their objectives.

- A viable business model for solar carports must be developed to demonstrate the benefits of RE integration with BESS, while also addressing regulatory feasibility and engaging with MNRE and State Energy Departments for a scaling strategy.

The mid-term review highlighted the critical need to integrate women's empowerment through e-bicycles and training into existing central and state government schemes. EA will address the same by organizing a dedicated workshop to disseminate the electric bicycle pilot results and facilitate stakeholder brainstorming on scaling strategies, affordability, financing, and ecosystem integration for e-bicycles.

Information on Progress on gender-responsive measures as documented at CEO Endorsement/Approval in the gender action plan or equivalent

The MTR mentions that the learnings from the E-bicycle program should be linked to existing schemes that focus on education for girls in rural areas. For example, the e-bicycle program can be linked to Beti Bachao Beti Padhao and other schemes focusing on girl education both by the center and state and an incentive scheme should be developed that reduces the high upfront cost of the e-bicycles.

The MTR recommends that the learnings from the STREE project should be used in Gender sensitive capacity development and awareness raising for scaling up e-mobility. This will help to integrate gender inclusion capacity development activities related to e-mobility and to engage with policymakers in designing gender-inclusive policies and solutions.

The MTR also highlighted the need to focus on the inclusiveness of the transition across all vehicle segments. Some progress on enabling an inclusive transition has been observed in the 2W and 3W segments, with some vehicle manufacturers focusing on women employment on shop floors and a greater industry focus on women's driver training. The review recommends an evaluation of the gender aspect in the skilling, entrepreneurship and employment programs in one or two states. The need to address the inclusion of vulnerable groups during the electric mobility transition is being addressed in Component 4 of the UNEP project.

Knowledge activities / products (based on the Knowledge management approach approved at CEO Endorsement / Approval) and lessons learned (if available)

Main Findings of the MTR

This section in the MTR seeks to determine the extent to which the anticipated outcomes of the project are likely to be achieved, thus contributing ultimately to the project's intended impact. The progress of the outputs combined form the substantive basis upon which this assessment of achievement of direct outcomes is based. Outcome indicators in the project Results Framework are used to determine progress.

Outcome of ADB led Component 3: Outcome 3: Enabling conditions for e-mobility investments created, new business models and charging infrastructure plans developed at city level (ADB).

Overall, the project has made significant progress especially on component 3 led by ADB. Market assessment, charging infrastructure plans, business models and financing applications have been developed and disseminated to city authorities and public and private entities.

- a) As an outcome of Output 3.1, a report was developed having case studies on national and international best practices in the areas namely: Electric Bicycles, 3W Retrofit, Battery Swapping Market, Solar Carport with BESS and EV Charging as a Service.
- b) As part of the city level assessment activity, the project team launched a pivotal study titled “Electrifying Transport in Varanasi & EVCI Network Planning 2025-35.”
- c) For the Solar Port EV charging with Battery Energy Storage System, the installation work has been initiated at one of the five sites and is expected to commission by early October 2024.
- d) MoU has been signed between Ministry of Rural Development and CESL for implementation of the pilot program for deploying 1800 bicycles. Agreements have also been signed with State government agencies such as State Rural Livelihood Missions of Bihar, Kerala, Madhya Pradesh and Andhra Pradesh for execution of the pilot. The pilot also covers training and capacity development of ~500 women beneficiaries on benefits of micromobility. Tender has been prepared and will be published by mid of September 2024.

Core Indicators:

For UNEP-led components:

The project activities have been updated following the recommendations of the MTR, thus, the indicators are hereby revised.

Outcome Level indicators	Baseline	End of project Target	Means of Verification	Assumptions & Risks
Component 1				
1. Documentation and dissemination of learnings from pilots to test the feasibility of the financing/business models to facilitate the scaling-up of e-LCVs.	1. No 2. No 3. 0	1. 2 pilots (100 vehicles); 1 learning report; at least 1 webinar 2. Yes 3. 1 city	Project Documentation	1. Macro-economic and political conditions allow for sustainable financing and investment in electric mobility, particularly freight sector 2. Government remains committed to promote the adoption of electric vehicles and e-trucks continue to receive attention through required policy support 3. Relevant stakeholders, such as fleet operators, city authorities, financiers and vehicle OEMs, actively participate and align
2. A financing mechanism for e-MHDVs is implemented/integrated at national or sub-national level.				
3. A pilot for deploying charging infrastructure for e-LCVs in conducted.				

				with the project's objectives
Component 2 1. Government of India endorses the policy advisory framework for safe and efficient SLA of retired EV batteries in India. 2. Operationalization of battery data management framework with relevant central ministries. 3. State government endorses battery recycling implementation strategy and capacities built of policy makers to govern and implement a safe and efficient battery recycling ecosystem.	1. No 2. No 3. 0	1. Yes 2. Yes 3. 1 state	Project Documentation	1. Relevant government agencies and ministries are committed to building a circular ecosystem for EV batteries to prevent negative externalities from the transition to electric mobility. 2. Continued support from key stakeholders (industry, government, and academic institutions), facilitating a collaborative approach to develop policies and strategies that enhance battery circularity. 3. xxx
Component 4 1. Number of automotive/transport enterprises in the e-mobility sector that are sensitized to promote gender-inclusive employment policies. 2. Number of workers from vulnerable/marginalized groups who are skilled/upskilled for e-mobility jobs. 3. Pilot demonstration of infrastructural/ financial mechanism undertaken and scale-up pathway developed.	1. 0 2. 0 3. 0	1. 25 enterprises 2. 150 (100 women and 50 informal workers) across 2-3 cities 3. 1 pilot demonstration; learning report	Project Documentation	1. Partner government and industry organizations are keen on supporting the cause of enabling a just EV transition (gender & social equity) in the selected state's automotive ecosystem. 2. Industry associations willing to facilitate MSME buy-in to enable sustained engagement (data sharing, capacity building workshops, etc.) to enable a just EV transition in the selected state's automotive ecosystem. 3. Stakeholders are willing and comfortable to share data related to firm-/ecosystem-level policies/mechanisms relevant to enabling a just EV transition in the selected

				state's automotive ecosystem.
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For ADB-led component:

The project activities have been updated following the recommendations of the MTR, thus, the indicators are hereby revised.

Outcome level Indicators	Baseline	End of project Target	Means of Verification	Assumptions & Risks
Component 3 1. A business model to facilitate the scaling-up of low-carbon electric bicycles developed and endorsed by the government for future adoption* 2. Develop 25 female energy champions who will lead the adoption of sustainable electric micro-mobility in a rural area in one of the project states	0	1	Project documentation and pilot program report, Certification of training of technical and financial skills, repair and maintenance guidelines by EESL's knowledge partner	-Business models have been discovered for electric buses and e-autos in the market. It will be important to focus on e-bicycles as this is the segment that does not have any financing mechanism for mass-scale adoption. -The assumption here is that state governments will be interested in subsidizing e-bicycles -Demand for e-bicycles is created through state government schemes and tied to existing schemes for SHG women etc

				The market for e-bikes is attractive and the value chain is established.
Component 3 1. Number of city authorities and fleet operators adopting new business models for electric vehicles in commercial fleet applications.	No	Yes		

*Note: The MTR recommendations clearly highlight the need to focus on the scaling up of solar carports and promoting micromobility through electric bicycles. Additionally, there are multiple business models already discovered for e-2W, 3W, 4W and buses in the market, however, focus is very limited on promoting micromobility.

ADB and EA through various discussions assessed the need for focusing on e-bicycles and empowering women through micromobility and associated capacity development programs. Learnings from the STREE pilot shall be applied to gender-sensitive capacity development and awareness campaigns to integrate gender inclusion into e-mobility policies and solutions.

ANNEX B. Project Contacts

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ANNEX C: DEFINITION OF RATINGS

Implementation Progress Ratings

Highly Satisfactory (HS): Implementation of **all** components is in substantial compliance with the original/formally revised implementation plan for the project. The project can be presented as “good practice”.

Satisfactory (S): Implementation of **most** components is in substantial compliance with the original/formally revised plan except for only a few that is subject to remedial action.

Moderately Satisfactory (MS): Implementation of **some** components is in substantial compliance with the original/formally revised plan with **some** components requiring remedial action.

Moderately Unsatisfactory (MU): Implementation of **some** components is not in substantial compliance with the original/formally revised plan with **most** components requiring remedial action.

Unsatisfactory (U): Implementation of **most** components is not in substantial compliance with the original/formally revised plan.

Highly Unsatisfactory (HU): Implementation of **none** of the components is in substantial compliance with the original/formally revised plan.

Global Environment Objective/Development Objective Ratings

Highly Satisfactory (HS): Project is expected to achieve or exceed **all** its major global environmental objectives, and yield substantial global environmental benefits, without major shortcomings. The project can be presented as “good practice”.

Satisfactory (S): Project is expected to achieve **most** of its major global environmental objectives, and yield satisfactory global environmental benefits, with only minor shortcomings.

Moderately Satisfactory (MS): Project is expected to achieve **most** of its major relevant objectives but with either significant shortcomings or modest overall relevance. Project is expected not to achieve **some** of its major global environmental objectives or yield some of the expected global environment benefits.

Moderately Unsatisfactory (MU): Project is expected to achieve of its major global environmental objectives with major shortcomings or is expected to achieve only **some** of its major global environmental objectives.

Unsatisfactory (U): Project is expected **not** to achieve **most** of its major global environment objectives or to yield any satisfactory global environmental benefits.

Highly Unsatisfactory (HU): The project has failed to achieve, and is not expected to achieve, **any** of its major global environment objectives with no worthwhile benefits.

Risk Rating

Risk ratings will assess the overall risk of factors internal or external to the project which may affect implementation or prospects for achieving project objectives. Risks of projects should be rated on the following scale:

High Risk (H): There is a probability of greater than 75% that assumptions may fail to hold or materialize, and/or the project may face high risks.

Substantial Risk (S): There is a probability of between 51% and 75% that assumptions may fail to hold and/or the project may face substantial risks.

Modest Risk (M): There is a probability of between 26% and 50% that assumptions may fail to hold or materialize, and/ or the project may face only modest risks.

Low Risk (L): There is a probability of up to 25% that assumptions may fail to hold or materialize, and/ or the project may face only modest risks.

Annex D

A) Assumptions for Solar Carport

Solar Carport Capacity (kWp)	25	50
Average units generated per day by 1kWp solar panel (kWh/day)	4	4
Total power generation	100	200
Per day units required for charging 1 e-car (Assuming 80% charging)	24	24
Estimated No. of cars charging in a day	4	8
Battery Energy Storage system capacity (kWh)	100	200
Total No. of e-Cars charged per year	1200	2400
Reduction in Carbon Emission per carport (Kg)	41,28,000	82,56,000
Number of solar carports	4	1
Total estimated GHG reduction through solar Carport (Kg)	1,65,12,000	82,56,000
Asset life (Years)	10	
Estimated GHG reduction (tCO ₂)	2,47,680	

Current Project Status		
Solar Carport Capacity (kWp)	25	50
Number of solar carports Lot 1	0	1
Number of solar carports Lot 2	0	0
Total Number of solar carports	0	1
Total estimated GHG reduction through solar Carport (Kg)	-	82,56,000
Asset life (Years)	10	
Estimated GHG reduction (tCO ₂)	82,560	

B) Assumptions for Electric Bicycles

Emission reduction calculations for ICE 2W			
Electric 2W - Hero Winnx	Co2 emission from grid	0.81	kg/kWh
	Per day running KM	30	KM
	No. of days per annum	330	days
	Annual running KM	9900	KM
	Battery Capacity	0.52	kWh
	Range in Full charge	45	km
	Energy Consumption/km	0.0116	kWh/km
	Annual Energy Consumption	114.84	kWh
	Annual Co2 emission (electricity)	93.02	kg
	Co2 emission/KM (electricity)	0.0094	kg/KM
	Vehicle production CO2 eq./km	0.0008	kg/KM
	Battery production CO2 eq./km	0.0003	kg/KM
	Total Co2 emission/KM	0.0104	kg/KM
	Annual Co2 emission	103.42	kg
ICE-2W - Activa	Mileage	50.00	KM/litre
	Co2 emission/Litre (fuel)	2.31	kg/litre
	Total running KM per year	9900	KM
	Co2 emission/KM (fuel)	0.0462	kg/km
	Vehicle production CO2 eq./km	0.0047	kg/KM
	well to tank production CO2 eq./km	0.0128	kg/KM
	Total Co2 emission/KM	0.0637	kg/KM
	Annual Co2 emission	630.63	kg
	Annual Co2 reduction by e cargo bicycle	527.21	kgCo2
	No. of bicycles	1800	no.
	Total Co2 reduction estimate pa	949	tCO2
	Asset life	10	years
	Total estimated Co2 reduction	9,490	tCO2

Emission reduction calculations 3 W			
Electric 2W - Hero Winnx	Co2 emission from grid	0.81	kg/kWh
	Per day running KM	30	KM
	No. of days per annum	330	days
	Annual running KM	9900	KM
	Battery Capacity	0.52	kWh
	Range in Full charge	45	km
	Energy Consumption/km	0.01	kWh/km
	Annual Energy Consumption	114.84	kWh
	Annual Co2 emission (electricity)	93.02	kg
	Co2 emission/KM (electricity)	0.0094	kg/KM
	Vehicle production CO2 eq./km	0.0008	kg/KM
	Battery production CO2 eq./km	0.0003	kg/KM
	Total Co2 emission/KM	0.0104	kg/KM
	Annual Co2 emission	103.42	kg
Diesel Auto	Diesel consumption per KM in 3W	25.00	KM/litre
	Co2 emission/Litre of fuel consumed	2.68	kg/litre
	Daily running KM	30	KM
	Total running KM per year	9900	KM
	No. of person travelled in one trip	5	no.
	Distance covered per day	30	KM
	Assumed Occupancy at a given time	100%	%
	No. of passengers considered in one trip	5.0	no.
	No. of trips in a day	1	no.
	Co2 emission/KM	0.1072	kg/km
	Annual Co2 emission	1061.28	kg
	Emission reduction per passenger	0.21	tco2
	Annual Co2 reduction by e cargo bicycle	0.11	tCo2
	No. of bicycles	1800	no.
	Total Co2 reduction estimate pa	1,96	tCO2
	Asset life	10	years
	Total estimated Co2 reduction	1959	tCO2

Emission reduction calculations for Diesel Bus			
Electric 2W - Hero Winnx	Co2 emission from grid	0.81	kg/kWh
	Per day running KM	30	KM
	No. of days per annum	330	days
	Annual running KM	9900	KM

	Battery Capacity	0.52	kWh
	Range in Full charge	45	Km
	Energy Consumption/km	0.01	kWh/km
	Annual Energy Consumption	114.84	kWh
	Annual Co2 emission (electricity)	93.02	Kg
	Co2 emission/KM (electricity)	0.0094	kg/KM
	Vehicle production CO2 eq./km	0.0008	kg/KM
	Battery production CO2 eq./km	0.0003	kg/KM
	Total Co2 emission/KM	0.0104	kg/KM
	Annual Co2 emission	103.42	kg
Tata Bus 9 M (Diesel)	Mileage	4.00	KM/litre
	Total running KM per year	9900	KM
	Co2 emission/Litre of fuel consumed	2.64	kg/litre
	Daily running KM	30	KM
	Total running KM per year	9900	KM
	No. of person travelled in one trip	30	no.
	Assumed Occupancy at a given time	70%	
	No. of passengers considered in one trip	21.0	
	Co2 emission/KM	0.6600	kg/km
	Annual Co2 emission/KM	6534.00	kg
	Annual Co2 emission per passenger	311.14	kg
	Annual Co2 emission per passenger (in tons)	0.31	tco2
	Annual Co2 reduction by e cargo bicycle	0.21	tCo2
	No. of bicycles	1800	no.
	Total Co2 reduction estimate pa	374	tCO2
	Asset life	10	years
	Total estimated Co2 reduction	3,739	tCO2

Total CO2 reduction – 4,945 tCO2 (40% ICE 2W, 30% 3W and 15% Buses)

Note: "This estimation is under the premise that people adopting e-bicycle cargo are users of ICE engine 2W (40%), autos (30%) and buses (15%)". There may be users who are adopting e-bicycle cargo without any prior ownership of ICE engines or using other modes of transport.