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Shillong

CONVERGENCE
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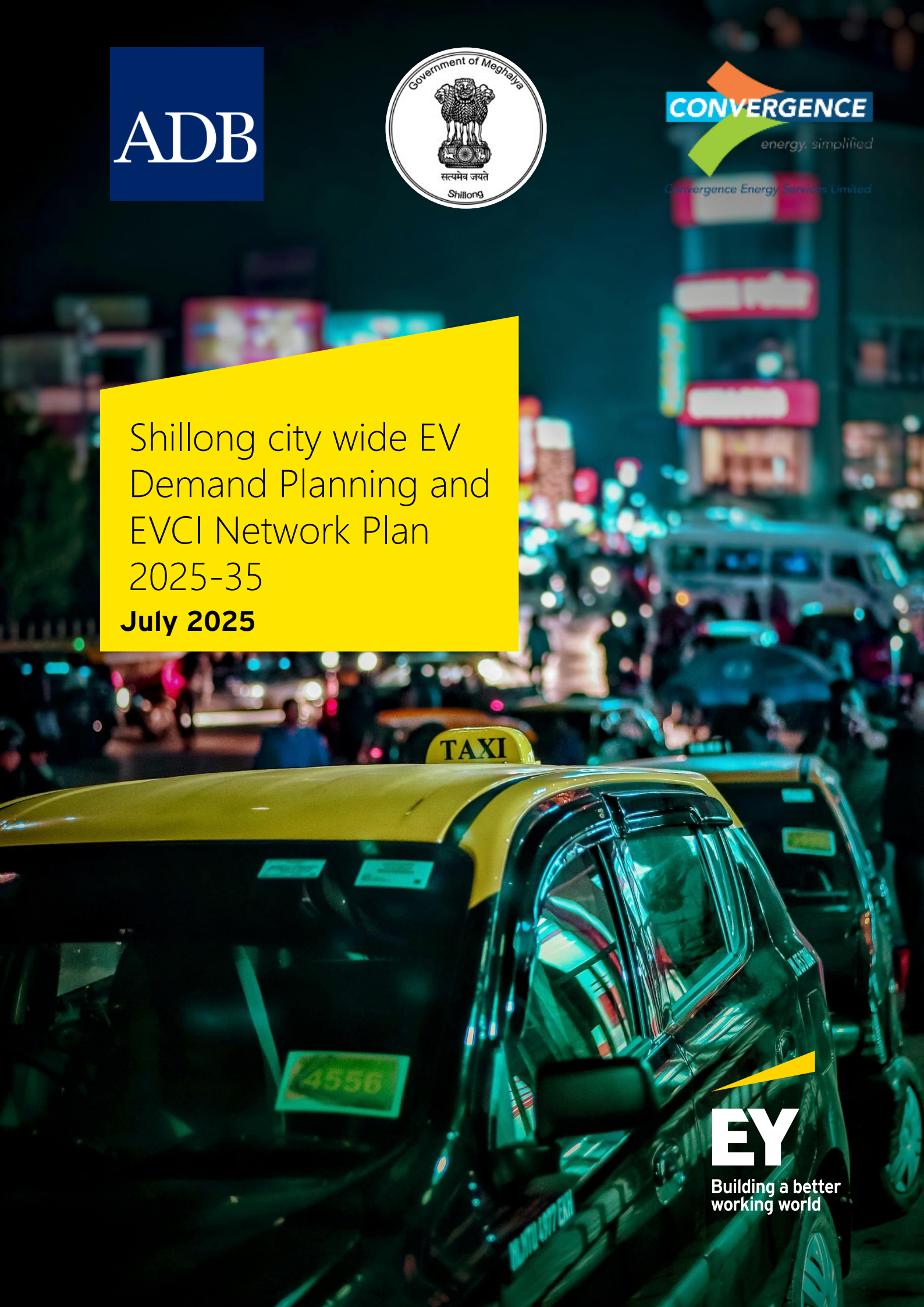
Convergence Energy Services Limited

Shillong city wide EV Demand Planning and EVCI Network Plan 2025-35

July 2025



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Foreword

As India makes significant commitments to combat climate change during COP26, Shillong, with its unique topography and growing urban challenges, stands at the cusp of a significant transition in the way we envision and experience urban mobility. As one of the leading destinations in Meghalaya, Shillong is uniquely positioned to drive the adoption of sustainable transportation solutions, making it an ideal location for promoting green and electric mobility. This report marks a crucial step in steering Shillong's transport system toward India's clean energy vision, emphasizing the need to transition from fossil-fuel vehicles to sustainable electric mobility for a greener future.

The transition to electric mobility offers not just a cleaner and low-emission mode of transport but also unlocks new economic opportunities for manufacturers, service providers, and operators to establish their presence in the state. With thoughtful planning and coordinated efforts from all stakeholders, we are charting a path toward a more sustainable and environmentally responsible transport system. Shillong's distinct landscape and urban character make it a fitting ground to showcase how modern clean technologies can harmoniously blend with the city's natural charm and cultural heritage.

As we stand at the threshold of a new era in transportation, the development of Electric Vehicle Charging Infrastructure (EVCI) is not just a technological advancement, but a crucial step toward a sustainable future. This report highlights our commitment to building a robust and accessible EVCI network that will pave the way for widespread electric vehicle adoption. By investing in this infrastructure, we are not only addressing today's environmental challenges but also setting the foundation for a cleaner, greener tomorrow. This report serves as a testament to our collective efforts and vision for a more sustainable world.

I am confident that this initiative from Department of Transport, Meghalaya will significantly promote electric mobility in Shillong. Let us embark together on this journey toward a cleaner, greener, and sustainable transportation in future.

17.6.2025

D.D Sangma, I.A.S
Commissioner, Transport Department

Acknowledgement

We express our deepest gratitude to all those who have contributed to the fruition of this project, which aims to catalyze the integration and expansion of Electric Vehicles (EVs) and Electric Vehicle Charging Infrastructure (EVCI) across select cities in India. This endeavor has been made possible through the collaborative efforts of Convergence Energy Services Limited (CESL) and Ernst & Young LLP supported by Asian Development Bank (ADB).

Special thanks are extended to Shri Sanjay Goyal, IAS, Chairman & Managing Director, MePDCL, and Shri. David D. Sangma, IAS., Secretary of Transport, for their invaluable support and guidance throughout the project. Their vision and leadership have been instrumental in shaping the direction of this initiative.

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Lastly, we extend our gratitude to all the stakeholders, partners, and participants involved in this endeavour. Your collaboration and commitment have been indispensable in conducting a thorough analysis and charting a course towards a sustainable future for electric mobility in the Shillong city.

Disclaimer

The opinions expressed within this document exclusively represent those of the author(s) and cannot be attributed to the Department of Transport, Meghalaya or its affiliated entities. The data provided in this publication is presented without any assurance of its accuracy, and the authors do not assume liability for reliance upon it. No responsibility is assumed by the author(s) for the potential consequences resulting from its use. The principal objective of this document is to understand the future demand for electric vehicles for accessing the requirement of public charging infrastructure to cater for the projected demand and provide recommendations regarding the implementation of public Electric Vehicle Charging Infrastructure (EVCI) within Shillong. It is important to note that any depictions and information contained in maps do not indicate the author(s) stance on matters of territorial sovereignty. It is explicitly stated that the author is not providing advisory services to any entity utilizing this document and is not incurring liability in connection with it. Moreover, the author expressly disclaims any fiduciary obligations and liability for damages arising from the use of the information presented herein. Seeking professional guidance before acting on the information in this document is highly recommended. This document is not intended to establish a standard, specification, or regulation, and any description of products, if applicable, does not imply endorsement by the author.

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LIST OF ABBREVIATIONS

AC	Alternating Current
ACC	Advanced Chemistry Cell
ACoS	Average Cost of Supply
BEE	Bureau of Energy Efficiency
BEV	Battery Electric Vehicles
BSS	Battery Swapping Station
CAGR	Compound Annual Growth Rate
CAPEX	Capital Expenditures
CCS	Combined Charging System
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CESL	Convergence Energy Services Limited
CHAdeMO	CHArge de MOve
CNA	City Nodal Agencies
CO_2	Carbon dioxide
COP	Conference of the Parties
CPO	Charge Point Operators
DC	Direct Current
DISCOMS	Distribution Companies
E2W	Electric 2-Wheeler
E3W	Electric 3-Wheeler
E4W	Electric 4-Wheeler
E-Bus	Electric Bus
EoI	Expression of Interest
ETP	Effluent Treatment Plant
EV	Electric Vehicles
EVCI	Electric Vehicles Charging Infrastructure
EVSE	Electric Vehicle Supply Equipment
EWCD	Elderly, Women, Children, and Disabled
FAME	Faster Adoption and Manufacturing of Electric Vehicles
FI	Financial Institutions
GCC	Gross Cost Contract
GDP	Gross Domestic Product
GIS	Geographic Information Systems
GoI	Government of India
ICE	Internal Combustion Engine
IFI	International Financial Institutions
ISBT	Inter-State Bus Terminal
kms	Kilometres
kWh	Kilo-Watt Hours
LED	Light-emitting diode
LLP	Limited Liability Party
LoA	Land Owning Agency
MePDCL	Meghalaya Power Distribution Corporation Limited
MHI	Ministry of Heavy Industry
MIS	Management Information System
MNRE	Ministry of New and Renewable Energy
MNREDA	Meghalaya New and Renewable Energy Development Agency
MOEFCC	Ministry of Environment, Forest, and Climate Change
MoHI&PE	Ministry of Heavy Industries and Public Enterprises
MoHUA	Ministry of Housing and Urban Affairs

MOP	Ministry of Power
MoRTH	Ministry of Road Transport & Highways
MoU	Memorandum of Understanding
MTC	Meghalaya Transport Corporation
MUDA	Meghalaya Urban Development Authority
MW	Mega Watt
MWh	Mega-Watt hours
NBEM	National Board for Electric Mobility
NBFC	Non-Banking Financial Companies
NCEM	National Council for Electric Mobility
NEMMP	National Electric Mobility Mission Plan
NHAI	National Highway Authority of India
NITI Aayog	National Institution for Transforming India
OEM	Original Equipment Manufacturer
OMC	Oil Marketing Companies
OPM	Outright Purchase Model
PBS	Public Bicycle System
PCS	Public Charging Stations
PCU	Passenger Car Unit
PLI	Production Linked Incentive
PM	Particulate Matter
POI	Point of Interest
PPP	Public-Private Partnership
R&D	Research & Development
RDAs/UDAs	Regional/Urban Development Authorities
RE	Renewable Energy
ROI	Return on Investments
SGST	State Goods and Services Tax
SMB	Shillong Municipal Board
SNA	State Nodal Agencies
SPA	Shillong Planning Area
SSCL	Shillong Smart City Limited
STU - P	State Transmission Utility
STU - T	State Transport Undertaking (Transport)
SWM	Solid-Waste Management
TCO	Total Cost of Ownership
tCO_2	Total Carbon dioxide
UAs	Urban Agglomerations
ULBs	Urban Local Bodies
UT	Union Territory
VAHAN	Vehicle in Sanskrit
(E)	Estimated
2W	Two-wheeler
3W	Three-wheeler
4W	Four-wheeler


Power
Charging
Power Fault
Charging Fault
ClipperCreek
Electric Vehicle
Charge Station
High Power


Zaptec

EXECUTIVE SUMMARY

City background

Shillong, the capital of Meghalaya, sits at 1,520 meters in the East Khasi Hills and is known as the "Scotland of the East" for its scenic beauty. Spanning 64.4 sq. km, with a larger planning area of 288.5 sq. km, it blends urban zones with lush landscapes, attracting 1.5 million tourists annually. The city relies on road networks, as Umroi Airport has limited flights, and rail service is accessible via Guwahati. Efforts to improve transport infrastructure include modernizing public transit.

Policy framework

E-mobility adoption is growing rapidly worldwide, driving governments to establish regulations and frameworks. In India, the Ministry of Power (MoP) and Ministry of Heavy Industries (MHI) lead this transition, focusing on charging infrastructure and incentives, while the Bureau of Energy Efficiency (BEE), as the Central Nodal Agency (CNA), collaborates with State Nodal Agencies (SNA) to build supportive ecosystems.

The Meghalaya Electric Vehicle Policy 2021 targets 15% EV adoption by 2025, offering purchase incentives based on battery capacity, plans for reliable charging networks with favourable tariffs, and promoting innovation in automotive and shared mobility. The policy fosters a skilled workforce, entrepreneurship, phased EV adoption in government bodies, public bus electrification, eco-friendly tourism, battery recycling, and alignment with national EV standards.

The Meghalaya Taxi Aggregator Operational Rules, 2020, establish a legal framework for taxi and bike-taxi services under the Motor Vehicles Act, 1988. Key provisions include mandatory licensing, a minimum fleet of 10 vehicles, app and call centre integration, state-regulated fare structures, and operational compliance, ensuring organized and efficient services.

Key Government Stakeholders in Shillong

The various departments and authorities in Meghalaya are working cohesively to foster a sustainable and efficient transportation system. The Transport Department plays a pivotal role in regulating and promoting the adoption of electric vehicles (EVs), while the Meghalaya Urban Development Authority (MUDA) focuses on urban infrastructure and regional connectivity, supporting the introduction of electric buses to reduce reliance on fossil fuels. Complementing these efforts, the Meghalaya Power Distribution Corporation Limited (MePDCL) ensures that the state's power grid is equipped to support EV charging stations, balancing electricity supply and demand. The Shillong Municipal Board (SMB) can contribute by incorporating e-mobility solutions into city planning, particularly by providing land for installing EVCI. Furthermore, the Meghalaya Transport Corporation (MTC) is evaluating options to transition its public transport fleet to electric. Together, these organizations are creating a unified framework to drive the state's transition towards sustainable transport, ultimately reducing emissions and promoting the widespread adoption of electric vehicles across Meghalaya.

Vehicular sales in Shillong

Under a Business-as-Usual (BAU) scenario, EV penetration in Shillong is projected to reach only 10% by FY2030 and 11% by FY2035. However, realistic assumption, which have been tailored to Shillong's existing EV penetration rate and developed by analyzing the implementation of the suggested recommendations, indicate a significantly higher adoption rate of around 50% by FY2030 and 70% by FY2035. While India's national EV targets suggest a penetration of around 75% by FY2030 and 90% by FY2035, achieving such ambitious goals may be challenging for a small city like Shillong due to infrastructure constraints, market readiness, and unique geographical challenges.

Two-wheelers

Two-wheelers can be an ideal mode of transport in Shillong, efficiently navigating the city's hilly terrain and narrow roads, but they contribute to congestion in areas like Laitumkhrah, Police Bazaar and other areas with similar terrain. The overall sales remain low due to unpredictable weathers, which in turn also hampers the adoption of electric two-wheelers. Further, lack of awareness on existing incentives for electric 2Ws leads to low adoption rate of both private and commercial segments. Additionally, bike taxi drivers experience range anxiety due to lack of charging infrastructure.

Three-wheelers

The growth of three-wheelers in Shillong is limited due to the city's topography, with operations mainly restricted to plains like Nongpoh and Molai. However, electric three-wheelers could offer a compact, eco-friendly solution for shared transport in congested areas, alleviating traffic and reducing emissions. They provide affordable public transport, tourist-friendly rides, and accessible shared services. Despite this potential, challenges like steep terrain and limited charging infrastructure hinder the adoption of both internal combustion and electric three-wheelers, leading dealers to focus more on the two-wheeler market.

Private four-wheelers

Private four-wheelers are a popular choice in Shillong, providing flexibility for navigating the city's varied terrain and unpredictable weather. However, the adoption of electric private cars remains minimal due to high upfront costs, inadequate charging infrastructure, and performance concerns on steep inclines. While private cars provide comfort, safety, and convenience for both daily commutes and long-distance travel, their increasing numbers have added to traffic congestion and strained parking availability.

Commercial four-wheelers

Commercial four-wheelers in Shillong, primarily taxis and fleet vehicles, play a vital role in intercity transport and tourism services. Compact ICE cars like Maruti K10 dominate the market, while EV penetration is hindered by low awareness and infrastructure challenges. Primary consultations indicate that while EV adoption among fleet operators and government bodies is not yet widespread, there is a growing interest driven by potential environmental benefits and lower operational costs. Expanding charging networks and transitioning government fleets to EVs can accelerate adoption, reduce emissions, and set a strong example for sustainable urban mobility.

Buses

Meghalaya is expanding its bus network with a focus on transitioning to electric buses to reduce congestion and emissions, especially in Shillong, where limited road expansion necessitates a shift to public transport. The government plans to deploy 100 e-buses, including 50 under the PM eBus Sewa Scheme. The fleet

currently comprises 118 buses from manufacturers like Ashok Leyland and Tata Motors, serving key routes and suburbs, with a phased renewal plan for older vehicles. MUDA operates the buses through outsourced tenders, while challenges such as land constraints for e-bus depots. Efforts also include enhancing tourism connectivity with e-buses, fostering eco-friendly mobility, and addressing operational gaps through strategic infrastructure planning.

Recommendations

Shillong, with its natural beauty and tourist hotspots, presents a strong case for adopting sustainable mobility solutions, including public EV charging stations near popular sites like Police Bazaar and Ward's Lake. However, the city's hilly terrain and unpredictable weather require robust planning and stakeholder collaboration. Key initiatives include partnerships for EV infrastructure, public awareness campaigns, integration with urban mobility plans, and innovative financing options. Proposed use cases for EVs include tourist rentals, last-mile deliveries, and public services like electric buses, government fleet electrification and SWM vehicles. The focus is on sustainable, eco-friendly transportation, with a focus on local infrastructure and stakeholder engagement to ensure the success of electric mobility

Power demand projections

Vehicle category	Volume ('000)*		Total Power Demand (MW)*	
	FY 2030 (E)	FY 2035 (E)	FY 2030 (E)	FY 2035 (E)
e-2W	20 - 22	120 - 122	1.5 – 2.0	6 – 7
e-3W	0.1 – 0.3	0.2 – 0.5	0.03 – 0.05	0.05 – 0.1
e-4W (private)	4 – 6	17 – 19	4 – 5	10 - 11
e-4W (commercial)	1.5 – 2.0	10 - 12	1 – 2	6 – 7
e-bus	0.13 – 0.15	0.15 – 0.16	0.7 – 0.9	0.9 – 1.2
Total	**25 - 30**	**147 - 153**	**5 - 8**	**19 - 22**

**Cumulative figures*

Vehicle category	Numbers ('000)		Total Power Demand (MW)*	
	FY 2030 (E)	FY 2035 (E)	FY 2030 (E)	FY 2035 (E)
Tourist cabs (EV influx)	11 - 13	45 - 47	1 - 2	7 – 8

Vehicle category	Volume*		Total Power Demand (MW)*	
	FY 2030 (E)	FY 2035 (E)	FY 2030 (E)	FY 2035 (E)
SWM	220 - 250	350 - 380	0.01 – 0.03	0.014 – 0.016

**Cumulative figures*

Charger Rated Capacity	kW	Total Number of chargers required by 2030	Total Number of chargers required by 2035
LEV AC	10 (3.3 x 3)	**23**	**71**

IS-17017-2-6/7	12	28	87
CCS II	60	35	102
CCS II	180	28	36
Total		114	296

Impact on GHG emissions

The link between decarbonization and the evolving vehicle landscape in Shillong is clear and significant. Projections indicate that the transition from Internal Combustion Engine (ICE) vehicles to Electric Vehicles (EVs) could lead to a reduction in emissions ranging from 0.1 to 0.2 lakh tons by FY 2030. This noteworthy estimate is poised to experience a significant upsurge by FY 2035, culminating in a remarkable reduction in CO_2 emissions spanning from 0.6 lakh to 0.8 lakh tons.

Estimating Total Cost of Ownership

The Total Cost of Ownership (TCO) of a vehicle encompasses all expenses from purchase to disposal, including purchase price, depreciation, fuel costs, maintenance, insurance, and financing fees. It guides decision-making by analyzing factors such as purchase price, depreciation, fuel efficiency, maintenance, insurance premiums, and financing costs. Electric vehicles are cost effective in all segments of vehicle category.

EV Charging Infrastructure And Location Assessment

Selecting the right location for EV charging stations is crucial to encourage adoption by ensuring accessibility, infrastructure compatibility, safety, and regulatory compliance. It also enhances user experience, supports business viability, and meets the power demands of efficient station operation. A total of 24 locations have been identified in this report where EVCI can be installed.

Potential Business Models for Vehicle Procurement and EVCI Deployment

Public Bicycle Sharing (PBS) systems, including electric bikes, are gaining popularity in India, and introducing one in Shillong could boost tourist mobility. The model involves collaboration between the Shillong Municipal Board and an implementing agency, with shared revenue. The government is also exploring leasing models for vehicles and electric bus procurement to reduce pollution. Additionally, public charging infrastructure is key to promoting EV adoption, with the Shillong Municipal Board playing a central role in deploying Electric Vehicle Charging Infrastructure (EVCI) through various funding models.

Renewable energy integration

The Meghalaya New and Renewable Energy Development Agency (MNREDA) focused on expanding renewable energy in the state. Key efforts included harnessing solar, biogas, biomass, and wind energy, particularly in remote areas. MNREDA prioritized solar photovoltaics, wind, and bioenergy, with a combined potential of 3,692 MW.

BACKGROUND & NEED

This report aims to accelerate the adoption of electric vehicles (EVs) in Shillong, tackling urban congestion, reducing pollution[1], and addressing topographical challenges while highlighting significant environmental benefits, oil savings, increased integration of renewable energy, and support for meeting national clean energy and climate targets. while leveraging partnerships with the Asian Development Bank (ADB) and Convergence Energy Services Limited (CESL). Shillong's growing tourism and commercial traffic highlights the need for sustainable transport solutions.

The report provides a tailored analysis for Shillong, covering:

- Market Size and Demand Projections: Assessing EV market potential through vehicle data, tourism needs, and population growth, with demand forecasts up to 2035.
- Charging Infrastructure: Planning a distributed network for Shillong's steep terrain, integrating renewable energy.
- Fleet Use Cases: Evaluating electrification of government car fleet, public transport, shared e-mobility, and waste collection vehicles.
- Policy and Business Models: Reviewing state policies and proposing enhancements for financial sustainability and private sector investment.

The roadmap aims to build a resilient EV ecosystem while addressing Shillong's unique challenges and maximizing environmental and economic benefits with an aim to enhance the penetration of e-mobility in the city.

Shillong faces traffic congestion, air quality decline[2], and a need for sustainable transportation. The city's narrow roads and challenging terrain make EV adoption a viable solution for reducing air and noise pollution. However, barriers include limited charging infrastructure, very low consumer awareness, and high upfront cost of EVs.

This report analyses the local EV market, segments demand in public and private sectors and assesses the feasibility of deploying EVs in key segments like two-wheelers and taxis. It also evaluates Meghalaya's EV policy, identifies gaps, and proposes reforms.

The report focuses on developing charging infrastructure in high-footfall areas and leveraging renewable energy for sustainable EV charging.

Proposed business models integrate EVs into Shillong's government fleet, considering local economics and CPO revenue opportunities for EVCI deployment. This report guides Shillong's shift to sustainable transport, reducing fossil fuel reliance and driving EV adoption.

1 https://theshillongtimes.com/2024/09/29/evs-yet-to-bring-any-respite-as-shillongs-air-quality-worsens/#google_vignette
2 https://nenews.in/meghalaya/meghalaya-vehicle-surge-polluting-air-quality-in-shillong-claims-study/12464/

APPROACH AND METHODOLOGY

EV Sales, power demand and Public EV charger estimates calculation

Methodology for estimating EV sales of 2W, private 4W, commercial 4W and buses

A bottom-up approach is used to understand the trajectory of electric vehicles penetration, the power demand required for the EV charging, estimation on the number of chargers required and capital investment for deploying the required number of public chargers till FY 2035.

The assessment starts with understanding the present demand of various vehicle segments such as 2W, 3W, private 4W and commercial 4W. To understand segment wise demand, the number of ICE vehicles registered from FY 2015 to FY 2024 are taken into consideration and then the number of ICE vehicles are projected till FY 2035 based on the previous year's CAGR. For buses, we analysed past procurement and scrappage trends. MUDA procured 120 buses in FY 2010-11, which were fully scrapped by FY 2020-21. Another set of 139 buses was procured in FY 2015-16, with 21 allocated to schools and institutions, while the remaining 118 continue to serve as public transport in Shillong. Given Shillong's current population of approximately 0.2 million, each bus serves around 1,700 people daily. Based on this capacity, we projected the required number of buses for 2030 and 2035. Further we have taken in account the scrappage of ICE 118 buses following the past trend.

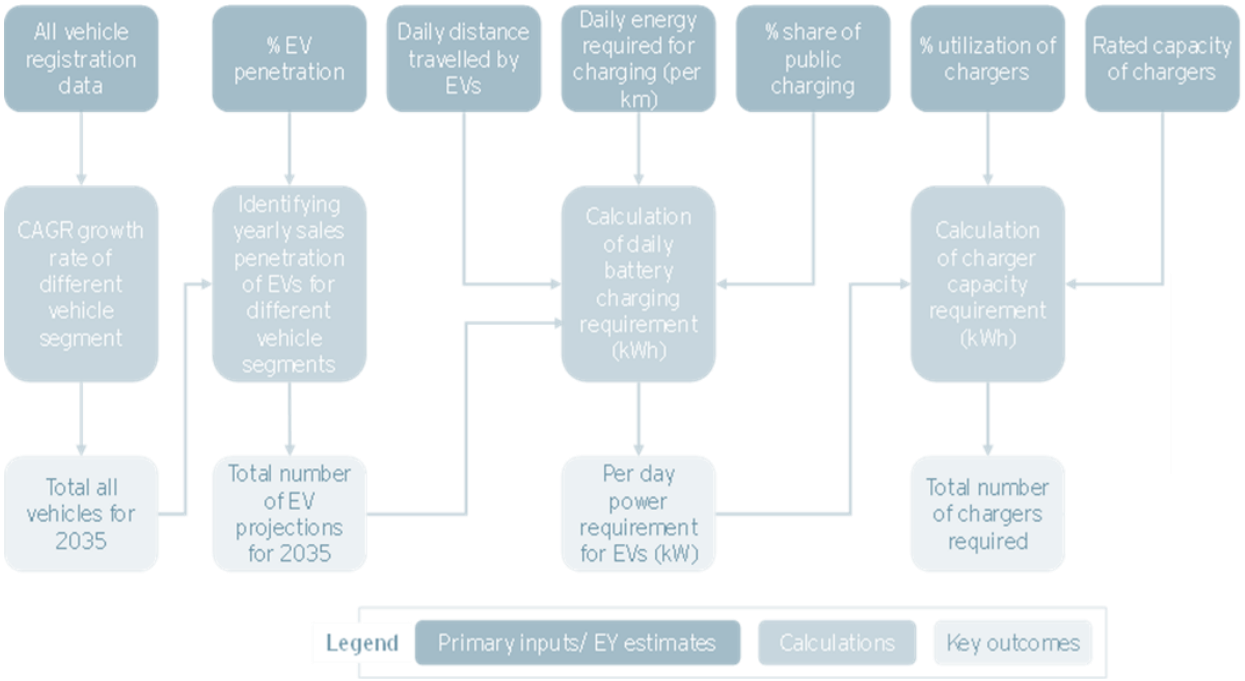
To assess the EV projections till FY 2035, the present EV penetration is observed for various vehicle segments such as e-2W, e-3W, private e-4W, commercial e-4W and e-buses. Based on the growth rate of present EV penetration rate and government targets, assumptions are for future EV penetration. Based on the projected number of ICE vehicles are future EV penetration, the number of EVs are projected till FY 2035.

Table 1: Assumption for type of charging share by vehicle segment

Charging type	e-2W	e-3w	e-4W (private)	e-4W (commercial)	e-Bus
Public Charging Share	20%	20%	50%	30%	0%
Home charging	50%	30%	10%	0%	0%
Captive charging	0%	50%	0%	70%	100%
Workplace charging	30%	0%	40%	0%	0%

The process flow for the assessment of EV sales projections, power demand from EVCI of projected number of EV chargers is presented below:

Figure 1: EV Charging Infrastructure Model



Power demand due to EV charging

Charging infrastructure is essential for the widespread adoption of electric vehicles (EVs). A reliable, affordable, and accessible charging network is crucial for building confidence in EVs. As urbanization and EV adoption grow, so will power demand, especially for e-buses, which consume significant energy. Projections for 2030 and 2035 estimate varying levels of charger utilization, with public chargers reaching 60%, workplace chargers 40%, and captive chargers 80%. The government plays a key role in planning and implementing this infrastructure to support sustainable transportation.

Table 2: Assumptions considered for estimating power demand due to EV charging by 2035

Assumptions[3]	e-2W	e-3w	e-4W (private)	e-4W (commercial)	e-Bus
Average Daily run (in kms)	20	20	30	100	90
Battery capacity (kWh)	2.98	8	28.6	26	151
Daily battery charge requirement (kWh)	0.66	1.03	3.2	11	90.6

Projections for public EV chargers

Different EV models and segments have different charging requirements. It is usually recommended to have a good mix of different charger types that can cater to existing and future demand. It is equally important to determine the quantity of chargers to be installed. Installing too many chargers will increase the cost and installing fewer chargers will create scheduling and access issues and will create a discouraging impact on the existing EV users and upcoming potential EV buyers.

The number of installed EV chargers in a charging station should aim to serve existing EVs as well as additional demand in the future. Several research papers suggest that fast charging a vehicle's battery on continuous basis depletes the battery life. Therefore, it is recommended to keep this factor in mind and choose a combination

[3] National Automotive Board (NAB) (heavyindustries.gov.in)

chargers to maximize the life of the battery of the vehicles. For the purpose of projecting the number of chargers to cater the EV charging power demand as per the projections in the previous section, the type of chargers is assumed in this report as provided below:

Table 3: Projected number of chargers share for public charging stations & bus depots

Type of charger	kW rating	e-2W	e-3w	e-4W (private and commercial)	Bus
LEV AC	10 (3.3 x 3)	40%	20%	-	-
IS-17017-2-6/7	12	60%	80%	-	
CCS II	60	-		100%	-
CCS II	180 (2*90)	-		-	100%

A ratio of 1:5 charger to vehicle ratio has been assumed for the calculation of buses.

Reduction in CO_2 emissions

E-mobility plays a critical role in decarbonization of transport sector. The concerning levels of vehicular emissions underscore the pressing need to address and mitigate the adverse environmental impacts posed by the ICE vehicles. A transition to electric mobility has the potential to reduce the impact of vehicular emissions by road transport sector and it will help reduce oil imports as well.

To assess the impact of additional CO_2 emissions reduction due to future penetration of EVs are estimated based on EV stock volume, which is the cumulative value of the year-on-year addition of EVs. The following assumptions are considered as provided in the table below:

Table 4: Assumptions for CO_2 emissions calculations

ICE Vehicle type	Daily run (In kms)	Emission norms[4] (Grams CO_2/km)
Two-wheeler	20	28.58
Three-wheelers	80	77.89
Four-wheeler (Private)	50	139.52
Four-wheeler (Commercial)	100	139.52
Bus	120	787.72

While adoption of electric vehicles (EVs) can help in reducing the impact of tailpipe emissions within the city, it is also important to recognize that certain level emissions are also present at the point of electricity generation that fulfil the EV charging demand. Presently, a significant portion of electricity generation is derived from non-renewable sources like coal based thermal power. Therefore, the actual reduction in carbon emissions due to EV adoption is projected by taking into consideration, the impact of carbon emissions due to electricity generation as well. The assumptions for daily power requirement for each EV segment is provided in the Table 2.

CEA Clean Development Mechanism

Based on the data of Central Electricity Authority (CEA) for Clean Development Mechanism (CDM), the weighted average emission factor for CO_2 based on power generation from grid connected power plants in India including Renewable Energy generation are:

[4] Appraisal guidelines for Metro rail projects proposals, Ministry of Housing & Urban Affairs, Government of India, September 2017

Table 5: Weighted average emission factor for CO_2 based on power generation from grid connected power plants

FY	Carbon Emission factor of Grid Electricity (including RE) (tCO_2/MWh) [5]
2017-18	0.754
2018-19	0.744
2019-20	0.713
2020-21	0.703
2021-22	0.715

The above table shows the weighted average emission factor over the period from FY 2017-18 to FY 2021-22. The weighted average emission factor has been reducing by a factor of around 2% to 4% except for FY 2021-22 where it has increased slightly due to increase in total generation, where coal-based generation is increased compared to gas & hydro based generation as per the CEA emissions report.

However, with Clean Development Mechanism (CDM), generation of power will be more efficient with higher efficient technologies such as supercritical technology, integrated gasification combined cycle, renovation and modernization of old thermal power plants and co-generation along with renewable energy sources. Therefore, it can be assumed that the weighted average emission factor will reduce slightly each year. The assumed weighted average emission factor for FY 2024 to FY 2035 is mentioned below assuming yearly reduction of 2%:

Table 6: Assumed weighted average emission factor for FY 2024 to FY 2035 Reduction in CO2 emission

FY	Carbon Emission factor of Grid Electricity (including RE) (tCO_2/MWh) [6]
2023-24	0.701
2024-25	0.687
2025-26	0.673
2026-27	0.659
2027-28	0.646
2028-29	0.633
2029-30	0.621
2030-31	0.608
2031-32	0.596
2032-33	0.584
2033-34	0.573
2034-35	0.561

[5] https://cea.nic.in/wp-content/uploads/baseline/2023/01/Approved_report_emission__2021_22.pdf
[6] https://cea.nic.in/wp-content/uploads/baseline/2023/01/Approved_report_emission__2021_22.pdf

Heat map of all Point of Interests (PoI)

Step 1: Identification of key points of interest (PoI), including railway stations, airports, bus stands, hospitals, existing EV charging stations, commercial malls, government buildings, public parking lots, major 5-star hotels, and potential parking lots.

Step 2: Assignment of weightage to each PoI based on various factors such as the type of charging it supports, charger type, and expected time spent at the charging station. Weightage values are defined in tables representing charger type, charging type, and time spent intervals.

Table 7: Assumed weightages for assigning weightages to PoI

Charging type	weightage
PCS	3
Captive	2
Private	1

Charger Type	weightage
Fast	3
Moderate	2
Slow	1

Time spent (In minutes)	weightage
0 - 30	4
30 - 60	3
60 - 90	2
> 90	1

Step 3: Normalization of weightage values to ensure uniformity and prevent data discrepancies.

Step 4: Visualization of the normalized weightage data as kernel density heatmap, providing insights into the distribution and significance of PoIs across Shillong

Approach and methodology for tourist and SWM vehicle calculation

Tourist vehicles:

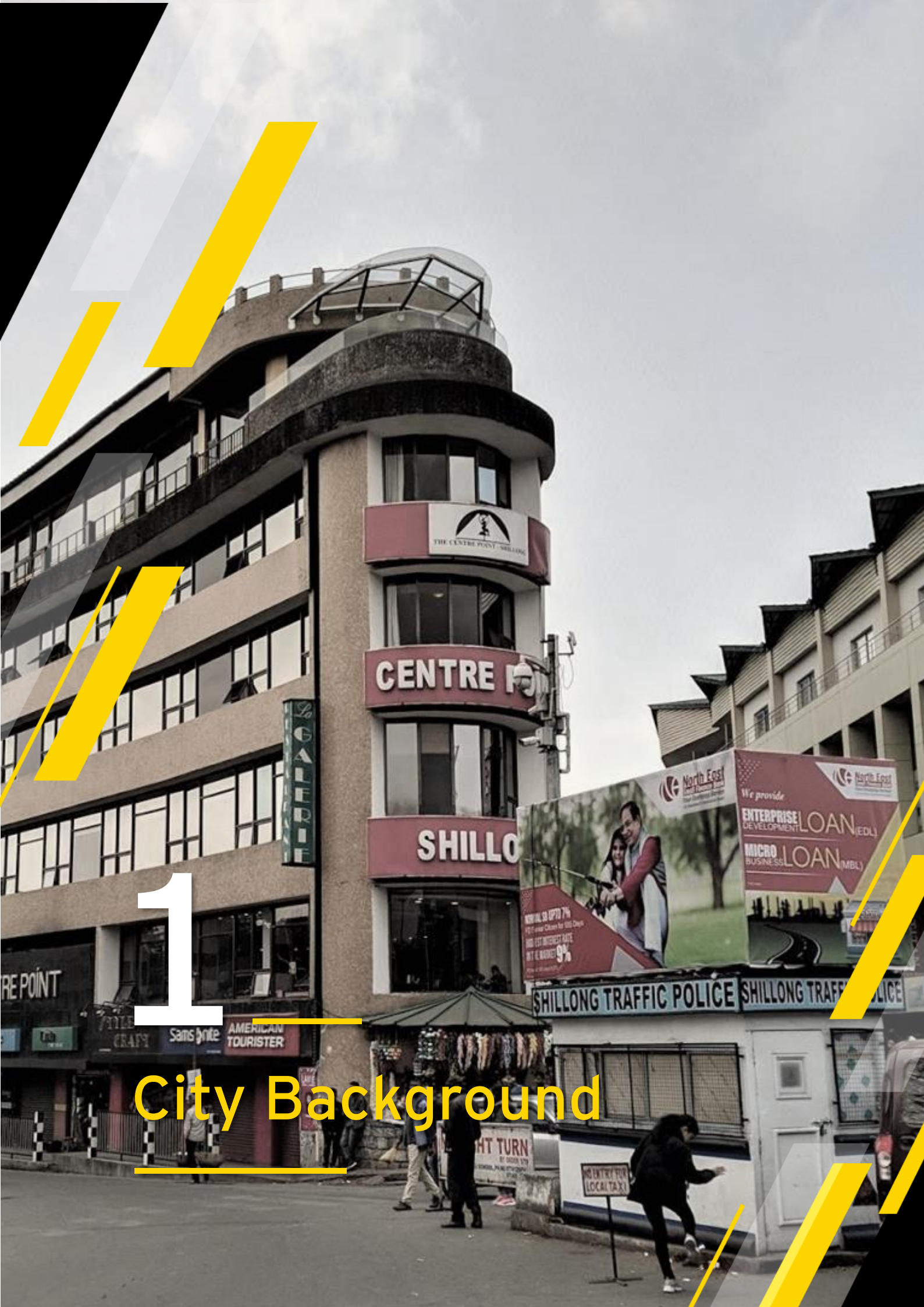
The total number of tourists arriving in Meghalaya in 2013 and 2023 has been used to achieve the CAGR to estimate the influx of tourist in Meghalaya. Further to estimate tourist influx in Shillong it was assumed that 80% of the tourist footfall would be in Shillong. By converting this tourist data into Passenger Car Units (PCUs), assuming an average car occupancy of 5, and considering that 30% of these vehicles are intercity tourist cars while the remainder are buses and other types of transport, we project the influx of electric tourist cars for the years 2030 and 2035. This projection provides a clearer understanding of the future demand for EV infrastructure to accommodate increasing tourist traffic.

It is assumed that intercity tourist cars EV penetration will reach approximately 10% by 2030 and approximately 25% by 2035.

SWM Vehicles:

The total number of Solid Waste Management (SWM) vehicles in Shillong has been provided by the Shillong Municipal Board. To analyses future trends, a Compound Annual Growth Rate (CAGR) was applied. Based on this analysis, projections for the total number of electric SWM vehicles have been made for the years 2030 and 2035, offering insights into the anticipated shift towards electrification in waste management.

It is assumed that electric SWM vehicles penetration will reach around 50% by 2030 and approximately 80% by 2035.



1 City Background

1.1 Geographical Placement of Shillong City

Shillong is located in the northeastern part of India, specifically in the state of Meghalaya. It sits at an elevation of approximately 1,520 meters above sea level and is positioned between **25.5788° N latitude and 91.8933° E longitude.** The city is surrounded by lush hills and is part of the East Khasi Hills district. To the west, Shillong is bordered by the district of Ri-Bhoi, while to the south, it extends towards the districts of Jaintia Hills and West Khasi Hills.

Situated approximately 100 km from Guwahati, the city is nestled within a picturesque landscape of rolling hills and dense forests. Shillong is known for its natural beauty and pleasant climate, which contribute to its reputation as a popular hill station. The city is administratively organized into several localities and wards, which helps in managing urban development, infrastructure, and public services efficiently. This structure allows for effective governance and caters to the specific needs of the diverse communities residing in Shillong, enhancing the overall quality of life for its residents[7].

1.2 History

Shillong, the capital city of Meghalaya, is a picturesque hill station. The town was founded by the British Government in 1864 but was devastated by an earthquake in 1897 and subsequently rebuilt.

Often referred to as the **"Scotland of the East"** due to its striking resemblance to the Scottish Highlands, Shillong is a popular tourist destination in Northeast India. Known for its lush, evergreen landscape and moderate climate, it is accessible via a scenic drive of 104 kilometers from Guwahati and 128 kilometers from Guwahati Airport.

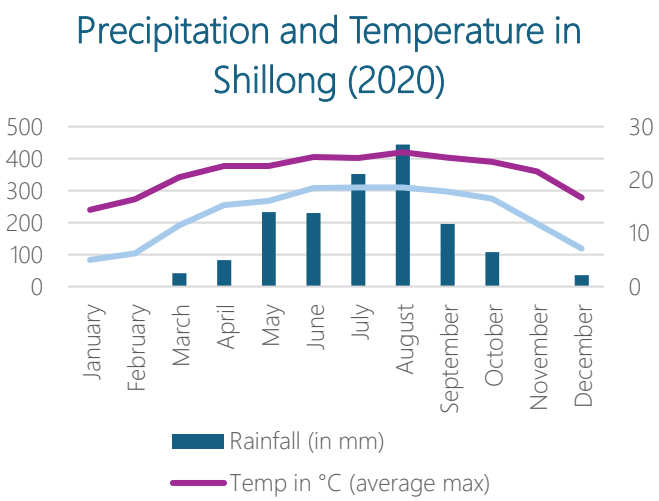
The Shillong Cantonment is encircled by municipal areas and lands belonging to the Syiem of Mylliem. National Highway-40 runs through the Cantonment, providing a direct route to Cherrapunji, which is approximately 65 kilometers away[8].

[7] https://smb.gov.in/
[8] https://shillong.cantt.gov.in/history/

1.3 Climate

Shillong has a warm and temperate climate. The climate shows clear seasonal variation. January and February are mostly dry, with rainfall at 0 mm and 1 mm, and cool temperatures, ranging from average maximums of 14.4°C to 16.4°C and minimums of 5°C to 6.2°C. Rainfall increases significantly from March, peaking in August at 443.9 mm. During the monsoon, average maximum temperatures stabilize around 24°C to 25.2°C, with minimums around 18.6°C. Rainfall drops sharply to 108 mm by October, and temperatures cool into winter, with December seeing 35.9 mm of rain and temperatures between 16.7°C and 7.1°C[9].

Graph 1: Precipitation and Temperature in Shillong (2020)



1.4 Economy, Trade, and commerce

Shillong's historical significance as a colonial hill station has shaped its economy and culture. Its strategic location and pleasant climate made it a key administrative and military base during British rule, fostering growth in trade and infrastructure. The city's rich cultural heritage is reflected in its diverse traditions and festivals, which attract both locals and visitors.

Shillong's economy today benefits from sectors such as tourism, education, and handicrafts. With an estimated GDP per capita of $3,800 and a labor force focused on various sectors, Shillong's economy is supported by its role as a regional hub. The city hosts numerous small and medium-sized enterprises, with a significant portion of economic activity centered around local crafts, tea production, and services.

Formal sector: The formal sector comprises businesses and economic activities that are under the supervision of the government

Informal sector: The informal sector consists of workers and enterprises that do not come under the regulation of the government.

9 https://des.megplanning.gov.in/documents/Statistical-Abstract-2023.pdf

1.5 Tourism

Tourism is a significant aspect of Shillong's economy, with its scenic landscapes, pleasant climate, and cultural heritage drawing visitors from across the country and abroad. The city is known for its picturesque hill views, serene lakes, and vibrant local festivals, which contribute to its appeal as a popular travel destination. As of recent estimates, Shillong attracts approximately 1.5 million tourists annually, reflecting a strong interest in its natural beauty and cultural offerings. This influx of visitors greatly exceeds the city's local population, showcasing Shillong's status as a prominent tourist hub in northeastern India[10].

1.6 Area and Landuse

Shillong covers an area of approximately 64.4 square kilometers, while Shillong Planning Area spans to 288.5 sq.km which is about more than 4 times larger than Shillong municipal boundary.

This encompasses the Shillong Urban Agglomeration along with 54 neighbouring villages spread across East Khasi Hills and Ri Bhoi districts, with 37 villages located within East Khasi Hills and 17 situated near Ri Bhoi

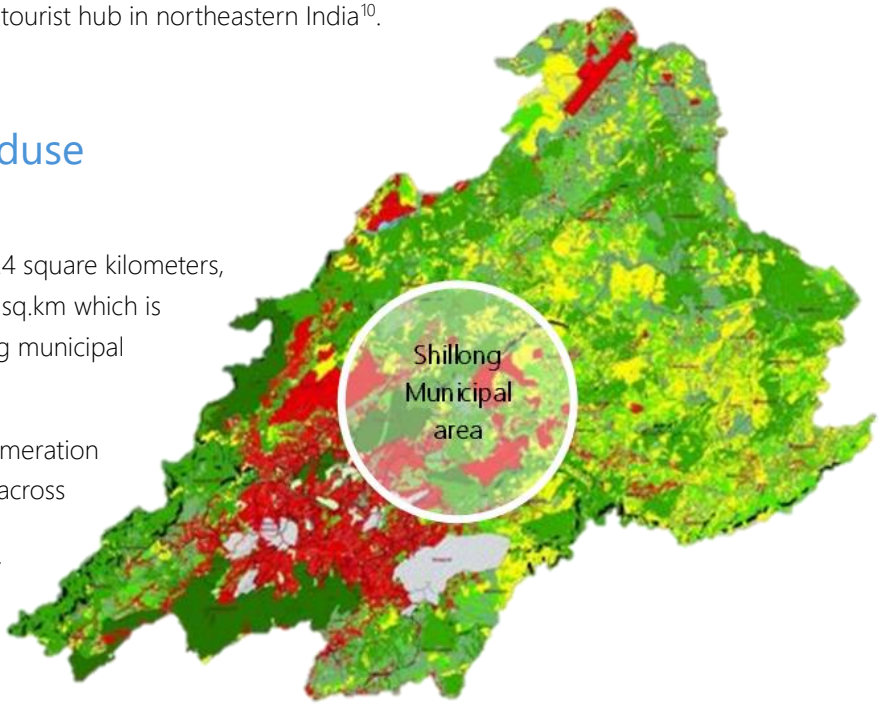
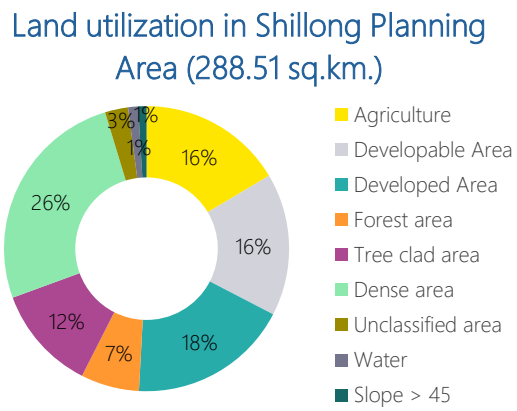


Figure 2: Shillong Planning Area - Land cover map

[10] https://www.iosrjournals.org/iosr-jhss/papers/Vol20-issue9/Version-3/C020932934.pdf

The land use is categorized into various types with approximate percentages of Shillong Planning Area is as follows[11]:

- **Agriculture:** Accounts for 16.4% of the area, emphasizing the region's strong agrarian base.
- **Developable Area:** Represents 16.2%, highlighting potential for future construction or urbanization.
- **Developed Area:** Covers 18.2%, indicating significant existing urban infrastructure.
- **Forest Area:** Comprises 6.6%, reflecting limited natural forest cover.
- **Tree Clad Area:** Makes up 11.9%, showcasing additional vegetative landscapes.
- **Dense Area:** Dominates with 25.9%, signifying high-density urban or population regions.
- **Unclassified:** Takes up 2.6%, denoting areas not specified under conventional categories.
- **Water Sheet:** Occupies 1.1%, representing water bodies like lakes and ponds.
- **Slope > 45:** Constitutes 0.9%, marking steep and less usable terrain.



Graph 2: Land utilization in Shillong Planning Area (288.51 sq.km.)

1.7 Population and population density

The top three most populated cities of Meghalaya are[12]:

- Shillong - Approximately 1,43,000
- Tura - Approximately 75,000
- Mawlai - Approximately 55,000

Shillong ranks as one of the most populous cities in the state of Meghalaya. Classified as a Class-I city, it has a municipal area population of approximately 1,43,000 according to the Census of 2011.

[11] https://megurban.gov.in/notifications/RiskInformedMasterPlans/Finalised%20Report%20-%20Shillong.pdf
[12] https://des.megplanning.gov.in/documents/Statistical-Abstract-2023.pdf

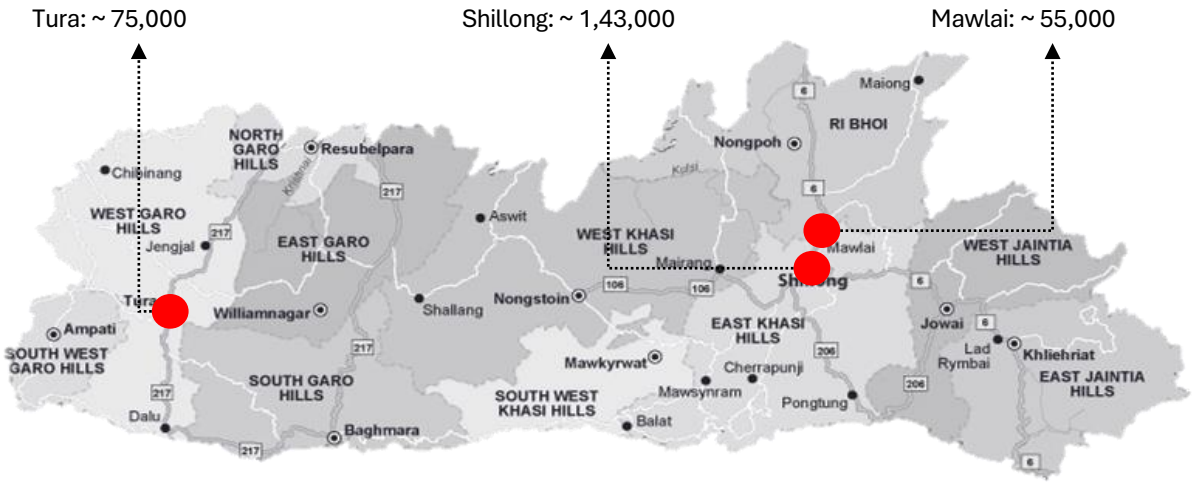
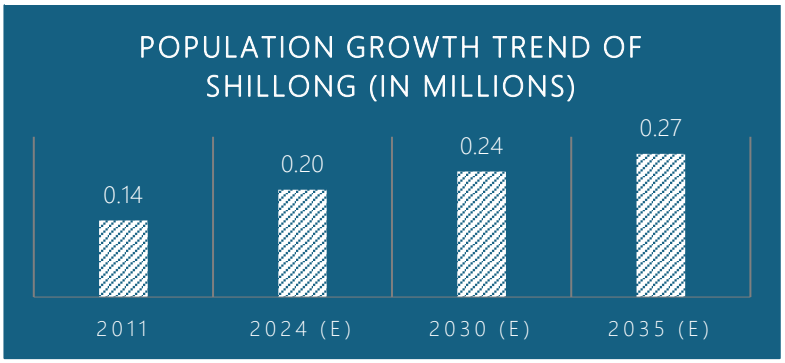


Figure 3: Meghalaya's top 3 populous cities

According to the Shillong Municipal Board, the city's population has experienced a compounded growth. The estimated population in 2024 is 2,01,000[13], which gives a CAGR of 2.6%. The projected population for Shillong and its surrounding areas is expected to reach around 0.27 million by 2035[14].

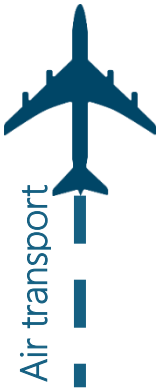
Graph 3: Population growth trend of shillong (in millions)



Shillong's average population density stands at approximately 3,120 persons per square kilometer. This density varies across different parts of the city, with some areas experiencing higher concentrations due to urban development and residential growth. For instance, population densities in specific wards and localities can range from about 1,000 persons per square kilometer in less densely populated zones to over 3,500 persons per square kilometer in more central and developed areas.

[13] https://www.census2011.co.in/census/city/187-shillong.html
[14] EY Analysis

1.8 Existing Transportation in Shillong



The city boasts a comprehensive transportation network, including rail, air, and road connections.

Shillong is served by Umroi Airport, located about 30 km from the city center, primarily connecting it to Guwahati. The airport, while essential, has limited capacity and flight options, with most connectivity to major Indian cities routed through Guwahati. Transport to and from the airport is mainly by taxi or private vehicle, with public transport options being limited. Efforts are underway to expand and upgrade the airport facilities under schemes like UDAN, aimed at enhancing regional connectivity. However, weather conditions and existing infrastructure challenges continue to impact air travel efficiency.

Shillong does not currently have a railway station within the city itself. The nearest major railway station is in Guwahati, approximately 100 km away, which serves as the primary rail hub for Shillong. There are plans to improve rail connectivity to Shillong, including proposals to extend the rail network closer to the city. For now, travellers from Shillong typically use road transport to reach Guwahati's railway station, where they can access a range of train services connecting to various parts of India. Efforts are ongoing to enhance this connection and improve overall accessibility.

Shillong is well-connected by road, with major highways linking it to key cities and towns in the region. The city is accessible via National Highway 6 (NH 6), which connects it to Guwahati and other parts of Assam, and other state highways that facilitate travel within Meghalaya. Road transport within Shillong is managed by a network of local and state-run buses, taxis, and private vehicles. The city's road infrastructure supports a range of transportation options, though traffic

congestion and road conditions can vary. Efforts are in place to maintain and improve road quality and connectivity, particularly in light of increasing traffic and tourism.

1.9 Local Transportation:

Local transport in Shillong is diverse and caters to various needs within the city. The primary modes of local transport include:

- **Local Buses:** Operated by the state-run Meghalaya Urban Development Authority (MUDA) and private operators, these buses cover major routes.
- **Shared Taxis:** Known "Maxi cabs," these shared vehicles offer inter-city and intra-city transport, often used for commuting between different parts of Shillong and neighboring areas.
- **Private Vehicles:** Many residents and visitors use private cars and two wheelers for personal travel, which can be more convenient but contributes to traffic congestion.
- **Bike Taxi:** Bike taxis in Shillong offer a quick, affordable way to navigate the city's hilly terrain and narrow streets. Favored by locals and tourists, they provide an efficient solution for short-distance travel and commuting.

Despite the availability of various options, traffic congestion and road conditions affect travel times, especially during peak hours. Efforts to improve infrastructure and public transport services are ongoing to enhance the efficiency and reliability of local transport in Shillong.

1.10 Shillong Supplementary Public Transport service

In 2012, the Maxi Taxi service under the Shillong Supplementary Public Transport Service (SSPTS), launched in January, proved to be a promising addition to the city's transportation network. By March, the service had gained popularity among commuters, offering much-needed relief on routes not covered by the Shillong Public Transport Service (SPTS).

By mid-year, 40 maxi taxis were operational, with plans to expand the fleet further. An additional 60 vehicles were scheduled to join by

May, including 15 assigned to Mawlai and Mawroh to meet high demand. It was operated by the Symoplang Self Help Group, the service shared its revenue equally with the Shillong Municipal Board, emphasizing sustainability over profit generation.

Currently the Shillong Supplementary Public Transport Service, overseen by the Shillong Municipal board, operates a fleet of 100 Mahindra Maximo maxi-cabs. Passengers typically pay an average fare of INR 30 per journey, contributing to the revenue flow that supports service operations. The maxi-cabs have a projected operational lifespan of 7 years, which underlines the urgency for strategic asset replacement planning, especially since 97 of these vehicles are slated for phasing out. This situation presents challenges and opportunities for modernizing public transport services while balancing cost and efficiency.

1.11 General Observations:

Traffic & Parking Issues:

- **Congestion:** Shillong experiences severe traffic congestion, particularly during peak hours, exacerbated by narrow roads and limited infrastructure.
- **Limited Parking:** Parking space is insufficient, especially around residential areas and popular tourist destinations. Despite the city's low-rise nature, parking continues to be a major challenge for residents.
- **Unauthorized Parking:** MUDA buses, which are privately operated, often park in unauthorized areas such as roadsides or near petrol pumps, especially at night, adding to the congestion.
- **Tourist Areas:** Popular tourist spots, such as Ward Lake, have limited roadside parking, further intensifying the city's parking issues.

Traffic Signals:

- Shillong does not have traffic signals. The absence of signals leads to further traffic chaos.

Lack of EV Awareness:

- There is a general lack of awareness about electric vehicles (EVs) among residents, government officials, and fleet owners. Many locals are unaware of available subsidies for EVs, while some have misconceptions about their safety.

There is an opportunity to facilitate capacity building among government officials regarding the EV procurement process, which could facilitate smoother adoption of electric vehicles.

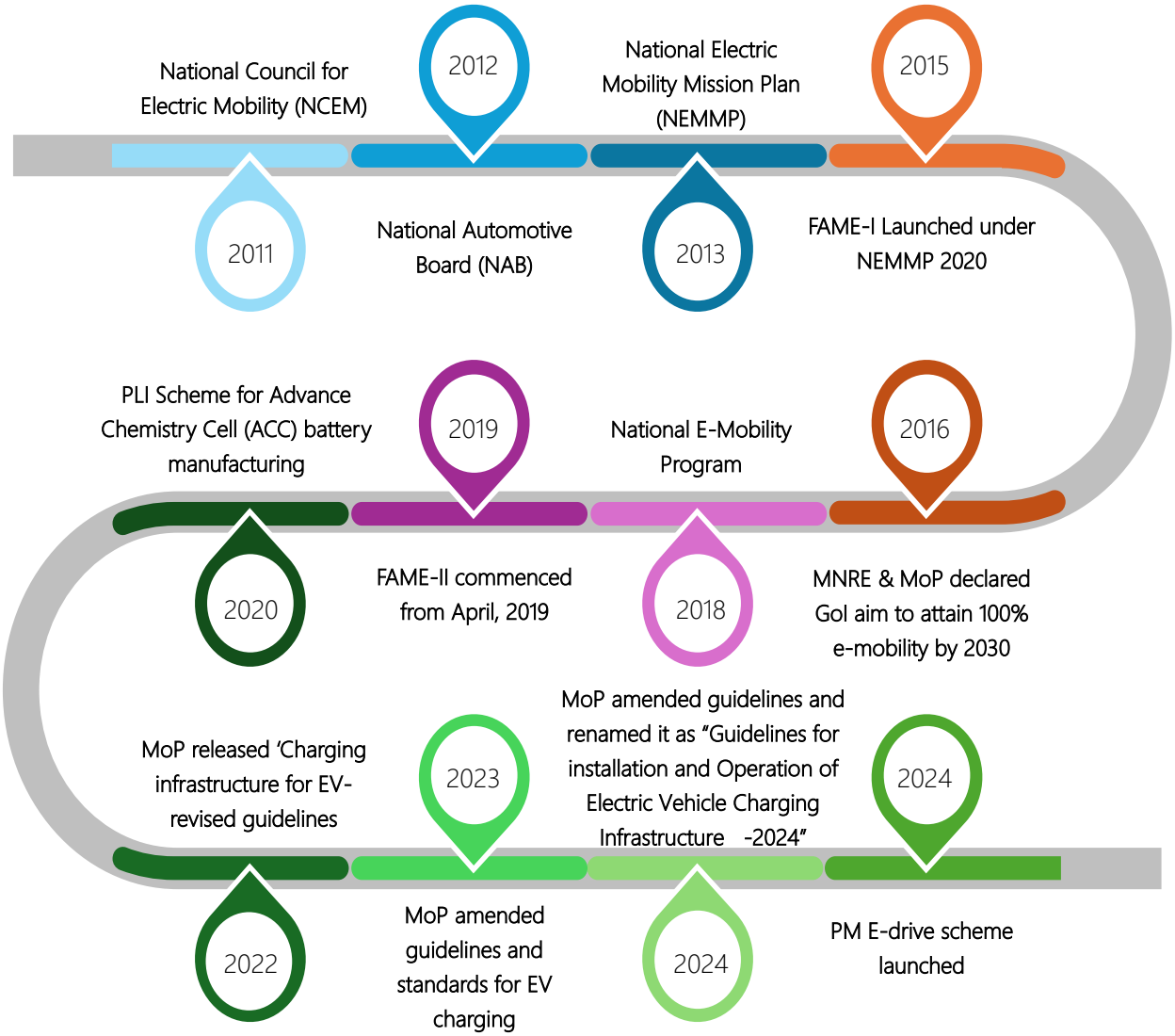
Vehicle encroachment outside ward lake

2 Policy framework

The pressing need to address climate change has sparked a significant shift in global climate policy, driving nations worldwide to embrace the transition toward a low-carbon economy as a vital step in mitigating the detrimental effects of environmental degradation. During the recent COP 26 summit, India reaffirmed its commitment by pledging substantial reductions, aiming to decrease the emissions intensity of its GDP by 45 percent by 2030 compared to 2005 levels. Simultaneously, India aims to achieve an admirable milestone of 50 percent cumulative electric power installed capacity from non-fossil fuel-based energy sources by the same year.

On the international stage, the momentum to tackle climate change has catalyzed policies and governmental incentives geared towards accelerating the adoption of e-mobility as a sustainable alternative for both freight and passenger transportation. This concerted effort has prompted Central and State Governments worldwide to develop comprehensive frameworks and regulations to facilitate the transition to electric vehicles (EVs).

In India, the Ministry of Power (MoP) has assumed a central role in orchestrating this transition, while the Ministry of Heavy Industries (MHI) has been tasked with establishing widespread charging infrastructure across the nation, leveraging various incentive programs.



2.1 Meghalaya Electric Vehicle Policy 2021

The Meghalaya Electric Vehicle Policy was officially launched on October 16, 2021 and will remain in operation and valid for a period of five years from the date of its notification or till such time the Government may deem fit and proper.

Figure 4:Meghalaya EV Policy status

2.1.1 Purchase incentives

Figure 5: Meghalaya EV Policy 2021 - Purchase incentives

	Battery capacity (in kWh)	Incentive (per kWh)	Count of vehicles	Total incentive in 5 years (in Cr)	Maximum ex-factory price
	2	₹10,000	3,500	7	₹ 1.5 lakh
	5	₹4,000	200	0.4	₹ 5 lakh
	15	₹4,000	2,500	15	₹ 15 lakh
	1.3	₹4,000	30	0.02	₹ 15 lakh
	250	₹4,000	30	3	₹ 2 Crore

2.1.2 Support for Charging Stations:

- **Promotion of both slow and fast charging networks** in public places and government buildings.
- Facilitation of **land identification and private investments**.
- **Charging stations to be set up at key locations** with attractive electricity tariffs and priority connections.
- **Government land may be provided free for the first five years** to make EV charging stations economically viable.

2.1.3 Support for Start-ups:

- Skilling and mentoring support for EV-related start-ups.
- Incentives as per the Meghalaya Startup Policy, 2018.

2.1.4 Tourism Sector:

- Identification of tourist spots for exclusive use of EVs, including necessary charging infrastructure.

2.1.5 Industrial and Technology Parks:

- Promotion of EV use and support for EV charging stations in industrial estates, export promotion parks, and technology parks.

2.1.6 Other Benefits:

- Priority registration for EVs, exemption from any Odd-Even vehicle restrictions, reserved parking slots, and waiver of registration fees and road tax for EVs during the policy period.

2.1.7 Funding incentives:

- Feebate Concept: Inspired by the "polluter pays" principle, polluting vehicles incur a fee, while efficient ones get a rebate.
- Meghalaya EV Adoption Fund (MEVAF): Non-lapsable fund for incentives, established in consultation with the State Finance department.

Funding Sources:

- Pollution Cess: 10 paise per liter on diesel/petrol, projected to raise around ₹5 crores annually.
- Additional Funding: Budgetary allocations to cover gaps if MEVAF resources are insufficient.

2.1.8 Recycling Support

- Battery Reuse: Facilitate the establishment of recycling units to reclaim rare materials from end-of-life EV batteries in collaboration with manufacturers.
- Recycling at Charging Stations: Encourage charging station operators to function as battery recycling agencies where used batteries can be deposited.
- Business Invitation: Attract battery recycling businesses to set up operations in the state.
- Protocols and Subsidies: Develop protocols and investment subsidies for recycling units, holding OEMs responsible for battery recycling.

2.1.9 Capacity Building

- Training Programs: Introduce short-term courses on EVs and related technologies in collaboration with academic institutions.
- Course Development: Courses will include internships with OEMs and focus on skills needed for service centers, retrofitting, and battery recycling.
- Certification: Consider certification mechanisms for relevant courses to enhance credibility and industry relevance.

2.1.10 Nodal Agency

- Agency Role: The Commissionerate of Transport will oversee the policy's implementation, including developing operational guidelines and disbursing incentives.
- Review and Registration: The agency will review the policy periodically and may adjust registration and road tax processes.

2.1.11 Approval of Incentives

- State Level Committee: A committee chaired by the senior-most Transport Secretary will review and approve subsidy claims.
- Channeling Incentives: Purchase incentives will be processed through registered EV dealers.

Meghalaya Electric Vehicle Policy Implementation challenges:

1. Low EV Adoption Due to Lack of Public Awareness and Incentive Reach

- Limited Public Awareness
  - Many consumers are unaware of the benefits of EVs, including lower running costs, environmental advantages, and performance improvements.
  - Lack of clear information about government incentives, subsidies, and tax rebates reduces interest in EV adoption.
- Lack of Consumer Trust in EV Technology
  - Concerns about battery life, driving range, charging infrastructure, and maintenance issues make buyers hesitant.
  - Misconceptions and limited exposure to EVs create scepticism about their reliability and practicality.

2. Inadequate Charging Infrastructure Hindering EV Growth

- Severely Limited Charging Infrastructure
  - Very few public charging stations are operational (only 2 currently functional in the area).
  - Lack of accessible and reliable chargers restricts EV usability and convenience.
- Absence of Charging and Parking Facilities at Tourist Spots
  - Popular tourist destinations lack basic EV support infrastructure like chargers and dedicated parking areas.
  - This discourages EV users from planning long-distance trips and visiting these locations.
- Range Anxiety Among Consumers
  - Fear of running out of battery without access to nearby chargers remains a major psychological barrier.
  - Without a robust charging network, EV drivers experience constant uncertainty over trip feasibility.

3. Slow Government Adoption and Policy Execution

- Minimal Government Vehicles Procurement of EVs
  - Very few electric vehicles have been purchased for government fleets (2 vehicles), despite policy targets.
  - Lack of government leadership by example slows overall market confidence.
- Delayed Electrification of Public Transport
  - Plans to electrify buses and other public transport services are progressing slowly.
  - Procurement delays and infrastructure gaps hold back large-scale implementation.
- Lack of Inter-Departmental Coordination
  - Poor coordination between transport, power, and urban development departments leads to fragmented efforts.
  - Overlapping responsibilities and unclear roles cause delays in project execution.

2.2 Meghalaya Taxi Aggregator Operational Rules, 2020:

The Meghalaya Taxi Aggregator Operational Rules, 2020 establish a legal framework for licensing and regulating taxi aggregators and bike-taxi services in Meghalaya. Key highlights include:

2.2.1 Background and Purpose:

- The rules are framed under the Motor Vehicles Act, 1988, to regulate taxi and bike-taxi operations.
- They allow two-wheelers to be used as bike-taxis, aligning with provisions of the Motor Vehicles Act and notifications by the Government of India.

2.2.2 Licensing Requirements:

- Individuals, firms, or companies must obtain a license to act as taxi aggregators.
- Applications must include supporting documents such as company registration, proof of address in Meghalaya, GST details, audited financial statements, and a fleet agreement for at least 10 vehicles.

2.2.3 Application Process:

- Applications are submitted in a prescribed form with proof of payment of fees and other mandatory documentation.
- Aggregators must maintain a minimum fleet of 10 vehicles (taxis or motorcycles), either owned or through agreements, and convert private vehicles to commercial ones within 30 days of obtaining a license.

2.2.4 Provisional License:

- A provisional license is issued upon meeting preliminary conditions, valid for 30 days, extendable by another 30 days.
- Compliance with terms and conditions within the provisional period is mandatory to obtain a permanent license. Failure to meet eligibility criteria may result in cancellation.

2.2.5 Technology Integration:

- Aggregators must have a management information system (MIS), a call centre, a web portal, and a mobile app for operations.

2.2.6 Fare Regulations:

- The State Government will regulate taxi fares, including flag-down charges, waiting charges, and night charges.
- Aggregators must display fare rates and provide fare estimators on their platforms.

2.2.7 Operational Infrastructure:

- Vehicles must meet all legal and technical requirements (fitness, insurance, pollution certificates, GPS/GPRS tracking).
- Features like real-time location sharing, driver details, safety helplines, and first-aid kits are mandatory.
- Bike-taxis have specific rules, including helmet provisions, restrictions on minors, and luggage limits.

Meghalaya Taxi Aggregator Operational Rules Implementation challenges:

1. High Minimum Fleet Requirement and Mandatory Tracking

- The minimum fleet size requirement of 10 vehicles creates a barrier for small operators and startups.
- Mandatory GPS/GPRS installation across all vehicles increases operational costs, particularly for smaller aggregators.

2. Complex Management Information System (MIS) Obligations

- The requirement for an integrated MIS with technical specifications adds a heavy compliance burden.
- Smaller aggregators may lack the technical expertise and financial resources to build and maintain such systems.

3. Short Provisional License Period and Stringent Extension Criteria

- A provisional license valid for only 30 days offers limited operational security for new entrants.
- Uncertainty around fulfilling all compliance criteria within a short time frame discourages investment.

4. Burdensome Renewal Conditions

- The need to submit detailed passenger usage data and complaint redressal records for license renewal adds significant administrative overhead.
- Any shortcomings in record-keeping can risk non-renewal, leading to operational instability.

5. 24/7 Control Room Requirement

- Maintaining a fully functional 24/7 control room with sufficient manpower is cost-intensive, particularly for smaller aggregators.
- This requirement disproportionately affects operators with limited budgets and lower trip volumes.

6. Rigid Restrictions on Business Location

- The inability to shift business premises or open new branches without prior approval reduces operational flexibility.
- This creates bureaucratic delays, hampering expansion or necessary business adjustments.

7. Strict Operational Area Compliance

- Area-specific regulations add complexity to operations, especially for aggregators looking to scale across multiple jurisdictions.
- Navigating different local rules increases compliance costs and management challenges.

8. Heavy Security Deposit Requirements

- High security deposits (₹10 lakh for taxi aggregators and ₹5 lakh for bike taxis) create a financial barrier to entry.
- Startups and small players may struggle to mobilize such large upfront amounts, leading to reduced competition and innovation.


by Uber
by Uber
Electric

3

Key Government Stakeholders related to EV transition

Key government stakeholders are critical in advancing the e-mobility ecosystem. Their roles and influence ensure a cohesive approach to sustainable transportation, covering policy, regulation, and implementation. Here's a summary of their importance:

- Policy Formulation and Regulation: Government bodies like ministries of transport and power are pivotal in drafting policies that promote e-mobility. They set vehicle emission standards, approve EV incentives, and design EV charging infrastructure frameworks to boost adoption and ensure compliance with climate goals.
- Incentives and Financial Support: Ministries of finance and industry design incentive structures such as subsidies, tax rebates, and concessional financing to make EVs and charging infrastructure more accessible. This financial backing helps reduce the upfront cost barrier for consumers and businesses.
- Urban Planning and Infrastructure Development: Urban planning authorities and municipal governments play a crucial role in integrating EV charging infrastructure into city plans. They facilitate the allocation of land for charging stations and develop public-private partnerships to support large-scale deployment.
- Energy Management and Grid Integration: Power and energy departments are essential in planning the grid to handle increased electricity demand from EVs. They work on load management strategies, renewable energy integration, and developing smart grids to ensure energy supply reliability and efficiency.
- Standards and Safety: Agencies responsible for vehicle standards and safety establish protocols for EV performance, charger compatibility, and safety measures. These standards ensure interoperability and consumer trust in the technology.
- Public Awareness and Adoption: Government campaigns are vital for educating the public about the benefits of e-mobility. Stakeholders in this space work on behaviour change initiatives and promote cleaner transport options through dedicated outreach programs.
- International Collaboration: Government stakeholders engage with global institutions to learn from international best practices, secure funding, and align with international sustainability commitments. This collaboration helps accelerate the transition to e-mobility through shared experiences and resources.
- Research and Development Support: Government investment in R&D fosters innovation in EV technology, batteries, and charging solutions. It also encourages collaboration between academic institutions and industry for future advancements.

3.1 The following are the key government stakeholders in Shillong:

Transport Department, Government of Meghalaya: The Transport department is responsible for regulating and overseeing transportation activities across the state. It plays a crucial role in formulating policies that support the adoption of electric vehicles, implementing regulations for EV infrastructure, and promoting the electrification of public and private transport fleets. The department ensures that e-mobility policies align with the broader goals of sustainable and efficient transportation in Meghalaya[15].

Meghalaya Urban Development Authority (MUDA):
The Meghalaya Urban Development Authority (MUDA), established under the Meghalaya Town and Country Planning Act, 1973, began in 1990 as the Shillong Development Authority, initially covering the Shillong Master Plan Area. Renamed MUDA in 1991, its jurisdiction expanded statewide. Today, MUDA focuses on urban infrastructure, regional connectivity, and sustainable transport, including plans to introduce electric buses to reduce emissions and reliance on fossil fuels.[16].

Meghalaya Power Distribution Corporation Limited (MePDCL): MePDCL is the entity responsible for the distribution and supply of electricity across Meghalaya, including Shillong. It oversees the critical task of integrating EV charging stations with the power grid, ensuring the provision of reliable and efficient electricity. MePDCL also manages metering and billing for EV charging stations, working to maintain an effective balance between power supply and demand, and supporting the infrastructure required for e-mobility[17].

Shillong Municipal Board (SMB): The Shillong Municipal Board oversees urban management and infrastructure in Shillong, focusing on sustainable development. It plays a key role in enhancing transportation by implementing EV charging stations, supporting urban planning, and integrating e-mobility solutions into city infrastructure.[18].

Meghalaya Transport Corporation (MTC): MTC is responsible for providing public transportation services throughout Meghalaya. It plays a key role in transitioning the public bus fleet to electric vehicles, aiming to reduce emissions and enhance the sustainability of public transport. MTC's efforts are crucial in demonstrating the viability of electric buses and promoting broader adoption of e-mobility solutions in urban areas[19].

[15] https://megtransport.gov.in/
16 https://www.mudashillong.org.in/about.html
[17] http://www.meprepaidmeter.in/
[18] https://eastkhasihills.gov.in/public-utility/shillong-municipal-board-smb/
[19] https://meghalaya.gov.in/key-contacts/organisation/35303

3.2 Primary Consultations with Government

Transport Department:

- The Transport department highlighted **limited adoption of electric vehicles (EVs).**
- The department **emphasized the need for a charging station** at the Secretariat.
- It was noted that the **government fleet has a minimal number of EVs**, with only two currently in operation: a Hyundai Kona assigned to the Inspector General of Police and an MG ZS allocated to the Chief Minister.
- Additionally, the department reported that **only 300 EVs are in use out of a total of 20,000 vehicles** in East Khasi Hills.
- **Parking constraints** were identified as a significant challenge, with only few authorized parking spaces available.

Meghalaya Urban Development Authority (MUDA):

- **Bus Procurement:** MUDA is procuring 50 electric buses to enhance sustainable transport in Shillong. In collaboration with CESL under the PM E-Bus Sewa initiative, MUDA aims to ensure successful deployment, focusing on route viability and infrastructure readiness. Despite initial setbacks in leasing government land for operations, alternative options are being explored..

Meghalaya Power Distribution Corporation Ltd (MePDCL):

- **Power Distribution:** Power shedding has significantly reduced over the years, with 2024 seeing negligible power cuts. The DISCOM is committed to maintaining this trend, with no plans for power shedding in 2025, which is crucial for consistent EV charging. An EV tariff is already in place, and efforts to provide priority connections for EVCIs are underway, ensuring a reliable power supply to support the growth of electric vehicles in the region.

Shillong Municipal Board (SMB):

- **SWM Vehicle Conversion**: The Municipal Corporation of Shillong is exploring options for transitioning their Solid Waste Management (SWM) vehicles to electric vehicles (EVs). While they believe suitable EV alternatives for their current fleet may not yet be available, they are open to exploring future solutions as the EV market evolves and suitable technologies emerge.

Tourism Department:

- The Tourism department is interested in introducing EVs as part of their efforts to modernize transport within the state.
- **Procurement History**: In 2022, the department procured 50 Toyota Innovas for local tourism, distributing them to locals to improve employability. They assisted in financing and connecting the owners with MTDC hotels.
- **Future Plans**: The department is planning to deploy 100 vehicles (including passenger vehicles and travellers), and the selection process for beneficiaries is currently underway.

4

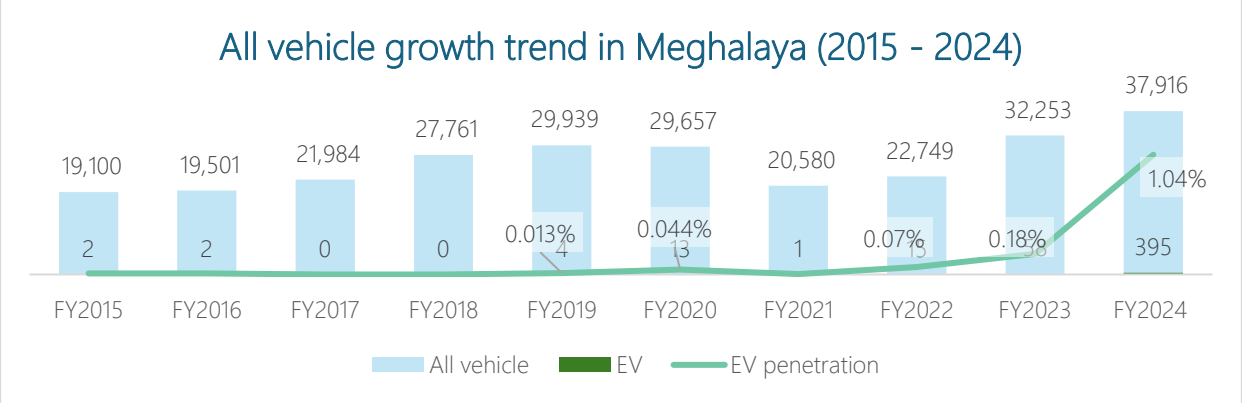
Vehicular Sales
in Shillong City

4.1 Growth trend of conventional vehicles in Meghalaya and Shillong[20]:

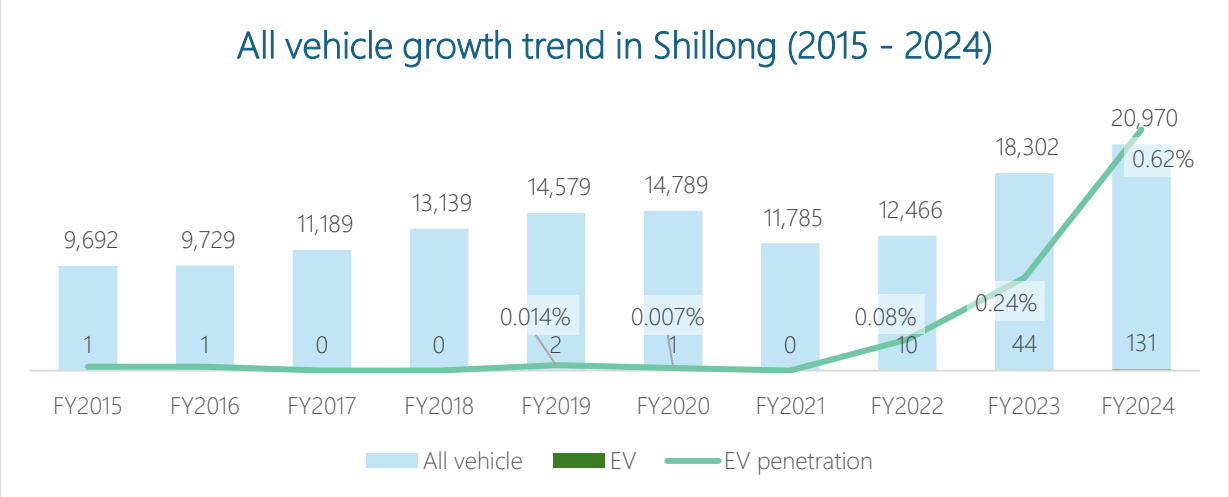
Meghalaya have a diverse range of vehicles, including private cars, taxis, buses, and two-wheelers, serving both local residents and tourists. The region's hilly terrain and growing urbanization have led to increased vehicle usage, making efficient transportation infrastructure crucial. The adoption of electric vehicles (EVs) and the development of public charging stations are key steps towards sustainable mobility in the area.

Vehicle growth trend of ICE and EVs over 10 years, starting from FY 2015

Graph 4: All vehicle growth trend in Meghalaya (2015 - 2024)



Graph 5: All vehicle growth trend in Shillong (2015 - 2024)

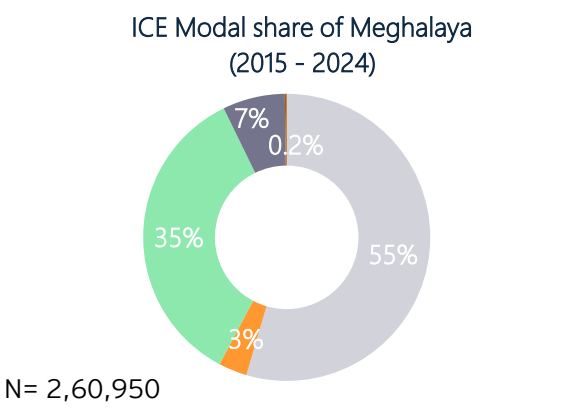


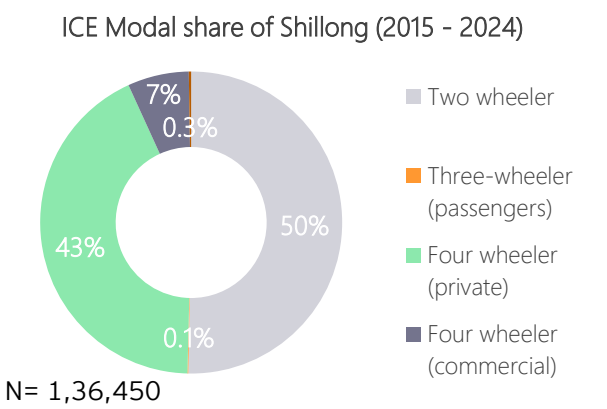
Shillong has accounted for **over 50% of all vehicle registrations in Meghalaya** over the past decade, underscoring its dominant role in the state's automotive landscape.

Despite overall low levels of EV adoption across Meghalaya, **Shillong alone contributes approximately 33% of total EV sales**, reflecting a clear concentration of early adopters within the capital city.

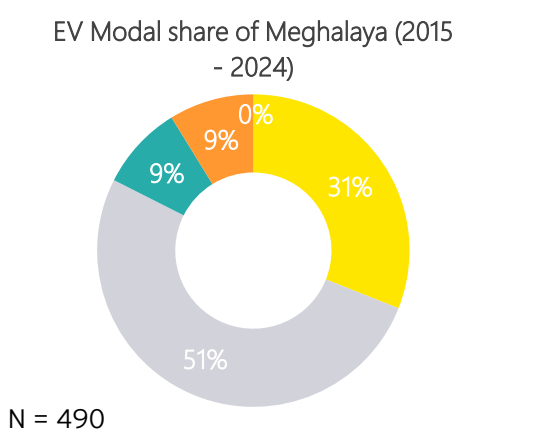
[20] Vahan Dashboard

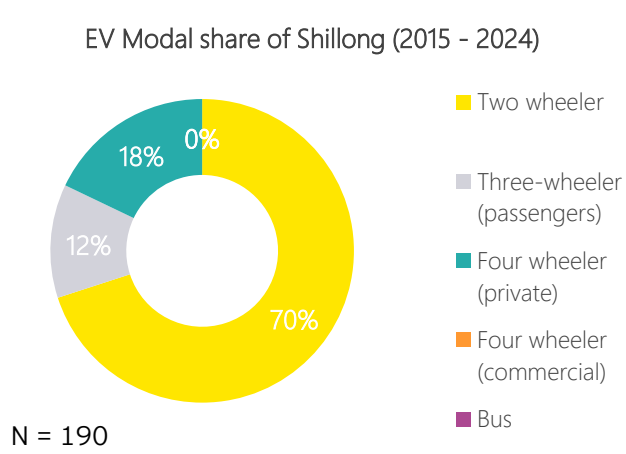
Graph 6: ICE modal share of Meghalaya and Shillong





Graph 7: EV modal share of Meghalaya and Shillong





5

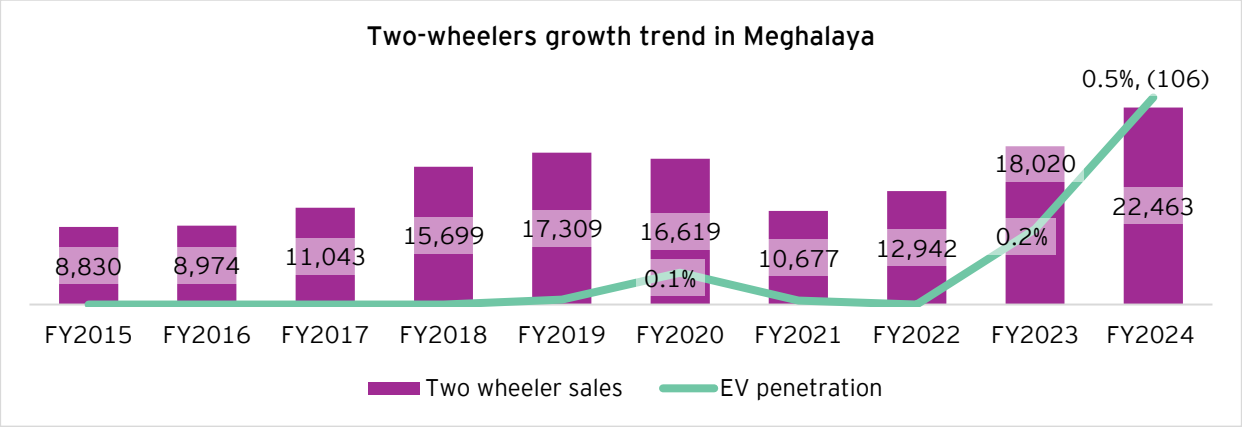
Two-wheelers

in Shillong City

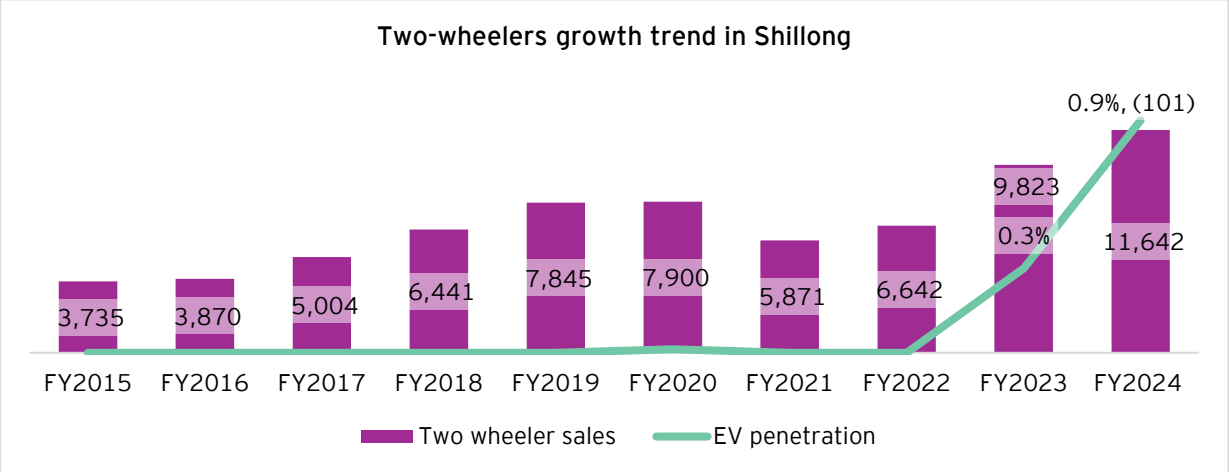
5.1 Two-wheeler growth trend

In Shillong, two-wheelers are commonly used for commuting, especially given the city's hilly terrain and narrow roads. While they provide a convenient means of getting around, they also contribute to traffic congestion, particularly in crowded areas like Police Bazaar and Lewduh. The adoption of electric two-wheelers is slowly gaining momentum as a cleaner alternative, though challenges such as limited charging infrastructure and the city's unpredictable weather pose barriers to widespread use. Despite these challenges, electric two-wheelers could offer a more sustainable option for short-distance travel if the necessary infrastructure and policies are put in place.

Graph 8: Two-wheelers growth trend in Meghalaya



Graph 9: Two-wheelers growth trend in Shillong



Shillong accounts for nearly **50% of Meghalaya's total two-wheeler registrations**, reaffirming its role as the state's primary mobility hub.

In FY2024, **Shillong captured an impressive 95% of all electric two-wheeler (e-2W) registrations in the state**, a significant rise from approximately 82% in FY2023, signalling a rapid acceleration in its transition toward electric mobility.

5.2 Use cases

Personal Use

a) Navigating Terrain and Traffic:

- Two-wheelers handle Shillong's steep slopes and narrow roads with ease, making them ideal for daily commutes and errands in areas like Laitumkhrah, Police Bazaar.
- Their compact size allows for quicker travel through traffic and easier parking in crowded spaces.

b) Tourism and Recreation:

- Tourists and locals use two-wheelers to explore scenic attractions like Shillong Peak.
- It provides flexibility for sightseeing and recreational rides.

c) Last-Mile and Rural Connectivity:

- Two-wheelers ensure access to areas with limited public transport, connecting remote regions and transit hubs like the Shillong Bus Terminal.

d) Workplace and Home Charging Convenience:

- Residents can charge electric two-wheelers at home or workplaces with standard 15A sockets, making charging straightforward and cost-effective.

Bike Taxi Services

a) Tourist-Friendly Transport:

- Bike taxis cater to tourists by providing easy access to popular spots, often with local drivers acting as informal guides.
- Affordable fares and agility in traffic make them a preferred choice for sightseeing.

b) Employment Opportunities:

- Bike taxis create job opportunities for locals, with low investment requirements and higher profitability, especially for electric models.

c) Last-Mile Connectivity:

- Two-wheelers connect residents to transit points like local taxi stands or the Shillong Bus Terminal, ensuring seamless travel to final destinations.

5.3 Primary consultation with Two-wheeler dealerships:

ICE Two-Wheelers

- Seasonal Variations in Sales: Due to Shillong's prolonged rainy and winter seasons, the sales of Internal Combustion Engine (ICE) two-wheelers remain lower in proportion to other cities in India. The challenging weather conditions make two-wheelers less practical for daily commuting, despite their advantage in navigating narrow and congested streets. This seasonal limitation contributes to the overall lower demand for two-wheelers in Shillong compared to the national average.
- Low Adoption:
  - While the city experiences heavy traffic during peak hours, residents prefer cars over two-wheelers, as Shillong's unpredictable weather and hilly terrain make two-wheelers less comfortable and practical for daily commuting.
  - Many people also rely on bike taxis due to their prevalence and affordable fares, making them a popular choice for short trips.

EV Two-Wheelers

- Hesitation Due to Misconceptions:
  Residents remain sceptical about EV two-wheelers' reliability on steep inclines and safety concerns, often influenced by media coverage about battery-related incidents.
- Lack of Subsidy Awareness:
  Despite the availability of government subsidies that could significantly reduce the cost of EV 2Ws, a large section of the population remains unaware of these benefits.
- Promotional Campaigns by Manufacturers:
  Companies like OLA are proactively conducting door-to-door campaigns and promotional activities to counter misinformation and improve public awareness.

6

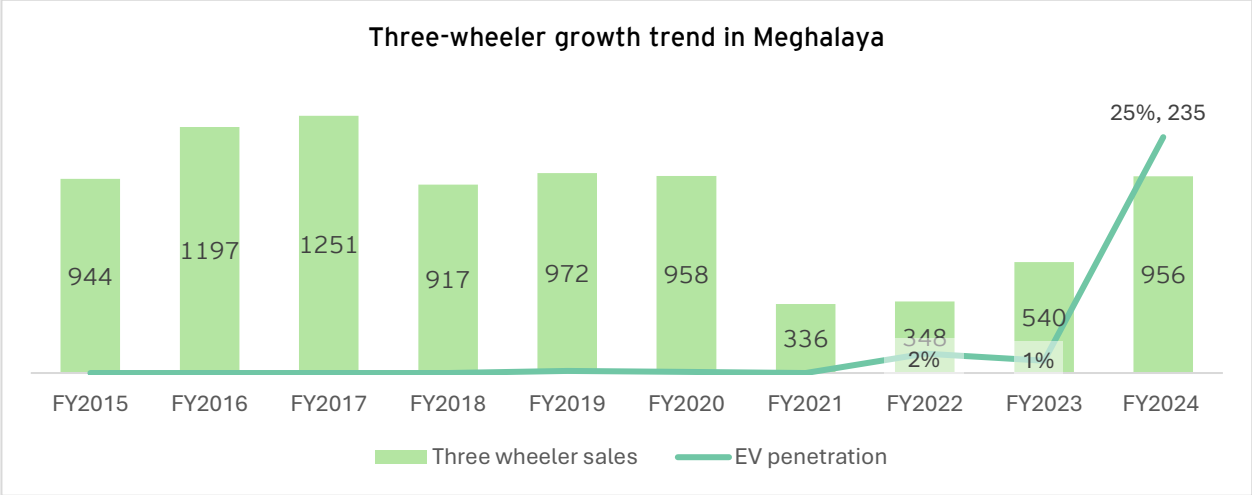
Three-wheelers

in Shillong City

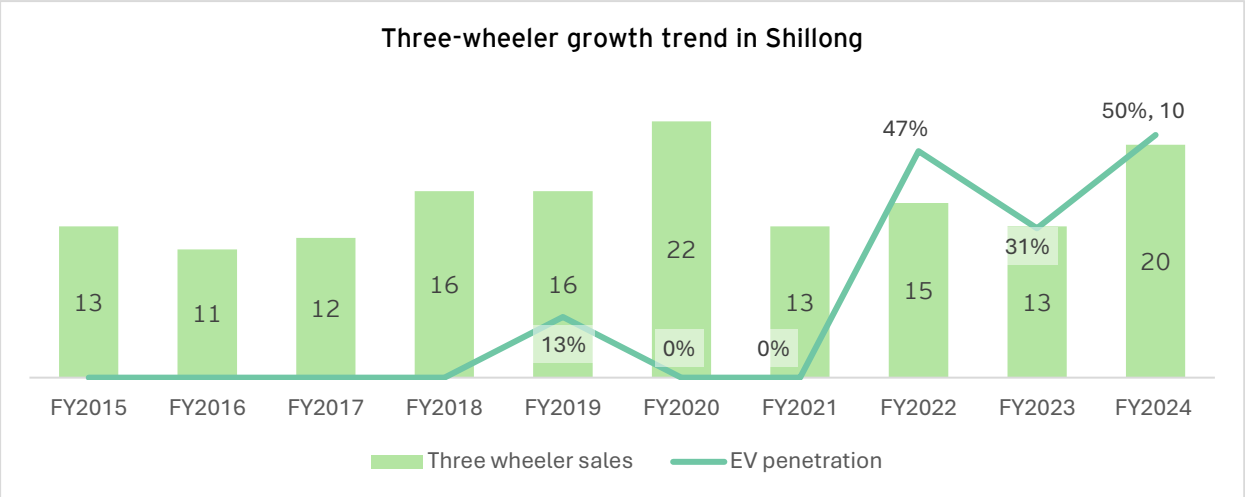
6.1 Three wheeler growth trend

The growth of three-wheelers is low in Shillong due to its topography. The operation of three-wheelers is restricted to plain areas only such as Nongpoh, Nanjeri, Huboi and Molai. While in Meghalaya, the maximum number of three-wheelers are operating in Tura due to its plain terrain.

Graph 11: Three-wheeler growth trend in Meghalaya



Graph 10: Three-wheeler growth trend in Shillong



In FY2024, the highest number of three-wheeler (3W) sales in Meghalaya were recorded in Tura, Nongpoh, and Ampati, while Shillong witnessed very low 3W registrations.

Shillong's limited 3W uptake can be attributed to key operational challenges:

- Steep Slopes: The city's hilly terrain poses significant difficulties for 3Ws, particularly due to their gradeability limitations.
- Barriers for Electric 3Ws: e-3Ws face additional hurdles, including a lack of adequate public charging infrastructure and limited availability of parking spaces necessary for installing personal EV chargers for drivers.

6.2 Use case

Passenger Segment

1. Affordable Public Transport:
    - Three-wheeler passenger autos provide low-cost transportation for short and medium distances, connecting key areas like Police Bazaar, and Mawlai.
2. Tourist-Friendly Rides:
    - Tourists use three-wheelers to travel between local attractions like Shillong Peak.
3. Ride-Hailing and Shared Services:
    - Shared auto services reduce individual costs and increase accessibility, especially during peak hours or in areas with limited taxi services.
    - Electric three-wheelers are increasingly adopted in ride-hailing platforms, offering an eco-friendly commuting option.

6.3 Primary consultation with Three-wheeler dealerships:

ICE Three-Wheelers

- Unfavourable for Shillong's Terrain:
  The steep inclines and winding roads in Shillong make ICE 3Ws less viable for daily commuting within the city, leading to low adoption rates.
- Higher Demand in Peripheral Areas:
  In regions the outskirts of Shillong like Nongpoh, where roads are more navigable.

E-Three-Wheelers

- Performance Concerns:
  Passenger E-3Ws face challenges with gradeability. While these vehicles perform adequately on Shillong's outskirts, the city's steep slopes make them less appealing for urban drivers.

- Shift in Dealer Focus:
  The overall uptake of electric vehicles (EVs) remains low, especially in the three-wheeler (3W) segment. **Dealers, observing the decline in 3W sales, have shifted their focus to the two-wheeler (2W) market.** For instance, Bajaj, which once had a steady market in ICE 3Ws, has seen a drastic dip in sales, managing only 4-5 sales per month. Sighting similar reasoning. Piaggio has pivoted entirely to operating a Honda showroom, moving away from the 3W market altogether. This shift indicates both the challenges and the adaptation strategies in response to market dynamics in the EV sector.

6.4 Challenge

Migrant Drivers' Challenges: Many migrant drivers of electric three-wheelers face challenges due to limited access to charging infrastructure, which is a significant barrier to the adoption of electric three-wheelers in Shillong.

7

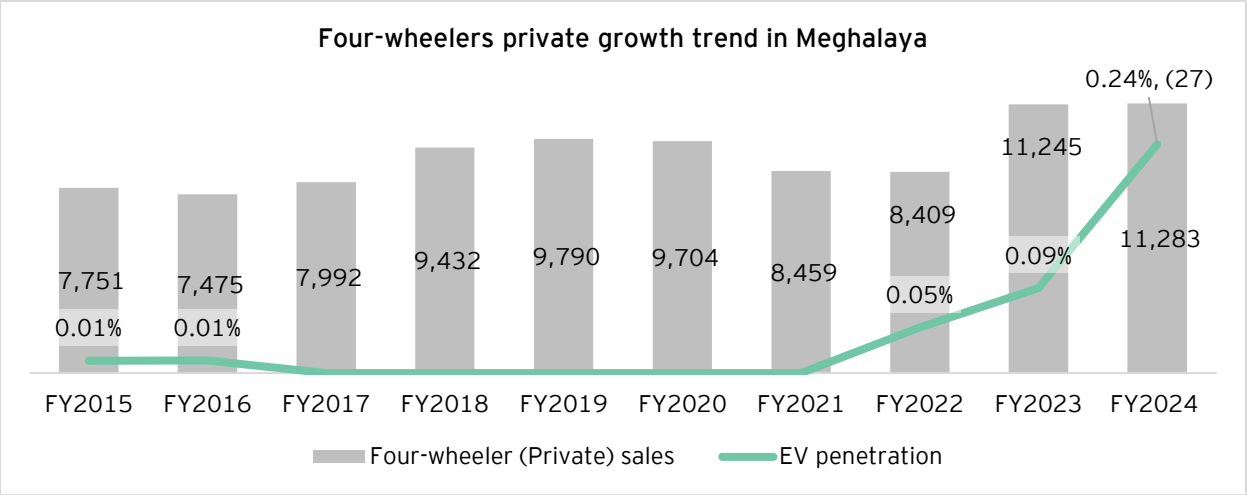
Private Four-wheelers

in Shillong City

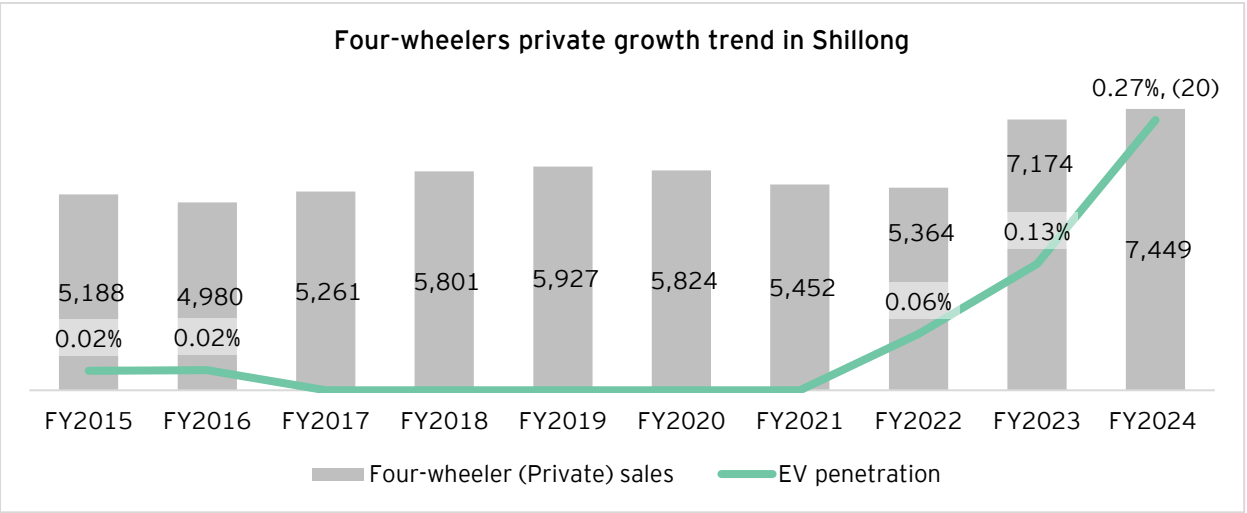
7.1 Four-wheeler (private) growth trend

Private four-wheelers are widely used in Shillong, contributing to traffic congestion due to the city's diverse terrain and need for flexibility. The adoption of electric cars is limited by high upfront costs, lack of charging infrastructure, and challenges posed by hilly roads. This slow transition to electric vehicles, despite their potential to reduce emissions, exacerbates congestion and limits the shift to more sustainable transport options.

Graph 12: Four-wheelers private growth trend in Meghalaya



Graph 13: Four-wheelers private growth trend in Shillong



- Approximately 66% of all four-wheeler (4W) registrations in Meghalaya are concentrated in Shillong, reaffirming its position as the state's automotive center.
- While overall electric four-wheeler (e-4W) penetration remains low, Shillong leads the transition, accounting for about 75% of the state's total e-4W registrations.
- In FY2024, Nongpoh (ML10), located around 52 km from Shillong, recorded just 7 four-wheeler registrations. Similarly, in FY2023, Jowai (ML04), approximately 63 km from Shillong, registered only 1 four-wheeler, while the remaining 9 registrations were concentrated in Shillong.

7.2 Use cases

1. Comfortable Long-Distance Travel:
    - Four-wheelers are ideal for long drives to nearby destinations like Cherrapunji, Dawki, and Umiam Lake, offering comfort
    - They allow families or groups to travel together.
2. Daily Commutes and Errands:
    - Residents use private cars for daily commutes to offices, schools, or markets.
    - Cars provide a safer and more private alternative to shared transportation options.
3. Navigating Unpredictable Weather:
    - Shillong's frequent rains make private cars a preferred option, offering protection and convenience compared to two-wheelers or open vehicles.
4. Safe and Secure Travel:
    - Cars provide safety and security, particularly for women and families traveling at odd hours or to less populated areas.
5. Status and Convenience:
    - Owning a private car in Shillong is often seen as a symbol of status and independence, providing flexibility in travel without relying on public or shared transport.

7.3 Primary consultation with Four-wheeler dealerships

ICE Four-Wheelers

- Market Insights:
    - Maruti: Continues to dominate the market with monthly sales of 150-200 units.
    - Toyota/Mahindra: Struggle with low sales volumes

EV Four-Wheelers

- Minimal Penetration:
  EV 4W adoption in Shillong has remained low due to limited public awareness, inadequate charging infrastructure, and concerns about performance in hilly terrain. While the numbers are still minimal, Shillong accounts for the highest EV registrations in Meghalaya.
- Dealer Challenges:
  Dealers report low inquiries and conversions, despite available government incentives. Residents remain hesitant to transition to EVs, preferring ICE vehicles for reliability.


J N Suzuki
SUZUKI
SERVICE
SUZUKI
SUZUKI

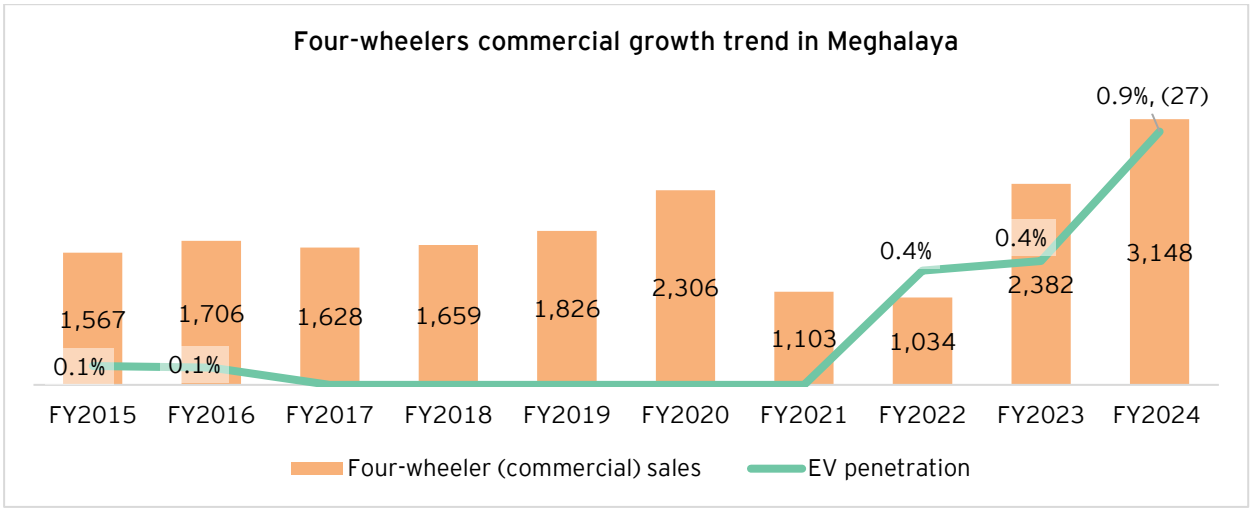

HYUNDAI
Goenka Hyundai
lenskart
iDestiny
ICICI Prudential Life Insurance

8 Commercial Four- wheelers in Shillong City

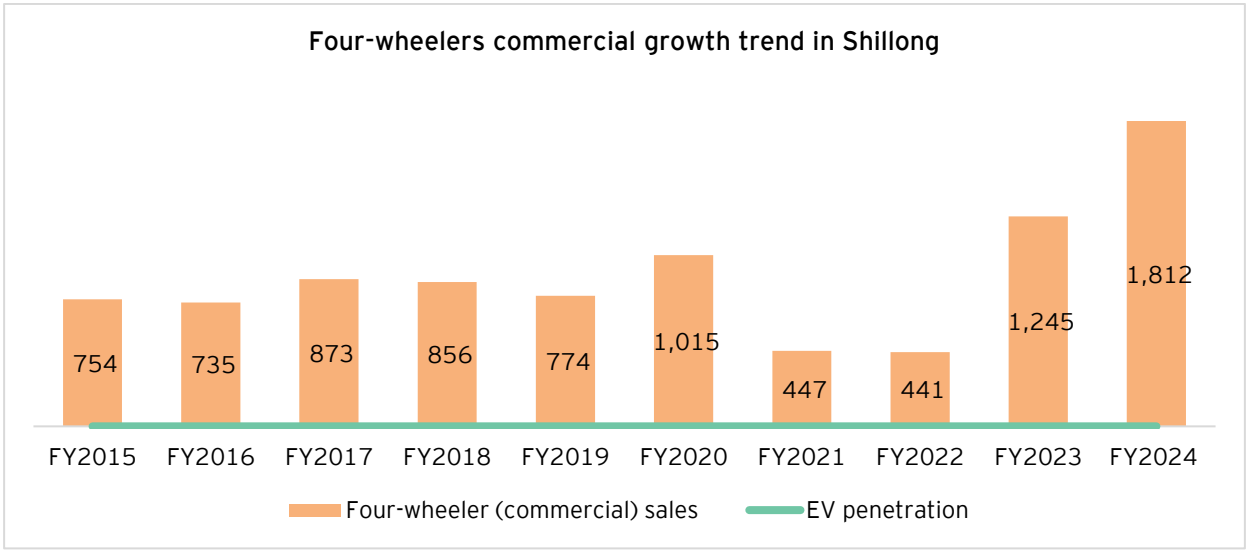
8.1 Four-wheeler (commercial) growth trend

In Shillong, commercial four-wheelers, primarily taxis, dominate the transport segment, serving a role that three-wheelers typically play in other states. As a result, three-wheeler adoption remains low, further compounded by operational challenges. Additionally, the lack of sufficient charging stations and the high upfront costs of electric taxis deter many operators from making the switch. While electric taxis could offer lower emissions and reduced long-term operating costs, these logistical and financial barriers continue to limit their adoption.

Graph 14: Four-wheelers commercial growth trend in Meghalaya



Graph 15: Four-wheelers commercial growth trend in Shillong



8.2 Use cases

Passenger Segment

1. Intercity and Local Public Transport:
    - Commercial four-wheelers like vans and shared taxis are crucial for connecting Shillong to nearby towns such as Jowai, Tura, Sohra (Cherrapunji) and Guwahati.
2. Tourism Services:
    - Tour operators use commercial four-wheelers to transport tourists to popular destinations like Shillong Peak, Umiam Lake, and Dawki.
    - Comfortable seating and luggage space make them ideal for group travel and sightseeing tours.
3. Ride-Hailing:
    - Ride-hailing services employ commercial vehicles for passenger transportation, offering flexible options for individuals and groups.

8.3 Primary consultation with commercial Four-wheeler drivers and operators:

Fleet drivers

After the initial consultation with a total of 30 drivers, it was determined that the drivers in the fleet use traditional vehicles for ride-hailing purposes.

- The analysis reveals that **~90%** of the drivers predominantly operate small vehicles with a seating capacity of 4.
- **Number of operational days in a year:** The average number of working days is about **350**.
- **Average distance travelled per day:** The average distance travelled per day for intracity travel is ~**50** km. For intercity travel average per day running distance is **~150 km.**

Major pickup / drop off points in Shillong

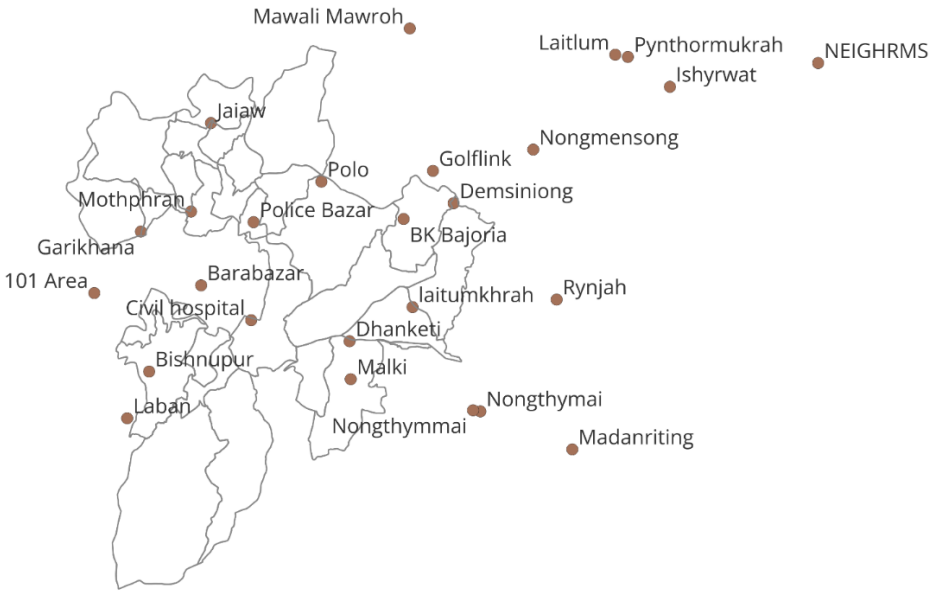
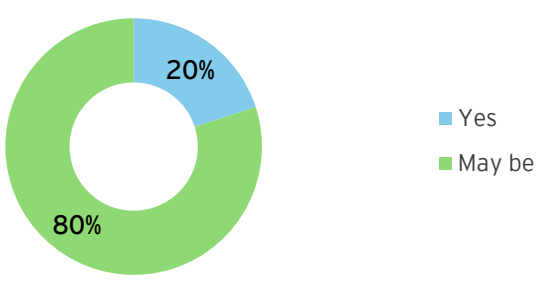


Figure 6: Major pickup / drop off points in Shillong

Likelihood of Switching to Electric Vehicles in the Next 1-2 Years

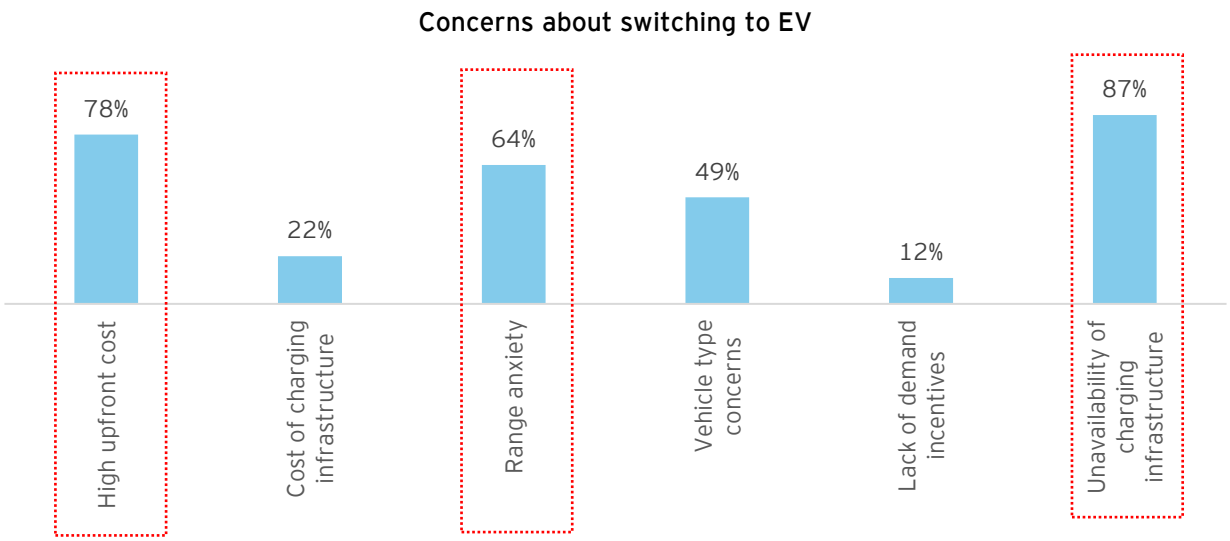
While none of the drivers outright rejected the idea of switching, the majority are unsure. This indicates a need for further engagement and information to move drivers from a "maybe" to a "yes" response.

Graph 16: Fleet drivers likelihood of Switching to Electric Vehicles



Concerns about switching to EVs:

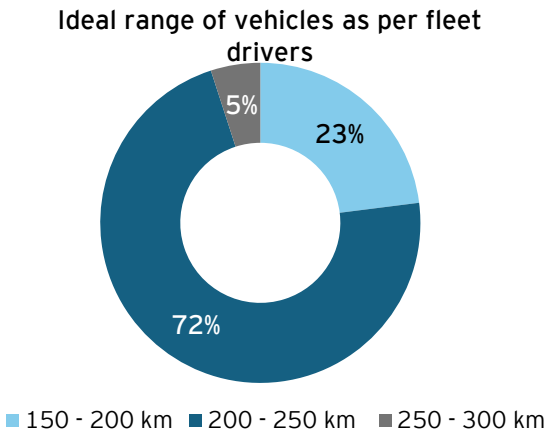
Graph 17: Concerns about switching to EV



Acceptable range of vehicle run per charge

The current average daily distance covered by vehicles stands at ~50 km as per fleet drivers.

Graph 18: Ideal range of vehicles as per fleet drivers



Taxi fleet operator:

- **Compact models such as Maruti K10 and Maruti 800 dominate the market.** Their small size, affordability, fuel efficiency, and ease of maintenance make them ideal for navigating Shillong's narrow and congested roads.
- There are challenges in adopting EVs across a fleet of 20-50 ICE vehicles each with an operator, currently operating in various regions, including Police Bazar, Cherapunjee, Dawki, Jowai, Mawlynong, Tura, Shillong, and Siliguri.
- These vehicles cover an average daily distance ranging from 100 to 200 km.
- There is some interest in EV adoption, but this is often dependent on external factors such as cost or the feasibility of operating in hilly terrains. Concerns about power reliability, frequent outages, and battery durability also pose significant barriers.
- Preferred locations for EV chargers include key transit points such as ISBT, MUDA, Cherapunjee, Mawkdok Viewpoint, and areas with high tourist traffic.

Government Fleet

In Shillong, the government fleet includes two electric vehicles: a Hyundai Kona Electric for the Inspector-General of Police and an MG ZS EV for the Chief Minister. Despite the state's EV policy advocating for sustainable mobility, the transition from ICE vehicles has been slow. The government should lead by example in this shift.

Figure 7: EV being used by the CM of Meghalya

Accelerating the adoption of EVs within its fleet allows the government to lead by example and encourage other departments for transitioning to EVs, as a step towards achieving the targets of the State's EV policy.

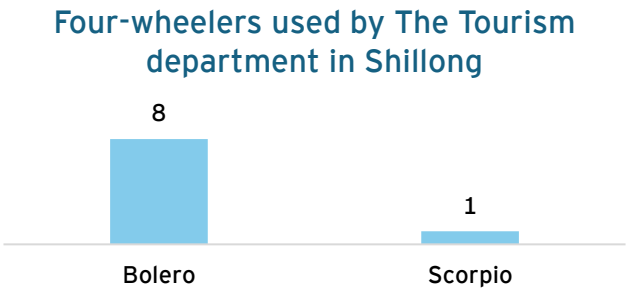
Tourism Department

At present, very limited initiatives for EV adoption have been implemented in Shillong. However, the Tourism department also shared a successful initiative from 2022, where 50 Innovas were procured to boost the number of luxury taxis in Shillong. This not only improved the tourist experience but also created job opportunities for local residents. Building on this success, the department is planning to procure over 100 vehicles in near future. The process for the procurement is underway.

Additionally, the Meghalaya Tourism Development Corporation (MTDC) has shown interest in introducing EVs for its officials. However, they highlighted key challenges:

1. Lack of adequate charging infrastructure.
2. Limited awareness of available subsidies and the procurement process for EVs.

While there is evident interest and willingness to adopt EVs, more structured initiatives and focused handholding is necessary to address the existing challenges.



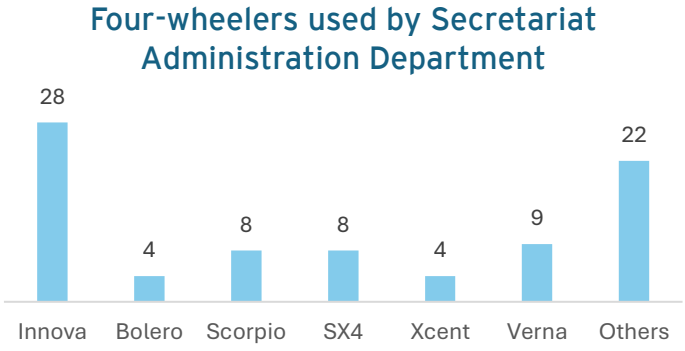
Graph 19: Four-wheelers used by The Tourism department in Shillong in last 10 years

Tourism department has a total of 9 vehicles.

Secretariat Administration Department

The fleet consists of a mix of vehicles from various OEMs, including Mahindra, Toyota, Hyundai, Maruti Suzuki, Chevrolet, and Tata Motors.

Popular models include Innova (Toyota), Dzire (Maruti), Verna (Hyundai), and Scorpio (Mahindra).



Graph 20: Four-wheelers used by Secretariat Administration department

- Toyota Innova is the most common vehicle in the fleet, with a significant number of entries, highlighting its preference in the fleet.
- Hyundai Verna and Maruti Dzire also appear frequently in recent registrations.
- There is an increase in vehicle procurement from 2019 onward, with a notable focus on models like Innova and Dzire for both utility and comfort.

As sustainability becomes a priority, the Secretariat Administration department can explore transitioning part of the fleet to electric vehicles (EVs). This could align with government goals for reducing emissions and set a precedent for other departments.

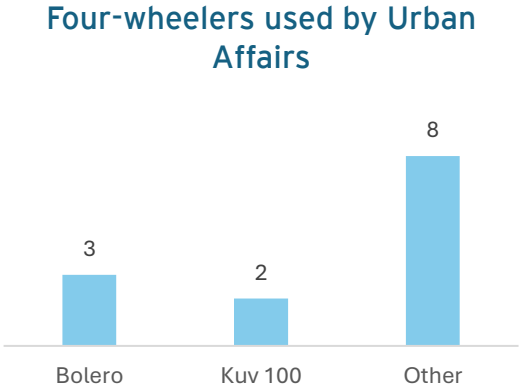
Secretariat administration department has a total of 83 vehicles, of which 22 vehicles are more than 10 years old.

Urban Affairs Department

The Urban Affairs department collection features a diverse range of vehicles from well-known brands such as Mahindra, Maruti, Toyota, and Hyundai.

Notable Vehicles in the Fleet:

- Mahindra Bolero (2012, 2013, 2014) – Is the most common four-wheeler being used by the Urban Affairs department.
- Mahindra KUV 100 – Known for its compact size and efficient fuel consumption, the Mahindra KUV 100 is the second most commonly used vehicle in the Urban Affairs Department.



Graph 21: Four-wheelers used by Urban Affairs

The Urban Affairs department utilized vehicles like the i20, Ciaz, Swift, Fortuner, Etios, Manza, Glanza, and Scorpio for their official operations.

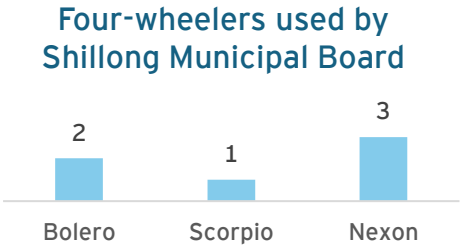
While some of these, such as the Fortuner and Ciaz, fall under the premium category, others like the Swift and Etios are standard vehicles, catering to diverse operational needs.

Urban Affairs department has a total of 13 vehicles of which 4 are more than 10 years old.

Shillong Municipal Board (SMB)

The fleet used by the Shillong Municipal Board consists of modern, reliable vehicles chosen to meet the varied demands of municipal operations in both urban and rural settings. These vehicles, primarily from Mahindra and Tata.

Shillong Municipal Board has a total of 6 vehicles, all of them have been procured within 10 years.



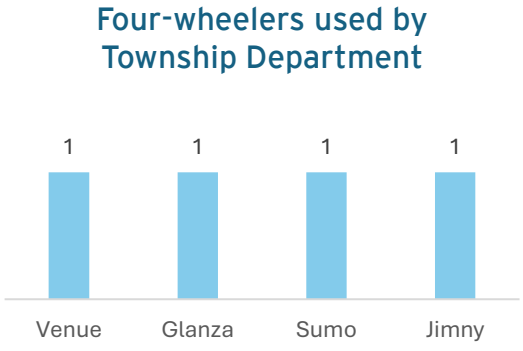
Graph 22: Four-wheelers used by Shillong Municipal Board

Township Department

The fleet used by the Township administration includes a diverse selection of vehicles tailored to meet the operational needs of the area.

- Hyundai venue and Glanza are the compact

Township department has 4 vehicles of which 1 is more than 10 years old.



Graph 23: Four-wheelers used by Township department

8.4 Carbon Emissions and Oil Savings

Shillong's government fleet of 115 vehicles, contributes to high emissions and fuel consumption. Replacing or retrofitting these with EVs will cut carbon emissions, reduce fuel usage, and position the government as a leader in sustainable mobility. This initiative sets an example for others, aligns with sustainability goals, and promotes cleaner air and a healthier environment.

Table 8: Parameters for calculating oil savings and CO2 emissions savings by government fleet electrification

Particulars	Govt. Vehicle	
Vehicle Considered	Petrol	Diesel
Distance travelled per day (in Km) / vehicle	30	30
No. of days per annum	300	300
Total distance travelled by each vehicle (in Km / year)	9000	9000
Mileage of ICE/Energy consumption/Km	18	14
Co2 emission/Liter of fuel (kg/litre) / vehicle	2.31	2.68
No. of vehicles	50	65

Table 9: Fuel savings by government fleet electrification

Particulars	Govt. Vehicle	
Fuel consumption (Litre) / vehicle / Year	500	643
Fuel savings per year (tonnes)	25	42
Total Fuel savings / Year	~67	
Total fuel savings in 5 Years	~335	

Table 10: Carbon Emissions by government fleet electrification

Particulars	Govt. Vehicle	
Total Co2 emission (tonnes) / vehicle	1.16	1.72
CO_2 emissions saved in tonnes / Year	56.6	112.0
Total CO_2 emissions saved in tonnes / Year	~170	
CO_2 emissions saved in tonnes in 5 Years	~845	

By replacing the vehicles, the government will play an instrumental role in shaping the future of eco-friendly infrastructure, while setting a strong example that aligns with national and global sustainability goals. This action will also help the city make substantial progress towards cleaner air and a healthier environment for all.


100% electri

90

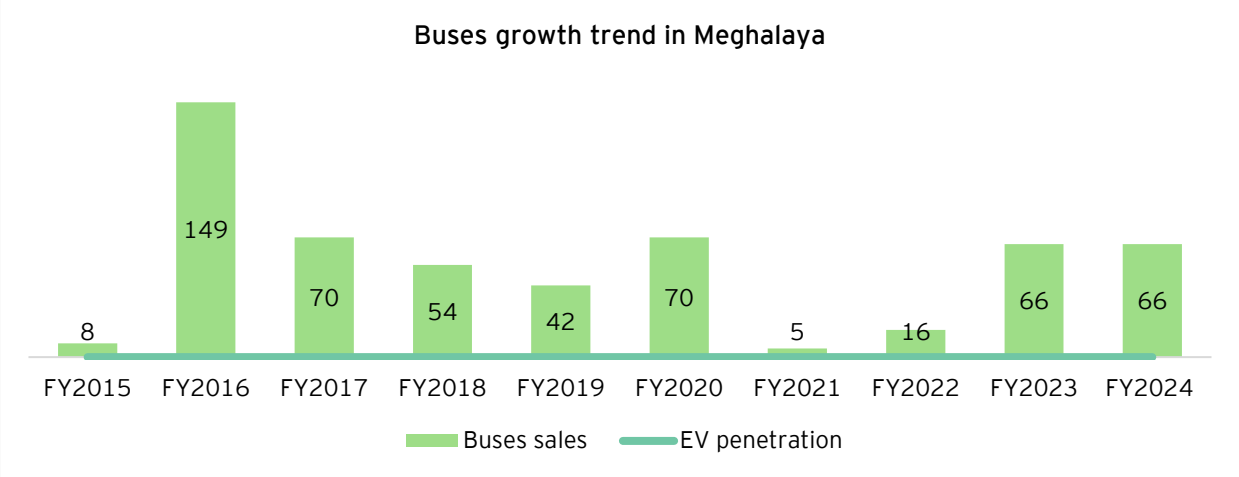
Buses

in Shillong City

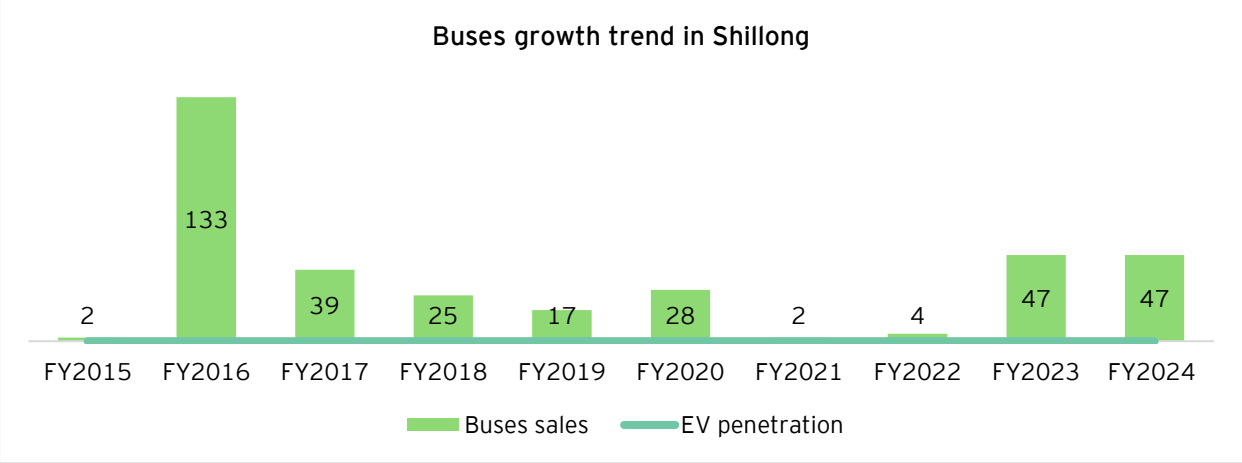
9.1 Buses growth trend

To enhance Shillong's public transport system and reduce emissions, the adoption of electric buses is recommended. Given the city's growing traffic congestion and the need for sustainable mobility solutions, electric buses could provide a cleaner and more efficient alternative to traditional diesel-powered buses. The shift would be driven by benefits such as lower operating costs, reduced dependence on fossil fuels, and improved air quality. However, successful implementation would require investments in charging infrastructure, route optimization, and policy support to ensure a smooth transition to an electric bus fleet.

Graph 24: Buses growth trend in Meghalaya



Graph 25: Buses growth trend in Shillong



- The buses registration trend presented in the graphs includes all buses registered in Meghalaya and Shillong; however, for further analysis in the report, only public transport vehicles have been considered.
- None of the type of buses have observed electric variant registration in the last 10 years
- Currently, Shillong has 118 operational public transport (PT) buses, managed by the Meghalaya Urban Development Authority (MUDA). These PT buses were procured in FY2016. Previously, MUDA had acquired 120 buses in FY2012, which were decommissioned in FY2022.
- MUDA is procuring 50 e-buses under PM e-bus Sewa, of which 20 will be of 7m and remaining 30 will be 9m buses.

9.2 Use cases

Passenger Transportation

1. Daily Commutes:
    - Intracity buses serve as a reliable option for office workers, students, and marketgoers traveling between key areas such as Laitumkhrah, Police Bazaar, Mawlai, and Nongthymmai.
    - They provide affordable fares, ensuring accessibility for all sections of society.

2. Tourist Connectivity:
    - Buses connect tourists to popular attractions within the city and its outskirts, such as Shillong Peak, Ward's Lake, and Don Bosco Museum.
3. Public Transport Backbone:
    - As a key component of Shillong's urban transport network, buses help reduce dependence on private vehicles, alleviating traffic congestion and minimizing parking challenges in busy areas.
4. Connecting Suburbs and City Centres:
    - Intracity buses link suburban and peri-urban areas, such as Mawpat, Nongmensong, and Happy Valley, to central locations, ensuring smooth mobility for residents in outlying areas.

9.3 Meghalaya Public Transport profile

The Meghalaya government plans to procure 100 electric buses for Shillong to ease traffic congestion and foster sustainable urban mobility. In addition, a budget of Rs 20 crore has been sanctioned to enhance overall mobility infrastructure in the city. This initiative aims to improve public transport services and promote a greener, more efficient transportation system in Shillong[21].

Key aspects of the project include:

- **Electric Bus Integration**: Fifty electric buses will be procured under the PM eBus Sewa Scheme by 2025, with an emphasis on reducing carbon emissions and supporting the city's environmental goals.

9.4 Shillong's bus fleet profile

The fleet currently includes 118 operational buses. These buses are allocated across the routes to maintain service efficiency. However, some buses are off-road due to major repairs, while others are proposed for condemnation or reassignment to schools and colleges.

The fleet includes various models from manufacturers like Ashok Leyland, Tata Motors, and Force Motors, catering to different passenger capacities and operational needs. Specific models include the Ashok Leyland Midi 22S, Tata Motors Mini 185, Force Motors 21S, Tata Motors Midi, and Tata Motors STD 108

Expected Lifespan of Buses:

The expected lifespan of the buses is 10 years.

Existing business model:

The bus fleet is owned by MUDA but is **operationally managed through an outsourcing framework**.

Under this model, services are allocated to **individuals, societies, or private operators** on a **route-wise tender basis**. Each route is tendered through a competitive bidding process, where interested operators submit
bids detailing their proposed financial terms and service commitments.

[21] https://auto.economictimes.indiatimes.com/news/commercial-vehicle/mhcv/meghalaya-to-deploy-electric-buses-to-reduce-traffic-congestion-in-shillong/90162524

The tender is awarded to the highest bidder per route, who then assumes responsibility for operating the buses in accordance with predefined service standards. This includes adhering to schedules, maintaining the buses, and ensuring efficient and reliable service delivery. The revenue generated from fare collections is subsequently shared between the MUDA and the operator based on the financial arrangement stipulated in the tender agreement.

This operational structure enables MUDA to maximize resource utilization and enhance service efficiency by leveraging private sector expertise, while still retaining overall control and oversight of public transportation services.

Shillong's public bus system currently relies on a fleet of diesel-powered buses that contribute to significant air pollution and greenhouse gas emissions. The steep and narrow roads in the city make these vehicles prone to high fuel consumption and frequent maintenance issues, impacting overall reliability and operational costs.

The introduction of electric buses could address many of these challenges. By switching to an electric fleet, the city stands to benefit from reduced emissions, improved air quality, and lower long-term maintenance expenses. However, for this transition to be successful, a strategic focus on electric vehicle charging infrastructure is essential. Placing charging stations at optimal locations, such as major bus depots and route endpoints, would help ensure that the electric buses can maintain service schedules without extended downtimes.

10 Recommendations

Shillong, renowned for its natural beauty and cultural heritage, offers immense potential for adopting sustainable mobility solutions. **Popular tourist destinations like Police Bazaar, Ward's Lake, and Umiam lake see consistent footfall, making them ideal locations for public EV charging stations.** Strategically installing these stations near key landmarks will enhance accessibility for both residents and tourists while promoting environmentally friendly transportation.

However, Shillong's unique geography poses challenges. Its hilly terrain, narrow roads, and unpredictable weather necessitate robust and well-planned EV infrastructure. **Effective collaboration among stakeholders is essential to overcome these obstacles and create a resilient framework for electric mobility.**

Challenges have been identified based on a thorough analysis of this report, highlighting key areas that require attention. These obstacles range from Topography-induced operational limitations to regulatory gaps and infrastructure limitations, affecting overall efficiency and impact. By understanding these challenges in depth, suitable measures can be implemented to enhance efficiency, sustainability, and overall progress.

To effectively address the identified challenges, a set of well-structured recommendations has been proposed. By adopting a holistic approach, the report aims to resolve underlying issues rather than just addressing surface-level concerns.

TWO WHEELERS

CHALLENGES

Adoption remains limited due to extreme weather conditions, which reduce the viability of 2Ws for daily use, also the widespread availability of conventional bike taxis further hinder the adoption of private two-wheelers. Additionally, factors such as low awareness of EVs, concerns over technology reliability and lack of charging infrastructure hinders the adoption of e-2Ws.

RECOMMENDATION

Implement a policy mandate requiring the electrification of bike taxis in Shillong to enhance sustainability and operational efficiency. This can be achieved through:

Phased Transition Strategy: Gradually replace ICE bike taxis with electric two-wheelers (E2Ws), prioritizing those over 10 years old. All new bike taxis will be electric, ensuring a seamless transition, facilitated by the Transport Commissionerate.

The Meghalaya Taxi Aggregator Operational Rules 2020 should be amended by the Transport Department to shift the focus from ICE vehicles to EVs. Rules on visual appearance and features of bikes should also be introduced. Licensing and permit policies must be updated to support E2W adoption, with mandatory commercial registration (yellow number plates) under Rule 50 of CMVR, 1989. Licensing fee exemptions or relaxations should be considered to encourage fleet aggregators.

Charging Infrastructure Development: The Shillong Municipal Board (SMB), along with key government entities such as the Transport department, Tourism department, Shillong Smart City, and MePDCL, which own government land, may collaborate with Charge Point Operators (CPOs) under a PPP model to expand the EV charging network. This collaboration should prioritize dedicated spaces and pole-mounted chargers to improve parking convenience **(see Annexure II for details).**

Battery Swapping: An option of battery swapping can also be explored for two-wheelers to minimize charging downtime and enhance operational efficiency. This approach allows riders to quickly exchange depleted batteries for fully charged ones, ensuring continuous mobility without long charging waits. (Case study of a company deploying commercial 2W fleet is attached in Annexure IV)

THREE WHEELERS

CHALLENGES

Three-wheelers encounter operational challenges due to limited gradeability, hindering their performance on Shillong's hilly terrain. Additionally, many drivers, who are migrants, do not have access to designated parking spaces at their rented accommodations, further complicating the situation. The lack of public charging infrastructure also adds to these difficulties. The short-distance taxi services of four-wheelers overlap with three-wheeler services, reducing their demand and further limiting their market penetration.

RECOMMENDATION

Probable Stakeholder:

Transport Commissionerate

Three-wheelers struggle on steep inclines, restricting their usage in Shillong's hilly areas. However, they perform efficiently on flat terrain, making them ideal for electrification. **Expanding their network to the flatter Police Bazaar area could enhance their viability.** To assess feasibility, **a pilot project can be launched by Transport Commissionerate in collaboration with the three-wheeler OEMs/operators at designated locations by building dedicated parking stand with charging infrastructure** to test the vehicle performance and operational efficiency before scaling up deployment.

FOUR WHEELERS- COMMERCIAL

CHALLENGES

Due to existing constraints like the lack of charging infrastructure and public awareness the adoption of private four-wheelers is low. While four-wheeler taxis dominate Shillong's transport landscape, their high numbers (4,000–4,500 taxis) contribute significantly to traffic congestion and tailpipe emissions. Due to existing constraints i.e., the lack of charging infrastructure, and a suitable vehicle model hinders the adoption of EVs, making them less viable for widespread use.

RECOMMENDATION

Probable Stakeholder:

Transport Commissionerate

Policy-Driven Electrification Reform: The amendment of the Meghalaya Taxi Aggregator Operational Rules, 2020, which will mandate fleet electrification with annual targets for taxi aggregators to boost EV adoption. Taxis over 10 years old should be prioritized for replacement with electric models. Consider providing concession on licensing fee for taxi aggregators. Additionally, local job creation should be encouraged through incentives for residents.

Retrofit Existing Taxis: Introduce retrofitting programs to convert existing taxis into electric vehicles, supported by government incentives to reduce costs. This will lower emissions, provide operational savings for taxi operators, and help avoid increasing road congestion by not adding more vehicles on road (Refer Annexure III)

Comprehensive Charging: Set up a city-wide network of fast-charging stations for electric taxis, strategically located at taxi stands and key tourist spots, in this report 24 key locations have been already identified. Integration of renewable energy solutions like solar carports will be an added benefit to boost sustainability

Facilitating EV Financing: The government will facilitate partnerships between financial institutions and fleet operators through workshops and schemes, offering low-interest loans and financing options to help taxi operators overcome the initial cost barrier of EV adoption.

GOVERNMENT FOUR - WHEELERS

CHALLENGES

The government fleet comprises diverse vehicles suited to various needs. However, a portion of these vehicles is aging and nearing the end of their lifecycle, posing challenges for efficient fleet management and service continuity. A focus on shifting towards EVs is required.

RECOMMENDATION

Probable Stakeholder:

Respective government department / Ministries

The government should lead by example and begin electrifying its fleet, in line with the Meghalaya EV policy. This would help reduce emissions and set a clear example for the city. Given that the fleet includes a variety of vehicles, prioritizing the replacement of aging vehicles with electric alternatives would ensure more sustainable operations and encourage wider EV adoption. For example, CESL (Convergence Energy Services Limited) successfully facilitated the deployment of around 2,100 electric vehicles, which led to a significant increase in the uptake of EVs in the region.

Set an Example: Demonstrate leadership in sustainability by transitioning their existing fleet of 115 vehicles to an electric fleet, highlighting the benefits of EV adoption. A visible presence of EVs on the roads will enhance public awareness, encourage wider acceptance, and accelerate the shift toward cleaner transportation. *(Tourism department, Secretariat, Urban Affairs department, Shillong Municipal Board, Township department)*

Enhance Environmental Impact: Transitioning to EVs will significantly reduce the government's carbon footprint, aligning with the city's sustainability goals. By replacing fuel-dependent vehicles, this shift will lead to substantial fuel savings (approximately 65 tonnes/year) and a marked reduction in carbon emissions, as per EY's estimates, a total of ~170 tons/year of carbon emissions can be saved in a year by replacing all government vehicle fleet to electric.

PUBLIC TRANSPORT - BUSES

CHALLENGES

Shillong's bus network mainly caters to intercity routes, with limited options for intra-city travel. The limited intracity running kilometers restrict vehicle utilization, ultimately leading to a higher Total Cost of Ownership.

RECOMMENDATION

Probable Stakeholder:

Meghalaya Urban Development Authority (MUDA)

Proposed Depot: Repurpose the ISBT as a charging hub to optimize infrastructure, improve operations, and ensure easy access. Integrating renewable energy and adding a solar bus port will enhance efficiency.

Operational Efficiency & Route Planning: Electric buses must operate at least 82 km per day to be cost-effective. Optimized route planning by the government is key to reducing costs and improving the viability of electric public transport.

Open Bus Depot Chargers to the Public: Make bus depot chargers available to the public when not in use, based on the bus charging schedule. This will not only provide additional charging options but also generate extra revenue.

Training for e-Buses: Offer specialized training for government bus operators on the operation, maintenance, and management of electric buses to ensure efficiency, safety, and a smooth transition.

SUPPLEMENTARY PUBLIC TRANSPORT VANS

CHALLENGES

The supplementary public transport vehicles in Shillong are outdated, with most being over 10 years old. Their aging condition results in higher maintenance costs, reduced fuel efficiency, and increased emissions, making them less sustainable for long-term urban mobility. As it is a public transport vehicle, government should focus on electrification of this vehicle type.

Probable Stakeholder:

Shillong municipal Board

RECOMMENDATION

Electric Vehicle Transition Plan: Plan to replace all vehicles with electric models, focusing on long-term savings in fuel, maintenance, and reduced emissions, while supporting sustainability goals.

Charging Infrastructure: Set up charging stations at depots.

Designated Pick-Up/Drop-Off Spaces: Set up dedicated spaces at ISBT for government electric vehicles to pick up passengers, easing transfers, reducing congestion, and improving commuter convenience.

Training and Capacity Building: Offer training for government vehicle operators on the handling, maintenance, and management of electric vehicles, ensuring the workforce is prepared for this transition.

OEM Collaboration: Partner with manufacturers providing customized solutions, meeting Shillong's public transport requirements.

SOLID WASTE MANAGEMENT VEHICLES

RECOMMENDATION

Probable Stakeholder:

Shillong municipal Board

Assess Fleet Needs: Conduct a detailed assessment to determine the specific requirements for electrifying the waste management fleet, such as vehicle range, operational demands, and suitability for the city's infrastructure.

Phased Rollout: Implement a phased approach to gradually replace older diesel-powered vehicles with electric ones, starting with high-use vehicles and expanding the fleet over time.

Optimize Route Planning: Design efficient collection routes to maximize battery utilization, reduce energy consumption, and enhance overall operational efficiency of the electric solid waste management fleet.

Develop Charging Infrastructure: Establish a network of charging stations at strategic locations, such as waste management depots, to ensure that the electric fleet can operate efficiently.

Training and Capacity Building: Offer training for Solid waste management vehicles operators on the handling, maintenance and management of the vehicle

ELECTRIC BICYCLES

RECOMMENDATION

Probable Stakeholder:

Private players in collaboration with Transport Commissionerate and Shillong Municipal Board

Electric bikes can serve as both an eco-friendly sightseeing option for tourists and a practical, affordable mode of transport for daily commutes in Shillong. Positioned near popular tourist spots, e-bikes provide visitors with a sustainable way to explore the city, while also offering locals an efficient solution for navigating the city's steep slopes, reducing reliance on traditional vehicles and promoting greener transportation.

Proposed PBS Docking Stations at Police Bazar and Laitumkhrah Point, Shillong

Police Bazar: As Shillong's commercial hub, Police Bazar sees heavy foot and vehicle traffic. A PBS docking station with 15 bicycles here will provide an eco-friendly travel option, easing congestion and pollution while connecting tourists, shoppers, and locals to nearby markets, hotels, and transport hubs.

Laitumkhrah Point: A vibrant area with residences, schools, and cafes, Laitumkhrah Point attracts a diverse crowd. A 15-bicycle PBS station here will offer a sustainable, affordable transport option, enhancing connectivity between residential and commercial zones.

ADDITIONAL RECOMMENDATION

	Probable Stakeholder(s)
• **Creation of EV Accelerator Cell:** Establish a dedicated EV cell to focus on growth strategies and support the development of the electric vehicle ecosystem by implementing policies created regarding EVs.	Transport Commissionerate
• **Parking Solutions:** Develop parking spaces through public-private partnerships to address parking shortages and create a sustainable revenue stream, while improving access to EV charging stations.	Meghalaya Urban Development Authority (MUDA)
• **Awareness program:** Promote EV adoption through targeted campaigns like roadshows, radio jingles, and workshops.	Transport Commissionerate / SMB in collaboration with vehicle dealership
• **E-Vouchers for EV Users:** Provide e-vouchers to EV buyers as certificates, detailing the subsidy amount they have received, ensuring transparency and promoting awareness of available financial support.	Transport Commissionerate
• **Exemption from odd-Even rule:** All public transport vehicles (SPTS buses, SSPTS maxi cabs, and local taxis) in Shillong follow an Odd-Even rule based on their registration numbers, excluding Sundays. However, all electric variants of these vehicles should be exempted from this rule.	Transport Commissionerate

ADDITIONAL RECOMMENDATION

	Probable Stakeholder(s)
• **Scrappage Incentives:** Introduce financial incentives for scrapping old, polluting vehicles in exchange for discounts or rewards, promoting cleaner, more efficient transportation options.	Transport Commissionerate
• **Priority Parking:** Mandate the inclusion of EV-ready parking spaces in all new developments, ensuring accessible charging infrastructure for electric vehicles.	Transport Commissionerate & Shillong Municipal Board (SMB)
• **Dynamic Pricing Models:** Implement demand-based or time-of-use pricing for charging stations to optimize usage during peak times, reduce grid stress, and enhance efficiency.	Meghalaya Power Distribution Corporation Limited (MePDCL)
• **Prioritizing Electric Feeders for EVCI:** Electric feeders with EVCI should be prioritized to ensure a stable and efficient power supply for EV charging infrastructure, supporting reliable and widespread EV adoption	Meghalaya Power Distribution Corporation Limited (MePDCL)
• **Mandating Hotels to set up EV Charging Stations:** Mandate hotels to install EV chargers, enhancing the city's EV-friendly image and serving eco-conscious travellers.	Meghalaya Urban Development Authority (MUDA)
• **Developing an EVCI Dashboard:** Create a real-time dashboard to track EV usage, charging patterns, and infrastructure performance, ensuring transparency and informed decision-making.	Meghalaya Power Distribution Corporation Limited (MePDCL)

ADDITIONAL RECOMMENDATION

	Probable Stakeholder(s)
• **Subsidy Dashboard**: Develop a dedicated platform to display available subsidies and incentives for EV adoption, making it easier for users to access.	Transport Commissionerate
• **Green tax:** It is recommended to implement a Green Tax on per litre basis on diesel and petrol vehicles.	Transport Commissionerate
• **Integration with Development Plans:** Align EV infrastructure planning with urban mobility and sustainability goals to create a cohesive, future-ready transport network.	Meghalaya Urban Development Authority (MUDA)
• **Single Window System:** Streamline the permit approval process for EV-related infrastructure and services, making it easier for stakeholders to navigate regulations and get necessary approvals.	Meghalaya Power Distribution Corporation Limited (MePDCL)
• **Regular Review and Policy Adaptation:** Continuously assess and adapt policies to stay relevant amid emerging technologies and market changes.	Transport Commissionerate

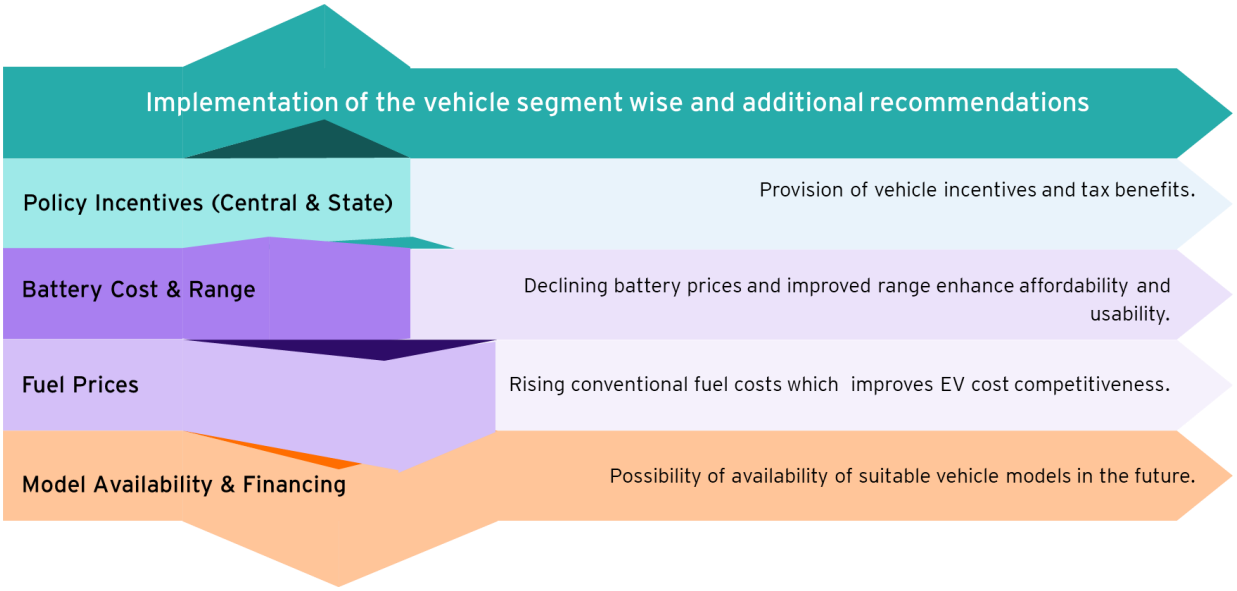
11

EV & EVCI

Projections

Realistic Assumption Approach:

A realistic segment-wise implementation approach considers policy incentives (central and state) to improve EV affordability through subsidies and tax benefits. Declining battery costs, better range, and rising fuel prices enhance EV competitiveness. Though current model options may be limited, future availability and financing improvements are likely to support phased adoption.



11.1 EV Sales volume projections

The graph illustrates the EV penetration targets for India by 2030, with further estimates extending to 2035 based on realistic assumptions. It compares the Business-As-Usual (BAU) scenario, which assumes minimal and realistic assumptions. Possibility of availability of suitable vehicle models in the future and infrastructure expansion. This comparison provides a comprehensive view of the expected trajectory for EV adoption in Shillong, highlighting the impact of different growth scenarios.

Vehicle Segment	Government Target	Business As Usual (BAU)	Realistic Scenario
Two-Wheeler	100%	2%	30%
Three-Wheeler	100%	46%	100%
Four-Wheeler (P)	30%	2%	10%
Four-Wheeler (C)	70%	-	40%
Bus	100%	-	100%

Graph 26: EV penetration rates comparison (FY2030)

Table 11: EV sales projections until FY2030

Vehicle Category	As per, India targets	BAU Scenario	Realistic assumptions	Total vehicle volume
e-2W	81,049	1,928	22,304	1,11,236
e-3W	120	68	120	143
e-4W (private)	9,635	450	2,524	51,567
e-4W (commercial)	7,282	-	3,960	15,502
e-bus (govt intracity)	138	-	142	310

** The numbers represent the volume of EVs i.e., the cumulative number until the specified year.*

*Based on the existing India level targets until FY2030, we have assumed the trend till FY2035.

Vehicle Segment	Government Target	Business As Usual (BAU)	Realistic Scenario
Two-Wheeler	100%	6%	50%
Three-Wheeler	100%	43%	100%
Four-Wheeler (P)	50%	7%	30%
Four-Wheeler (C)	100%	-	70%
Bus	100%	-	100%

Graph 27: EV penetration rates comparison (FY2035)

Table 12: EV sales projections until FY2035

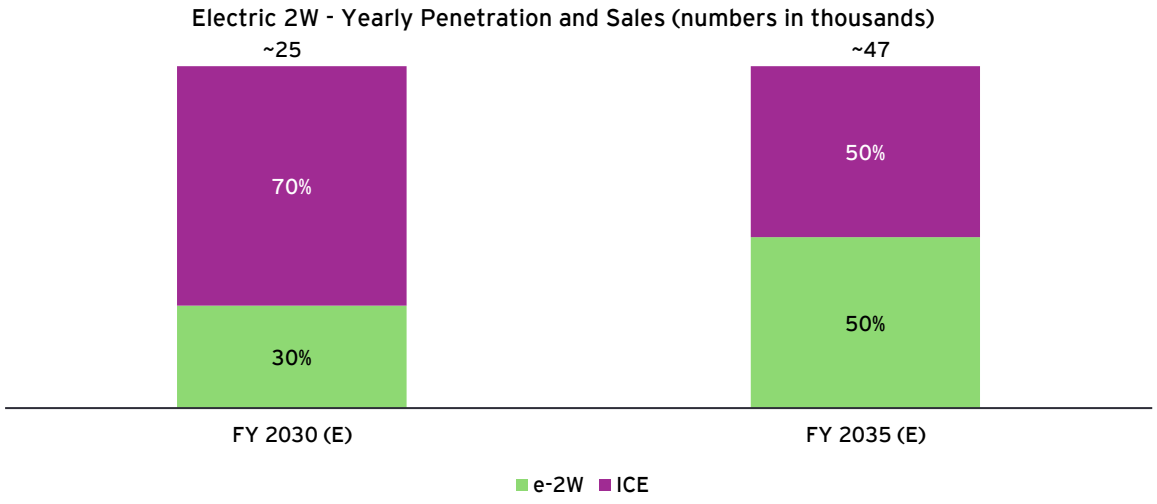
Vehicle category	India targets	BAU	Realistic assumptions	Total vehicle volume
e-2W	2,65,397	9,774	1,02,077	2,95,585
e-3W	275	136	275	297
e-4W (private)	32,477	2,678	14,017	1,05,130
e-4W (commercial)	27,314	-	17,006	37,483
e-bus (govt intracity)	407	-	159	609

** The numbers represent the volume of EVs i.e., the cumulative number until the specified year.*

11.2 Electric Two-wheelers estimated sales as per realistic assumptions

Traffic congestion is indeed a major issue in Shillong, particularly around areas like Police Bazar and key routes leading to and from Guwahati. The city's hilly terrain, limited road network, and increasing vehicle registrations exacerbate the problem. On average, traffic speed in Shillong is under 15 km/h, and road widening options are limited due to dense urban development. Thus, electric two-wheelers could indeed offer a feasible, flexible solution for private transport, aiding in smoother mobility for short distances and reducing emissions in densely populated areas.

Graph 28: Estimated sales of Electric two-wheelers

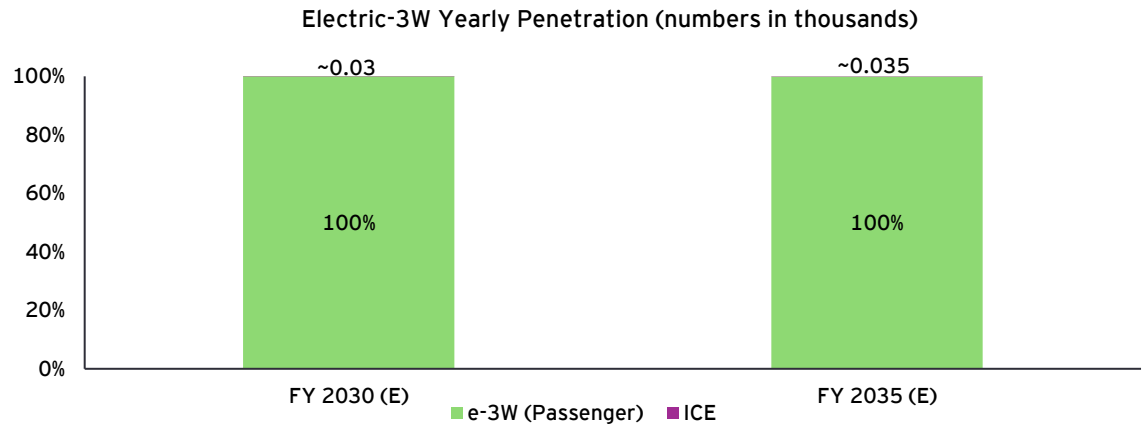


**Note: The sales are calculated based on realistic assumption as India's target seem too ambitious for a small city like Shillong and under a Business-As-Usual scenario, EV penetration remains minimal.*

11.3 Electric Three-wheelers estimated sales as per realistic assumptions

Three-wheelers, particularly electric auto-rickshaws, could serve as an efficient mode of shared transport in Shillong's congested areas. These vehicles are more compact than four-wheelers, making them suitable for maneuvering through narrow streets and alleviating congestion. Additionally, their lower emissions make them an environmentally friendly alternative to conventional autos.

Graph 29: Estimated sales of electric Three-wheelers

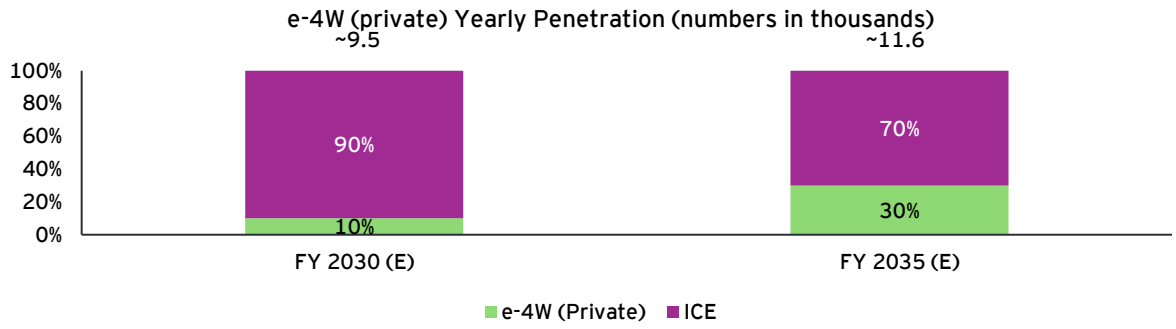


**Note: The sales are calculated based on realistic assumption as India's target seem too ambitious for a small city like Shillong and under a Business-As-Usual scenario, EV penetration remains minimal.*

11.4 Electric private Four-wheelers estimated sales as per realistic assumptions

Private cars in Shillong provide residents with flexible mobility for daily commutes, errands, and leisure, offering comfort, shelter, and privacy, especially given the limited public transport options. However, the growing number of private cars has exacerbated traffic congestion, worsened parking shortages, and raised environmental concerns. To address these issues, local authorities are working to develop charging infrastructure and promote a shift toward electric vehicles.

Graph 30: Estimated sales of electric four-wheeler (private)

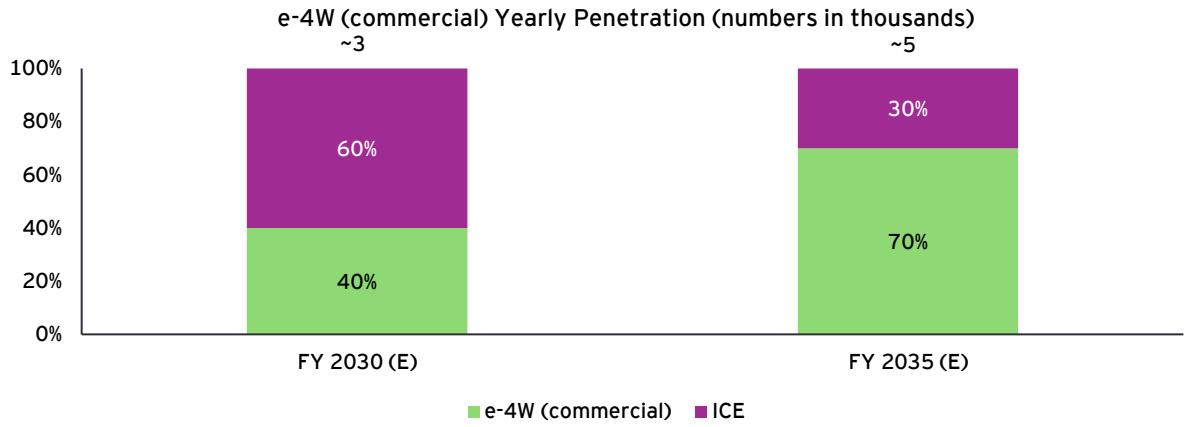


**Note: The sales are calculated based on realistic assumption as India's target seem too ambitious for a small city like Shillong and under a Business-As-Usual scenario, EV penetration remains minimal.*

11.5 Electric commercial Four-wheeler estimated sales as per realistic assumptions

To promote cleaner transport options in Shillong, the adoption of electric vehicles (EVs) in the commercial four-wheeler segment, particularly taxis, is recommended. This shift could be driven by total cost of ownership (TCO) benefits, such as lower operational and maintenance costs compared to traditional fuel-powered vehicles. Encouraging EV adoption would also align with broader efforts to mitigate traffic congestion and reduce emissions, making Shillong's transport system more sustainable and efficient in the long run.

Graph 31: Estimated sales of electric four-wheeler (commercial)

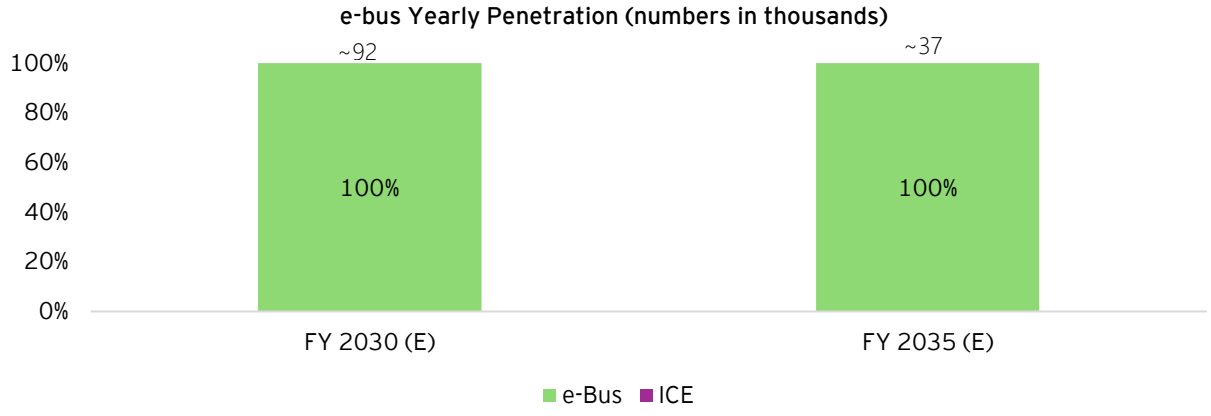


**Note: The sales are calculated based on realistic assumption as India's target seem too ambitious for a small city like Shillong and under a Business-As-Usual scenario, EV penetration remains minimal.*

11.6 Electric bus estimated sales as per realistic assumptions

Shillong city government is planning to procure electric buses in near future as there is a drive to improve the current bus network. The government also wants to align with broader goals of reducing congestion and emissions. These efforts are essential for a city with limited road expansion capacity, emphasizing the need for a shift from private vehicles to public transport to manage traffic and environmental concern.

Graph 32: Estimated sales of electric buses



**Note: The buses registration trend presented in the graphs includes all buses registered in Meghalaya and Shillong; however, for further analysis in the report, only public transport buses have been considered.*

11.7 Projection of power demand for different vehicle segment

The power requirements for charging electric vehicles, as presented in the table, are based on realistic assumptions. While India's national EV targets are ambitious, they represent figures that may not be realistically achievable for a smaller city like Shillong. Therefore, a more localized and pragmatic approach is necessary for accurate projections. Additionally, under the Business-As-Usual (BAU) scenario, EV penetration is expected to remain extremely low, resulting in negligible power demand. Consequently, detailed calculations of power demand under the BAU scenario hold limited significance for planning purposes. **Hence, for the calculation of power demand, realistic assumptions have been used.**

Table 13: EV stock volume & total power demand of Shillong by FY2030 and FY2035

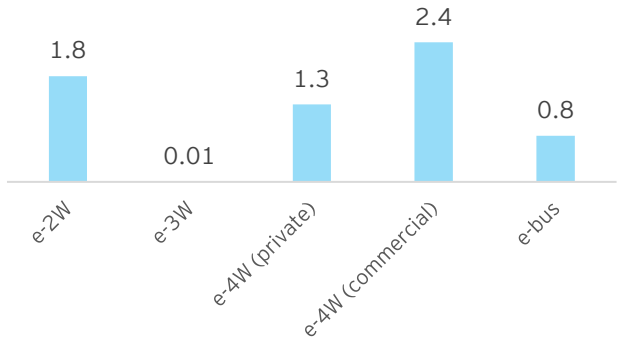
Vehicle Category	Volume ('000)*		Total Power Demand (MW)*	
	FY 2030 (E)	FY 2035 (E)	FY 2030 (E)	FY 2035 (E)
e-2W	20 - 22	102 - 104	1.7 – 2.0	5 - 7
e-3W	0.1 – 0.3	0.2 – 0.5	0.005 – 0.02	0.01 – 0.1
e-4W (private)	2 - 4	13 - 15	1 - 3	4 - 6
e-4W (commercial)	4 - 6	16 - 18	2 - 4	8 - 10
e-bus	0.13 – 0.15	0.15 – 0.17	0.7 – 0.9	0.9 – 1.2
Total	**28 - 30**	**133 - 135**	**6 - 8**	**20 - 22**

**Numbers are cumulative*

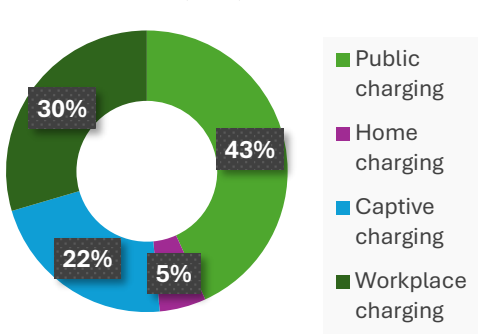
The share of public charging, home charging, captive charging and workplace charging are as follows:

Table 14: Charging type wise power demand by FY 2030

Power demand by 2030 (in MW)								
Vehicle category	Public charging share	Public charging (MW)	Home charging share	Home charging (MW)	Captive charging share	Captive charging (MW)	Workplace charging share	workplace charging (MW)
e-2W	20%	0.4	50%	0.3	-	-	30%	1.0
e-3W	20%	0.004	30%	0.002	50%	0.003	-	-
e-4W (private)	50%	0.5	10%	0.03	-	-	40%	0.8
e-4W (commercial)	30%	1.8	-	-	70%	0.6	-	
e-bus	-	-	-	-	100%	0.8	-	-
Total		~2.8		~0.3		~1.4		~2.0



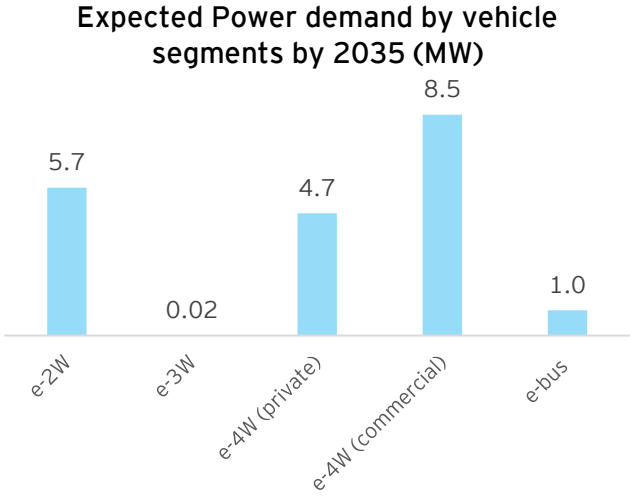
Graph 34: Expected Power demand by vehicle segments by 2030 (MW)

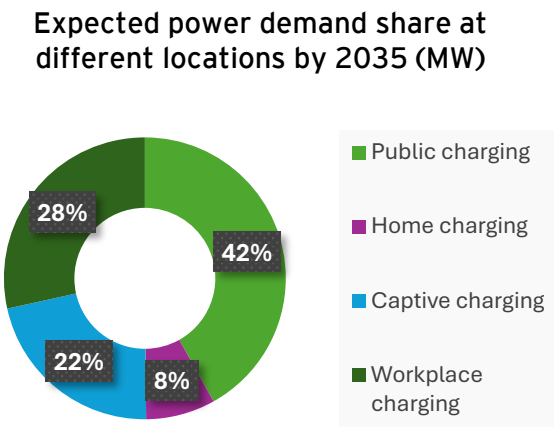


Graph 33: Expected power demand share at different locations by 2030 (MW)

Table 15: Power demand by 2035 (in MW)

Power demand by 2035 (in MW)								
Vehicle category	Public charging share	Public charging (MW)	Home charging share	Home charging (MW)	Captive charging share	Captive charging (MW)	Workplace charging share	Workplace charging (MW)
e-2W	20%	1.2	50%	1.4	-	-	30%	3.0
e-3W	20%	0.01	30%	0.004	50%	0.007	-	-
e-4W (private)	50%	2.0	10%	0.2	-	-	40%	2.6
e-4W (commercial)	30%	5.2	-	-	70%	3.4	-	
e-bus (govt intracity)	-	-	-	-	100%	1.0	-	-
Total		~8.5		~1.6		~4.5		~5.6





11.8 Additional power demand due to tourist four-wheeler (commercial) vehicles and electrification of Solid Waste Management vehicles

As Shillong continues to flourish as a prime tourist destination, the city anticipates a surge in intercity tourist vehicles, consequently leading to heightened demands on its power infrastructure. With the increasing global emphasis on sustainability, there is a notable shift towards electric vehicles (EVs). As a consequence, the introduction of EV cabs to cater to the tourist population.

However, this transition to EVs brings about additional power demands for charging infrastructure within the city. Thus, Shillong's evolution into a tourist hub necessitates proactive measures to augment its power infrastructure to accommodate the growing demand spurred by the integration of EV cabs into its transportation network

Table 16: Additional power demand due to electrification of Tourist cabs

Vehicle category	Numbers ('000)		Total Power Demand (MW)	
	FY 2030 (E)	FY 2035 (E)	FY 2030 (E)	FY 2035 (E)
Tourist cabs (EV influx)	11 - 13	45 - 47	1 - 2	7 – 8

Table 17:Additional power demand due to electrification of Solid Waste Management vehicles

Vehicle category	Volume*		Total Power Demand (MW)	
	FY 2030 (E)	FY 2035 (E)	FY 2030 (E)	FY 2035 (E)
SWM	220 - 250	350 - 380	0.01 – 0.03	0.014 – 0.016

**Cumulative figures*

11.9 Projection of EV Charging infrastructure

The number of chargers required is projected on the basis of total power demand required for charging electric vehicles and assumed utilization rate. Accordingly, the numbers of chargers projected is around 115 by FY 2030 which would further increase to around 300 EV chargers by FY 2035.

The projected number of chargers for deployment is mentioned in the table below:

Table 18: Projected number of chargers required for public charging stations & bus depots by 2030

Charger Rated Capacity	kW	e-2W	e-3W (P)	e-4W (Pvt)	e-4W (Com)	e-Bus	Total chargers
LEV AC	10 (3.3 x 3)	19	6				25
IS-17017-2-6/7	12	24	6				30
CCS II	60			12	33		45
CCS II	180					28	28
Total		43	12	12	33	28	128

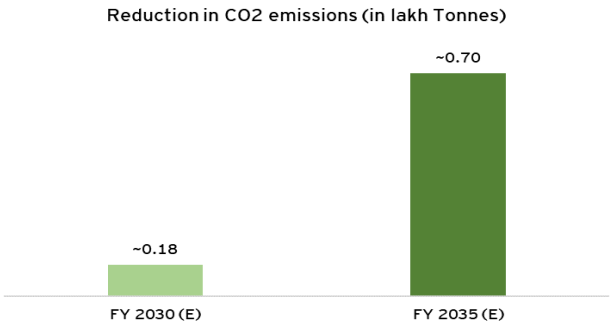
Table 19: Projected number of chargers required for public charging stations & bus depots by 2035

Charger Rated Capacity	kW	e-2W	e-3W (P)	e-4W (Pvt)	e-4W (Com)	e-Bus	Total chargers
LEV AC	10 (3.3 x 3)	54	11				65
IS-17017-2-6/7	12	68	11				79
CCS II	60			38	92		130
CCS II	180					36	36
Total		122	22	38	92	36	310

11.10 Impact on GHG emissions

The link between decarbonization and the evolving vehicle landscape in Shillong is clear and significant. Projections indicate that the transition from Internal Combustion Engine (ICE) vehicles to Electric Vehicles (EVs) could lead to a reduction in emissions ranging from 0.1 to 0.2 lakh tons by FY 2030. This noteworthy estimate is poised to experience a significant upsurge by FY 2035, culminating in a remarkable reduction in CO_2 emissions spanning from 0.6 lakh to 0.8 lakh tons.

Graph 37: Reduction in CO2 emissions (in lakh Tonnes)



Emissions savings by electric vehicles

(EV vehicle volume
X
Daily run km
X
Emission norms ($kgCO_2$/km)
X
No. of operational days) / 10^3

Emissions generated at source by EVs

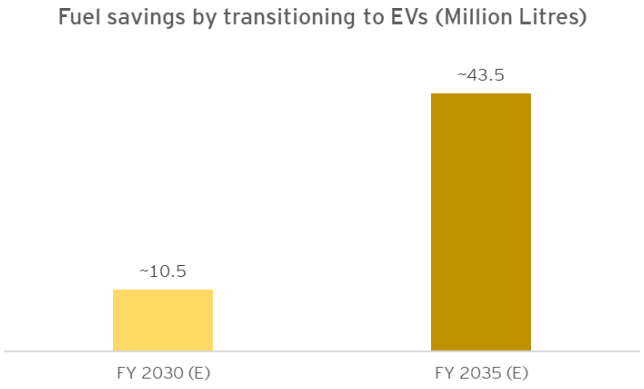
(EV volume
X
Daily battery requirements mode
X
Emission norms ($kgCO_2$/km)
X
No. of operational days) / 10^3

Reduction in CO_2 emissions

11.11 Impact on oil savings

The transition to EVs offers Shillong a transformative opportunity to reduce oil consumption and enhance energy security. With a growing vehicular population, EV adoption can help curtail reliance on fossil fuels, address environmental challenges. Projections for EV adoption across different segments suggests significant fuel savings by 10.5 million liters FY 2030, with further growth to approximately 43.5 million liters by 2035.

Graph 38: Fuel savings by transitioning to EVs (Million Litres)



Fuel savings by transitioning to EVs (Million Liters)

((EV volume
X
(Daily run km
/
Average mileage)
X
No. of operational days))
/
10^6

12

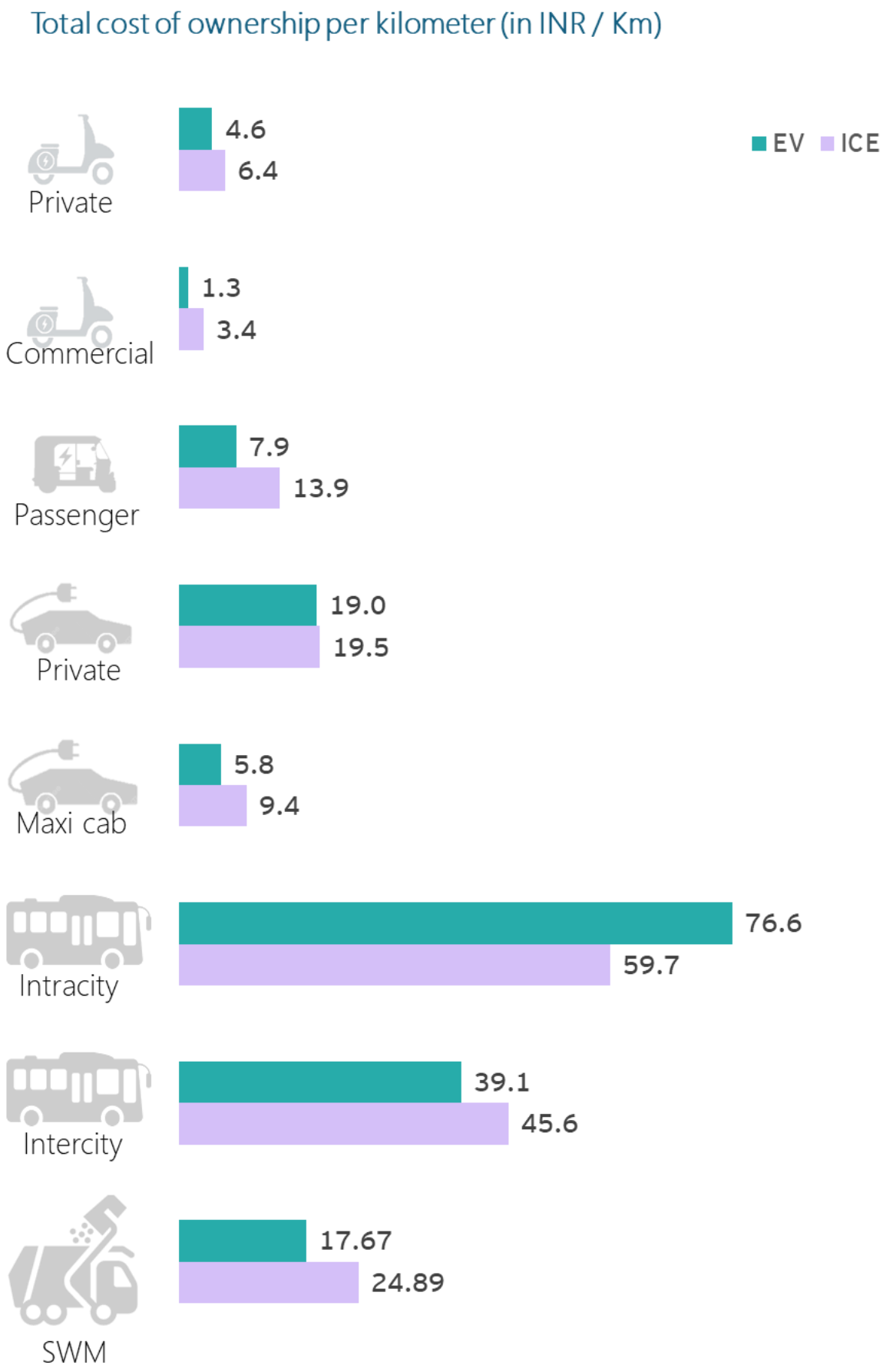
Estimating
Total Cost of Ownership

The total cost of ownership (TCO) of a vehicle encapsulates both present and future expenses associated with owning and operating it over its lifespan. This comprehensive analysis relies on carefully chosen assumptions to forecast the vehicle's usage patterns and its corresponding costs. Key components of TCO include capital expenditure, operational costs, and maintenance expenses. Operational costs entail fuel expenses, while maintenance costs cover repair and maintenance (R&M) expenditures. The salvage value of the vehicle at the conclusion of its life cycle is determined by assessing its depreciation over time due to usage and market inflation.

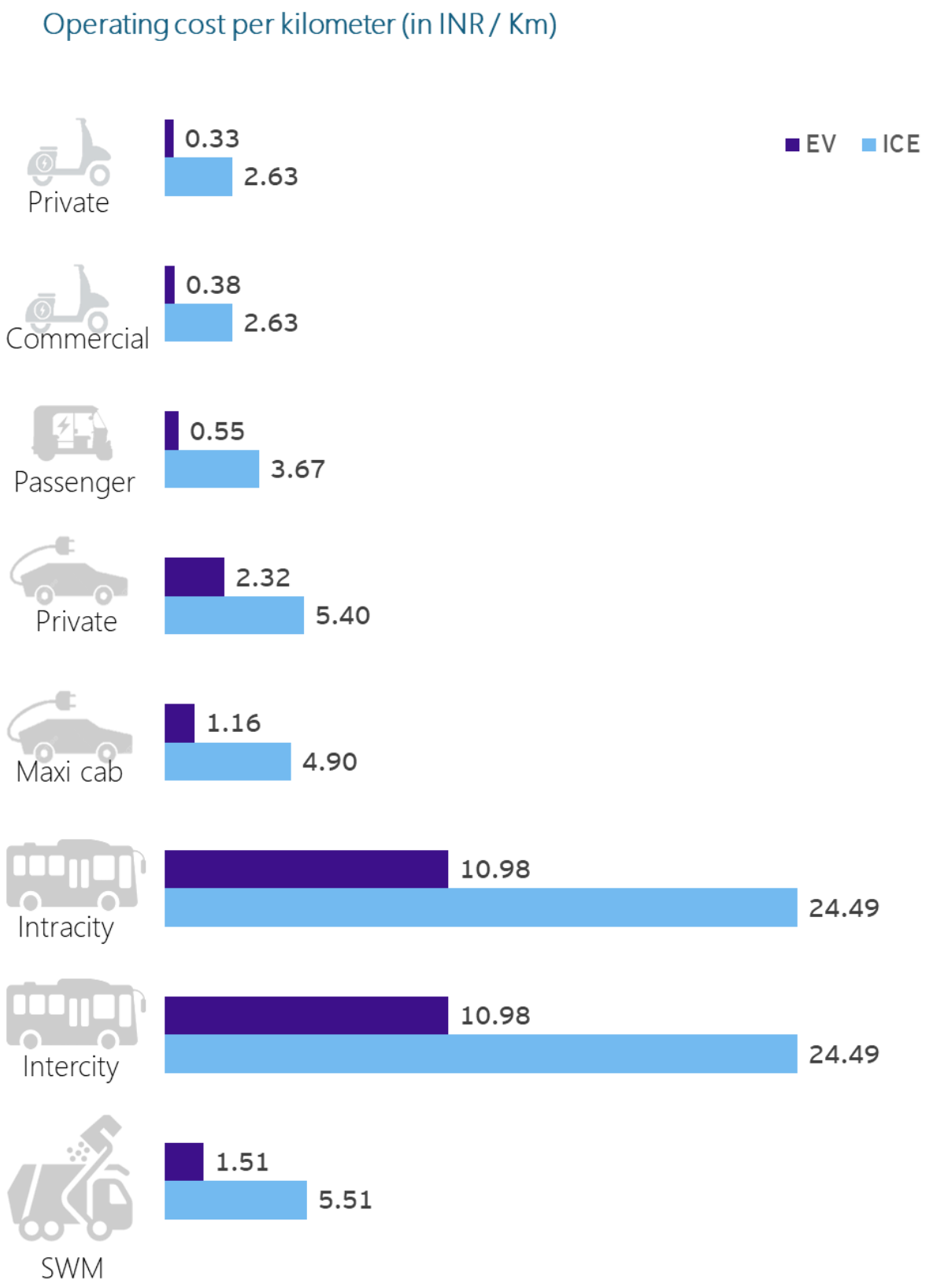
The parameters are comprehensively explained below:

- **Purchase Price:** This is the initial cost of buying the vehicle, which includes the negotiated price, taxes, registration fees, and any additional charges.
- **Depreciation:** Depreciation represents the decrease in the vehicle's value over time due to factors such as age, mileage, wear and tear, and market conditions. It is one of the most significant costs of vehicle ownership.
- **Fuel Costs:** The amount spent on fuel over the vehicle's lifetime depends on its fuel efficiency, the distance driven, and fuel prices.
- **Maintenance and Repairs:** Regular maintenance such as oil changes, tire rotations, brake replacements, and repairs for wear and tear are ongoing costs associated with vehicle ownership.
- **Insurance:** Insurance premiums vary depending on factors such as the vehicle's make and model, the driver's age and driving record, location, coverage options, and deductibles.
- **Financing Costs:** If the vehicle is financed through a loan, the interest payments and any financing fees are part of the TCO.

Graph 39: Total cost of ownership across lifetime (in INR)

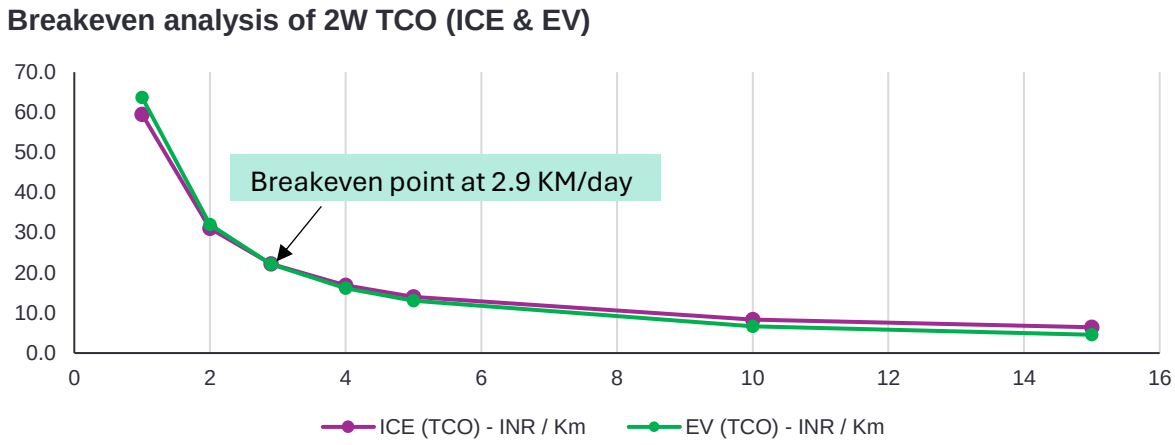


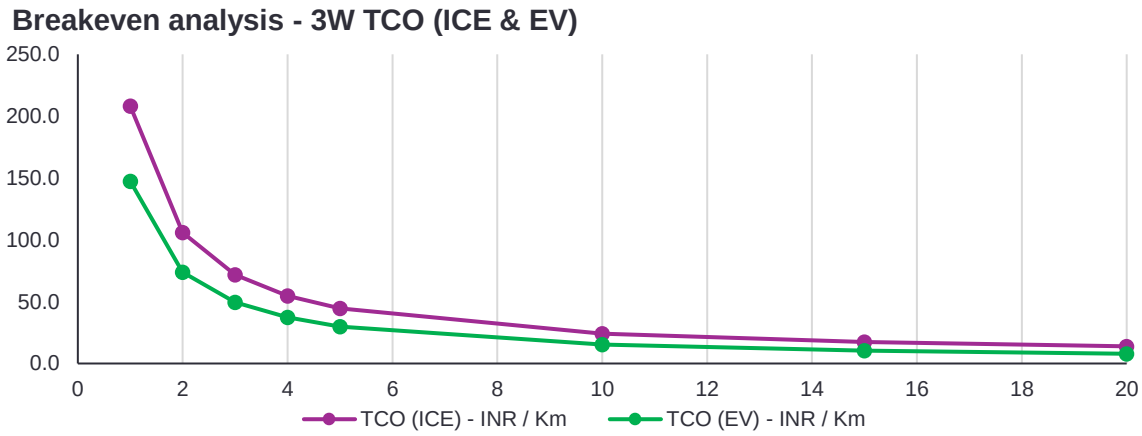
Graph 40: Operating cost per kilometer (in INR)



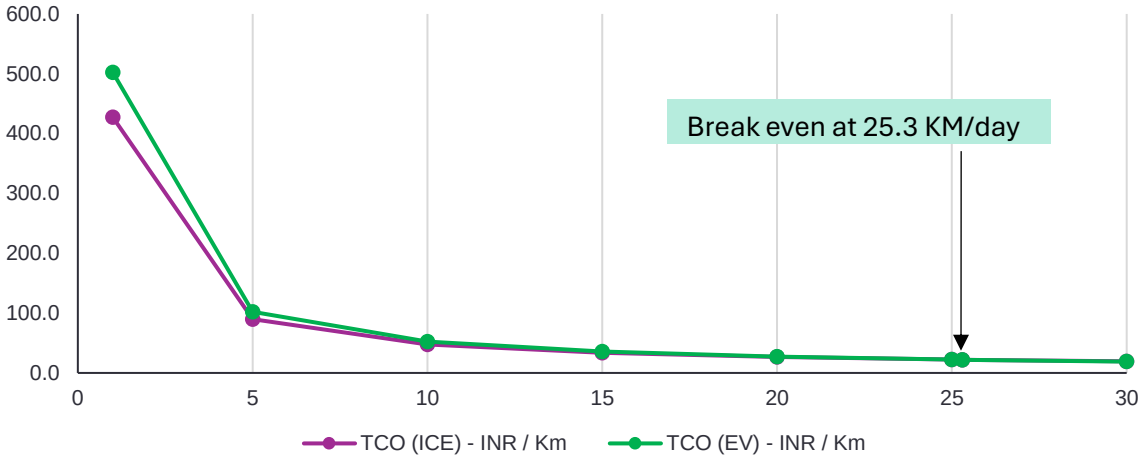
Breakeven Analysis of different vehicle segments:

A Total Cost of Ownership (TCO) breakeven analysis shows that EVs' lower operating costs can offset their higher upfront price over time. The breakeven point depends on factors like fuel prices, electricity costs, and driving patterns.

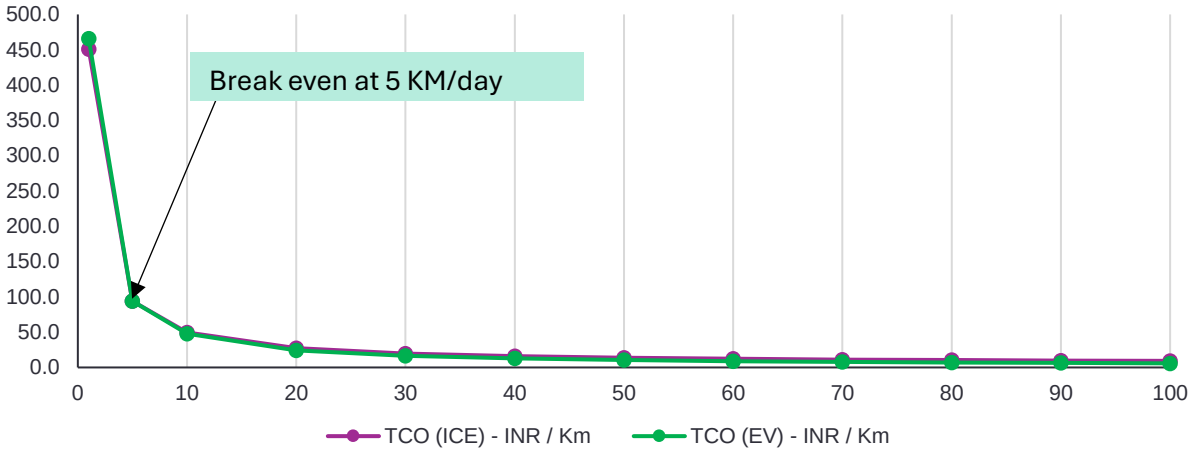




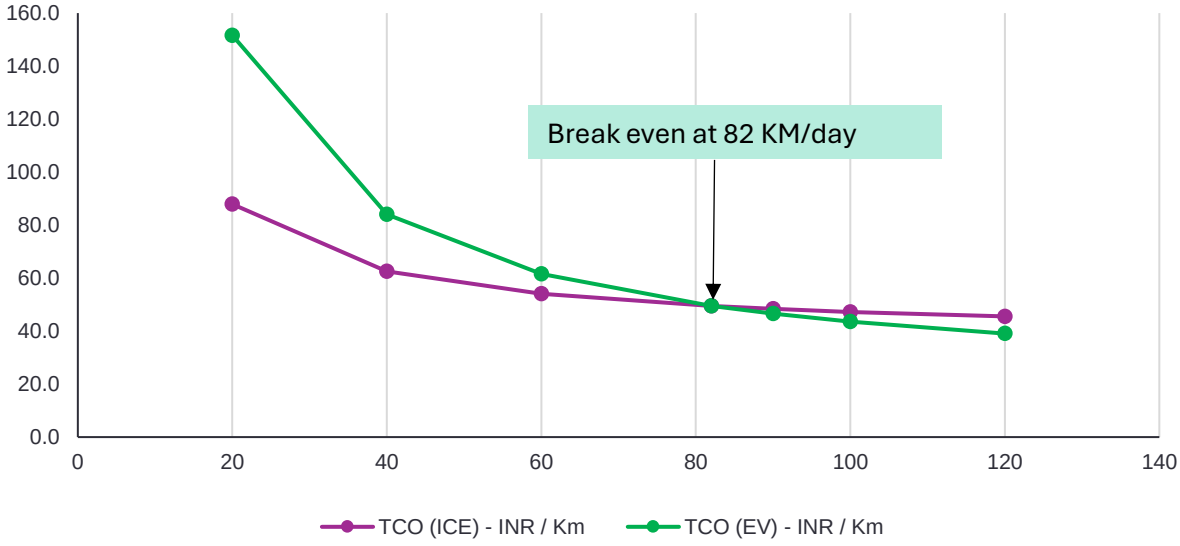
Breakeven analysis - Private 4W TCO (ICE & EV)

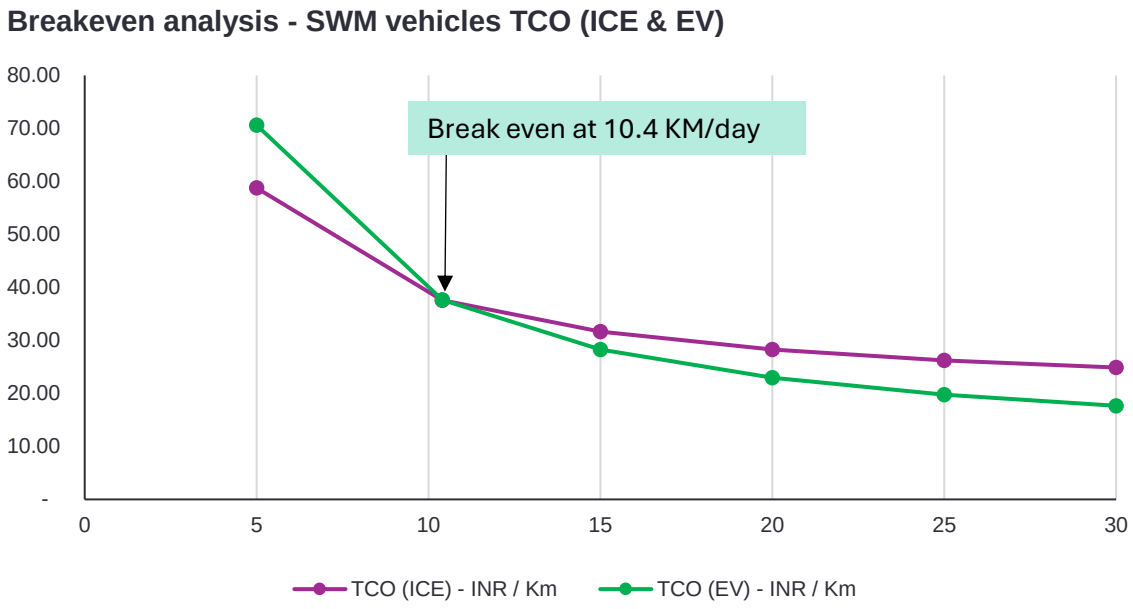


Breakeven analysis - Maxi cabs 4W TCO (ICE & EV)



Breakeven analysis - Bus TCO (ICE & EV)





Graph 41: Break-even analysis of all vehicle segments

- Two-Wheelers: Breakeven for both private and commercial two-wheelers is same i.e., at 2.9 kilometer. as the type of vehicle used is not different for the two categories. This is without subsidy, with subsidy the breakeven is anticipated to be even lower. The difference can be seen in total cost of ownership due to high per day running kilometers of a commercial two-wheeler.
- Three-Wheelers: Three-wheelers are cost-efficient sine the first kilometer even without subsidy as the difference in capital cost is not drastic while the operation cost is very low for electric variant.
- Four-Wheelers (Private): Breakeven at 25.5 km/day without subsidy.
- Four-Wheelers (Maxi cabs): Breakeven at 5 km/day without subsidy.
- Buses: Breakeven for both intracity and intercity buses is at 82 km/day with subsidy. There is no difference in breakeven as bus model is same in both categories.
- SWM vehicles: Breakeven at 10.4 km/day without subsidy.

**Only Meghalaya State EV Policy subsidy considered for calculation of TCO*

13

EV Charging Infrastructure

& Location Assessment

In Shillong, ambitious plans were outlined to promote electric mobility and establish a robust EV charging infrastructure. The Power Grid Corporation of India (POWERGRID) had proposed the installation of 11 EV charging stations (EVCS) across the city, aiming to enhance the availability of charging facilities and support the shift to electric vehicles.

The plan included strategically placing five public EVCS and six at government establishments. These stations were to feature a mix of 15 kW DC fast chargers and high-speed 100 kW CCS-2/CHAdeMO chargers, amounting to 66 charging points across Shillong. This diverse setup was designed to accommodate various EV types and provide convenient charging access for residents, commuters, and visitors. However, despite the initial enthusiasm and detailed planning, the implementation of this initiative was not realized, leaving Shillong's EV infrastructure goals unmet.

These efforts are part of Shillong's broader strategy to foster electric mobility, reduce air pollution, and align with national sustainability goals. The city's infrastructure development is in response to growing EV adoption in India, and these stations will help alleviate concerns such as range anxiety by providing reliable charging options[22].

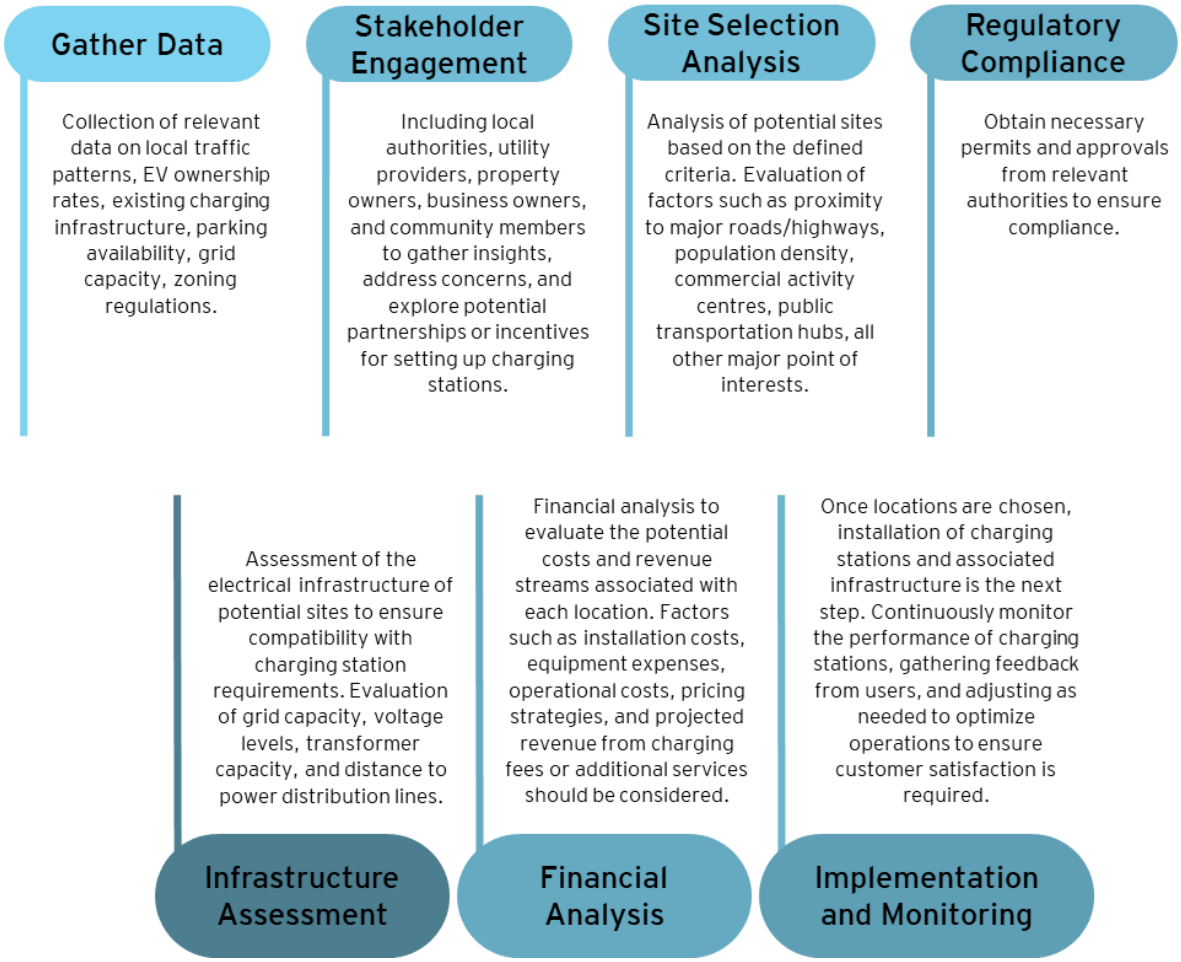
13.1 Need for location assessment for setting up of EVCI

- Accessibility and Convenience: The location should be easily accessible. It should be strategically placed along commonly used routes or near major point of interests. This accessibility encourages more EV adoption and ensures drivers can charge their vehicles conveniently during their daily activities.
- Infrastructure Compatibility: Assessing the location involves considering the existing infrastructure such as electrical grids and utility connections. Ensuring that the location can support the power demands of charging stations without overloading the grid or requiring extensive upgrades is essential for the station's efficient operation
- Parking Availability: Availability of parking space is critical for EV charging stations, especially for longer charging sessions. Locations with ample parking space or dedicated EV parking spots are preferable to accommodate EV drivers.
- Safety and Security: The safety and security the charging station and EV owners is critical. Assessing the location involves considering factors such as adequate lighting, visibility, and proximity to emergency services to ensure a safe charging experience for users.
- Regulatory Compliance and Permits: Assessing the location involves obtaining necessary permits and ensuring compliance with local regulations.
- Business Viability: For public charging stations, assessing the location includes evaluating the potential for generating revenue and achieving profitability. Factors such as nearby amenities, expected footfall, and competitive landscape play a crucial role in determining the station's business viability.

[22] https://indiainfrahub.com/news/power-grid-corporation-to-build-11-electric-vehicle-charging-stations-in-meghalayas-shillong/

13.2 Approach for location assessment for setting up EVCI

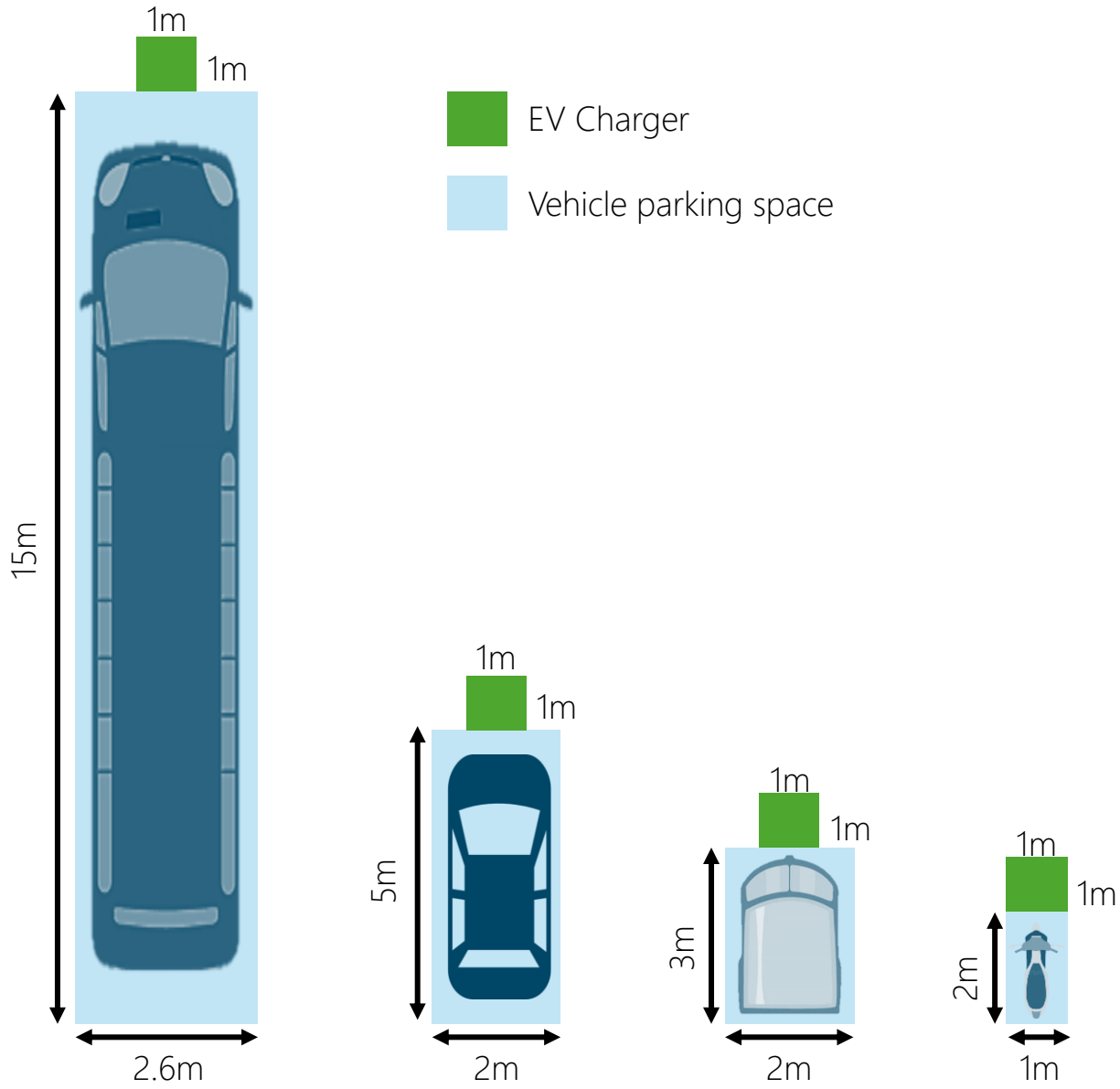
To systematically assess locations for setting up Electric Vehicle (EV) charging stations, the following approach can be employed



13.3 EV ready Parking space requirements

EV parking spaces are designated areas with charging stations, offering convenient locations for EV owners to charge while shopping, working, or residing. These spaces support EV adoption with features like reserved parking, proximity to entrances, and accessibility accommodations. Key considerations include:

- Clearance: Extra 3–4 feet (1 meter) for charging cable access and wheelchair accessibility.
- Height: Minimum clearance of 8–10 feet (2.4–3 meters) for covered parking.
- Signage: Clear markings and signs to reserve spaces for EVs and prevent misuse.



13.4 Location assessment for mapping potential EVCI locations

The process of mapping existing EV charging infrastructure involves four steps:

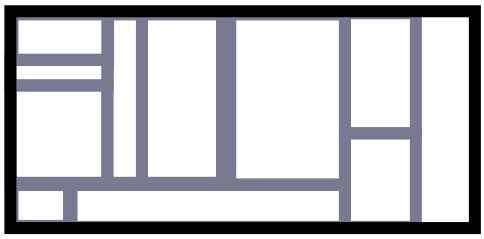
- Step 1 - City Boundary Mapping: Delineate Shillong's city boundary to establish the geographical scope.
- Step 2 - Identification of Key Points of Interest: Identify and mark major points of interest, including significant government buildings and key stakeholders' facilities and existing EV charging station, to ensure comprehensive coverage.

By executing the first two steps, valuable insights into the current EV charging infrastructure landscape can be gained. Moreover, this comprehensive mapping approach enables to project future requirements for EV charging infrastructure based on demand and availability trends.

- Step 3 – Heat map representing the demand areas for EVCI installation
- Step 4 – Identify potential EV charging infrastructure implementation locations

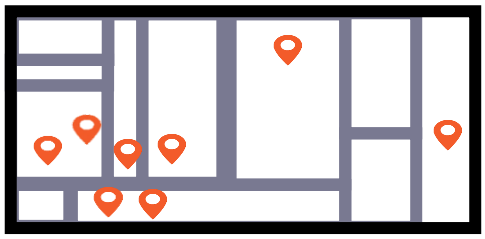
STEP 1

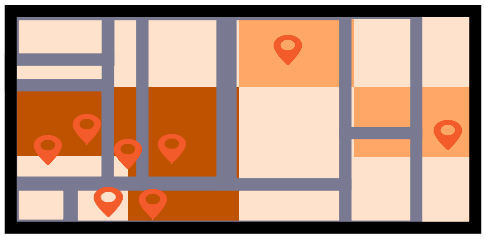
Delineation of city boundary



STEP 2

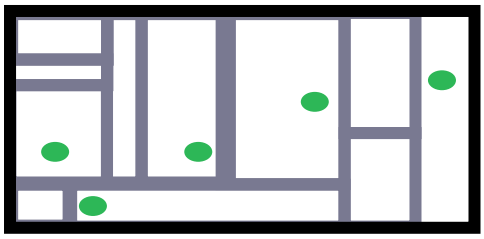
Identification of Point of Interests





STEP 3

Generation of heatmap of demand zones of EVCI installation



STEP 4

Identification of potential sites for EVCI installation

Step 1: City Boundary mapping

Shillong's Municipal Board manages an area of 64.6 square kilometers. Key highways, including NH6, NH44, NH40 (which connects to Guwahati) and NH27, pass through and surround the city, playing a crucial role in connecting Shillong to other parts of Meghalaya and neighboring states. These highways are vital for both local and regional traffic, impacting the flow of goods and passengers.

Step 2: Identification of Key Point of Interest

Transport hubs in Shillong

Figure 9: Transport hubs in Shillong

Major Government offices

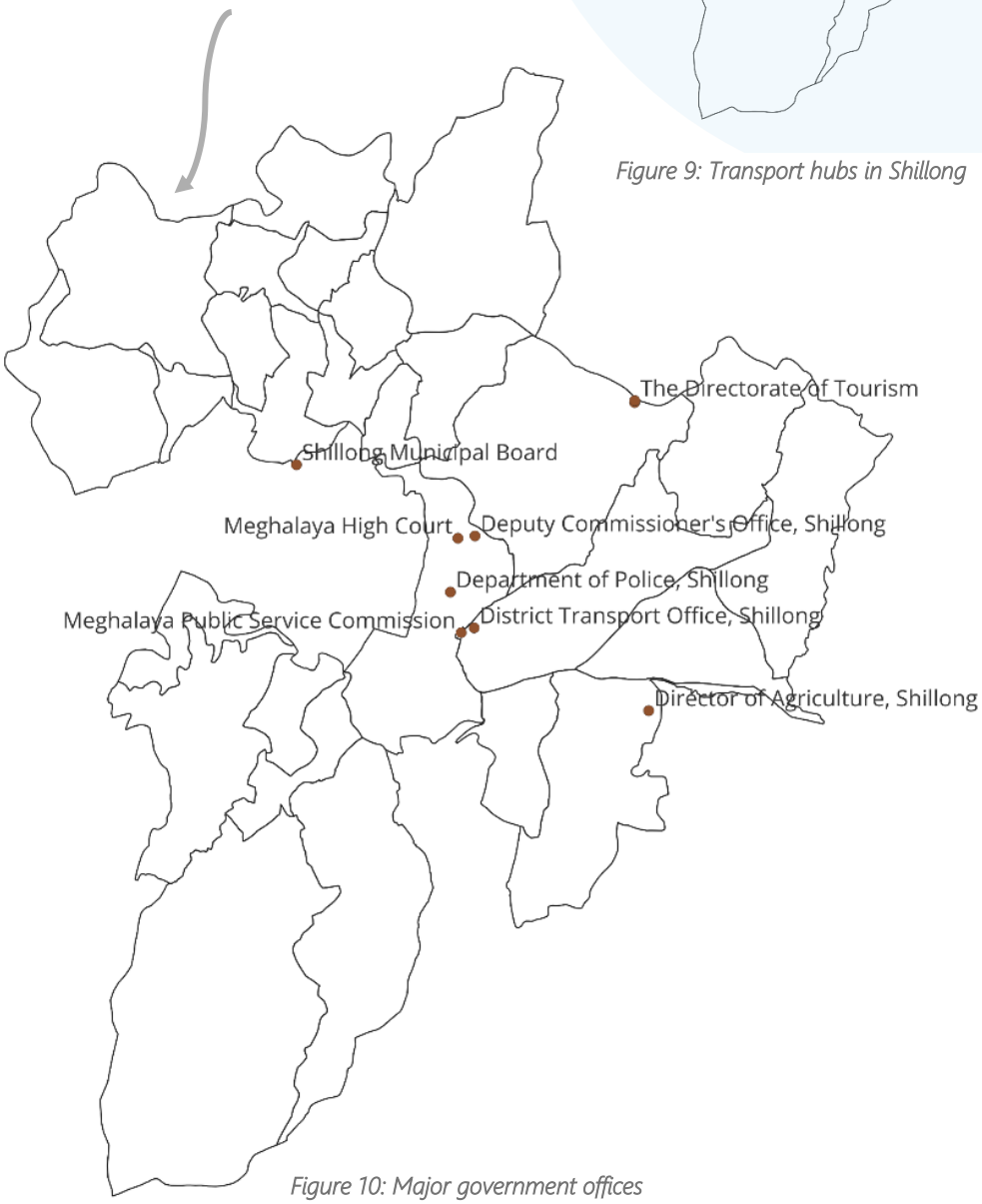


Figure 10: Major government offices

Figure 11: Malls in Shillong

Figure 12: Public parking lots

Figure 13: Five-star hotels

33/11kV substations in Shillong

Figure 14: 33/11kV substations

Figure 16: Existing EVCI in Shillong

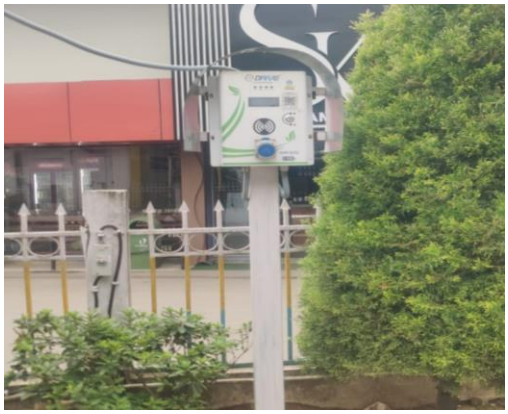
13.5 Analyzing usage, charging pattern and power demand of existing charging stations

1. Demsieniong, Shillong

Sr. No.	CPO	Charger type	Charger rating (kW)	Number of Chargers	Remark
1	IOCL	LEV AC	3.3	1	Installed, not commissioned yet

2. Demsiong

Sr. No.	CPO	Charger type	Charger rating (kW)	Number of Chargers	Remark
2	IOCL	LEV AC	3.3	1	Installed, not commissioned yet

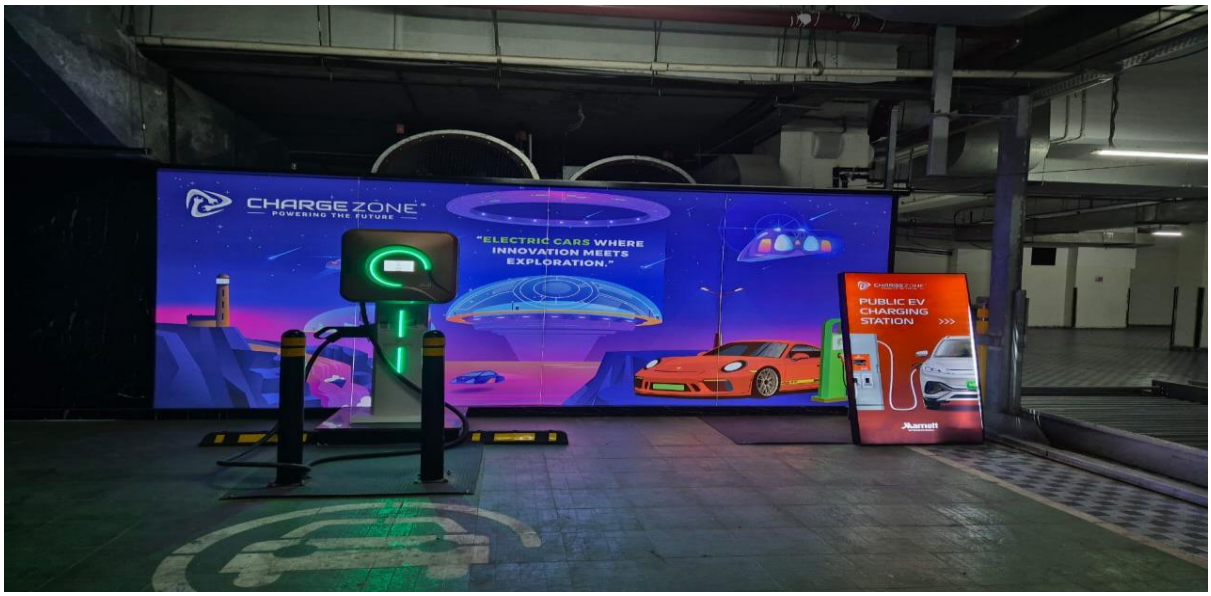


3. Vivanta by Taj

Sr. No.	CPO	Charger type	Charger rating (kW)	Number of Chargers	Remark
1	Tata Power	CCS II	30	1	Installed and operational

4. JW Marriott

Sr. No.	CPO	Charger type	Charger rating (kW)	Number of Chargers	Remark
1	ChargeZone+	CCS II	30	1	Installed and operational



Step 3: Heatmap of all Point of Interests (PoI)

This heatmap provides a visual representation of the concentration of points of interest across a grid with dimensions of 1km x 1km. Each point of interest is assigned a normalized weight, indicating its significance or frequency within the dataset, ranging from 0 to 1. The color scale employed in the heatmap ranges from red to green which is based on proximity of each point of interest of 1km, with varying shades representing different weight values. Yellow hues signify areas with lower weightage or fewer points of interest, gradually transitioning to red, which indicates higher weightage or a denser concentration of points.

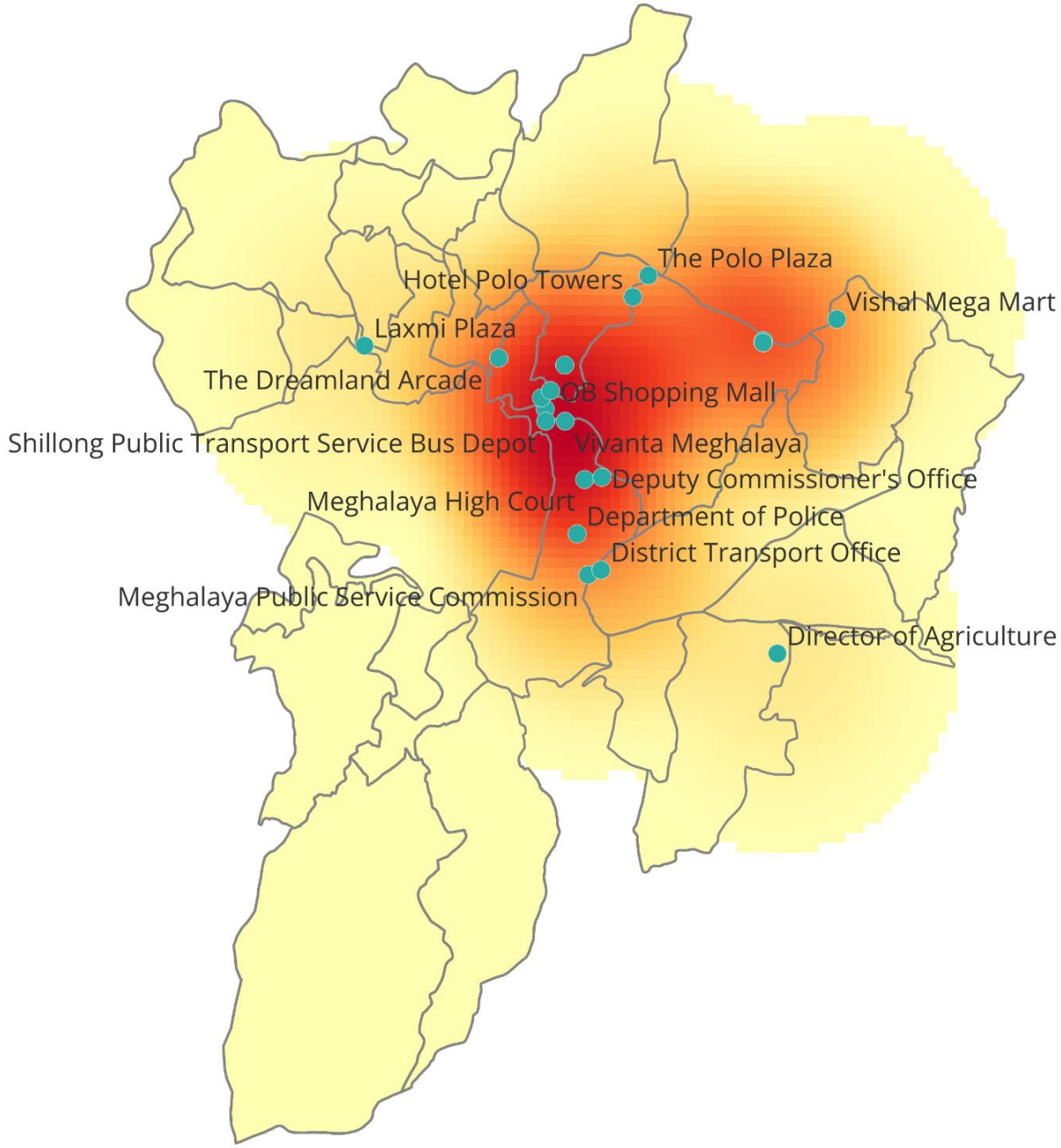


Figure 17: Heat map of EVCI demand region in Shillong

Step 4: Potential locations for setting up E charging infrastructure for different vehicle segment

Figure 18: Potential locations for setting up EVCI

13.6 PUBLIC CHARGING STATION'S LOCATIONS

The identification of Electric Vehicle Charging Station locations was guided by a heat map and satellite images, offering insights into site distribution. On-site reconnaissance surveys were then conducted to assess factors like accessibility, parking, power proximity, and logistical challenges.

Public Parking lots

1. Dhanketi Malki Parking

Site location address	Dhanketi, Malki ,Shillong
Latitude	25.565598
Longitude	91.893243
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Free Parking
Whether the location is open to public (24x7) or restricted operating hours.	10 AM- 10 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	Concrete
Visibility from Road/Highway	Yes
Distance from Road/Highway	Roadside Parking
Whether space is suitable for accessibility of M/HDVs	No
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W- 2 Nos
	2W-3 Nos
Total no. of parking capacity in parking area	4W – 15 no.
	2W- 20 No.
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	Yes
Public amenities available nearby.	No
Suitability for solar installation (canopy structures)	Yes
Ownership of the land and its maintenance agency.	Shillong Municipal Board

2. Municipal Parking, Laitumkhrah Main Road

Site location address	Municipal Parking, Laitumkhrah Main Road
Latitude	25.750955
Longitude	91.897397
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Free Parking
Whether the location is open to public (24x7) or restricted operating hours.	Yes
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	concrete
Visibility from Road/Highway	Yes
Distance from Road/Highway	Main Road
Whether space is suitable for accessibility of M/HDVs	No
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	2W-2-3Nos
Total no. of parking capacity in parking area	2W- 15
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	High
Public amenities available nearby.	No
Suitability for solar installation (canopy structures)	Yes
Ownership of the land and its maintenance agency.	Shillong Municipal Board
Existing Sanctioned Load	637 kW
Transformer Supply (rating)	250 kVA
Other information, if any	The existing DTR can't support the 50 kW charging load as the sanctioned load already exceeds its capacity. A dedicated substation is mandatory.

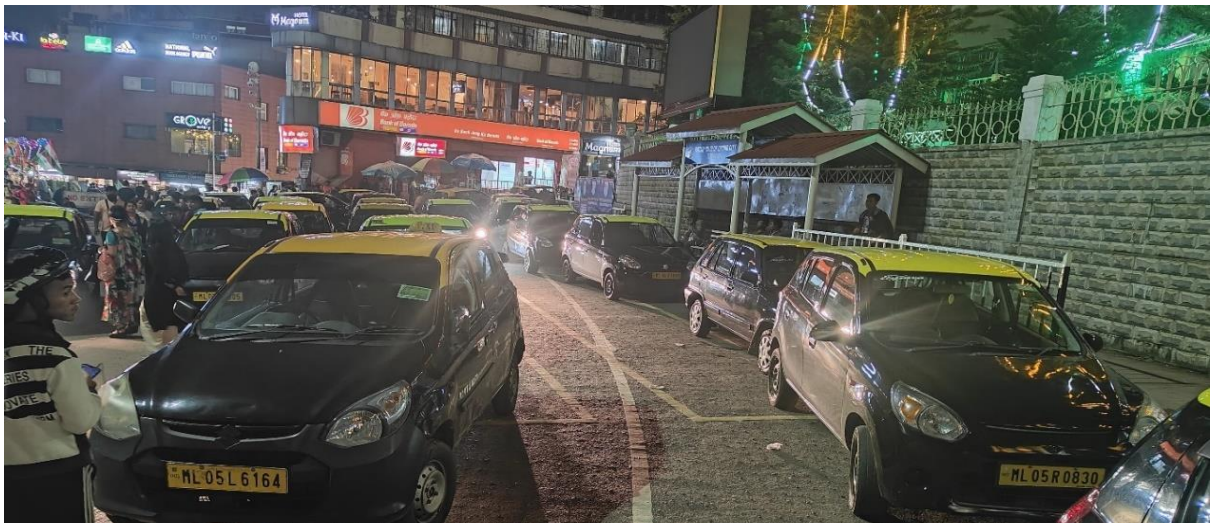
3. Municipal parking, Police Bazar near Hotel Pegasus

Site location address	Municipal parking, Police Bazar near Hotel Pegasus
Latitude	25.576149
Longitude	91.883703
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Paid
Whether the location is open to public (24x7) or restricted operating hours.	8:00AM- 10:00 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	concrete
Visibility from Road/Highway	Yes
Distance from Road/Highway	Main Road
Whether space is suitable for accessibility of M/HDVs	NA
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	2W- 2 Nos
Total no. of parking capacity in parking area	2W- 30
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	High
Public amenities available nearby.	No
Suitability for solar installation (canopy structures)	No (Direction & shadow issues)
Ownership of the land and its maintenance agency.	Shillong Municipal Board

4. Municipal parking, near OB Shopping Mall

Site location address	Municipal parking near OB Shopping Mall
Latitude	25.576237
Longitude	91.883651
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Paid
Whether the location is open to public (24x7) or restricted operating hours.	8:00AM- 10:00 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	concrete
Visibility from Road/Highway	Yes
Distance from Road/Highway	Main Road
Whether space is suitable for accessibility of M/HDVs	NA
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	2W- 4 Nos
Total no. of parking capacity in parking area	2W- 50
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	High
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	Yes
Ownership of the land and its maintenance agency.	Shillong Municipal Board

5. Municipal parking, near Taj by Vivanta Hotel



Site location address	Municipal parking near Taj by Vivanta Hotel
Latitude	25.575959
Longitude	91.883022
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Paid
Whether the location is open to public (24x7) or restricted operating hours.	8:00AM- 10:00 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	concrete
Visibility from Road/Highway	Yes
Distance from Road/Highway	Main Road
Whether space is suitable for accessibility of M/HDVs	NA
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W- 1 Nos
Total no. of parking capacity in parking area	4W- 20 Nos
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	High
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	Yes
Ownership of the land and its maintenance agency.	Shillong Municipal Board

6. Municipal parking, Umsohsun

Site location address	Municipal parking, Umsohsun
Latitude	25.577878
Longitude	91.880083
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Paid
Whether the location is open to public (24x7) or restricted operating hours.	8:00AM- 10:00 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	concrete
Visibility from Road/Highway	Yes
Distance from Road/Highway	10 meters
Whether space is suitable for accessibility of M/HDVs	NA
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W- 1 Nos
Total no. of parking capacity in parking area	4W- 10
	2W- 20
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	High
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	No
Ownership of the land and its maintenance agency.	Shillong Municipal Board

7. Municipal parking, Iewduh Market

Site location address	Municipal parking, Iewduh Market
Latitude	25.575618
Longitude	91.87166
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Paid
Whether the location is open to public (24x7) or restricted operating hours.	8:00AM- 10:00 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	concrete
Visibility from Road/Highway	Yes
Distance from Road/Highway	100 meters
Whether space is suitable for accessibility of M/HDVs	100 meters
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W-8 Nos
Total no. of parking capacity in parking area	4w- 100
	2W- 50
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	Low
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	Yes
Ownership of the land and its maintenance agency.	Shillong Municipal Board

8. Municipal parking, Laitumkhrah opposite Eldorado Guest House

Site location address	Municipal parking, Laitumkhrah opposite Eldorado Guest House
Latitude	25.566832
Longitude	91.89077
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Paid
Whether the location is open to public (24x7) or restricted operating hours.	8:00AM- 6:00 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	concrete
Visibility from Road/Highway	Yes
Distance from Road/Highway	10 m
Whether space is suitable for accessibility of M/HDVs	10 m
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W-2Nos
Total no. of parking capacity in parking area	4w- 20
	2W- 30
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	high
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	Yes
Ownership of the land and its maintenance agency.	Shillong Municipal Board
Existing Sanctioned Load	637 kW
Transformer Supply (rating)	250 kVA
Other information, if any	The existing DTR can't support the 50 kW charging load as the sanctioned load already exceeds its capacity. A dedicated substation is mandatory.

9. Municipal parking, Dhanketi

Site location address	Municipal parking, Dhanketi
Latitude	25566711
Longitude	91889836
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Paid
Whether the location is open to public (24x7) or restricted operating hours.	8:00AM- 6:00 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	concrete
Visibility from Road/Highway	Yes
Distance from Road/Highway	5m
Whether space is suitable for accessibility of M/HDVs	5m
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W-2Nos
Total no. of parking capacity in parking area	4w- 25
	2W- 30
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	High
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	Yes
Ownership of the land and its maintenance agency.	Shillong Municipal Board

10. Shillong Recreation Ground Trust

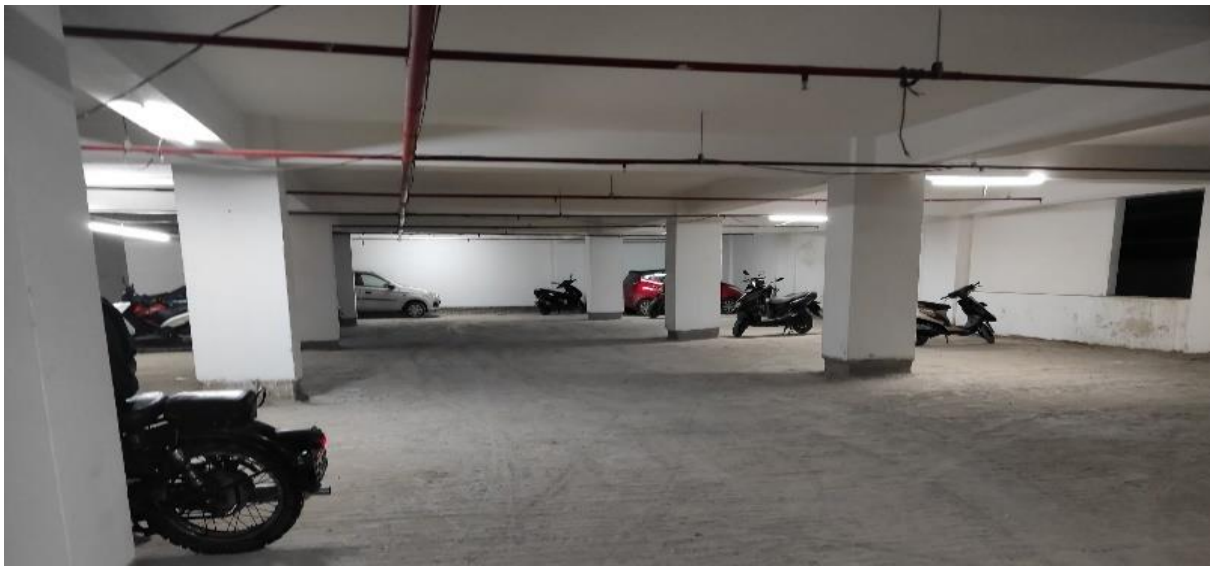
Site location address	Shillong Recreation Ground Trust, Polo
Latitude	25.582754
Longitude	91.88895
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Paid Parking
Whether the location is open to public (24x7) or restricted operating hours.	5:00 AM- 7 :00 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	concrete
Visibility from Road/Highway	Yes
Distance from Road/Highway	Main Road
Whether space is suitable for accessibility of M/HDVs	Yes
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W-8 Nos
	2W-5-10 Nos
Total no. of parking capacity in parking area	4W- 200
	2W- 300-400
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	High
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	Yes
Ownership of the land and its maintenance agency.	Shillong Recreation Ground Trust

Malls and eateries:

11. Zudio Shopping Mall

Site location address	Fire brigade, Laitumkhrah, Shillong
Latitude	25.565951
Longitude	91.899117
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	No
Type of parking (free parking or paid parking operated by parking concessionaire)	Free Parking to users
Whether the location is open to public (24x7) or restricted operating hours.	10- 9 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	Tiles
Visibility from Road/Highway	No
Distance from Road/Highway	20m
Whether space is suitable for accessibility of M/HDVs	No
Number of parking spaces possible to be allocated for EV charging stations	4W-2 Nos
	2W-3- 5 Nos
Total no. of parking capacity in parking area	4W- 10-15 Nos
	2W- 20-25 Nos
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	Low
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	No
Ownership of the land and its maintenance agency.	Zudio Shopping Mall
Existing Sanctioned Load	1091 kW
Transformer Supply (rating)	500 kVA
Existing load availability on transformer	166 kVA
Other information, if any	The existing DTR can't support the 50 kW charging load as the sanctioned load already exceeds its capacity. A dedicated substation is mandatory.

12. Shoppers Stop, Lachumiere



Site location address	Shoppers stop, Lachumiere
Latitude	25.569204
Longitude	91.884373
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Paid Parking
Whether the location is open to public (24x7) or restricted operating hours.	10 AM- 7 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	Concrete Road
Visibility from Road/Highway	Yes
Distance from Road/Highway	30 m
Whether space is suitable for accessibility of M/HDVs	No
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W- 5 Nos
	2W-10 Nos
Total no. of parking capacity in parking area	4W- 30 Nos
	2W- 40 No.
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	Low
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	No
Ownership of the land and its maintenance agency.	Shoppers Stop
Existing Sanctioned Load	45.44 kVA
Transformer Supply (rating)	463 kVA
Existing load availability on transformer	417.56 kVA

13. City Hut Dhaba

Site location address	City Hut Dhaba, Oakland Rd, Police Bazar
Latitude	25.577771
Longitude	91.885151
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Free Parking
Whether the location is open to public (24x7) or restricted operating hours.	10 AM- 9 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	Tiles Block
Visibility from Road/Highway	Yes
Distance from Road/Highway	50 m
Whether space is suitable for accessibility of M/HDVs	No
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W- 1 Nos
	2W-2 Nos
Total no. of parking capacity in parking area	4W- 10 Nos
	2W- 20 No.
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	Low
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	Yes
Ownership of the land and its maintenance agency.	City Hut Dhaba
Existing Sanctioned Load	35 kVA
Transformer Supply (rating)	47 kVA
Existing load availability on transformer	8 kVA
Other information, if any	During Festival times transformer gets overloaded

Hospitals:

14. Civil hospital

Site location address	Civil hospital, Lachumiere
Latitude	25.568101
Longitude	91.881403
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Free Parking for users
Whether the location is open to public (24x7) or restricted operating hours.	6 AM- 10 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	Blocks
Visibility from Road/Highway	Yes
Distance from Road/Highway	Roadside Parking
Whether space is suitable for accessibility of M/HDVs	No
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W- 3 Nos
	2W-4 Nos
Total no. of parking capacity in parking area	4W- 20 to 35 Nos
	2W- 30 No.
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	Yes
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	No
Ownership of the land and its maintenance agency.	Civil Hospital

15. North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences

Site location address	Mawdiangdiang
Latitude	25.592863
Longitude	91.938667
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	No
Type of parking (free parking or paid parking operated by parking concessionaire)	Free parking
Whether the location is open to public (24x7) or restricted operating hours.	5:00AM- 10:00 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	Concrete Block
Visibility from Road/Highway	Yes
Distance from Road/Highway	Main Road
Whether space is suitable for accessibility of M/HDVs	50 meters
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W-7 Nos
	2W- 10
Total no. of parking capacity in parking area	4W- 250
	2W- 300
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	High
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	Yes
Ownership of the land and its maintenance agency.	Smart City Township Development Agency
Existing Sanctioned Load	2 MVA
Transformer Supply (rating)	20 MVA
Existing load availability on transformer	18 MVA

Institutions:

16. Moreu Institute of Integral Training

Site location address	Moreu Institute of Integral Training
Latitude	25.565852
Longitude	91.893415
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Free Parking
Whether the location is open to public (24x7) or restricted operating hours.	10 AM- 9 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	Tiles
Visibility from Road/Highway	Yes
Distance from Road/Highway	20 m
Whether space is suitable for accessibility of M/HDVs	No
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W- 4 Nos
	2W-5 to 8 Nos
Total no. of parking capacity in parking area	4W- 30-50 Nos
	2W- 25-50 Nos
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	Low
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	No
Ownership of the land and its maintenance agency.	MIIT

17. Memorial Museum

Site location address	Memorial museum, Lachumiere
Latitude	25.568683
Longitude	91.8841
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Free Parking
Whether the location is open to public (24x7) or restricted operating hours.	10AM- 5 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	Concrete Road
Visibility from Road/Highway	Yes
Distance from Road/Highway	10 m
Whether space is suitable for accessibility of M/HDVs	No
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W- 2 Nos
	2W- Nos
Total no. of parking capacity in parking area	4W- 20 Nos
	2W- 30 No.
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	Yes
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	Yes
Ownership of the land and its maintenance agency.	Memorial Museum

18. High Court

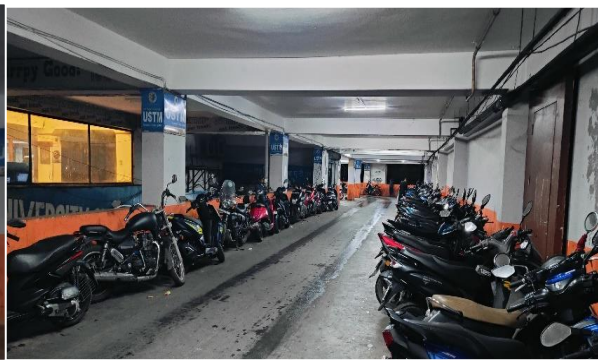
Site location address	High court, European Ward MG Road
Latitude	25.573125
Longitude	91.884373
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Free Parking for employees
Whether the location is open to public (24x7) or restricted operating hours.	10 AM- 5 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	Tiles Block
Visibility from Road/Highway	Yes
Distance from Road/Highway	20m
Whether space is suitable for accessibility of M/HDVs	No
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W- 3 Nos
	2W-3 Nos
Total no. of parking capacity in parking area	4W- 30 Nos
	2W- 40 No.
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	High
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	Yes
Ownership of the land and its maintenance agency.	High Court

19. Arts and Culture Department, Government of Meghalaya

Site location address	Mawdiangdiang (LARITI)
Latitude	25.591705
Longitude	91.939013
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Free
Whether the location is open to public (24x7) or restricted operating hours.	8:00AM- 10:00 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	concrete
Visibility from Road/Highway	Yes
Distance from Road/Highway	200 meters
Whether space is suitable for accessibility of M/HDVs	200 meters
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W-2-3 Nos
Total no. of parking capacity in parking area	4w- 50
	2W- 20
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	Low
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	Yes
Ownership of the land and its maintenance agency.	Arts and Culture department, Government of Meghalaya
Existing Sanctioned Load	1700 kVA
Transformer Supply (rating)	2000 kVA
Existing load availability on transformer	300 kVA

WORKPLACE CHARGING STATIONS (Government offices):

20. Meghalaya Urban Development Agency



Site location address	MUDA, MG Road, Soso Tham Road
Latitude	25.573279
Longitude	91.884566
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Paid Parking
Whether the location is open to public (24x7) or restricted operating hours.	10 AM- 10 AM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	Tiles Block
Visibility from Road/Highway	Yes
Distance from Road/Highway	5m
Whether space is suitable for accessibility of M/HDVs	No
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W- 10 Nos
	2W-20 Nos
Total no. of parking capacity in parking area	4W- 120 to 150 Nos
	2W- 200 No.
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	Low
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	No
Ownership of the land and its maintenance agency.	MUDA

21. Meghalaya Power Distribution Corporation Limited

Site location address	MEPDCL
Latitude	25.588735
Longitude	91.887166
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Free Parking
Whether the location is open to public (24x7) or restricted operating hours.	10 AM- 5 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	concrete
Visibility from Road/Highway	No
Distance from Road/Highway	300 m
Whether space is suitable for accessibility of M/HDVs	No
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W- 4 Nos
	2W-7 Nos
Total no. of parking capacity in parking area	4W- 50 to 70 Nos.
	2W- 100 to 120 No.
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	High
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	Yes
Ownership of the land and its maintenance agency.	MEPDCL

22. Smart City Township Development Agency

Site location address	Smart City Township Development Agency, Mawdiangdiang
Latitude	25.592044
Longitude	91.937707
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Paid Parking
Whether the location is open to public (24x7) or restricted operating hours.	6:00AM- 7:00 PM
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	Cemented Block
Visibility from Road/Highway	Yes
Distance from Road/Highway	Main Road
Whether space is suitable for accessibility of M/HDVs	5 meters
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W-5 Nos
	2W- 8
Total no. of parking capacity in parking area	4W- 150
	2W- 200-250
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	High
Public amenities available nearby.	No
Suitability for solar installation (canopy structures)	No (Trees)
Ownership of the land and its maintenance agency.	Smart City Township Development Agency
Existing Sanctioned Load	100 kVA
Transformer Supply (rating)	100 kVA
Existing load availability on transformer	Overloaded
Other information, if any	Network augmentation required

23. Directorate of Local Fund office

Site location address	Directorate of Local Fund office, Lachumiere
Latitude	25.57164
Longitude	91.88742
Ease for EV user during entry and exit	Yes
Visibility of EV charging station	Yes
Type of parking (free parking or paid parking operated by parking concessionaire)	Free Parking for employees
Whether the location is open to public (24x7) or restricted operating hours.	Yes
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	No
Floor type (concrete, tiles, mud etc.) at the proposed location	concrete
Visibility from Road/Highway	Yes
Distance from Road/Highway	Main Road
Whether space is suitable for accessibility of M/HDVs	No
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	4W-2 Nos
Total no. of parking capacity in parking area	4W- 8
	2W- 2
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	High
Public amenities available nearby.	Yes
Suitability for solar installation (canopy structures)	Yes
Ownership of the land and its maintenance agency.	Government Office

24. Secretariat, Shillong

Site location address	Secretariat, Shillong
Latitude	25.570242
Longitude	91.885022
Ease for EV user during entry and exit	yes
Visibility of EV charging station	No
Type of parking (free parking or paid parking operated by parking concessionaire)	Free
Whether the location is open to public (24x7) or restricted operating hours.	No
Presently do they have any installed EV chargers/BSS - Type/Capacity/Qty/CPO details.	Shed is prepared for EVCI installation
Floor type (concrete, tiles, mud etc.) at the proposed location	Concrete
Visibility from Road/Highway	No
Distance from Road/Highway	30m
Whether space is suitable for accessibility of M/HDVs	Medium Size Vehicles can be charged
Number of parking spaces possible to be allocated for EV charging stations (Min and Max)	3 – 4
Total no. of parking capacity in parking area	4W - 12
Security aspects - preferred manned or unmanned charging stations.	Manned
Advertisement potential (high/low)	Low
Public amenities available nearby.	NA
Suitability for solar installation (canopy structures)	Yes
Ownership of the land and its maintenance agency.	Secretariat Administration department
Existing Sanctioned Load	25 kW
Transformer Supply (rating)	25 kVA


Vestas

14 Business Models for Vehicle Procurement and EVCI Deployment

14.1 Public Bicycle Sharing (PBS) system

Ministry of Housing and Urban Affairs (MoHUA) defines PBS as "a high-quality bicycle based public transport system in which bicycles, stored in a closely spaced network of stations, are made available for short-term use."

The adoption of public bicycle sharing systems has gained momentum across numerous cities in India. Recent technological advancements have introduced electric bicycles with pedal assistance, revolutionizing the landscape of urban transportation. This innovative leap facilitates a more widespread adoption of bicycles, primarily owing to their enhanced ease of use and accessibility. Therefore, promoting an e-bicycle public sharing system in Shillong will enhance tourist mobility.

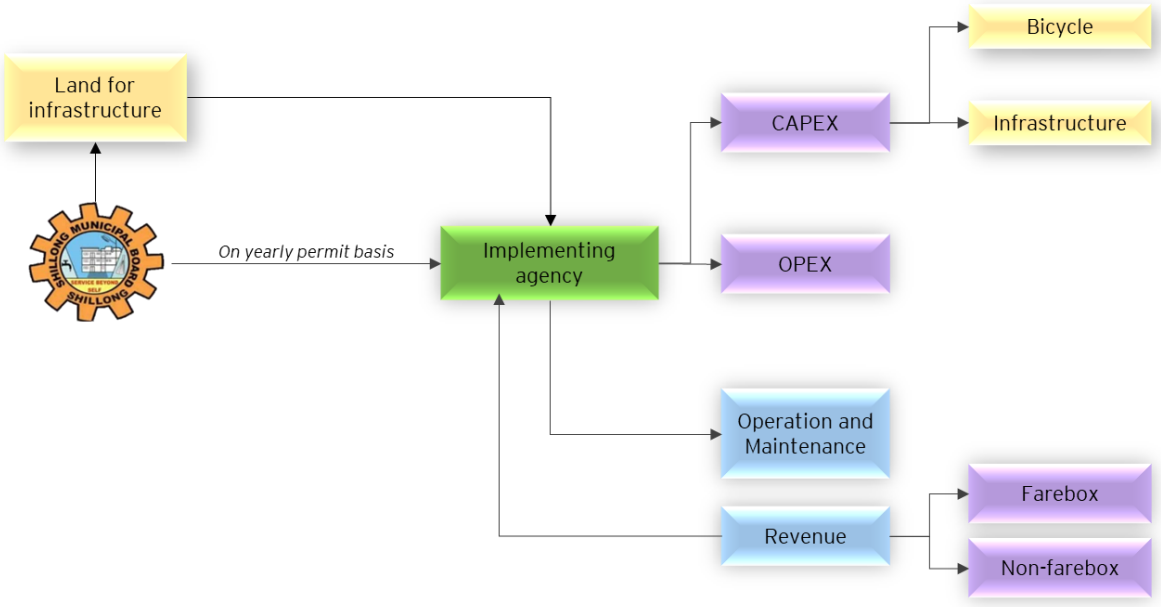
14.1.1 Business model:

Shillong Municipal Board can engage one or multiple entities for PBS installation, with contracts being on yearly permit basis. Capex covers bicycles, e-PBS infrastructure, and land acquisition. The implementing agency manages Opex and Capex for bicycles and infrastructure, with land provided by Shillong Municipal Board. The implementing agency manages operation, maintenance, and revenue collection.

Farebox revenue refers to the income generated directly from ticket sales or fares collected from passengers using public transportation systems, sustaining operations and maintenance.

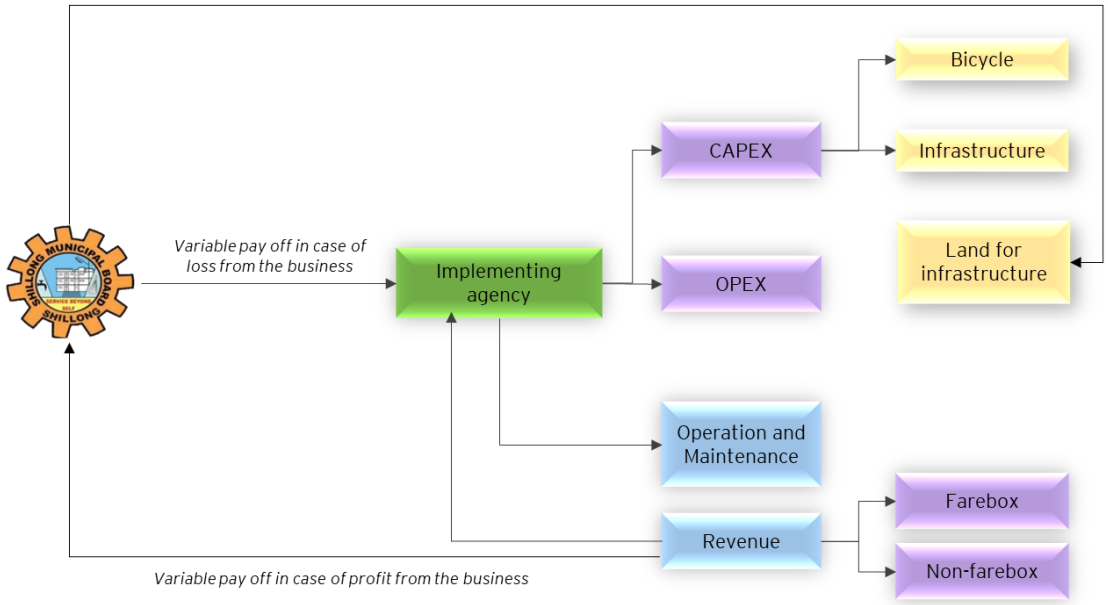
Non-farebox revenue encompasses income derived from sources other than passenger fares, such as advertising, rental of commercial space within transit stations, or partnerships.

Figure 20: PBS business model 1



.Shillong Municipal Board will onboard an implementing agency for PBS installation and would offer a variable pay off in case of loss from the business. Capex covers bicycles, e-PBS infrastructure, and land acquisition. The implementing agency manages Opex and Capex for bicycles and infrastructure, with land provided by Shillong Municipal Board. The implementing agency manages operation, maintenance, and revenue collection, and would share revenue with Shillong Municipal Board in case of profit.

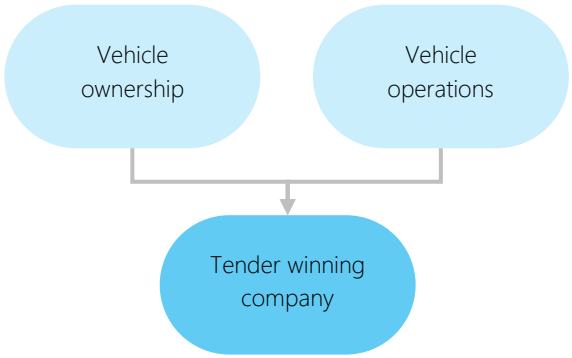
Figure 21: PBS business model 2



14.2 Government leased four-wheelers and SWM vehicles:

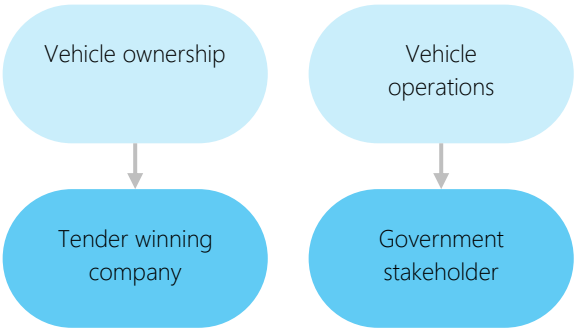
14.2.1 Procurement model 1: Wet leased vehicles

This type of model entails a more comprehensive arrangement. In this case, the winning company of the tender not only provides the vehicles but also offers additional services such as hiring and managing staff, maintenance, and possibly other operational aspects. This model grants the leasing company greater control over the entire operation of the vehicles, including personnel management and maintenance schedules.



14.2.2 Procurement model 2: Dry leased vehicles

This type of tender refers to a contractual agreement where the government entity, typically the urban local bodies, leases vehicles for utility work or for their staff from another party without additional services included. In this arrangement, the ULBs would solely receive the vehicles and be responsible for deploying their own staff or workforce to operate and maintain the vehicles.

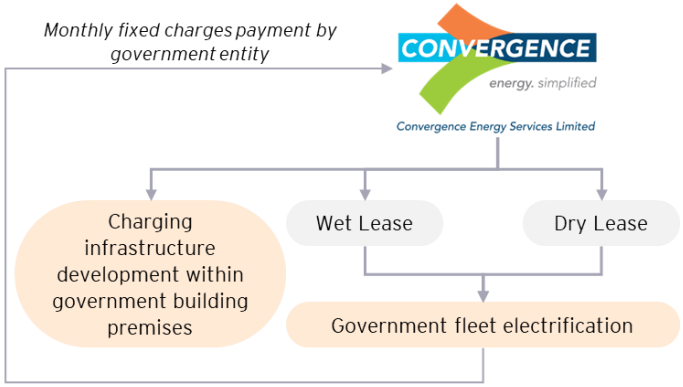


The National E-Mobility Programme, initiated by the Ministry of New and Renewable Energy (MNRE) on March 7th, 2018, represents a strategic effort to drive the adoption of electric vehicles (EVs) throughout India. The primary objective of the program is to transition towards sustainable and environmentally friendly modes of transportation while reducing dependency on traditional fossil fuel-powered vehicles.

Central to the program is the role of the Convergence Energy Services Limited (CESL), which acts as a key facilitator in implementing various initiatives aimed at promoting e-mobility. One of the core strategies employed by CESL involves the aggregation of demand for electric vehicles by procuring them in bulk. By purchasing a large number of EVs at once, CESL leverages economies of scale to make the adoption of electric vehicles more financially viable for government agencies and other stakeholders.

Previously this initiative was with EESL, as part of the procurement process, EESL issued a tender for the acquisition of 10,000 electric cars. These vehicles were intended to replace existing petrol and diesel vehicles used by various government departments and agencies across the country. By transitioning to electric vehicles, these entities not only contribute to reducing greenhouse gas emissions and air pollution but also set an example for sustainable transportation practices.

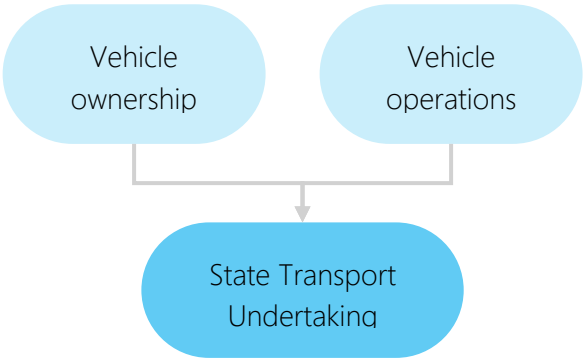
Furthermore, the deployment of electric vehicles is complemented by the establishment of a robust charging infrastructure. EESL, in collaboration with other stakeholders, has installed 256 public chargers in strategic locations across 42 cities. This infrastructure development is crucial for addressing range anxiety among EV users and ensuring the seamless integration of electric vehicles into the existing transportation network.



14.3 Government leased buses

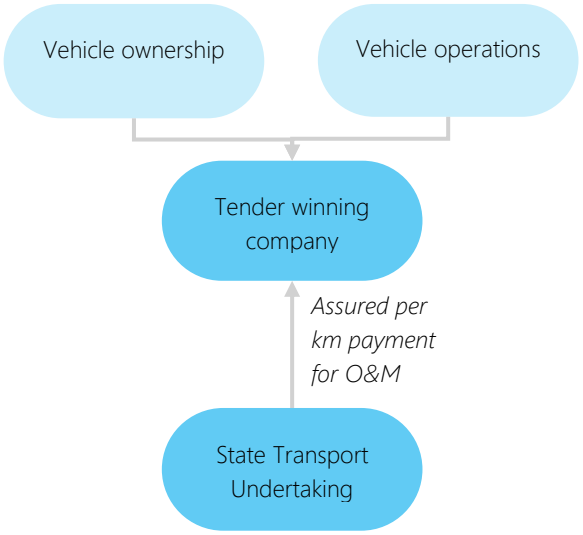
14.3.1 Outright Purchase Model (OPM):

The outright purchase model of bus acquisition offers significant control and potential long-term cost savings but requires a substantial initial investment and ongoing maintenance commitment. This model is well-suited to entities with stable financial resources and the capability to manage a fleet over the long term. It is particularly advantageous for those seeking to maintain full control over their operations and customize their vehicles to meet specific needs.



14.3.2 Gross Cost Contract Model (GCC):

The gross cost contract model for buses is a procurement and operational approach used in public transportation systems. Under this model, a contracting authority pays a fixed amount to a private operator to provide specified bus services for a defined period. The operator manages all aspects of the service, including fleet operation, maintenance, and scheduling, while adhering to service specifications outlined in the contract. The operator may retain revenue from fares, and the contracting authority monitors performance to ensure compliance with service standards. The model offers flexibility, risk transfer to the operator, and aims to deliver reliable, cost-effective bus services that meet the needs of communities.



14.3.3 PM e-bus Sewa:

PM e-bus Sewa is a central government initiative aimed at integrating electric buses into city networks to reduce air pollution and fossil fuel dependence. With an estimated cost of Rs. 57,613 crores and Rs. 20,000 crore in government support, the 10-year program targets cities with populations over three lakhs, focusing on those lacking organized bus services. It includes two segments: enhancing city bus services in 169 cities and promoting Green Urban Mobility Initiatives (GUMI) in 181 cities, with the goal of boosting e-mobility, infrastructure, and job creation

14.4 Business Model for EVCI deployment

In Shillong, the role of the Land-owning Agency (LoA) would be crucial for the deployment of Electric Vehicle Charging Infrastructure (EVCI). The relevant stakeholders might include:

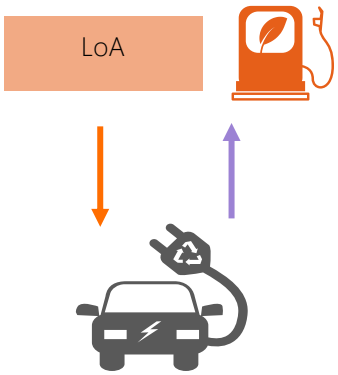
- Shillong Municipal Board (SMB) – Responsible for local urban planning and infrastructure.
- Meghalaya Power Distribution Corporation Limited (MPDCL) – Manages electricity distribution and supply.
- Shillong Smart City Limited – Involved in smart city initiatives and urban development.
- Meghalaya Transport Corporation – Manages public transport and may play a role in integrating EVs into the city's transport system.

These stakeholders would be essential in setting up and scaling the public charging infrastructure, addressing aspects such as land provision, capital expenditure, electricity supply, and operational maintenance.

Different types of implementation models may be used to set up and scale public charging infrastructure. A typical charging infrastructure implementation model comprises of multiple components, including the capital expenditure for charging equipment, provision of land, supply of electricity, and the day-to-day operations and maintenance of facilities and services. The different types of EV charging business models are:

Charge Point Operator

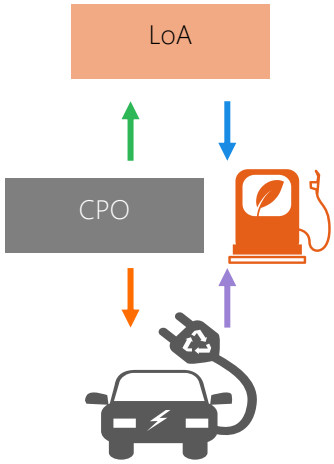
Public land (Public parking lots, government offices parking) / Private land (Malls, hospitals, eateries etc.)



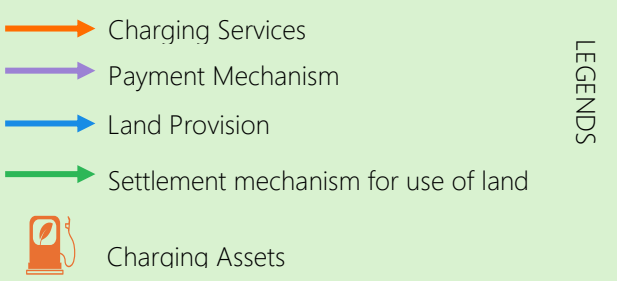
LoA as CPO owns the assets, operates the charging network.

Public Private Partnership

LoA provides land to CPO under rental model / revenue sharing model



CPO owns the assets, operates the charging network. Uses land provided by LoA



In Shillong, the investment required for establishing a public EV charging station involves several key cost components:

- Installation Costs: These include expenses related to procuring and setting up EV charging equipment.
- Land Provision Costs: Costs associated with acquiring or leasing land for the installation of the charging station.
- Operational and Maintenance Costs: Ongoing expenses for maintaining and operating the charging station, including regular upkeep and any repairs.
- Manpower Costs: Salaries and wages for staff needed to manage and oversee the daily operations of the charging station.

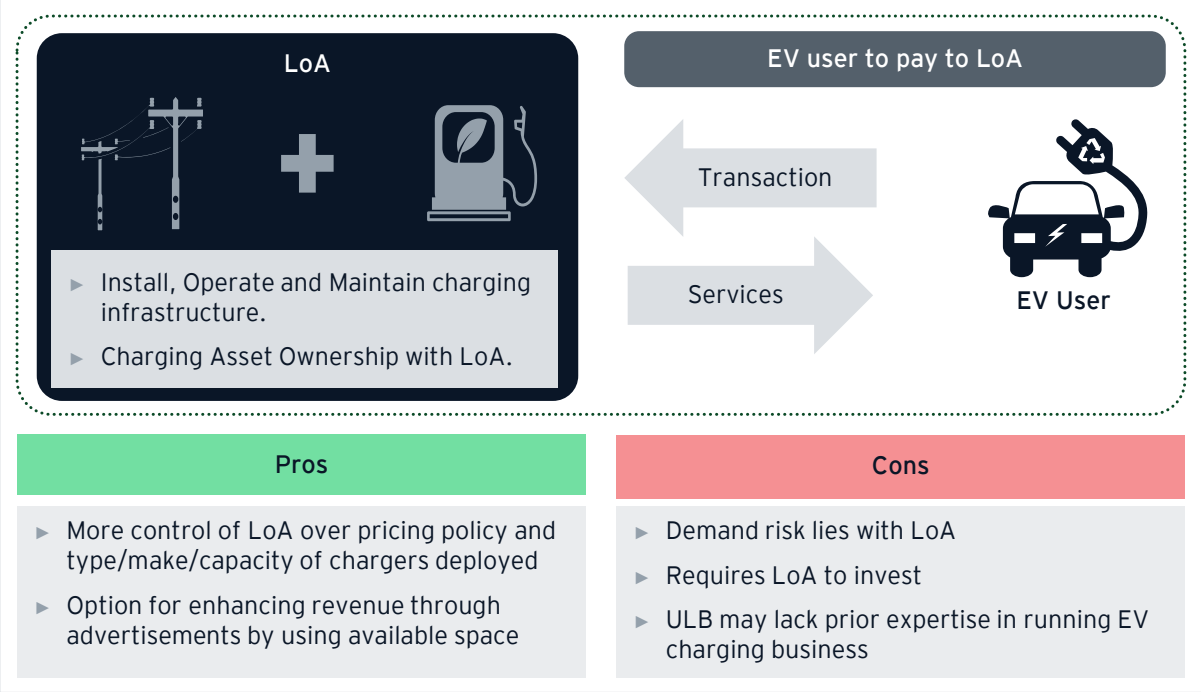
For revenue generation, the following direct methods can be employed:

- User Fees: Charging customers for energy use either on a per-user basis or through subscription models.
- Advertising Revenue: Generating income from advertisements placed at the charging station.
- Retail Co-location: Setting up EV charging stations alongside existing retail stores to increase visibility and foot traffic, thereby improving utilization rates.
- These approaches can enhance the financial viability of EV charging stations by diversifying income streams and leveraging existing infrastructure for added value.

14.4.1 Business Model 1: LoA own and operate public charging station on public land and private land

To establish an EV charging business, provision of land is one of the key requirements and from the perspective of lighthouse cities, availability of affordable land is exceptionally low. In this scenario, Land owning Agency (LoA) can play a leading role in setting up public charging stations at their premises itself. The ULB owns the EVSE and operate the public charging station.

Figure 23: Business Model 1: LoA own and operate PCS on public land and private land



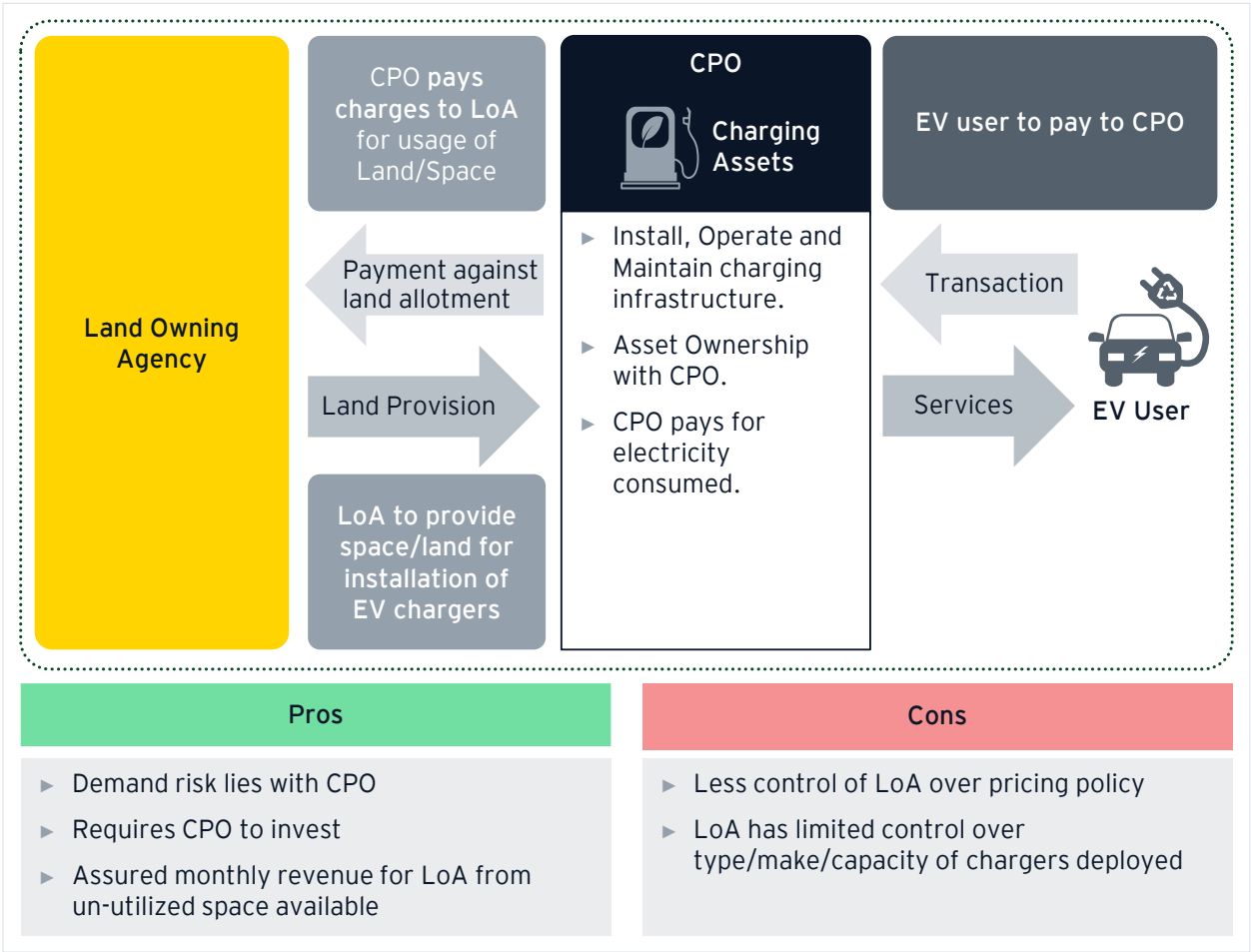
14.4.2 Business Model 2: LoA allocates land to CPO under rental or revenue sharing model

The government body can function as a Land-Owning Agency (LoA) and can provide the land to Charge Point Operator (CPO) to install and operate public charging stations within its license area after suitable locational planning. There can be multiple ways to implement this type of business model. ULB can either provide land to CPO on rental basis or ULB can enter into a revenue sharing agreement with CPO.

Business Model 2a: LoA - CPO Rental Arrangement Model

In urban areas, the cost of land is high and buying separate land to set up public charging stations significantly reduces the business viability. Arranging land on a rental basis is a better option where the land required for establishing the charging station is provided by the Land-Owning Agency (LoA). The Charge Point Operator (CPO) engages in a rental arrangement with the LoA, securing permission to utilize the land for charging infrastructure deployment. By the established terms of this agreement, the CPO disburses rental payments to the v. The CPO's role is installation, operation, and maintenance of the charging infrastructure, and retains full ownership of the charging station. Moreover, the CPO takes up the financial responsibility of covering the costs incurred by electricity consumption.

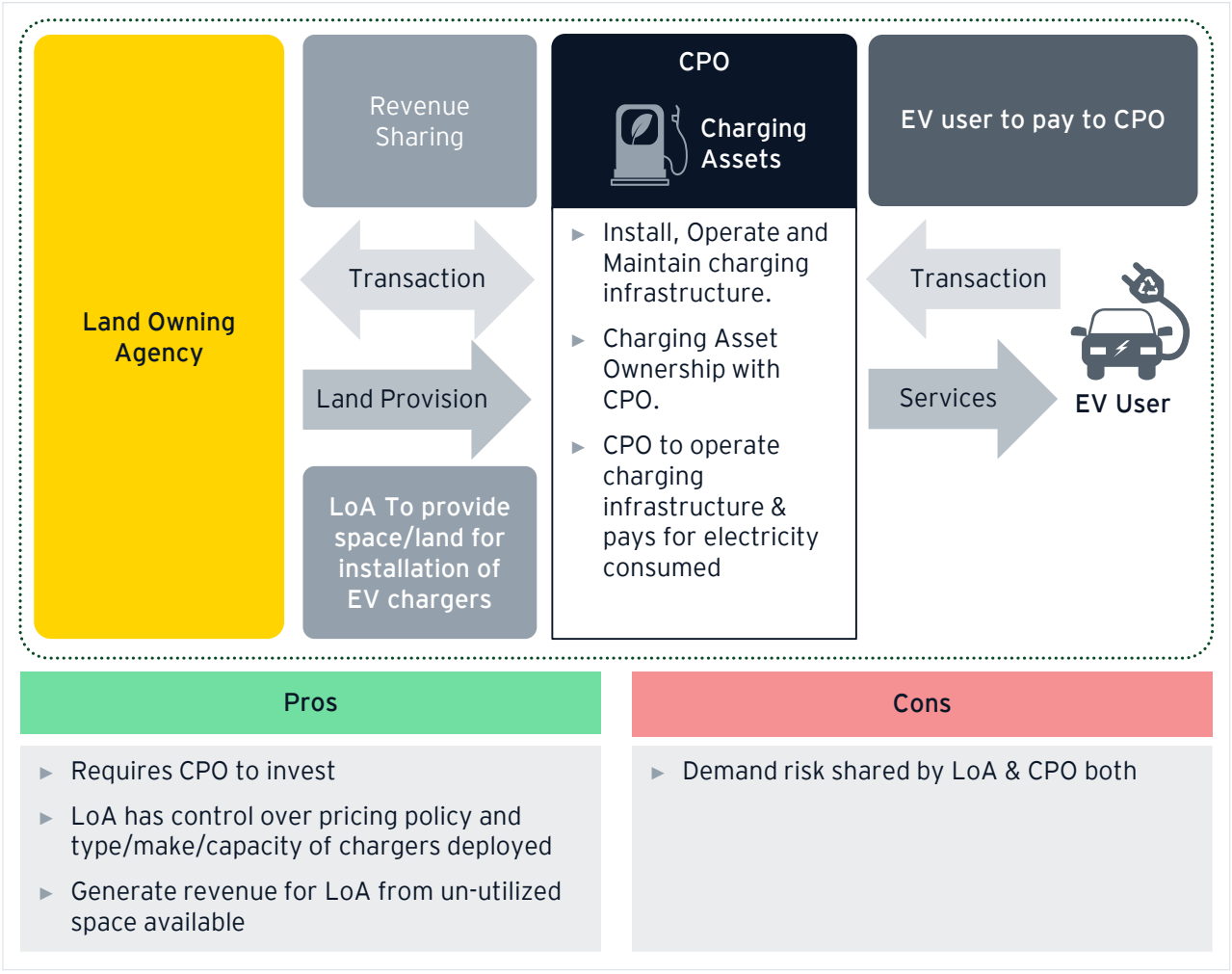
Figure 24: Business Model 2a: LoA - CPO Rental Arrangement Model

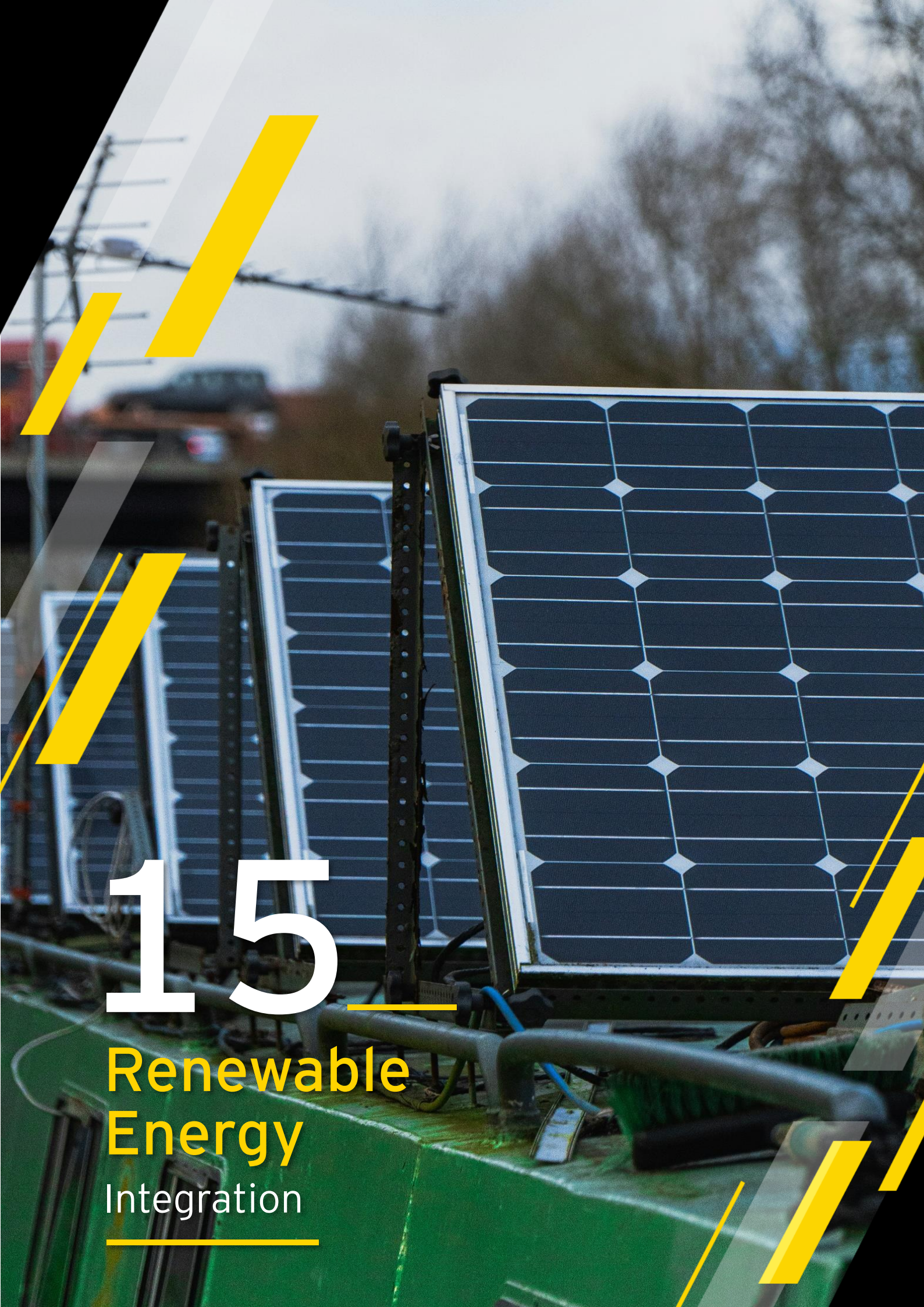


Business Model 2b: LoA - CPO Revenue Sharing Arrangement

A business model which is widely used for its financial benefits to both, the LoA and the CPO is a revenue-sharing business model. In this scenario, the ULB extends the use of their land to the CPO for the installation of a charging station. A mutually agreed upon revenue sharing agreement is established between the LoA and the CPO, wherein a specified percentage of the revenue generated from service charges, paid by EV users for their charging requirements, is passed on to the LoA. Remaining consistent, the CPO takes on the responsibilities of installation, operation, and maintenance of the charging infrastructure while retaining ownership of the assets. The CPO remains accountable for covering the electricity expenses incurred by the charging station. As before, EV users directly remit their payments to the CPO for the charging services they utilize.

Figure 25: Business Model 2b: LoA - CPO Revenue Sharing Arrangement





15

Renewable Energy Integration

The integration of Renewable Energy (RE) with Electric Vehicle (EV) charging infrastructure represents a pivotal stride towards sustainable and eco-friendly transportation solutions. In response to global environmental concerns and a collective commitment to reduce carbon emissions, the amalgamation of clean, renewable energy sources such as solar and wind power with EV charging systems has emerged as a transformative strategy. This synergistic approach not only aligns with India's pursuit of a low-carbon future but also addresses critical challenges related to energy security, air pollution, and grid management. In this context, the integration of RE with EV charging infrastructure becomes a linchpin, fostering a harmonious convergence of transportation and energy sectors for a cleaner, greener tomorrow.

> For India, a country with abundant sunlight and increasing emphasis on sustainability, the integration of renewable energy into EV charging infrastructure can play a pivotal role in shaping a cleaner and more resilient energy future.

At the global level, governments are implementing programs to transition away from traditional energy sources and towards clean energy to power EVs. Many utilities are introducing new pilot programs that enable EV users to utilize renewable energy for their charging needs. Integrating renewable energy with electric vehicle (EV) charging infrastructure in Shillong holds significant importance for several reasons such as environmental sustainability, reduced carbon footprint, and long-term energy cost savings. By harnessing renewable energy sources, the electric vehicle charging ecosystem becomes more sustainable and aligns with the overall goals of transitioning to clean energy.

15.1 Benefits of Integrating RE with EV charging

Implementing renewable energy integration in EV charging infrastructure can contribute to:

- Environmental Benefits: India, like many other countries, aims to reduce its carbon footprint to combat climate change. The integration of renewable energy sources, such as solar and wind power, with EV charging can significantly reduce carbon emissions associated with transportation. This is particularly crucial since the power sector is one of the largest contributors to carbon emissions.
- Energy Security: India heavily relies on imported fossil fuels to meet its energy needs. The integration of renewable energy sources for EV charging can enhance energy security by reducing dependence on imported fossil fuels. This, in turn, helps mitigate the risks associated with price volatility and geopolitical tensions.
- Air Quality Improvement: India grapples with severe air pollution issues in numerous cities, largely stemming from vehicular emissions. Shifting to electric vehicles charged with renewable energy holds the potential to enhance air quality by eliminating tailpipe emissions, which are major contributors to respiratory illnesses and other health concerns.
- Grid Stability and Peak Demand Management: The integration of EV charging infrastructure has the potential to exert stress on the electricity grid, especially during peak demand hours. By incorporating renewable energy sources into EV charging systems, grid load management becomes more effective, allowing a reduction in peak demand. Furthermore, the implementation of smart charging systems enables the scheduling of charging activities during off-peak hours or periods of abundant renewable energy generation.
- Promoting Renewable Energy Investments: The integration of renewable energy with EV charging infrastructure can establish synergies between the transportation and energy sectors, fostering investments in renewable energy projects. This has the potential to expedite the deployment of renewable energy projects in India, aligning with the country's sustainability targets and generating employment opportunities.
- Technological Innovation and Economic Growth: The integration of renewable energy with EV charging necessitates technological advancements, including smart grids, energy storage solutions, and vehicle-to-grid (V2G) systems. These innovations can catalyze economic growth by stimulating investments in research and development, nurturing entrepreneurship, and generating job opportunities in emerging industries.
- Utilization of Solar Energy Surplus: India has significant solar energy potential, particularly with its abundant sunlight throughout the year. However, solar power generation typically peaks during the daytime when electricity demand is relatively low. By coupling EV charging stations with solar installations, surplus solar energy can be effectively utilized to charge electric vehicles, maximizing the use of solar infrastructure, and reducing curtailment.
- Cost Savings: Solar energy is becoming increasingly cost-competitive with conventional sources of electricity generation in India. Leveraging solar power for EV charging presents an opportunity for vehicle owners and charging station operators to potentially reduce their electricity costs over the long term. By relying less on grid electricity, especially during daylight hours when solar generation is plentiful, they can achieve greater cost-effectiveness.
- Scalability and Flexibility: Solar-powered EV charging infrastructure exhibits a remarkable versatility, accommodating various scales ranging from residential installations to expansive public charging stations. This adaptability facilitates the widespread expansion of EV charging infrastructure, encompassing urban areas, highways, and even remote locations with limited grid connectivity. This, in turn, contributes significantly to the nationwide promotion of EV adoption.

15.2 Renewable energy in Meghalaya

In the 2017-2018 period, the Meghalaya New and Renewable Energy Development Agency (MNREDA) focused on advancing renewable energy projects across the state.

15.2.1 Key activities and achievements include:

The focus of MNREDA is to harness renewable energy sources such as solar, biogas, biomass gasification, and wind energy, and to distribute energy-saving devices. With increasing urban energy demand, renewable energy is crucial for both urban and rural areas, especially in remote villages where grid transmission is impractical. MNREDA prioritizes solar photovoltaic, wind, and bio-energy sources, which have a combined potential of 3,692 MW. Activities include distributing solar lighting systems in rural areas, installing solar water heaters and streetlights, and promoting biogas plants. Additionally, MNREDA is working on bamboo pellet gasification and Pico hydel projects and has distributed 40,000 LED solar lanterns to school students for awareness.

15.2.2 Renewable Energy Focus:

Solar Energy:

- Distribution of solar lighting systems and solar water heaters.
- Installation of solar street lighting and photovoltaic power plants.

Wind and Solar Hybrid:

- Installation of wind-solar hybrid systems in various locations.

Bioenergy:

- Promotion of biogas plants for rural households and the use of bio-energy for cooking and lighting.
- Electrification of remote villages using renewable energy sources.

Projects and Activities:

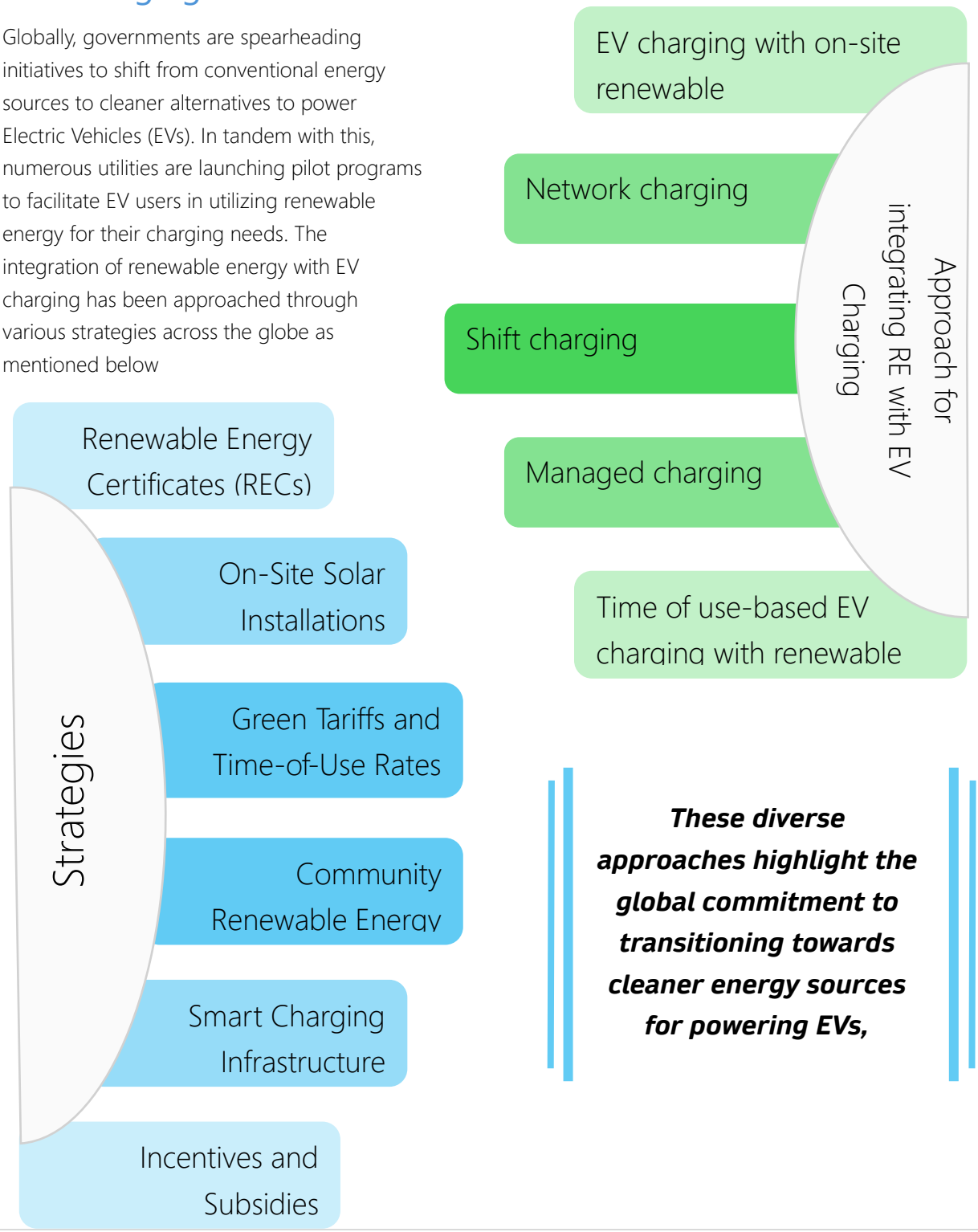
- **Solar Projects**: Installation of solar lanterns, street lighting, and power plants.
- **Wind Energy**: Implementation of wind-solar hybrid systems.
- **Bioenergy**: Expansion of biogas plants and remote village electrification.

15.2.3 Awareness and Popularization:

- Campaigns to promote renewable energy through training, exhibitions, and public awareness programs.
- Distribution of LED solar lanterns to students to increase awareness about renewable energy.

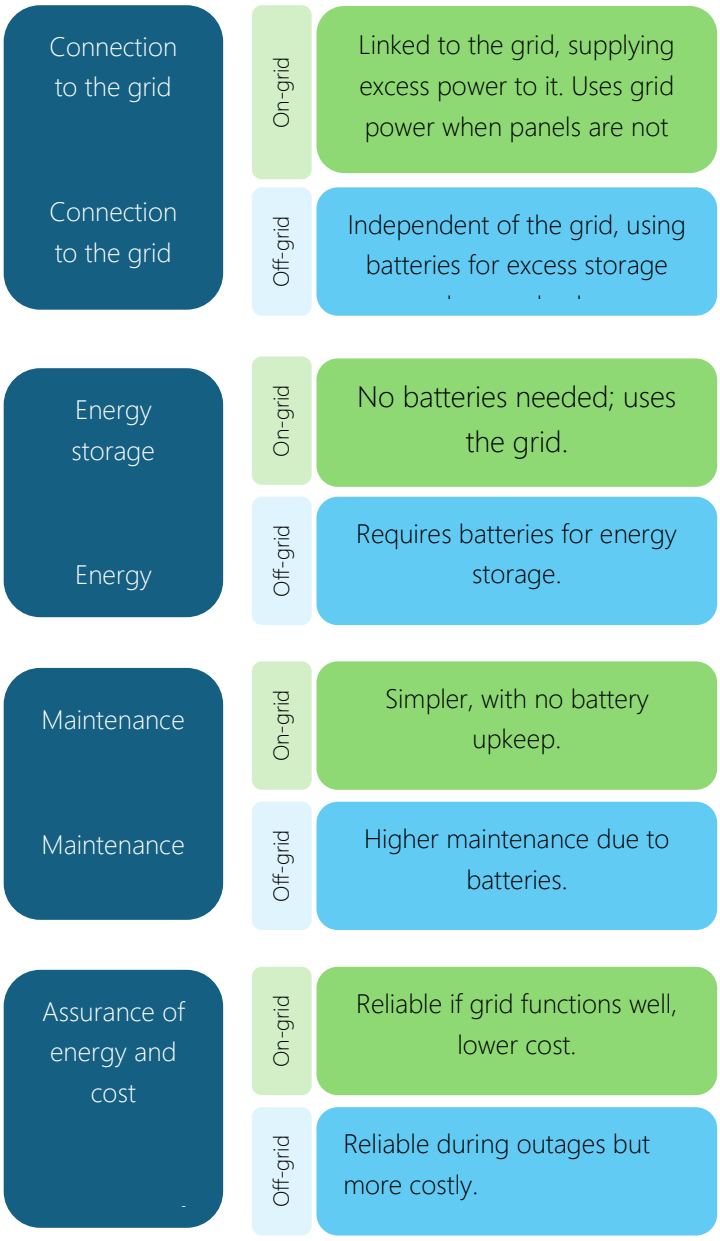
15.3 Approach for integrating Renewable Energy within EV Charging

Globally, governments are spearheading initiatives to shift from conventional energy sources to cleaner alternatives to power Electric Vehicles (EVs). In tandem with this, numerous utilities are launching pilot programs to facilitate EV users in utilizing renewable energy for their charging needs. The integration of renewable energy with EV charging has been approached through various strategies across the globe as mentioned below



These diverse approaches highlight the global commitment to transitioning towards cleaner energy sources for powering EVs,

- **EV Charging with on-site renewables:** EV charging is paired with an on-site renewable energy generation, most commonly by co-locating EVs with on-site solar energy systems.
- **Network charging:** Network charging approach allow EV users to use electricity exclusively from renewable sources to change their EVs at charging stations
- **Shift charging:** EV charging is encouraged during off-peak periods or when renewable energy generation is high
- **Managed charging:** Utilities and consumers can control the timing of EV charging to align with renewable energy availability and requirements of the electricity grid
- **Time of use-based EV charging with renewables:** Utilities provide discounted rates encourage customers to charge EVs when excess renewable are on the grid. Customers cannot claim the renewables.



Solar power, with its abundant availability and the feasibility of on-site installation, has emerged as an increasingly popular and suitable form of renewable energy for integrating with Electric Vehicle (EV) charging stations. This preference for solar energy extends beyond the charging infrastructure to homes and businesses, driven by a desire to reduce carbon footprints and achieve energy cost savings.

There are two primary categories of on-site solar power systems, each offering distinct advantages:

- On-Grid Solar Power Systems:
  On-grid solutions augment the electricity supply obtained from the utility grid by integrating solar power. Solar panels installed at the EV charging station feed excess energy back into the grid, contributing to the overall grid capacity. This approach ensures a continuous and reliable power supply, with any surplus energy being utilized beyond the charging station's requirements.
- Off-Grid Solar Power Systems:
  Off-grid solutions operate independently of the utility grid, relying on battery storage to store excess solar energy. These systems are self-sufficient and do not draw power from the grid. Off-grid solar power is

particularly advantageous in remote locations or areas with unreliable grid connectivity, providing autonomy and resilience.

The choice between the two depends on factors such as location, grid accessibility, energy requirements, and the level of desired autonomy, with each system presenting unique advantages and considerations.

Moreover, both on-grid and off-grid solar systems incorporate an EV Charging system. The EV charging system typically includes three main types of charging: DC charging, AC charging, and battery swapping. The system comprises charging guns, a power distribution controller, and protective appliances. In the battery swapping mode, the battery can be replaced using automatic or semi-automatic mechanical equipment, with replacement times typically ranging from 2 to 10 minutes.

15.4 Recommendations for different stakeholders for RE integration

The successful integration of renewable energy with EV charging in India requires a collaborative effort among both government and private stakeholders to establish an economically self-sustaining RE-integrated EV charging business. Key stakeholders include state and local governments, utilities, property owners/managers overseeing workplace charging and public parking, as well as participants from the solar and EV charging industries.

Recommendations for Government Sector

The government can play a crucial role by setting supportive policies and regulatory frameworks.

Table 20: Renewable energy integration recommendations for Government sector

Sr. No.	Initiatives	Description
1	Incentive Programs	Offer tax credits, grants, or subsidies to promote renewable energy-integrated EV charging infrastructure.
2	Regulatory Support	Simplify permitting and approval processes to accelerate renewable energy and EV charging projects.
3	Public-Private Partnerships	Collaborate with private entities to pool resources and expertise for large-scale deployment.
4	R&D Investments	Fund research to enhance energy storage, charging efficiency, and cost reduction.
5	Standardization	Develop industry standards for seamless integration of renewable energy with EV charging systems.
6	Education and Awareness	Conduct campaigns to inform the public about the benefits of renewable energy-integrated EV charging.
7	Grid Modernization	Upgrade the grid to handle increased demand and renewable energy inputs.
8	Demonstration Projects	Launch pilot projects showcasing the benefits and feasibility of integrated systems.
9	Financing Programs	Provide low-interest loans and financial incentives for infrastructure investments.
10	Policy Alignment	Align policies and remove regulatory barriers to support integration efforts.

Recommendations for Private Sector

The private sector, especially solar and EV industries, can drive renewable energy integration with EV charging by developing RE+EV market products and services that maximize value and enhance opportunities from pairing these technologies.

Table 21: Renewable energy integration recommendations for Private sector

Sr. No.	Initiatives	Description
1	Investment in Renewable Energy Infrastructure	Install on-site solar panels or partner with renewable energy providers.
2	Development of Smart Charging Infrastructure	Use technologies to optimize charging with renewable energy.
3	Participation in Government Initiatives	Participate in and support renewable energy programs.
4	Adoption of Energy Storage Solutions	Use batteries to store and manage renewable energy.
6	Green Financing and Grants	Use grants or loans to reduce renewable energy costs.
7	Monitoring and Reporting	Track and share data on renewable energy performance.

Recommendations for DISCOMs

DISCOMs play a key role in integrating renewable energy with EV charging by designing utility rates and incentives that offer demand charge savings, grid benefits, and bulk power advantages.

Table 22: Renewable energy integration recommendations for DISCOMs

Sr. No.	Initiatives	Description
1	Collaboration with Renewable Energy Developers	Partner to install solar or wind power for EV charging stations.
2	Net Metering Policies	Allow charging stations to feed excess renewable energy into the grid.
3	Grid Modernization	Enhance grid capacity for renewable-powered EV charging demands.
4	Dynamic Pricing Models	Reflect real-time electricity costs to promote sustainable charging.
5	Incentives for Renewable-Powered Charging Stations	Offer financial rewards for charging stations using renewable energy.
6	Development of Charging Hubs	Create renewable-powered hubs in strategic, sustainable locations.

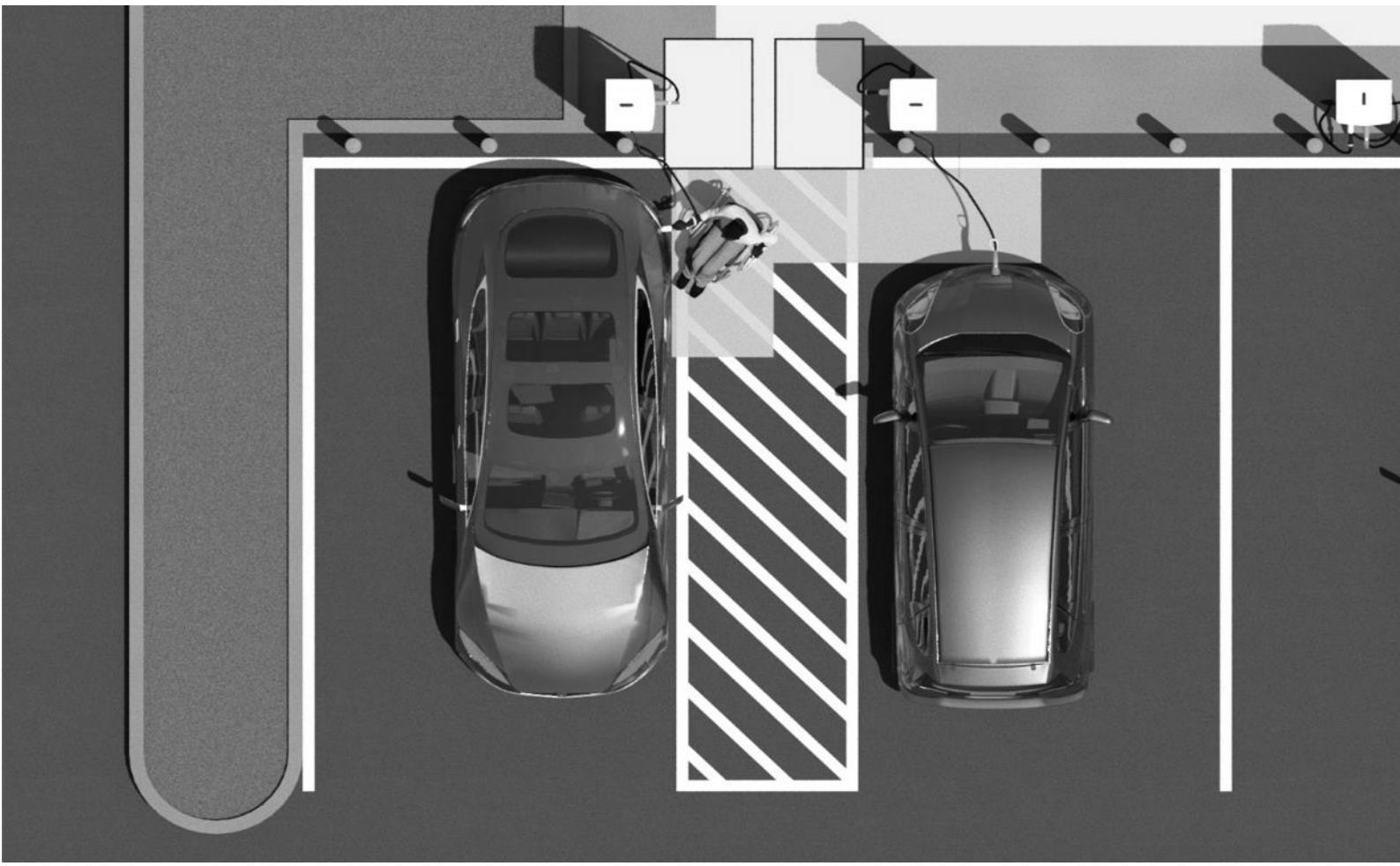
Annexures

ANNEXURE I: Integration of EWCD friendly features

Integrating Electric Vehicle (EV) Charging Infrastructure with services tailored to Elderly, Women, Children, and Disabled (EWCD) populations offers a range of benefits that cater to their specific needs and contribute to a more inclusive and accessible transportation system. Here are some key advantages:

- Inclusivity: Integration promotes inclusivity by ensuring that transportation solutions, including EV charging infrastructure, are designed with diverse users in mind. This helps to address barriers to mobility and transportation faced by EWCD populations, thereby fostering a more inclusive society.
- Sustainability: Encouraging the use of electric vehicles through integration with EWCD services aligns with broader sustainability goals by reducing greenhouse gas emissions and reliance on fossil fuels. This benefits not only current but also future generations, including children and vulnerable populations, by mitigating the impacts of climate change.
- Integration of EV Charging infrastructure can be done by the following measures:
- Opting for a location with a paved surface is advisable to guarantee accessibility regardless of weather conditions and to facilitate the delineation of buffer zones.
- Selecting a parking spot adjacent to open space is highly recommended as it enhances accessibility and maneuverability.
- Accessibility: EWCD integration ensures that EV charging infrastructure is accessible to all members of the community, including the elderly, women, children, and individuals with disabilities. This can include features such as designated parking spaces with easy access to charging stations and facilities that accommodate mobility aids.
- Safety and Security: Providing well-lit, easily accessible EV charging stations with enhanced security features ensures a safe environment, particularly for vulnerable groups like the elderly and children.
- Assistance Services: Helping services such as on-site personnel or digital support for charging assistance can be particularly beneficial for elderly individuals or those with disabilities who may require help navigating the charging process or handling charging equipment.
- Clear Indication of Compatibility: In situations where multiple chargers are available, it is crucial to ensure that users can easily identify which charging point is suitable for their specific vehicle or equipment. By prominently displaying notices at each charging point, clearly indicating compatibility with AC or DC charging, users can quickly determine the appropriate charging station to use, reducing confusion and streamlining the charging process.
- Distinct Differentiation of Rapid Charging Points: Rapid charging points, operating at 500V DC, pose unique hazards compared to conventional charging points. Therefore, it is essential to distinctly differentiate them to prevent accidental misuse and ensure user safety. Implementing measures such as unique signage and physical barriers can effectively communicate the differences and prevent potential accidents.
- Positioning for Flood Resilience: Electric vehicle charging points should be strategically positioned to mitigate the risk of water damage, especially in flood-prone areas. Ensuring that the socket-outlet of supply is at least 800 millimeters above the Highest Flood level helps safeguard the infrastructure against water ingress, minimizing the risk of electrical hazards and infrastructure damage during flooding events.
- Convenient Parking and Charging: Electric vehicle parking spaces should be designed to optimize convenience for users during the charging process. By positioning the parking space within a five-meter radius of the charging point, users can easily access the charging infrastructure without needing to navigate significant distances, enhancing user experience, and promoting widespread adoption of electric vehicles.

- Safety Considerations for Children: To ensure the safety of children, charging points should incorporate child-proof features and be situated away from designated play areas. By implementing safety measures such as child-proof enclosures and positioning charging points away from areas frequented by children, the risk of accidents or injuries can be significantly reduced, promoting a safer environment for all users.
- Prominent Signage and Markings: Clear signage and markings are essential for guiding users to the charging bays and ensuring efficient use of the infrastructure. By prominently displaying signage and markings on the ground, users can easily locate and navigate towards the charging points, minimizing congestion and facilitating a smooth charging experience. Additionally, ensuring that charging cables are of sufficient length helps prevent damage and ensures compatibility with various types of vehicles and equipment, further enhancing user satisfaction and usability of the charging infrastructure.
- For universal access, perpendicular charging bays should be 4.8m by 7.2m with 1.2m access zones on all sides, extendable to 1.5m near charging stations. Side-by-side bays need 1.5-1.8m between them.
- For universal access, parallel on-street charging bays should be 3.6m by 7.2m with 1.2m access zones in front, back, and along the roadside. If 3.6m width is not feasible, provide level access along the pavement. Consider extending the access zone to 1.5m where space permits.
- The public charging station requires installation on a flat, stable surface with good traction. Surrounding surfaces should vary to indicate orientation and obstacles.
- Whenever feasible, charging stations should align with road level for straightforward access. In cases of unavoidable height variations, ensure disabled access features like kerb drops and ramps adhere to existing regulations. Additionally, drainage infrastructure should be positioned to avoid obstructing access to the charging station.



ANNEXURE II: Pole-Mounted EV Charging (PMC)

As electric vehicles adoption grows worldwide, the demand for accessible and cost-effective charging solutions is increasing. However, traditional curbside chargers often require expensive underground electrical installations and compete for limited urban space, making widespread deployment challenging. This lack of infrastructure can discourage potential EV adopters, especially those without private parking spaces[23].

Benefits of Pole-Mounted EV Chargers (PMCs)

Pole-mounted EV chargers provide a smart, cost-effective alternative by utilizing existing utility and lighting poles along streets reducing the need for additional land or extensive electrical work. This innovative approach offers[24] [25]:

- **Significant cost savings** – Installation costs are 55% to 70% lower compared to ground-mounted chargers.
- **Space efficiency** – No additional infrastructure is required, preserving pedestrian walkways.
- **Scalability and adaptability** – Chargers can be relocated easily.
- **Equitable access** – Ideal for drivers without off-street parking, including apartment and condo residents.
- **Convenient locations** – Chargers are placed near businesses, parks, and libraries and are available **24/7**.

Technical Setup and Infrastructure Requirements

For an estimated load of 100 kW to 300 kW, the recommended setup includes[26]:

- One 11 kV pole-mounted or plinth-mounted distribution transformer (DT).
- Minimum space requirements: 4m x 4m for a pole-mounted DT

Example: Kerala's Leadership in EV Charging Expansion

Kerala, India, has emerged as a leader in implementing pole-mounted EV charging solutions to meet its growing EV demand. With over 39,868 registered EVs in 2023 and projections reaching 15 million by 2030, the state has leveraged existing distribution poles to rapidly deploy cost-effective and scalable charging stations. By integrating pole-mounted chargers into its charging network, Kerala has improved public charging access, especially in urban areas with limited space. The Kerala State Electricity Board Limited (KSEBL) has played a key role in this initiative, ensuring affordable, efficient, and widely available charging infrastructure[27].

Kerala State Electricity Board (KSEB) has installed **pole-mounted AC001 chargers** across the state, with **141 chargers deployed in Trivandrum alone**. These chargers, offering a **3.3 kW power output**, are open to all compatible vehicle types, making EV charging more accessible. The initiative began in **2021 with a pilot study in Calicut**, chosen for its high number of three-wheelers. Following the pilot's success, KSEB expanded the project statewide in **2022**, strengthening Kerala's EV infrastructure.

[23] https://www.wri.org/research/pole-mounted-electric-vehicle-charging-preliminary-guidance

[24] https://www.renewableenergyworld.com/electric-vehicle/ev-charging/ev-charging-access-is-lacking-are-pole-mounted-chargers-the-answer/

[25] https://www.pse.com/en/pages/electric-cars/Pole-Charging

[26] https://www.niti.gov.in/sites/default/files/2023-02/EV_Handbook_Final_14Oct.pdf

[27] https://kseb.in/uploads/Downloadtemsuppy/VOLUME%20I%20ISSUE%204-1699093195696131426.pdf

ANNEXURE III: Retrofitting of vehicles

Electric Vehicle retrofitting refers to converting a conventional petrol or diesel vehicle into an electric one. This process involves replacing the vehicle's original engine and related components with an electric powertrain and alternative energy source, all within the existing vehicle body. Retrofitting offers vehicle owners an economical way to extend the life of their expensive vehicles while contributing to environmental sustainability. However, it's essential that the retrofit kit receives approval from a designated testing agency, as outlined in Rule 12B of the Central Motor Vehicles Rules (CMVR), 1989[28].

The retrofit process involves customizing the battery pack size to match the vehicle's weight and desired acceleration for optimal performance. Additionally, motors, cables, and harnesses need to be properly fitted into the vehicle's frame, which requires skilled labor. This labor-intensive work ensures all components are securely integrated, preserving the vehicle's efficiency, safety, and performance[29].

The starting price for internal combustion engine (ICE) scooters and motorcycles is around Rs. 55,000, making them a cost-effective choice for many consumers[30].

Role of Testing Agencies in EV Retrofitting Kits

Testing agencies are crucial for the commercialization of EV retrofitting kits, helping manufacturers gain government approval. ARAI sets technical requirements for approval to ensure the safety and performance of retrofitted electric vehicles across categories such as two-wheelers, three-wheelers, LCVs, buses, and trucks.

Approval Process

The approval process involves two levels: component approval and vehicle level approval. Kits, including parts like traction motors, batteries, and inverters, must be approved before being integrated into a vehicle. Once the vehicle passes tests, a Type Approval certificate is granted, allowing manufacturers to sell the kits through dealers.

AIS 123 Approvals

- Part 1: Hybrid systems for vehicles with a GVW ≤ 3500 kg, including bi-mode hybrids that allow switching between engine and electric power.
- Part 2: Hybrid systems for vehicles with a GVW > 3500 kg, such as larger buses and goods carriers.
- Part 3: Electric propulsion kits for converting vehicles to pure electric operation by replacing the ICE with electric components.

Testing and Safety

The approval involves tests on vehicle weight, brake performance, motor power, safety compliance of batteries, and emissions. Tests also ensure wiring and connectors meet safety standards. Environmental tests have been minimized to focus on high-voltage safety, reducing approval costs[31].

[28] https://ev.delhi.gov.in/retro-fitment
[29] https://cleanmobilityshift.com/products-technology/retrofitted-evs-in-india-benefits-and-service-providers/https://cleanmobilityshift.com/products-technology/retrofitted-evs-in-india-benefits-and-service-providers/
[30] https://cleanmobilityshift.com/products-technology/retrofitted-evs-in-india-benefits-and-service-providers/
31 https://evreporter.com/regulatory-framework-for-retrofitting-in-india/

Companies working in Electric Vehicle Retrofitting Business[3233]

- Alti-Green
- EV Motors
- GoGreenBOV
- Lithium Urban Technologies
- BharatMobi
- LoopMoto
- RACEnergy
- FolksMotor
- Northway Motorsport

Figure 30: Four-wheeler electric retrofitment kit

Delhi's Retro-fitment plan

The Delhi government aims to retrofit 3% of older vehicles with electric powertrains by 2025–26 to reduce pollution and promote clean mobility.

- Convert 3% of older vehicles to electric by 2026 by replacing ICE engines with electric systems.
- Policies and expert input under development for retro-fitment
- Subsidies for retro-fitment under consideration
- Delhi government is working on a dedicated portal for retrofitting Internal Combustion Engine (ICE) vehicles to Electric Vehicles (EVs).

32 https://diyguru.org/automotive/electric-vehicle-retrofitting/
33 https://diyguru.org/faq/top-10-ev-retrofitting-companies-in-india/

ANNEXURE IV: Commercial 2W Battery Swapping case study

Gogoro Launches India-made Smart Scooter with Smart Battery Swapping System

Gogoro, a global leader in battery-swapping ecosystems and smart scooters, has launched its India-made smart scooter featuring an advanced battery-swapping system. This launch marks a significant step toward sustainable mobility solutions in the country, catering to the needs of both individual and fleet-based consumers.

The newly launched Gogoro smart scooter is tailored for the unique road and climatic conditions in India. Key features include:

- **Optimized for diverse terrains:** Designed to handle various road conditions, including hilly regions, ensuring a smooth riding experience.
- **Enhanced load capacity:** Engineered to accommodate larger cargo loads, making it suitable for delivery and logistics fleets while maintaining stability and comfort.
- **Dual utility design:** Offers ample space for passengers while also providing efficient storage options for commercial and fleet users.

Expansion and Market Reach

Gogoro has ambitious plans for the Indian market, starting with the launch of its first e-scooters in December 2023 following certification of its smart battery by ICAT in July 2023.

Operational Capabilities and Network

- **Supports 6,00,000 riders** with its battery-swapping technology.
- **Over 1.3 million smart batteries** in circulation.
- **A vast network of 12,000 battery-swapping stations** across 2,500 locations.

This extensive infrastructure is designed to ensure seamless operation for Gogoro users by reducing charging downtime and increasing convenience for fleet operators and individual riders alike.

Businesses and Fleet Operators

Gogoro is actively collaborating with leading fleet and delivery service providers to facilitate widespread adoption of its battery-swapping ecosystem. Key collaborations include:

- **Partnership with Zypp Electric** for last-mile delivery solutions, logistics fleets, and taxi services.
- **Initial launch in B2B segments** in **Delhi and Goa**, followed by expansion into **Mumbai and Pune**.

This strategic approach ensures that Gogoro's smart scooters become an integral part of India's commercial mobility landscape while promoting greener transportation alternatives.

Mobility-as-a-Service (MaaS)

Gogoro is working with **FutureEV** and other partners to introduce **Mobility-as-a-Service (MaaS)** models. These initiatives include:

- **Scooter-sharing services in Goa** leveraging Gogoro's smart scooters and battery-swapping stations.

- **Fleet-based deployments** for businesses requiring scalable and efficient electric vehicle solutions.

This MaaS approach aligns with India's push for sustainable and smart mobility solutions, ensuring greater accessibility and reduced dependence on traditional fuel-powered vehicles.

Potential Benefits for Shillong

Shillong's hilly terrain and unpredictable weather present challenges for two-wheeler adoption. However, battery-swapping electric scooters can offer effective solutions for the region's transportation sector. The key benefits include:

- **Reducing congestion and emissions:** Shillong's traffic congestion is largely due to a high number of taxis. A shift to battery-swapping electric two-wheelers can alleviate this issue, offering a cleaner, more efficient mode of transport.
- **Supporting delivery and taxi services:** Logistics and taxi operators in Shillong can integrate battery-swapping electric scooters into their operations, reducing operational costs and dependence on traditional fuel-based vehicles.

Overcoming charging infrastructure challenges: Shillong has limited public charging infrastructure, making battery-swapping stations a more practical alternative, ensuring uninterrupted mobility for users.

ANNEXURE V: Assumptions for TCO calculations

ICE vehicle segment and their specifications:

Table 23: ICE vehicle segments and their specifications for TCO calculation

Parameters	2W	3W	4W (private)	4W (Commercial)	Bus	SWM
Fuel type	Petrol	Diesel	Petrol	Petrol	Diesel	Diesel
Vehicle Model	Honda activa 125	Piaggio Ape auto DX-Diesel	Swift Dzire ZXI Plus	Swift Dzire ZXI Plus	Tata star bus LPO 7.5	Tata Ace Gold
Vehicle Cost	91,233	3,54,000	10,16,000	10,16,000	30,00,000	6,00,000
Range in full tank	243.8	315	829	829	540	600
Max. speed (kmph)	93	60	165	165	80	65
Engine capacity (cc)	124	597.7	1,197	1,197	3,300	700
Kerb weight	110	480	985	985	8,500	1020
tank Capacity (ltr.)	5.3	10.5	37	37	120	30
Mileage	46	30	22.41	22.41	4.5	20
Fuel Consumption/100KM (Ltr)	2.17	3.33	4.46	4.46	22.2	5.00
Fuel consumption/KM (Ltr)	0.02	0.03	0.044	0.044	0.22	0.05

Electric vehicle segment and their specifications:

Table 24: Electric vehicle segment and their specifications for TCO calculation

Parameters	e-2W	e-3W	e-4 (private)	e-4W (commercial)	e-Bus	SWM
Vehicle Model	Ola s1	Ape E- City FX NE MAX	Tata Nexon EV XM	Tata Tigor EV XE	PMI Regio-9m	Tata Ace EV
Vehicle Cost	1,30,000	3,26,000	14,49,000	13,74,000	1,00,00,000	10,40,000
Range	141	181	312	314	150	154
Max. speed (kmph)	75.3	41.6	80	116.5	80	60
Acceleration (m/s2)	1.32	0.68	1.7	1.4		
Kerb weight	125	125	1,235	1,235		
Battery Capacity (kWh)	2.98	8	30.2	26	151	21.3
Battery type	Nickel Manganese Cobalt Oxide	Lithium	Lithium-ion Iron Phosphate	Lithium-ion Iron Phosphate	Adv Lithium ion	Lithium Ion-LFP

Energy Consumption/100KM (kWh)	3.3	5.17	10.6	11	100.67	13.83
Energy Consumption/KM (kWh)	0.033	0.0517	0.106	0.11	1.01	0.14

Assumptions for calculation of TCO:

Table 25: Assumptions for calculation of TCO

	Parameter	Unit	e-2W (private)	e-2W (com)	e-3W (passenger)	e-4W (private)	e-4W (commercial)
General	Lifecycle of Vehicle	years	10	10	10	10	10
	Lifecycle of Battery	years	5	5	5	5	5
	Cost of Battery	$/kWh	98	98	98	98	98
	Dollar to INR	Rs.	86.64	86.64	86.64	86.64	86.64
Financial	Loan Tenure	years	5	5	5	5	5
	Rate of Interest	pa	20%	20%	10.5%	9.30%	9.30%
	Equity		20.00%	20.00%	20%	30%	30%
	Debt		80.00%	80.00%	80%	70%	70%
	Insurance Amount Annually- ICE	INR/PA	1060	1060	7500	1.30%	1.30%
	Insurance Amount Annually- EV	INR/PA	1600	1600	7500	1.30%	1.30%
	Maintenance Cost ICE + repairs	INR/PA	4,800	4,800	18200	21,674	21,672
	Maintenance Cost EV + repairs	INR/PA	2,000	2,000	7200	8,670	8,670
	Depreciation of Vehicles	PA	10%	10%	10%	10%	10%
	YoY escalation on maintenance		5%	5%	5%	5%	5%
Operational	Operational Days in a year	days	350	350	350	350	350
	Months in a Year	months	12	12	12	12	12
	Distance travelled per day	kms	15	70	20	30	100
	Home Charging/ EV Tariff	INR/kWh	5.05	5.05	5.61	5.89	5.89
	Public charging	INR/kWh	12.38	12.38	12.38	21.09	21.09
	Office Charging/captive tariff	INR/kWh	10.15	8.67	8.67	10.15	8.67
	YoY escalation of public		5%	5%	5%	5%	5%
	Cost of conventional fuel	INR/Liter	96.33	96.33	87.61	96.33	96.33
	YoY escalation of conventional fuel		5%	5%	5%	5%	5%
	GST on ICE vehicles		28%	28%	28%	28%	28%
	GST on EV		5%	5%	5%	5%	5%

	Parameter	Unit	Bus (Intracity)	Bus (Intercity)	SWM
General	Lifecycle of Vehicle	years	10	10	10
	Lifecycle of Battery	years	5	5	5
	Cost of Battery	$/kWh	98	98	98
	Dollar to INR	Rs.	86.64	86.64	87
Financial	Loan Tenure	years	5	5	5
	Rate of Interest	pa	9.30%	9.30%	9.3%
	Equity		30%	30%	30%
	Debt		70%	70%	70%
	Insurance Amount Annually- ICE	PA	1.30%	1.30%	1.30%
	Insurance Amount Annually- EV	PA	1.30%	1.30%	1.30%
	Maintenance Cost ICE + repairs	INR/km	10.02	10.02	10.02
	Maintenance Cost EV + repairs	INR/km	4.43	4.43	4.43
	Depreciation of Vehicles	PA	10%	10%	10%
	YoY escalation on maintenance		5%	5%	5%
Operational	Operational Days in a year	days	350	350	350
	Months in a Year	months	12	12	12
	Distance travelled per day	kms	45	120	30
	Depot Charging	INR/kWh	8.67	8.67	8.67
	YoY escalation of depot charging		5%	5%	5%
	Cost of conventional fuel	INR/Liter	87.61	87.61	87.61
	YoY escalation of conventional fuel		5%	5%	5%
	GST on ICE vehicles		28%	28%	28%
	GST on EV		5%	5%	5%

ANNEXURE VI: Existing prevalent models by vehicles segments

E-Two-wheeler

OEM	Model	Image
OLA	S1 Pro	
Ather	450 X	
Hero	Hero Electric Photon	
TVS	iQube	

E-Three-wheeler

OEM	Model	Image
Euler Motors		

Piaggio	Ape	
Mahindra	Treo	

E-Four-wheeler

OEM	Model	Image
Hyundai	Ionic 5	
TATA motors	Nexon	
MG	Mg ZS	

E-Bus

OEM	Model	Image
Ashok Layland	ECO-Life	
TATA	STAR BUS	

E-Dumper

OEM	Model	Image
I-board	Tipper Elecy V3525	

ANNEXURE VII: On-Site Survey

Dealerships

Team meeting with the Automobile dealer to discuss the scope and challenges of EV adoption

Bajaj Motors

A	Dealership - Bajaj	
1	Are people willing to buy EV? Percentage demand for EV vehicles,	Few people ask for EV's.
2	Is service facility available for EVs in your dealership or any nearby dealership?	No.
3	Are you planning to launch EVs in your dealership in the near future?	Not in shillong.
4	What could be the reason for low penetration of EV in Shillong? Mention all the Challenges	→ Hilly terrain → Low awareness of EV in People. → Expensive Vehicle.
5	Recommendations for Govt. to improve EV penetration	→ Create awareness → Give more Subsidy.
6	Are dealers aware about the subsidies for EVs?	→ yes.
7	What is the gradeability of E-3W in shillong/Hilly terrain	→ yes.

↳ Need to close their E-3W dealership because of less demand.

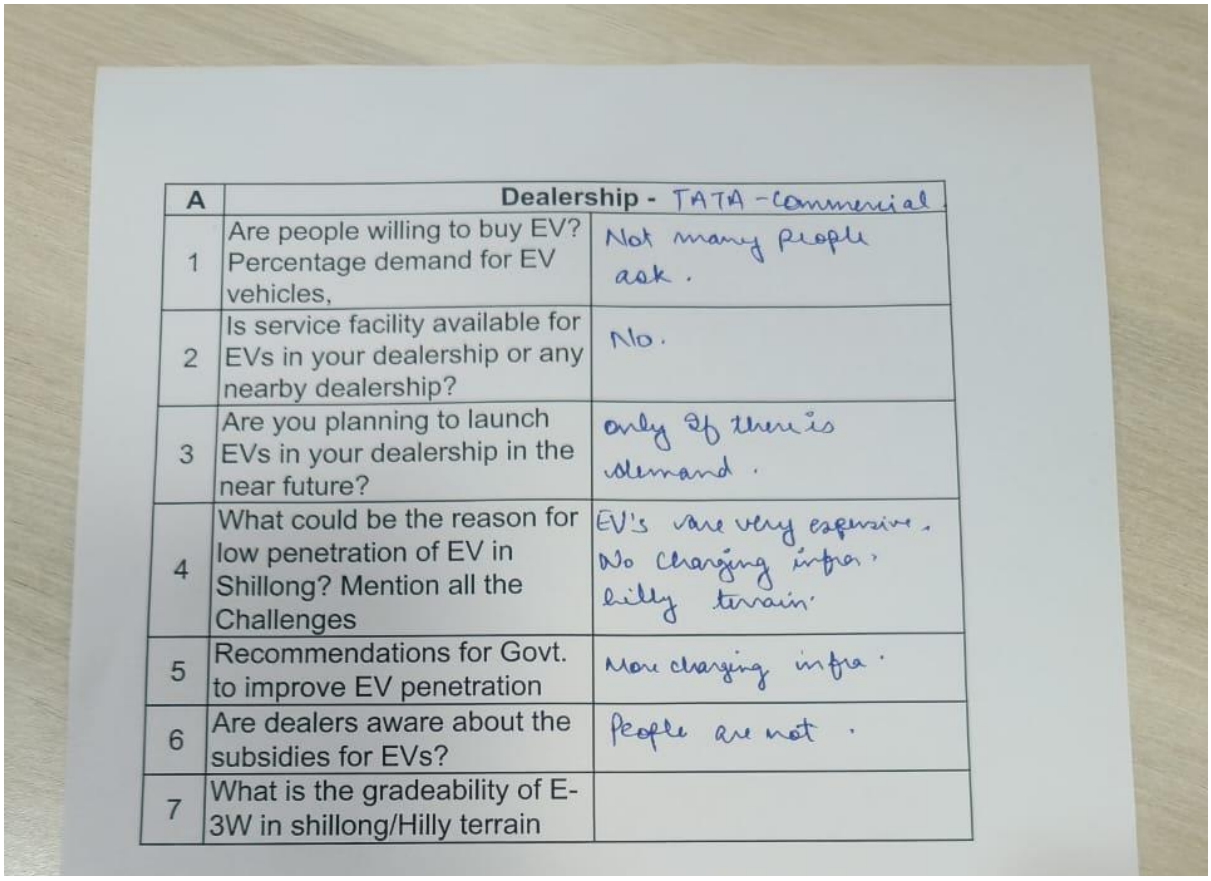
Suzuki

Suzuki

A	Dealership - Suzuki	
1	Are people willing to buy EV? Percentage demand for EV vehicles,	2W Sales are more in summer. Little awareness.
2	Is service facility available for EVs in your dealership or any nearby dealership?	Only for I.CE & not for EV's
3	Are you planning to launch EVs in your dealership in the near future?	Only with good Torque
4	What could be the reason for low penetration of EV in Shillong? Mention all the Challenges	Weather → mostly raining & E-Scooters are mostly expensive.
5	Recommendations for Govt. to improve EV penetration	Get more Subsidies.
6	Are dealers aware about the subsidies for EVs?	Dealers are, people are not.
7	What is the gradeability of EV 3W in shillong/Hilly terrain	Terrain is an issue

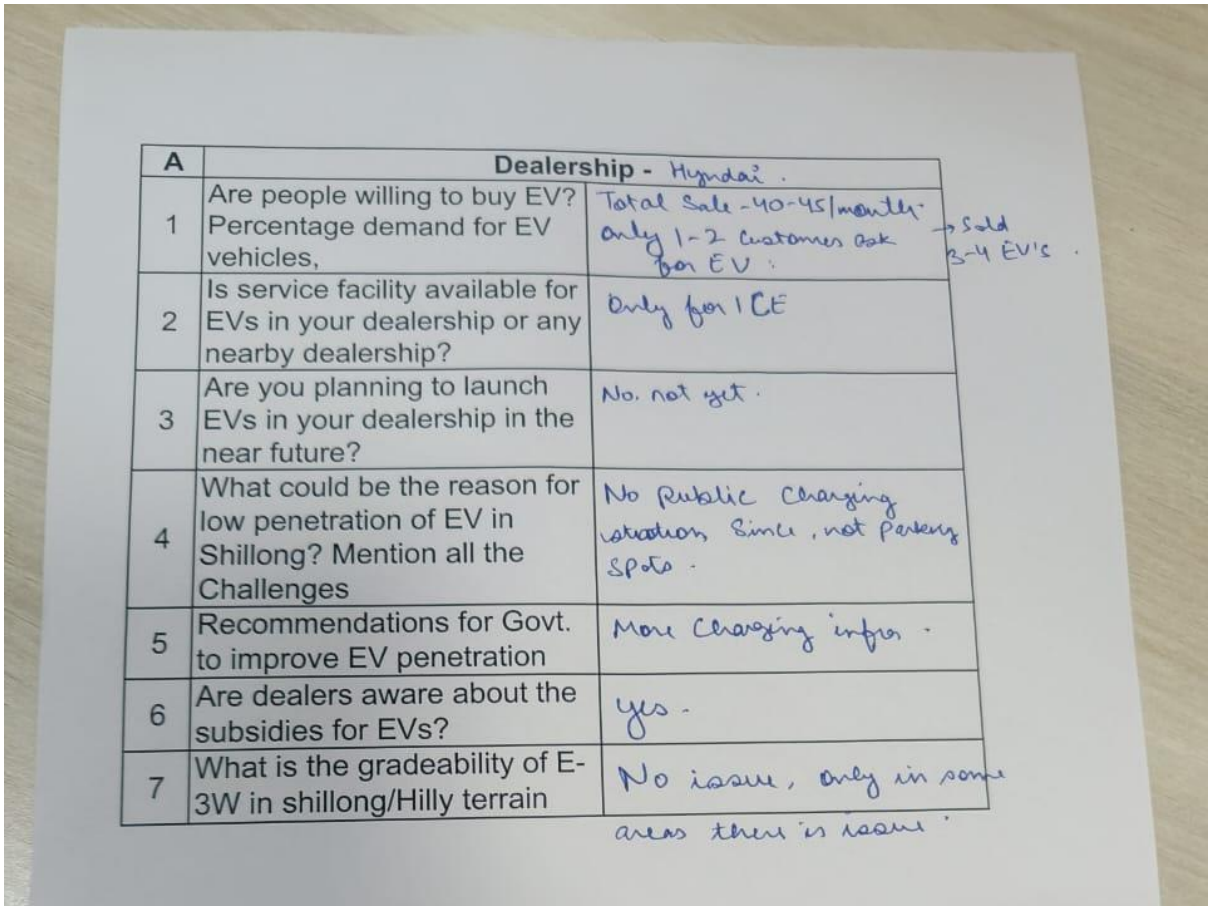
↳ People are not aware of EV's.
↳ 2W have terrain issues
↳ Weather doesn't support 2W.

Tata Motors



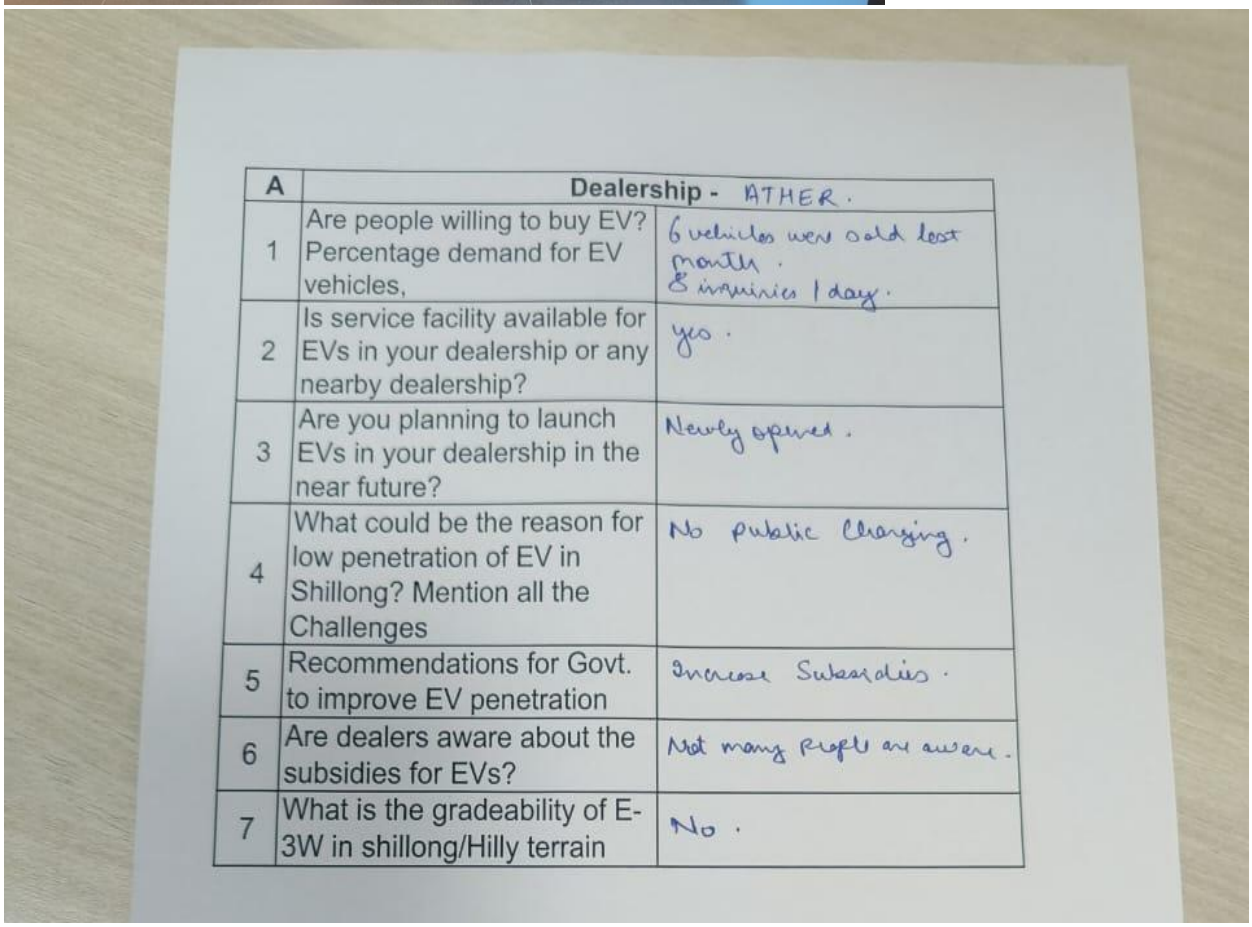
A	Dealership - TATA - Commercial
1	Are people willing to buy EV? Percentage demand for EV vehicles, — Not many people ask.
2	Is service facility available for EVs in your dealership or any nearby dealership? — No.
3	Are you planning to launch EVs in your dealership in the near future? — only if there is demand.
4	What could be the reason for low penetration of EV in Shillong? Mention all the Challenges — EV's are very expensive. No charging infra. hilly terrain.
5	Recommendations for Govt. to improve EV penetration — More charging infra.
6	Are dealers aware about the subsidies for EVs? — People are not.
7	What is the gradeability of E-3W in shillong/Hilly terrain

Hyundai



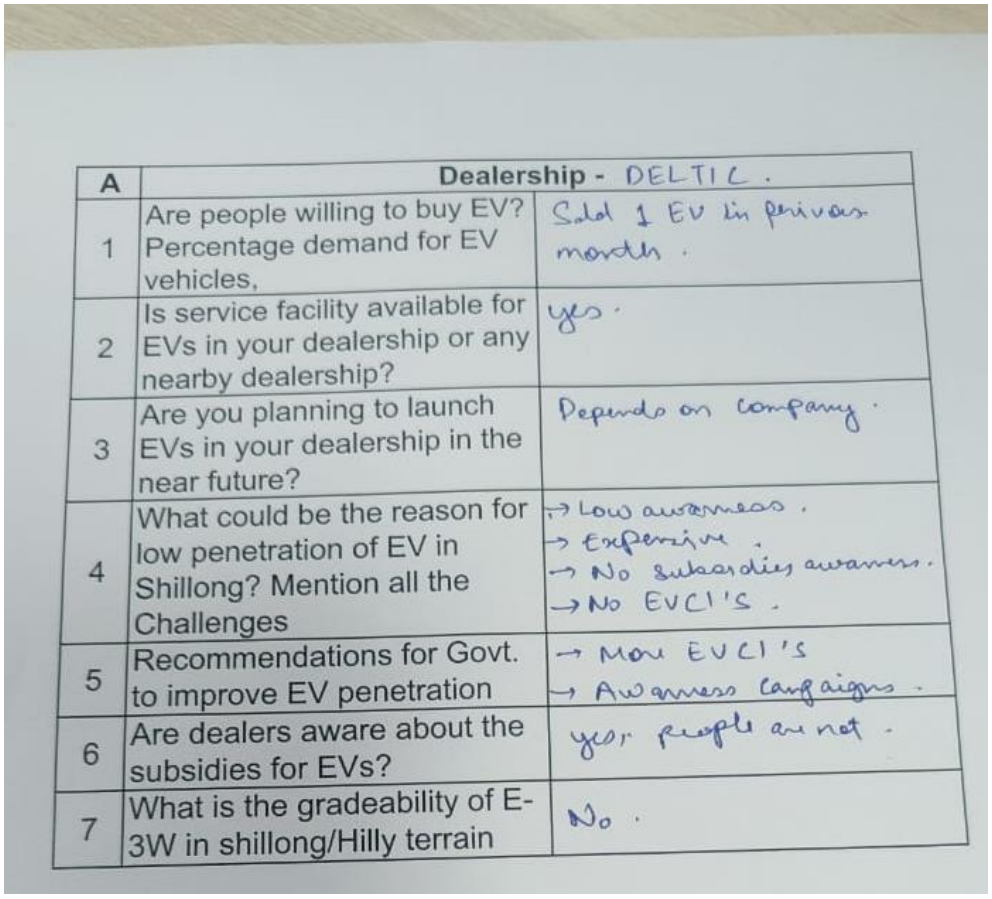
A	Dealership - Hyundai.	
1	Are people willing to buy EV? Percentage demand for EV vehicles,	Total Sale - 40-45/monthly. Only 1-2 customers ask for EV. → Sold 3-4 EV's.
2	Is service facility available for EVs in your dealership or any nearby dealership?	Only for ICE
3	Are you planning to launch EVs in your dealership in the near future?	No. not yet.
4	What could be the reason for low penetration of EV in Shillong? Mention all the Challenges	No Public Charging station, Since, not Parking Spots.
5	Recommendations for Govt. to improve EV penetration	More Charging infra.
6	Are dealers aware about the subsidies for EVs?	yes.
7	What is the gradeability of E-3W in shillong/Hilly terrain	No issue, only in some areas there is issue.

Ather



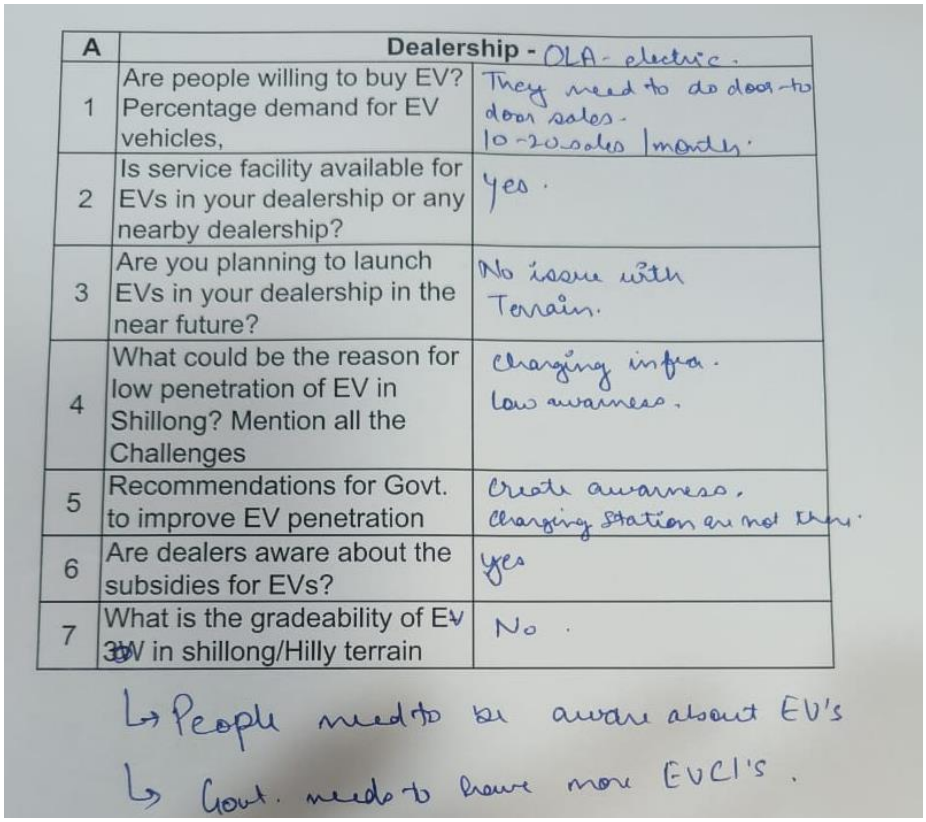
A	Dealership - ATHER.	
1	Are people willing to buy EV? Percentage demand for EV vehicles,	6 vehicles were sold last month. & inquiries 1 day.
2	Is service facility available for EVs in your dealership or any nearby dealership?	yes.
3	Are you planning to launch EVs in your dealership in the near future?	Newly opened.
4	What could be the reason for low penetration of EV in Shillong? Mention all the Challenges	No Public Charging.
5	Recommendations for Govt. to improve EV penetration	Increase Subsidies.
6	Are dealers aware about the subsidies for EVs?	Not many People are aware.
7	What is the gradeability of E-3W in shillong/Hilly terrain	No.

Deltic



A	Dealership - DELTIC.	
1	Are people willing to buy EV? Percentage demand for EV vehicles,	Sold 1 EV in privous month.
2	Is service facility available for EVs in your dealership or any nearby dealership?	yes.
3	Are you planning to launch EVs in your dealership in the near future?	Depends on company.
4	What could be the reason for low penetration of EV in Shillong? Mention all the Challenges	→ Low awarness. → Expensive. → No subsardies awarness. → No EVCI'S.
5	Recommendations for Govt. to improve EV penetration	→ More EVCI'S → Awarness campaigns.
6	Are dealers aware about the subsidies for EVs?	yes, people are not.
7	What is the gradeability of E-3W in shillong/Hilly terrain	No.

Ola Electric

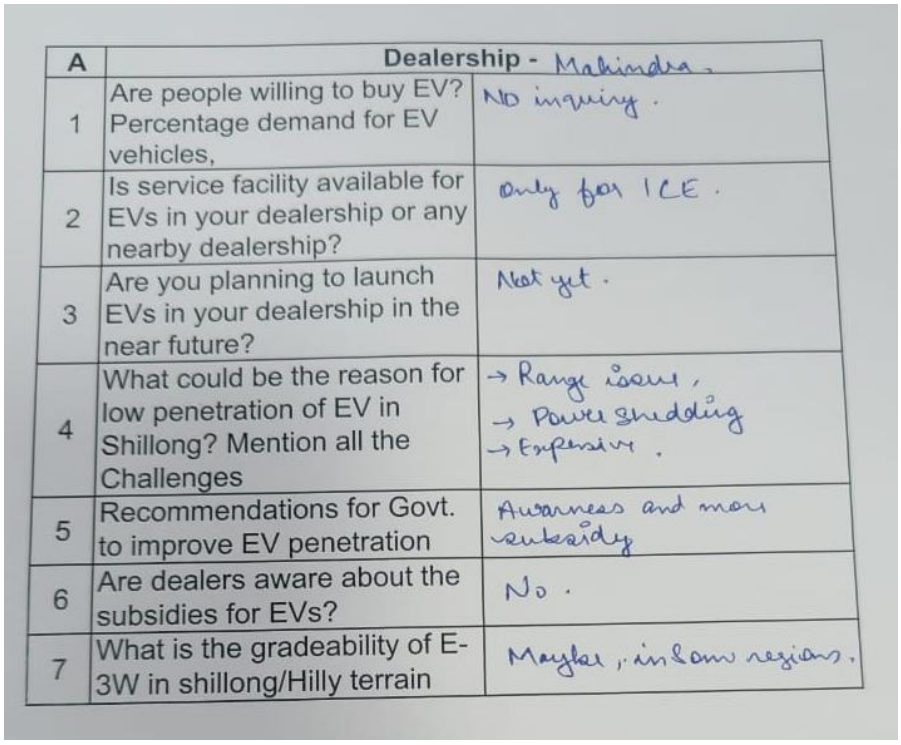


A	Dealership - OLA- electric.	
1	Are people willing to buy EV? Percentage demand for EV vehicles,	They need to do door-to door sales. 10-20 sales / month.
2	Is service facility available for EVs in your dealership or any nearby dealership?	yes.
3	Are you planning to launch EVs in your dealership in the near future?	No issue with Terrain.
4	What could be the reason for low penetration of EV in Shillong? Mention all the Challenges	charging infra. low awarness.
5	Recommendations for Govt. to improve EV penetration	Create awarness. Charging station are not there.
6	Are dealers aware about the subsidies for EVs?	yes
7	What is the gradeability of EV 3W in shillong/Hilly terrain	No.

↳ People need to be aware about EV's

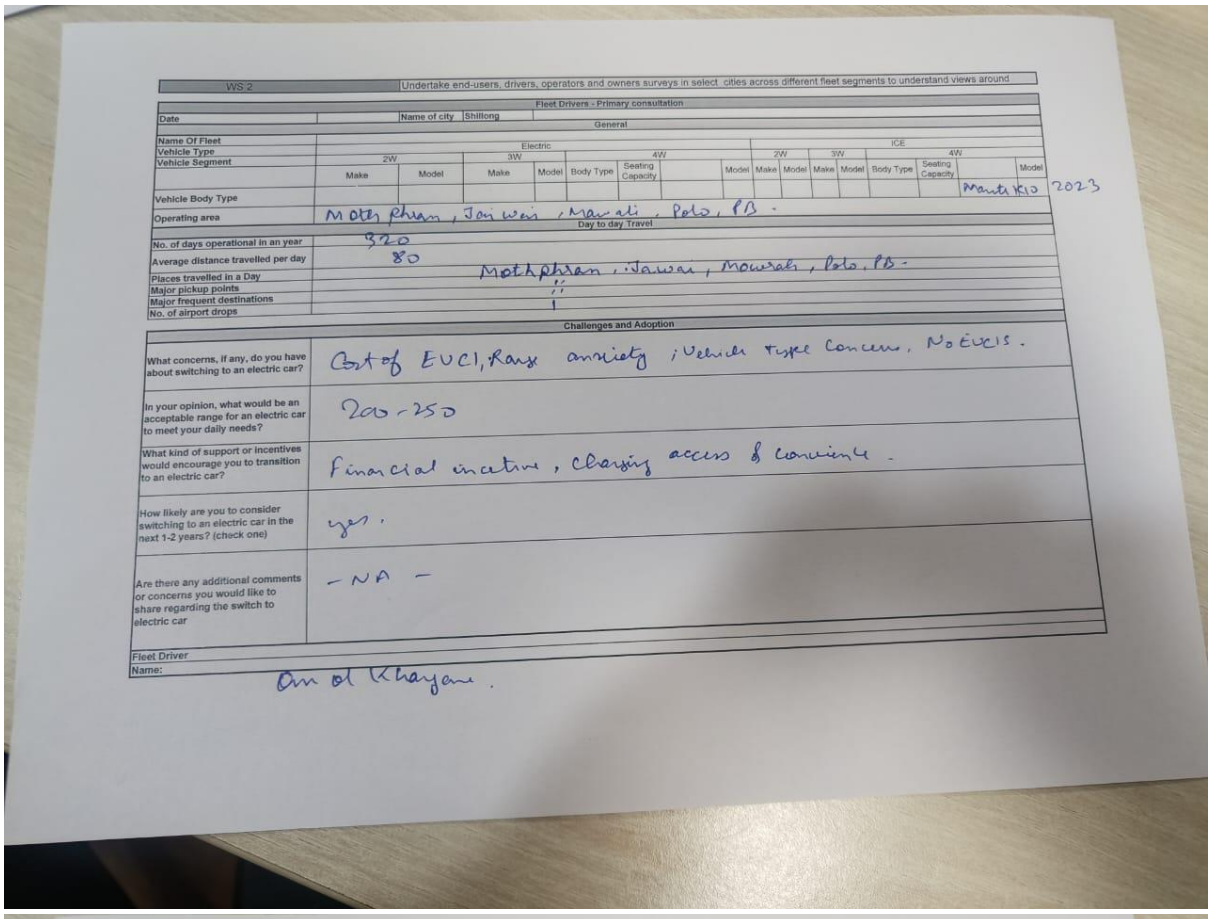
↳ Govt. needs to have more EVCI's.

Mahindra



A	Dealership - Mahindra.	
1	Are people willing to buy EV? Percentage demand for EV vehicles,	No inquiry.
2	Is service facility available for EVs in your dealership or any nearby dealership?	Only for ICE.
3	Are you planning to launch EVs in your dealership in the near future?	Not yet.
4	What could be the reason for low penetration of EV in Shillong? Mention all the Challenges	→ Range issue, → Power Shedding → Expensive.
5	Recommendations for Govt. to improve EV penetration	Awareness and more subsidy
6	Are dealers aware about the subsidies for EVs?	No.
7	What is the gradeability of E-3W in shillong/Hilly terrain	Maybe, in low regions.

Drivers



WS 2	Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date	Name of city: Shillong

General

Name Of Fleet																		
Vehicle Type	Electric								ICE									
Vehicle Segment	2W		3W		4W				2W		3W		4W					
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model		
Vehicle Body Type															Maruti K10		2023	
Operating area	Mothphran, Jowai, Mawali, Polo, PB.																	

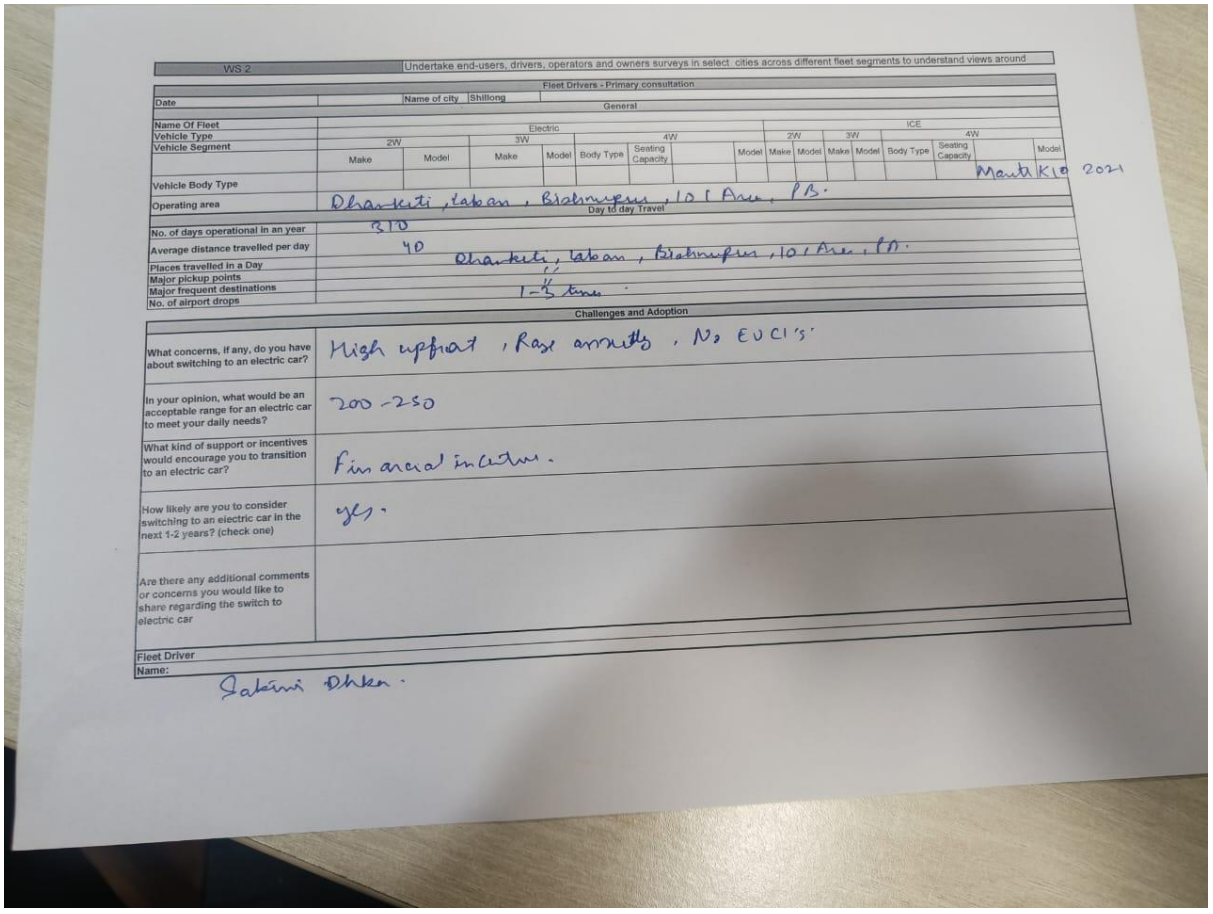
Day to day Travel

No. of days operational in an year	320
Average distance travelled per day	80
Places travelled in a Day	Mothphran, Jowai, Mawali, Polo, PB.
Major pickup points	"
Major frequent destinations	"
No. of airport drops	1

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	Cost of EVCI, Range anxiety; Vehicle type Concern, No EVCIS.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250
What kind of support or incentives would encourage you to transition to an electric car?	Financial incative, Charging access & convient.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	- NA -

Fleet Driver Name: Ann of Khayam.



WS 2	Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date	Name of city: Shillong

General

Name Of Fleet																		
Vehicle Type	Electric								ICE									
Vehicle Segment	2W		3W		4W				2W		3W		4W					
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model		
Vehicle Body Type															Maruti K10		2021	
Operating area	Dharkati, Jaban, Bishnupur, IOC Area, PB.																	

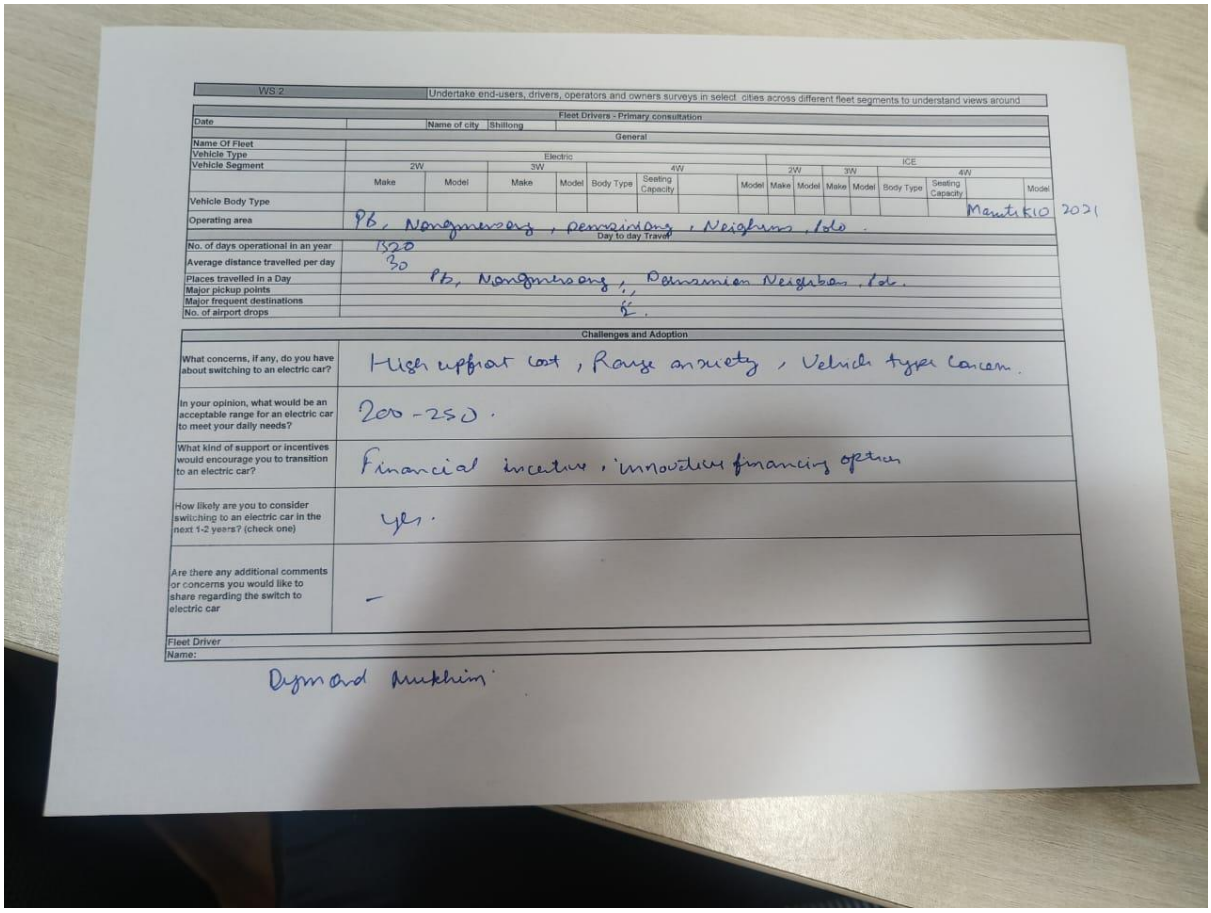
Day to day Travel

No. of days operational in an year	310
Average distance travelled per day	40
Places travelled in a Day	Dharkati, Jaban, Bishnupur, IOC Area, PB.
Major pickup points	"
Major frequent destinations	1-2 time.
No. of airport drops	

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	High upfront, Raze anxiety, No EVCI's.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250
What kind of support or incentives would encourage you to transition to an electric car?	Financial incative.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	

Fleet Driver Name: Jakimi Dhkar.



WS 2	Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date	Name of city: Shillong

General

Name Of Fleet																	
Vehicle Type	Electric								ICE								
Vehicle Segment	2W		3W		4W				2W		3W		4W				
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model	
Vehicle Body Type																	Maruti Kia 2021
Operating area	PB, Nongmensong, Pemgaindong, Neighrim, Lde.																

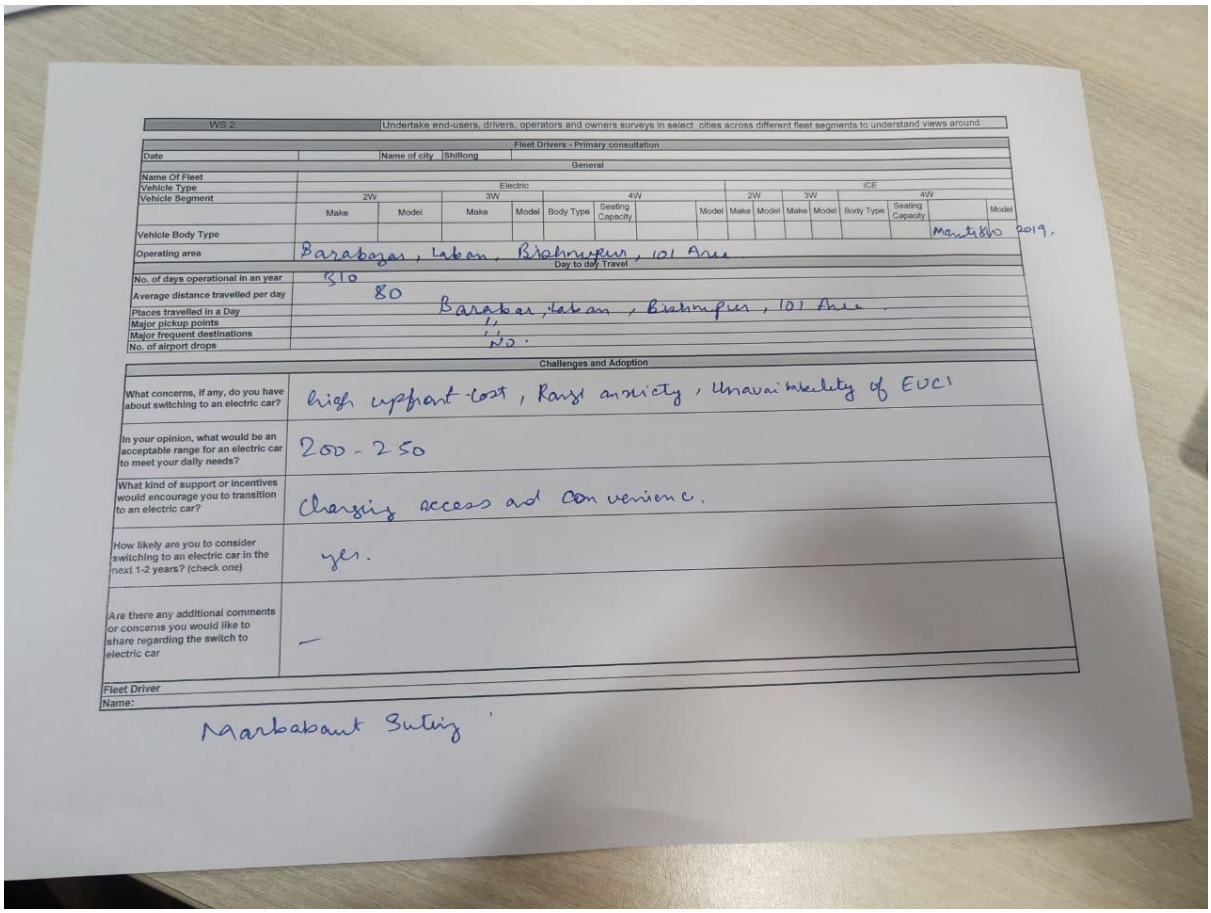
Day to day Travel

No. of days operational in an year	1320
Average distance travelled per day	30
Places travelled in a Day	PB, Nongmensong, Dorbanion Neighbor, Lde.
Major pickup points	"
Major frequent destinations	"
No. of airport drops	2.

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	High upfront cost, Range anxiety, Vehicle type concern.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250.
What kind of support or incentives would encourage you to transition to an electric car?	Financial incentive, innovative financing option
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	Yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	—

Fleet Driver Name: Dymond Nuckhin



WS 2	Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date	Name of city: Shillong

General

Name Of Fleet																	
Vehicle Type	Electric								ICE								
Vehicle Segment	2W		3W		4W				2W		3W		4W				
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model	
Vehicle Body Type																	Maruti Kia 2019.
Operating area	Barabazar, Laban, Bishnupur, 101 Area.																

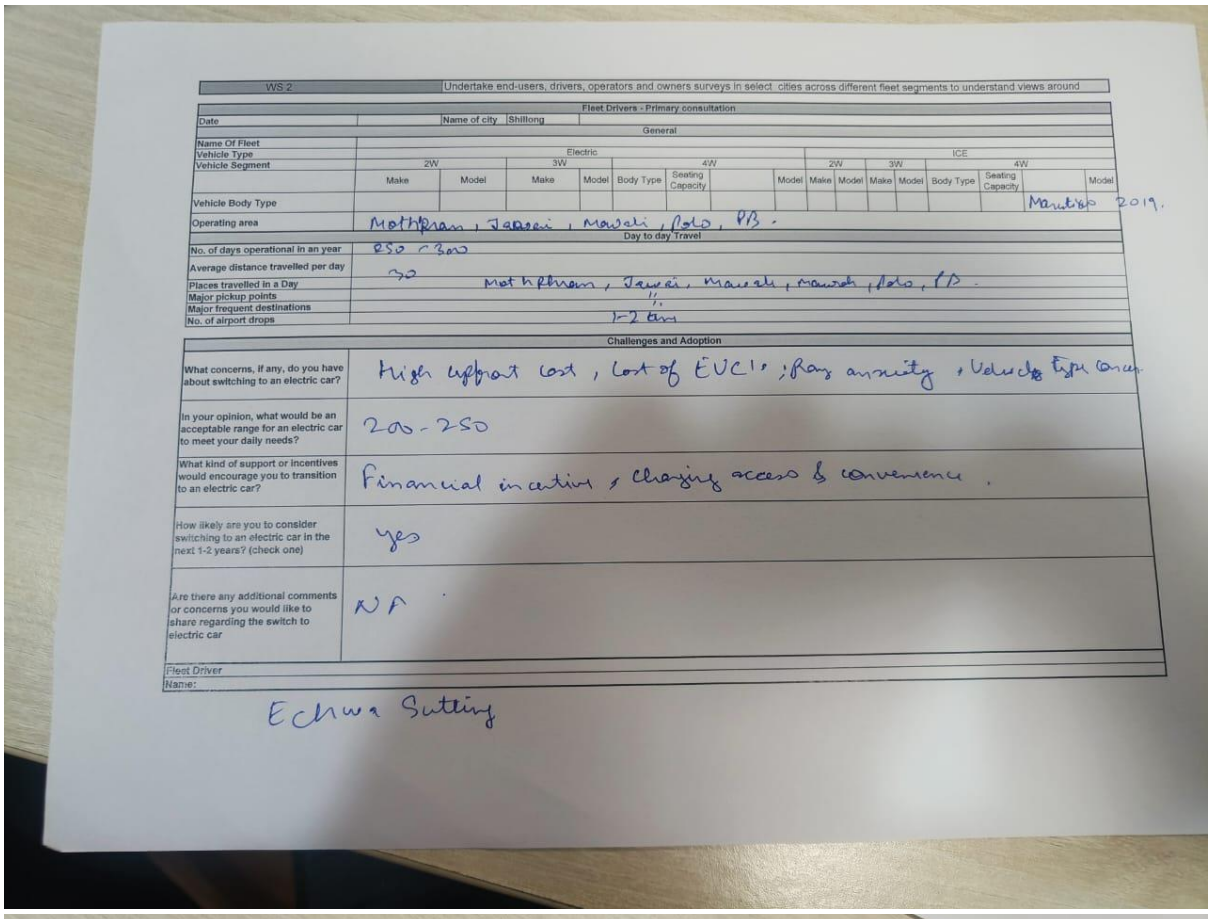
Day to day Travel

No. of days operational in an year	310
Average distance travelled per day	80
Places travelled in a Day	Barabazar, Laban, Bishnupur, 101 Area.
Major pickup points	"
Major frequent destinations	"
No. of airport drops	NO.

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	High upfront cost, Range anxiety, Unavailability of EVCI
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250
What kind of support or incentives would encourage you to transition to an electric car?	Charging access and convenience.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	—

Fleet Driver Name: Barbabasant Suting



WS 2 | Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date		Name of city	Shillong

General

Name Of Fleet																	
Vehicle Type	Electric								ICE								
Vehicle Segment	2W		3W		4W				2W		3W		4W				
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model	
Vehicle Body Type																	Maruti 800 2019.
Operating area	Motphran, Jaiaw, Mawali, Polo, PB.																

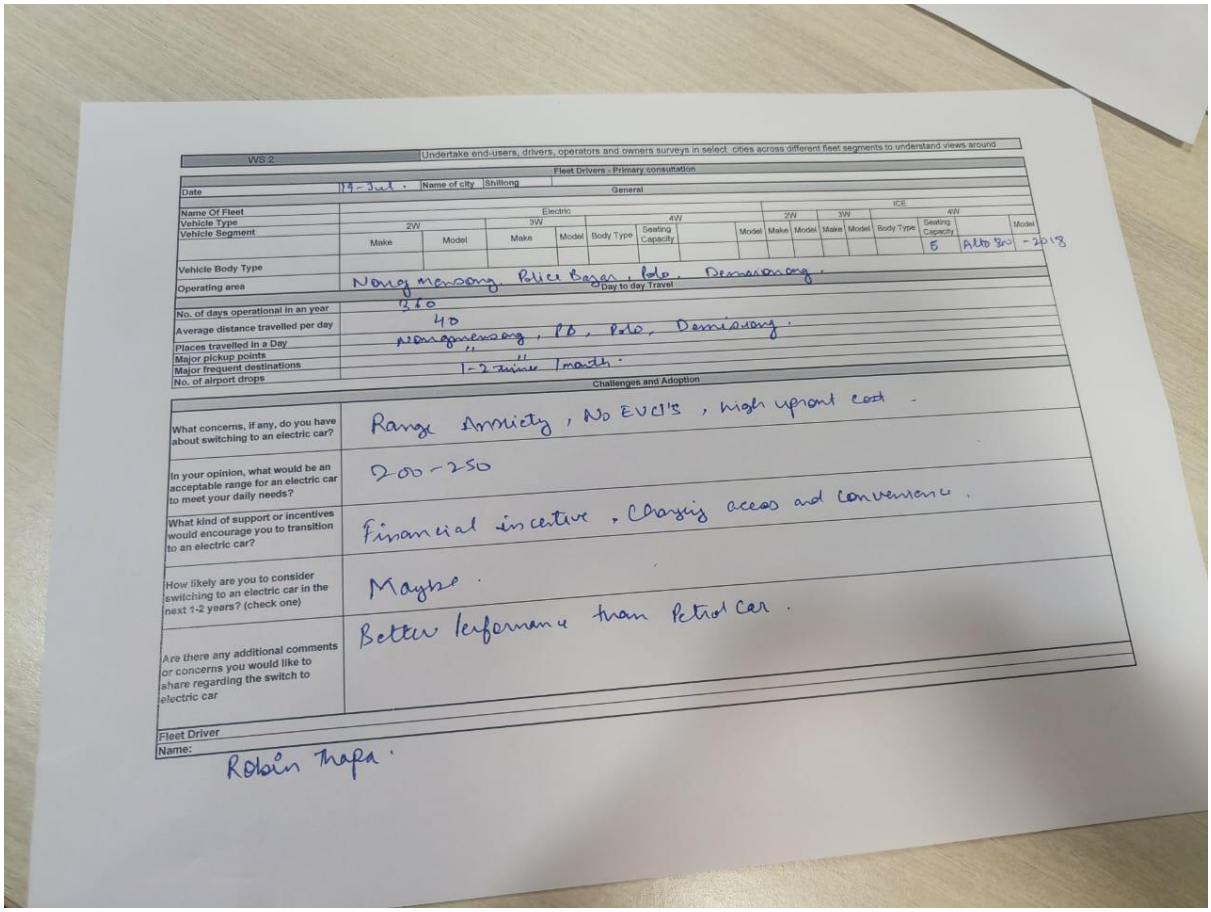
Day to day Travel

No. of days operational in an year	250 - 300
Average distance travelled per day	30
Places travelled in a Day	Motphran, Jaiaw, Mawali, Mawsh, Polo, PB.
Major pickup points	11
Major frequent destinations	11
No. of airport drops	1-2 times

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	High upfront cost, Cost of EVCI's, Range anxiety, Vehicle light range.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250
What kind of support or incentives would encourage you to transition to an electric car?	Financial incentive, Charging access & convenience.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes
Are there any additional comments or concerns you would like to share regarding the switch to electric car	NA.

Fleet Driver Name: Echwa Suting



WS 2 | Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date	19 - Jul.	Name of city	Shillong

General

Name Of Fleet																	
Vehicle Type	Electric								ICE								
Vehicle Segment	2W		3W		4W				2W		3W		4W				
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model	
Vehicle Body Type														5	Alto 800	- 2018	
Operating area	Nongmensong, Police Bazar, Polo, Demseiong.																

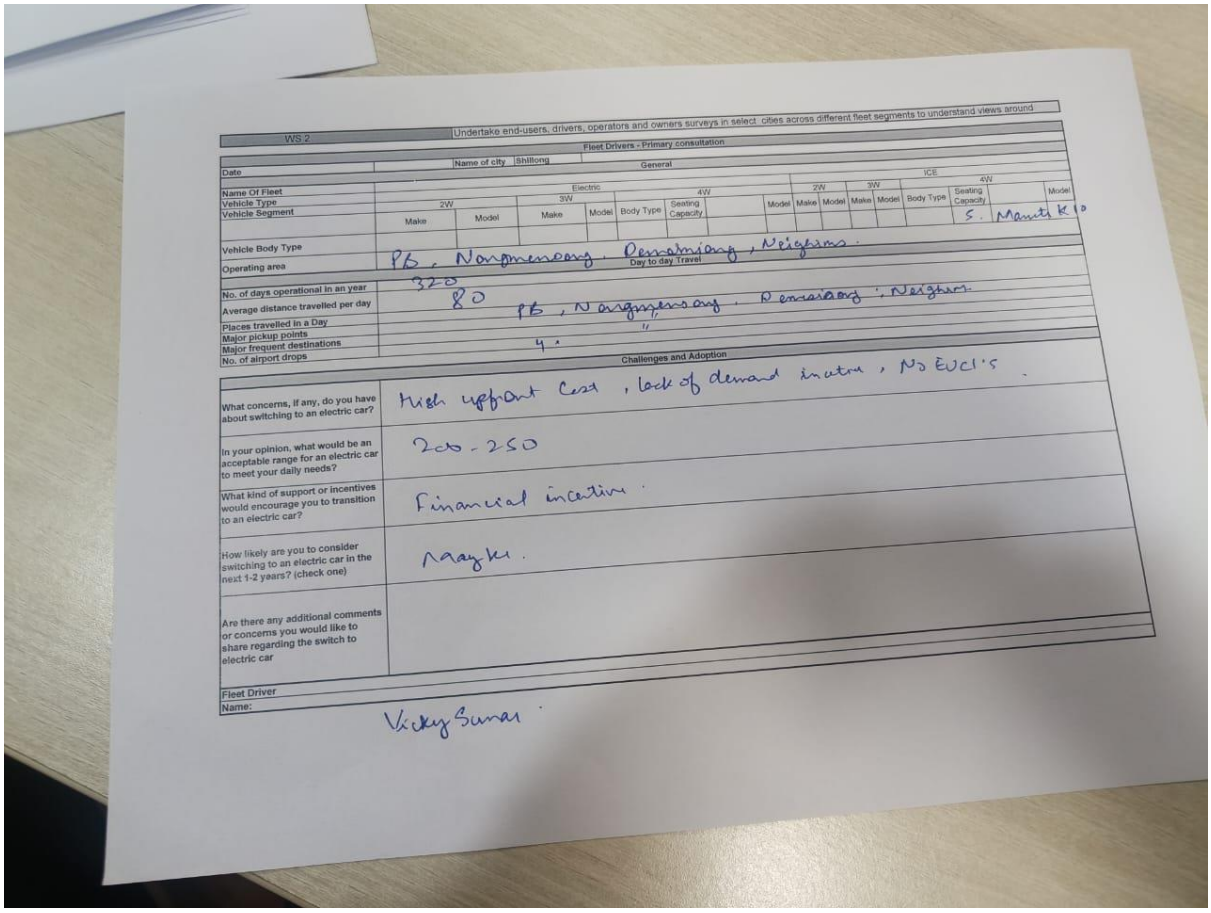
Day to day Travel

No. of days operational in an year	240
Average distance travelled per day	40
Places travelled in a Day	Nongmensong, PB, Polo, Demseiong.
Major pickup points	11
Major frequent destinations	11
No. of airport drops	1-2 time / month.

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	Range Anxiety, No EVCI's, high upfront cost.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250
What kind of support or incentives would encourage you to transition to an electric car?	Financial incentive, Charging access and convenience.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	Maybe.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	Better performance than Petrol car.

Fleet Driver Name: Robin Thapa.



WS 2 | Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

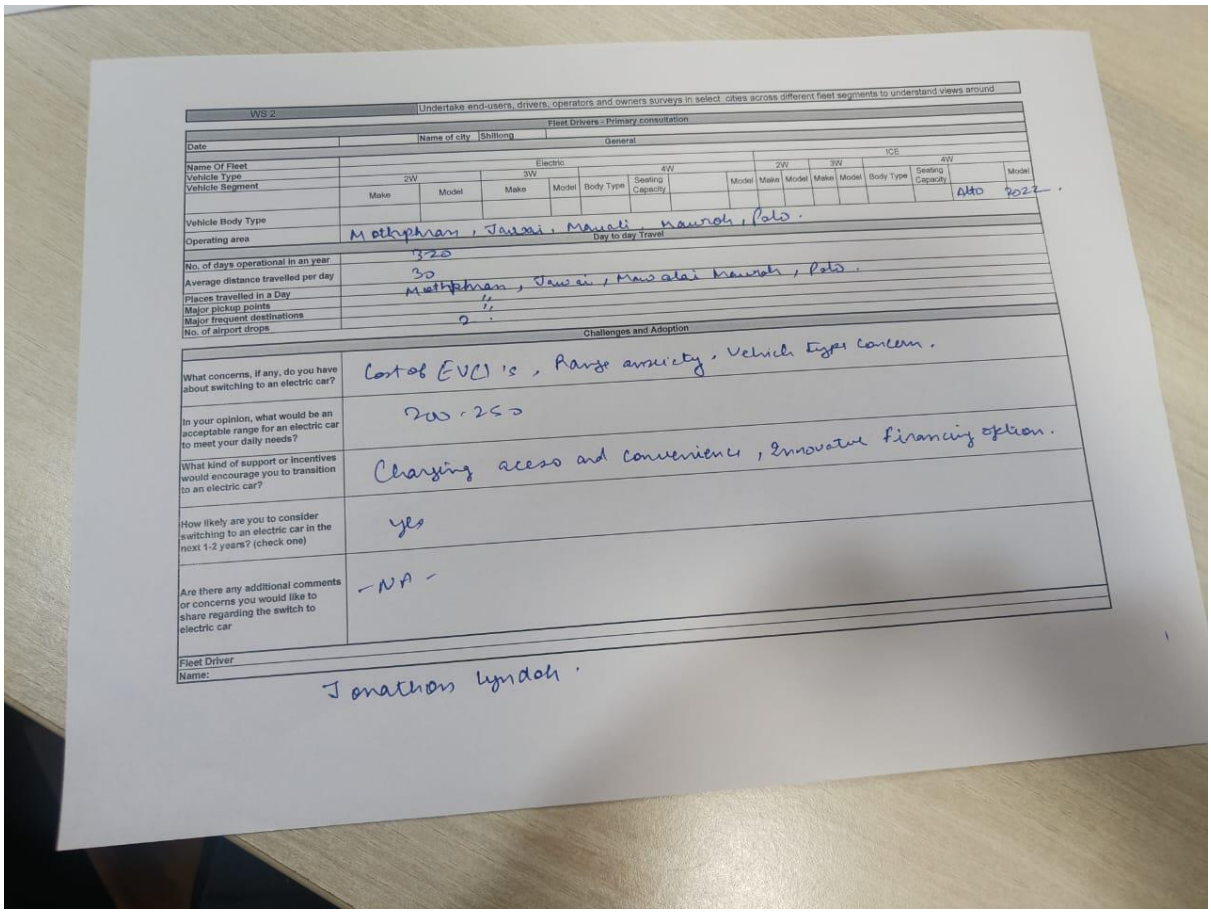
Fleet Drivers - Primary consultation

Date	Name of city: Shillong							General													
Name Of Fleet					Electric											ICE					
Vehicle Type	2W		3W		4W					2W		3W		4W							
Vehicle Segment	Make	Model	Make	Model	Body Type	Seating Capacity			Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model				
																5.	Maruti K10				
Vehicle Body Type																					
Operating area	PB, Nongmensong, Pensamang, Neighbrs.																				
								Day to day Travel													
No. of days operational in an year	320																				
Average distance travelled per day	80																				
Places travelled in a Day	PB, Nongmensong, Pensamang, Neighbrs.																				
Major pickup points	〃																				
Major frequent destinations	4.																				
No. of airport drops																					

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	High upfront Cost, lack of demand incentive, No EVCI's
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250
What kind of support or incentives would encourage you to transition to an electric car?	Financial incentive.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	Maybe.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	

Fleet Driver Name: Vicky Sunar.



WS 2 | Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

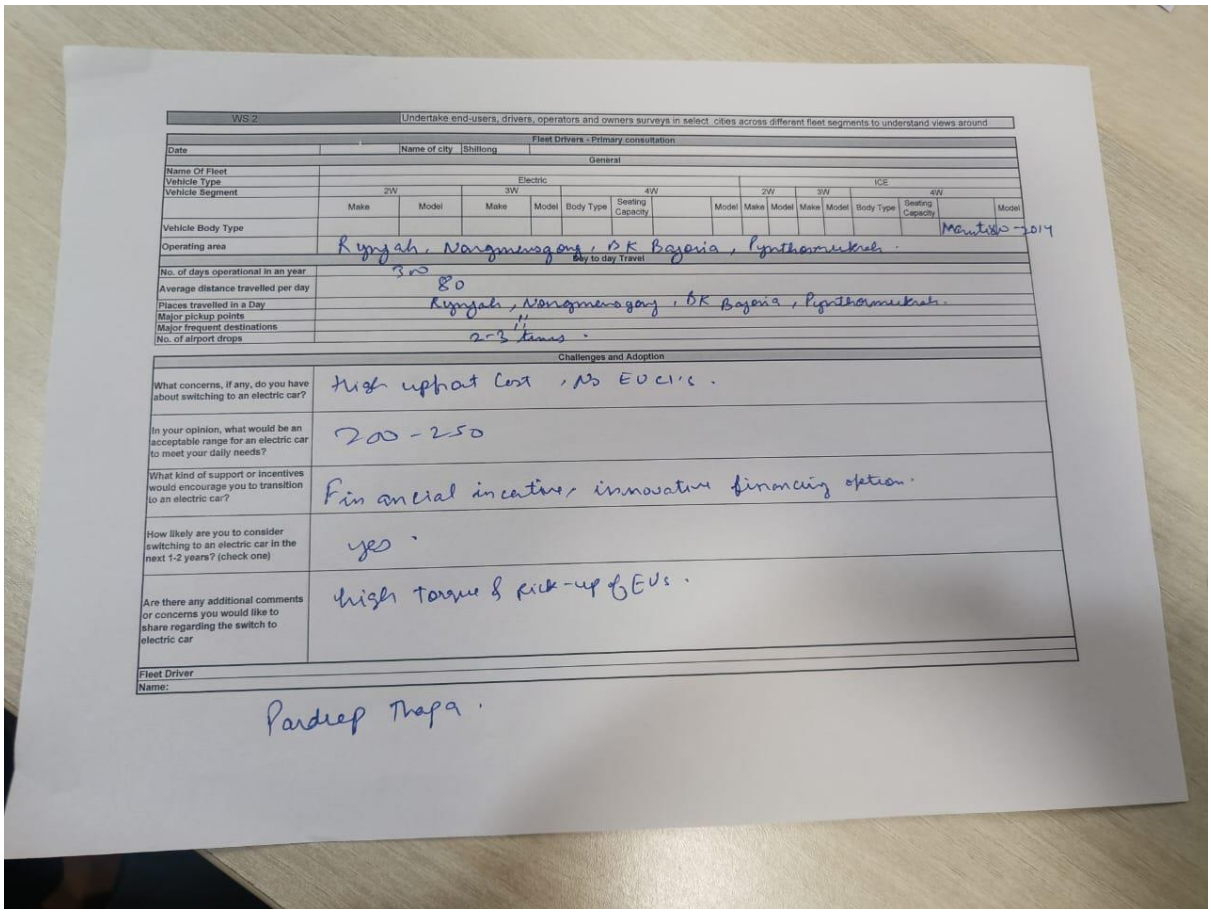
Fleet Drivers - Primary consultation

Date	Name of city: Shillong							General													
Name Of Fleet					Electric											ICE					
Vehicle Type	2W		3W		4W					2W		3W		4W							
Vehicle Segment	Make	Model	Make	Model	Body Type	Seating Capacity			Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model				
																Alto	2022.				
Vehicle Body Type																					
Operating area	Mothphran, Jowai, Mawali, Mawroh, Pala.																				
								Day to day Travel													
No. of days operational in an year	320																				
Average distance travelled per day	30																				
Places travelled in a Day	Mothphran, Jowai, Mawalai Mawroh, Pala.																				
Major pickup points	〃																				
Major frequent destinations	2.																				
No. of airport drops																					

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	Cost of EVCI's, Range anxiety, Vehicle type concern.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250
What kind of support or incentives would encourage you to transition to an electric car?	Charging access and convenience, Innovative financing option.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes
Are there any additional comments or concerns you would like to share regarding the switch to electric car	-NA-

Fleet Driver Name: Jonathon Lyndoh.



WS 2 — Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date | Name of city: Shillong

General

Name Of Fleet																
Vehicle Type	Electric								ICE							
Vehicle Segment	2W		3W		4W				2W		3W		4W			
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model
Vehicle Body Type															Mahindra	2014
Operating area	Ryngah, Nongmensong, BK Bajoria, Pynthormukhrah.															

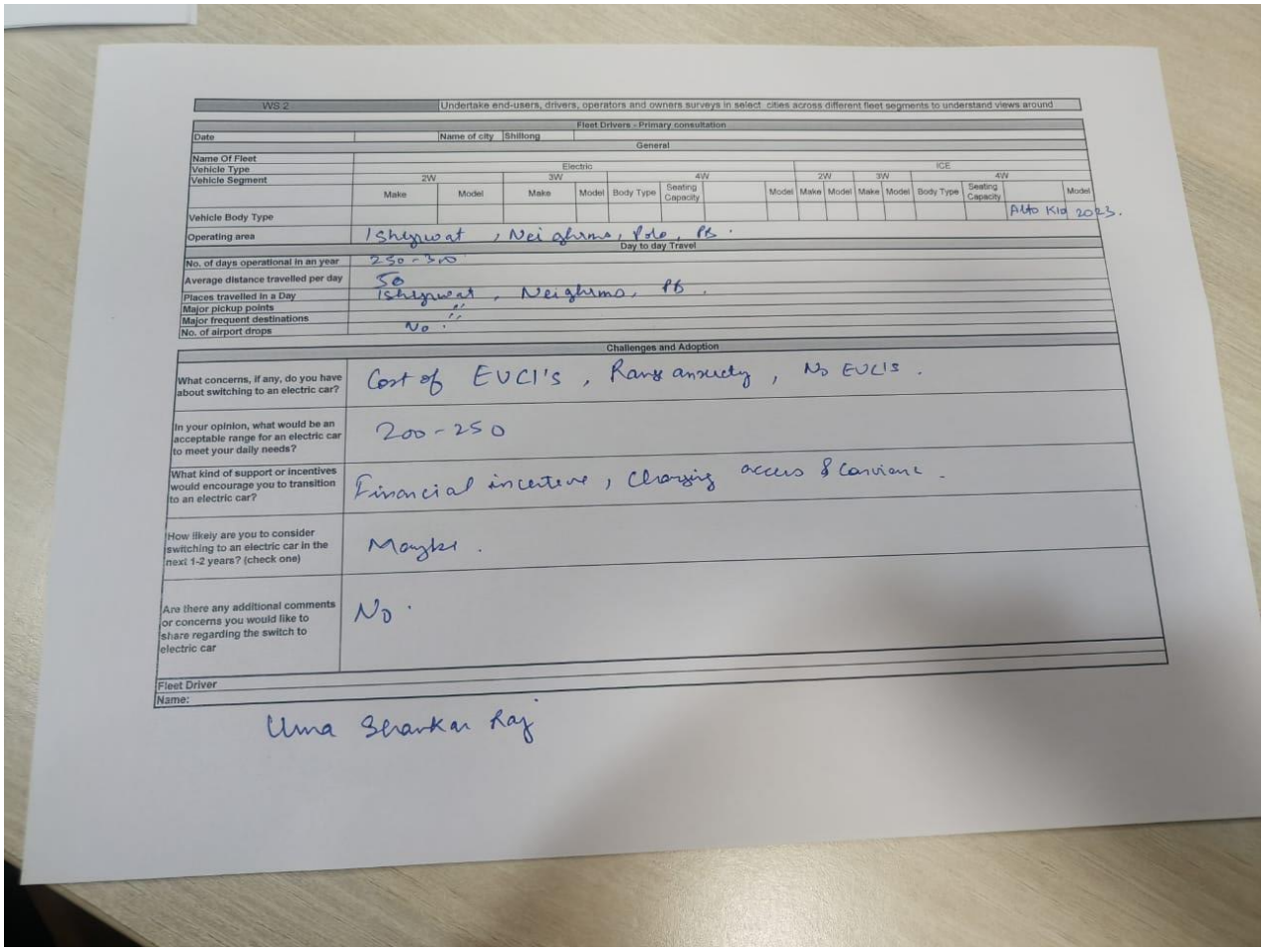
Day to day Travel

No. of days operational in an year	300
Average distance travelled per day	80
Places travelled in a Day	Ryngah, Nongmensong, BK Bajoria, Pynthormukhrah.
Major pickup points	"
Major frequent destinations	"
No. of airport drops	2-3 times.

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	High upfront Cost, No EVCI's.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250
What kind of support or incentives would encourage you to transition to an electric car?	Financial incentive, innovative financing option.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	High torque & Pick-up of EVs.

Fleet Driver Name: Pardeep Thapa.



WS 2 — Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date | Name of city: Shillong

General

Name Of Fleet																
Vehicle Type	Electric								ICE							
Vehicle Segment	2W		3W		4W				2W		3W		4W			
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model
Vehicle Body Type															Alto K10	2023.
Operating area	Ishingwat, Neighbrms, Pde, PB.															

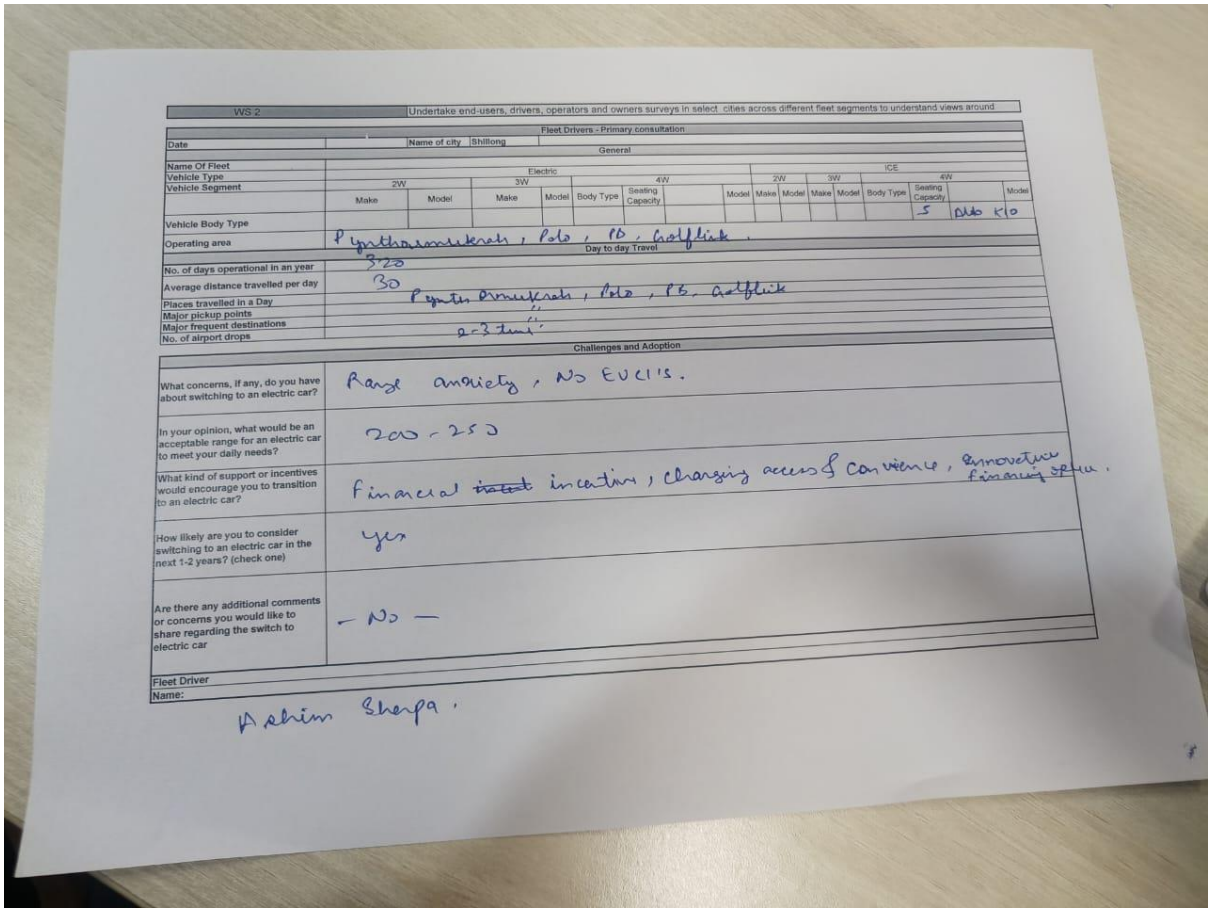
Day to day Travel

No. of days operational in an year	250-300
Average distance travelled per day	50
Places travelled in a Day	Ishingwat, Neighbrms, PB.
Major pickup points	"
Major frequent destinations	"
No. of airport drops	No.

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	Cost of EVCI's, Range anxiety, No EVCIs.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250
What kind of support or incentives would encourage you to transition to an electric car?	Financial incentive, Charging access & Convience.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	Maybe.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	No.

Fleet Driver Name: Uma Shankar Raj.



WS 2	Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date	Name of city: Shillong

General

Name Of Fleet / Vehicle Type / Vehicle Segment	Electric								ICE							
	2W		3W		4W				2W		3W		4W			
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model
Vehicle Body Type														5	Alto	K10
Operating area	Pynthorumkhrah, Polo, PB, Golflink.															

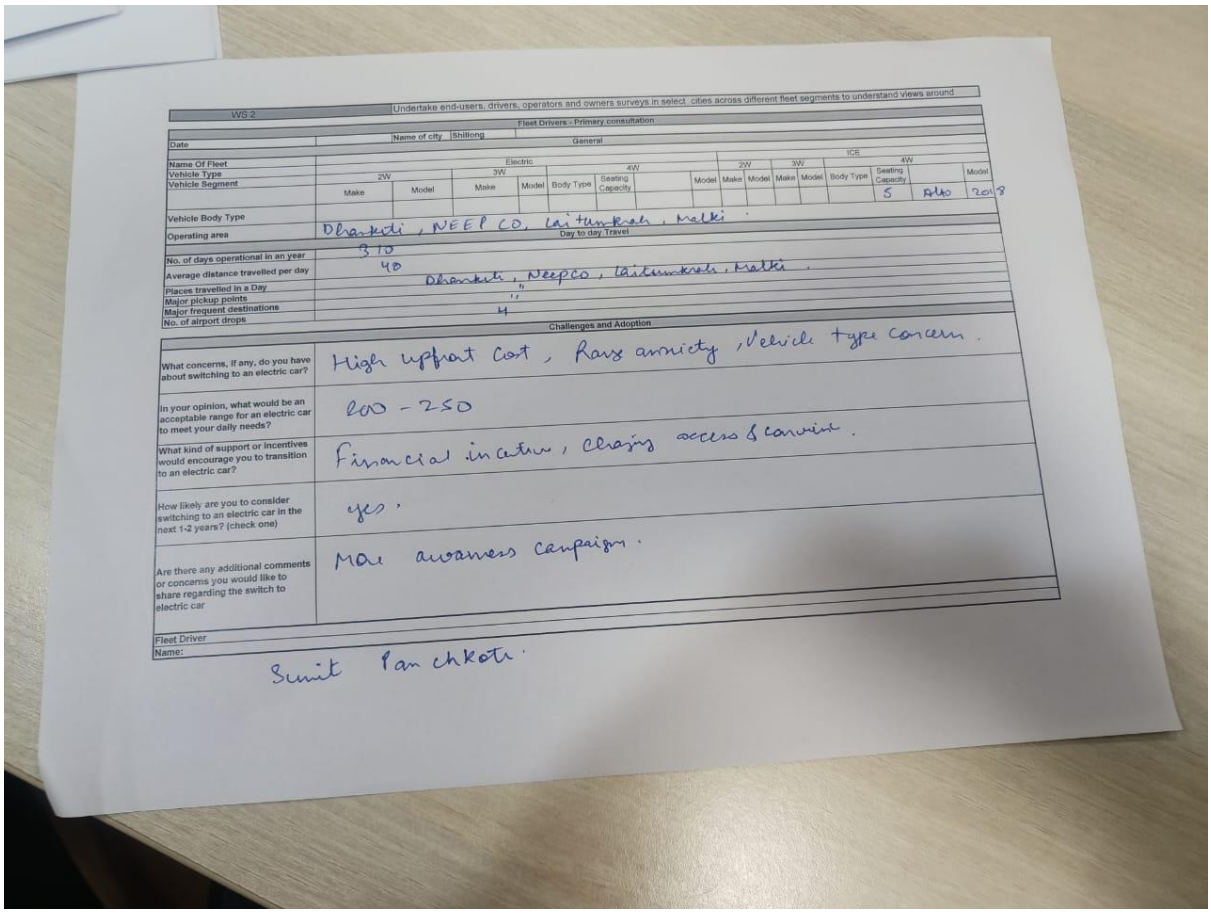
Day to day Travel

No. of days operational in an year	320
Average distance travelled per day	30
Places travelled in a Day	Pynthorumkhrah, Polo, PB, Golflink
Major pickup points	"
Major frequent destinations	"
No. of airport drops	2-3 times

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	Range anxiety, No EVCI's.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250
What kind of support or incentives would encourage you to transition to an electric car?	Financial ~~instant~~ incentive, charging access & convience, innovative financing option.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes
Are there any additional comments or concerns you would like to share regarding the switch to electric car	— No —

Fleet Driver Name: Ashim Sherpa.



WS 2	Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date	Name of city: Shillong

General

Name Of Fleet / Vehicle Type / Vehicle Segment	Electric								ICE							
	2W		3W		4W				2W		3W		4W			
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model
Vehicle Body Type														5	Alto	2018
Operating area	Dhankuti, NEEPCO, Laitumkrah, Malki.															

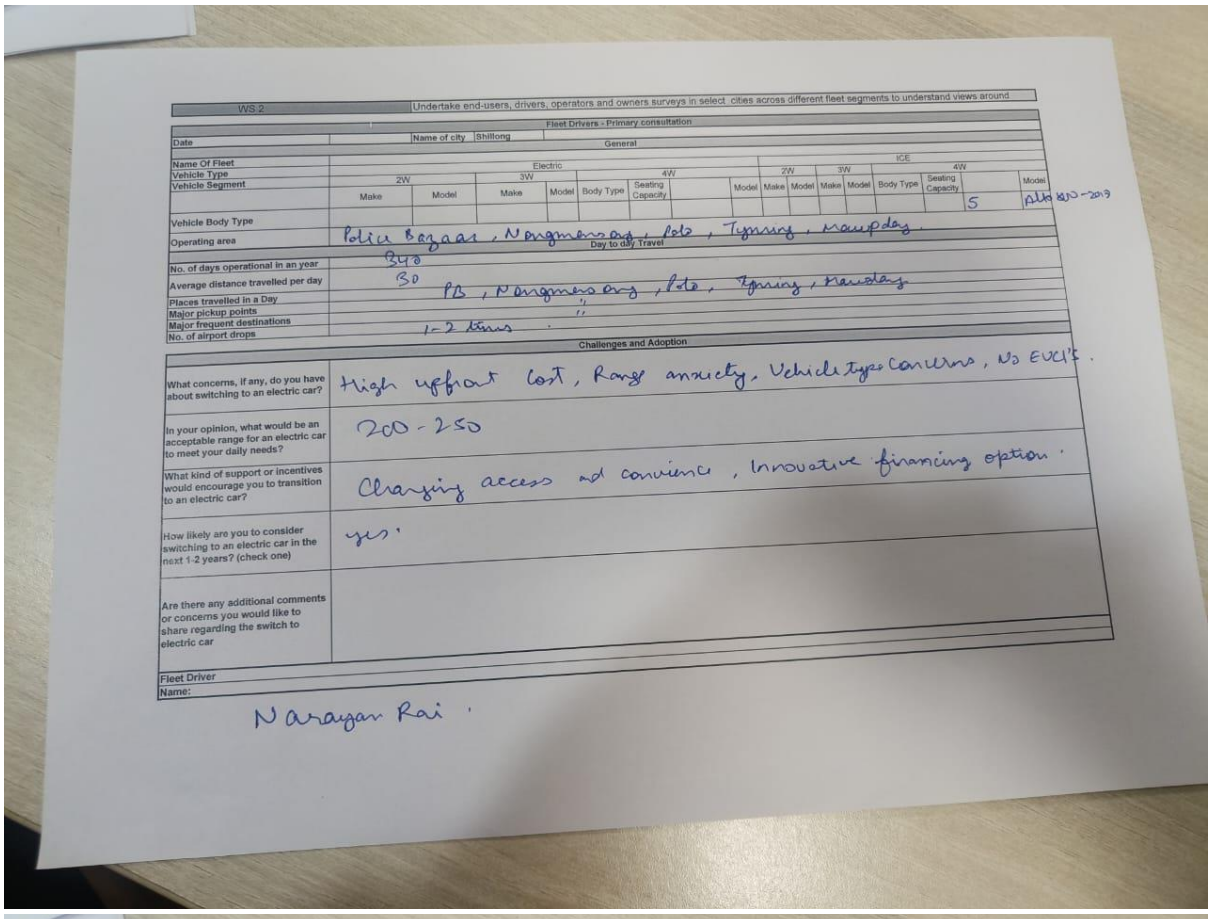
Day to day Travel

No. of days operational in an year	310
Average distance travelled per day	40
Places travelled in a Day	Dhankuti, Neepco, Laitumkrah, Malki.
Major pickup points	"
Major frequent destinations	4
No. of airport drops	

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	High upfront cost, Range anxiety, Vehicle type concern.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250
What kind of support or incentives would encourage you to transition to an electric car?	Financial incentive, charging access & convinit.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	More awareness campaign.

Fleet Driver Name: Sumit Panchkoti.



WS 2 — Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

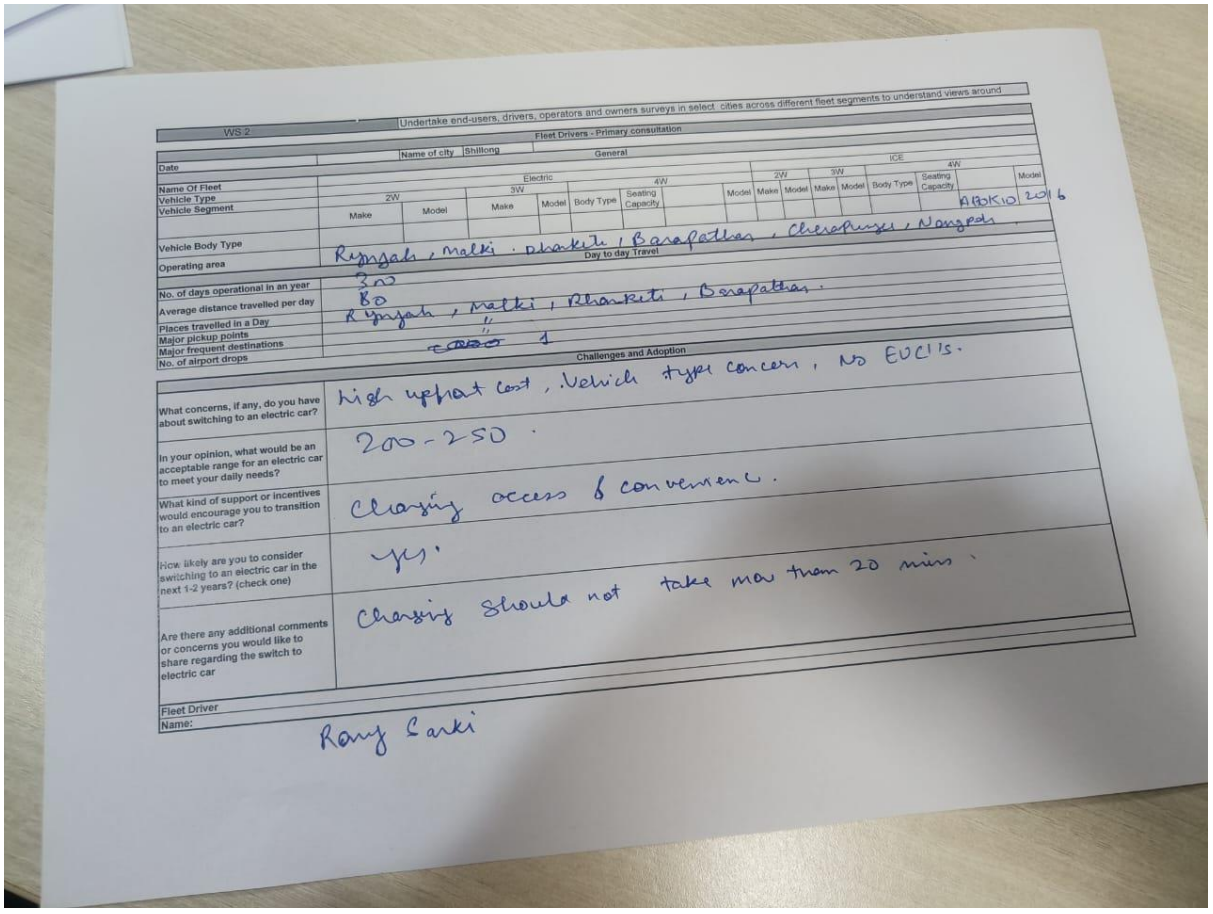
Fleet Drivers - Primary consultation

Date	Name of city: Shillong
General	
Name Of Fleet	
Vehicle Type	Electric: 2W Make: — Model: — / 3W Make: — Model: — / 4W Body Type: — Seating Capacity: —
Vehicle Segment	ICE: 2W Make: — Model: — / 3W Make: — Model: — / 4W Body Type: — Seating Capacity: 5 Model: Alto K10 2019
Vehicle Body Type	
Operating area	Police Bazaar, Nongmensong, Lato, Tynsong, Mawpdang.
Day to day Travel	
No. of days operational in an year	348
Average distance travelled per day	30
Places travelled in a Day	PB, Nongmensong, Lato, Tynsong, Mawlong
Major pickup points	"
Major frequent destinations	"
No. of airport drops	1-2 times

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	High upfront cost, Range anxiety, Vehicle type concerns, No EVCI's.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250
What kind of support or incentives would encourage you to transition to an electric car?	Charging access and convience, Innovative financing option.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	

Fleet Driver Name: Narayan Rai.



WS 2 — Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

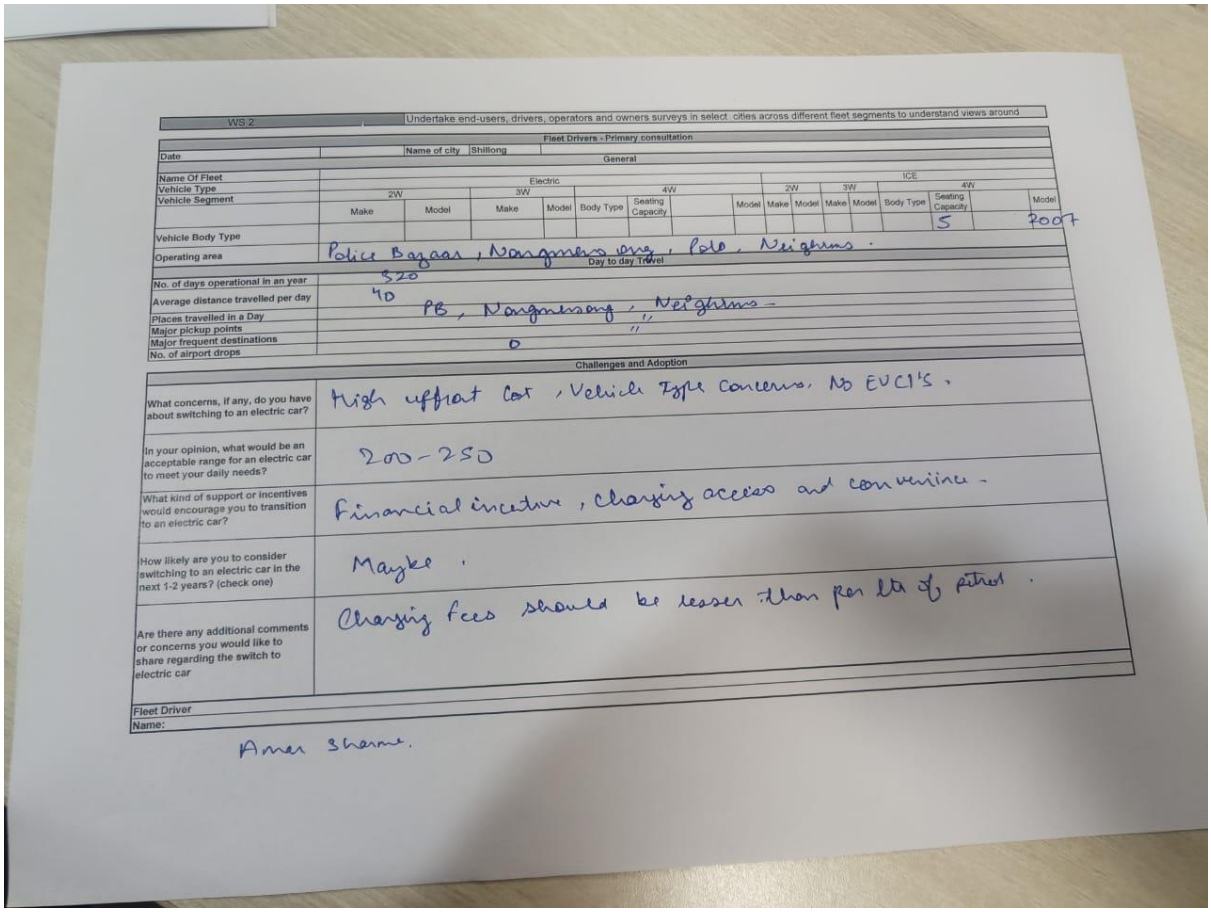
Fleet Drivers - Primary consultation

Date	Name of city: Shillong
General	
Name Of Fleet	
Vehicle Type	Electric: 2W Make: — Model: — / 3W Make: — Model: — / 4W Body Type: — Seating Capacity: —
Vehicle Segment	ICE: 2W Make: — Model: — / 3W Make: — Model: — / 4W Body Type: — Seating Capacity: — Model: Alto K10 2016
Vehicle Body Type	
Operating area	Rynjah, Malki, Rhakiti, Barapathar, Cherrapunji, Nongpoh.
Day to day Travel	
No. of days operational in an year	300
Average distance travelled per day	80
Places travelled in a Day	Rynjah, Malki, Rhakiti, Barapathar.
Major pickup points	"
Major frequent destinations	"
No. of airport drops	1

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	High upfront cost, Vehicle type concern, No EVCI's.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250.
What kind of support or incentives would encourage you to transition to an electric car?	Charging access & convenience.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	Charging should not take more than 20 mins.

Fleet Driver Name: Rony Sarki



WS 2 — Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date	Name of city: Shillong

General

	Electric								ICE							
Name Of Fleet / Vehicle Type / Vehicle Segment	2W		3W		4W				2W		3W		4W			
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model
Vehicle Body Type														5		2007
Operating area	Police Bazaar, Nongmeiong, Polo, Neighbins.															

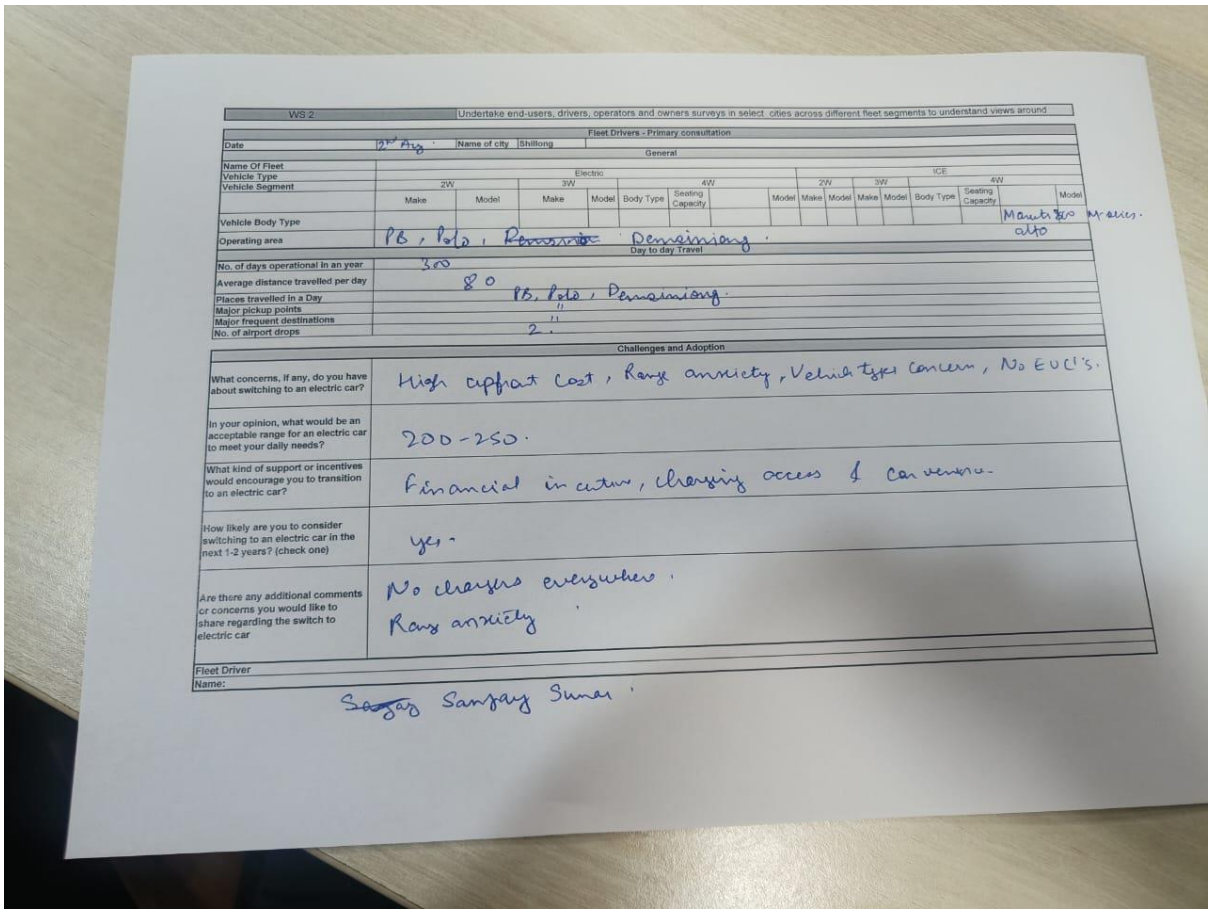
Day to day Travel

No. of days operational in an year	320
Average distance travelled per day	40
Places travelled in a Day	PB, Nongmeiong, Neighbins.
Major pickup points	"
Major frequent destinations	"
No. of airport drops	0

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	High upfront cost, Vehicle type concerns, No EVCI's.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250
What kind of support or incentives would encourage you to transition to an electric car?	Financial incentive, charging access and convenience.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	Maybe.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	Charging fees should be lesser than per Ltr of petrol.

Fleet Driver Name: Aman Sharma.



WS 2 — Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date: 2nd Aug	Name of city: Shillong

General

	Electric								ICE							
Name Of Fleet / Vehicle Type / Vehicle Segment	2W		3W		4W				2W		3W		4W			
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model
Vehicle Body Type																Mauti 800 Maruti. alto
Operating area	PB, Polo, ~~Romsiniar~~ Densiniang.															

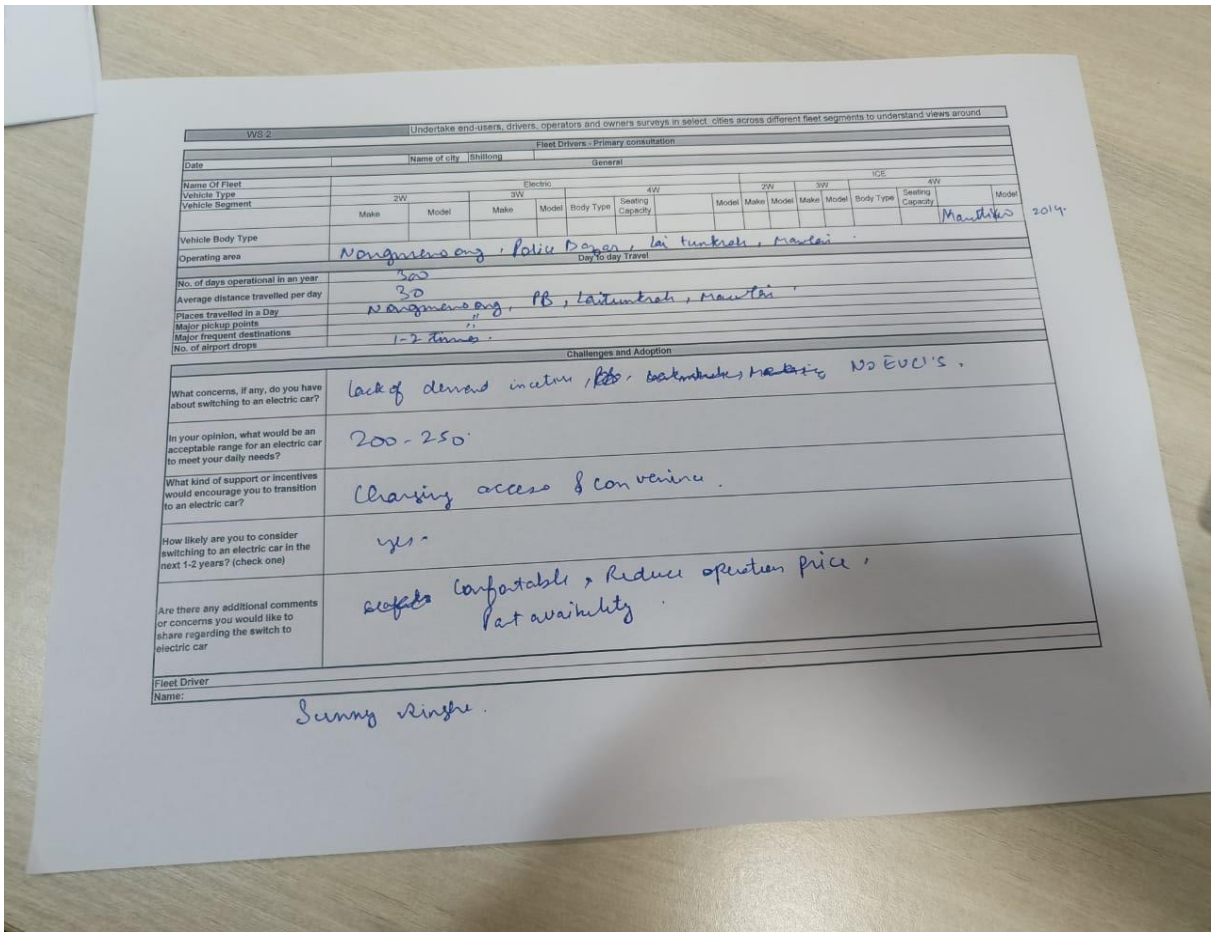
Day to day Travel

No. of days operational in an year	300
Average distance travelled per day	80
Places travelled in a Day	PB, Polo, Densiniang.
Major pickup points	"
Major frequent destinations	"
No. of airport drops	2.

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	High upfront cost, Range anxiety, Vehicle type concern, No EVCI's.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250.
What kind of support or incentives would encourage you to transition to an electric car?	Financial incentive, charging access & convenience.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	No chargers everywhere. Range anxiety.

Fleet Driver Name: ~~Sa~~Sanjay Sunar.



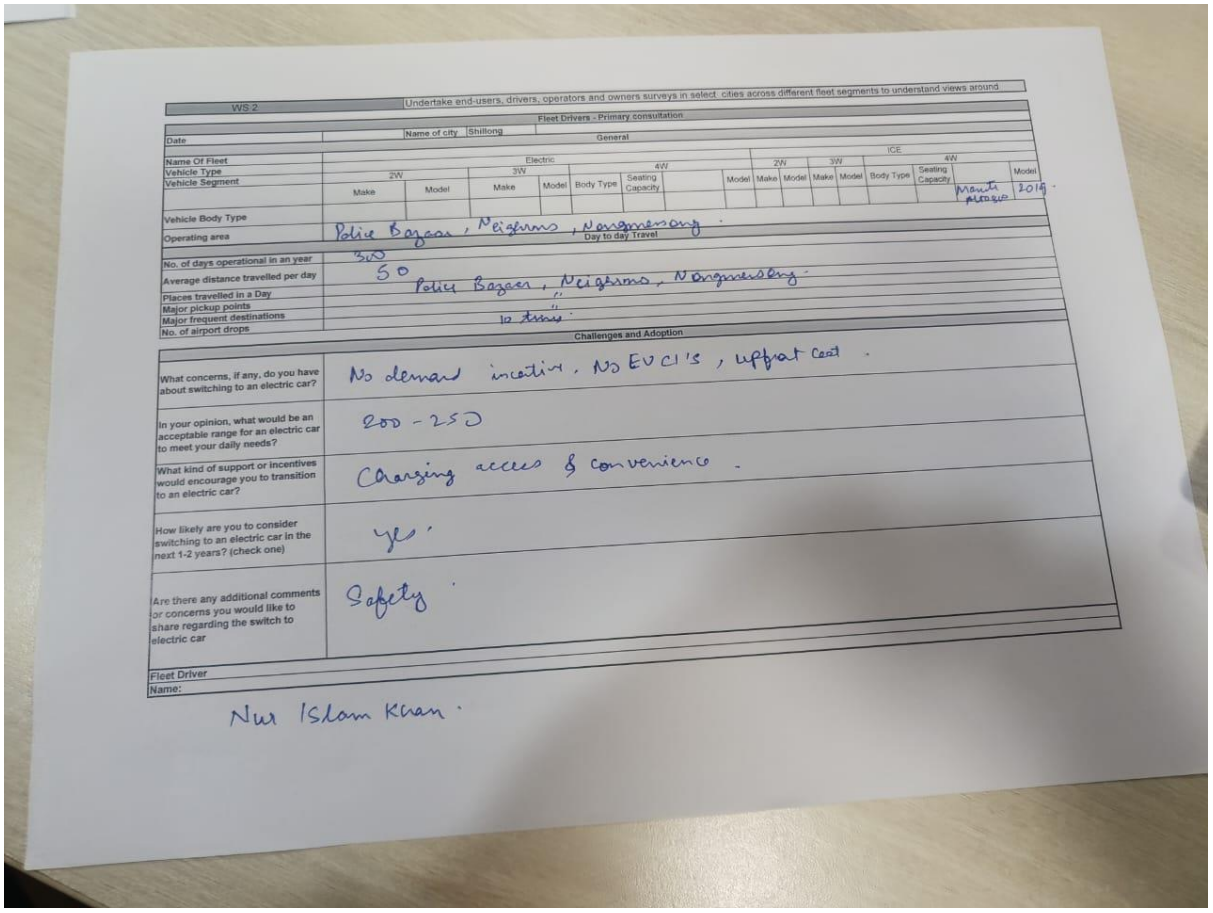
WS.2 | Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date	Name of city: Shillong																			
	General																			
Name Of Fleet																				
Vehicle Type	Electric													ICE						
Vehicle Segment	2W		3W		4W				2W		3W		4W							
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model				
Vehicle Body Type															Maruthi	2014				
Operating area	Nongmensong, Police Bazaar, Lai tunkrah, Mawlai.																			
	Day To day Travel																			
No. of days operational in an year	300																			
Average distance travelled per day	30																			
Places travelled in a Day	Nongmensong, PB, Laitumkrah, Mawlai.																			
Major pickup points	"																			
Major frequent destinations	1-2 times.																			
No. of airport drops																				

Challenges and Adoption	
What concerns, if any, do you have about switching to an electric car?	Lack of demand incetive, ~~PBS~~, ~~battery life~~, ~~Mileage~~, No EVCI's.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250.
What kind of support or incentives would encourage you to transition to an electric car?	Charging access & convenience.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	~~safety~~ Confortable, Reduce operation price, Pat availibility.

Fleet Driver Name: Sunny Singha.



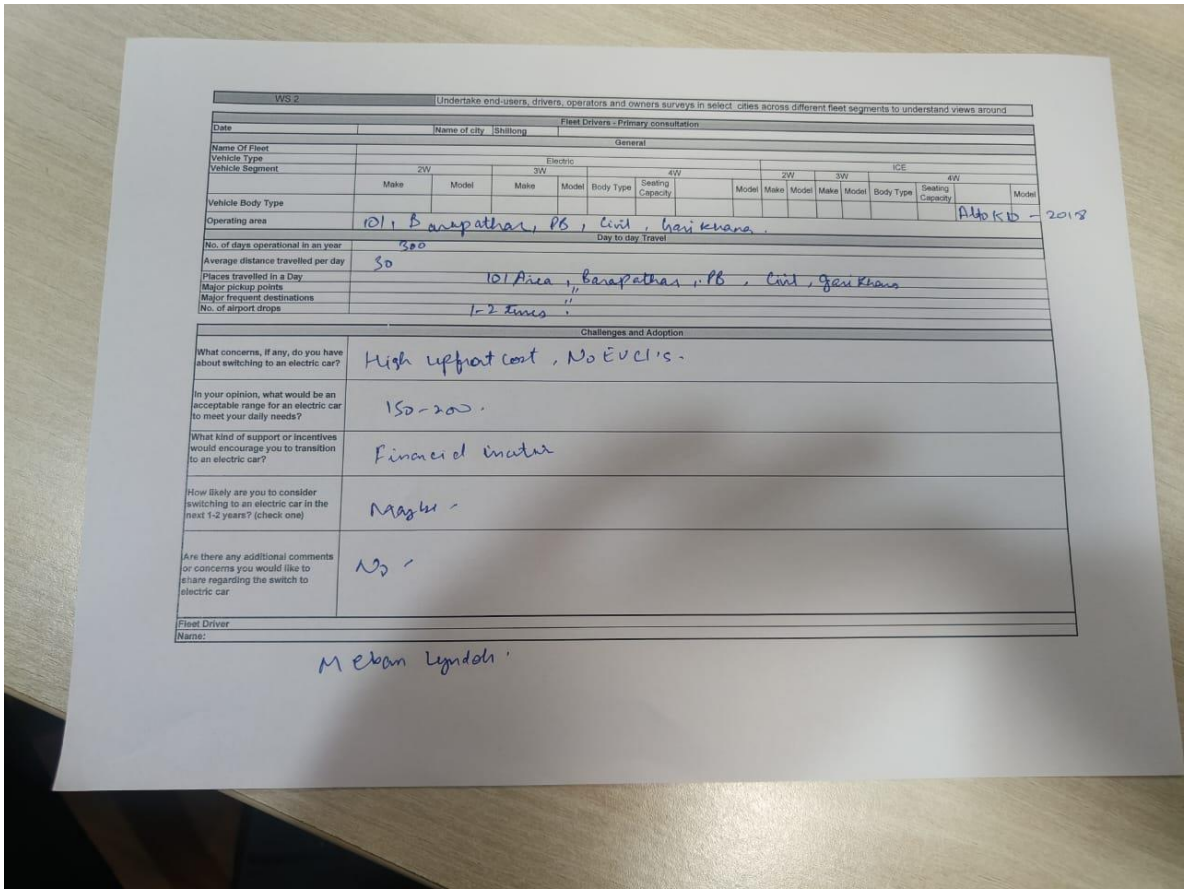
WS.2 | Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date	Name of city: Shillong																			
	General																			
Name Of Fleet																				
Vehicle Type	Electric													ICE						
Vehicle Segment	2W		3W		4W				2W		3W		4W							
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model				
Vehicle Body Type															Maruti Alto K10	2014.				
Operating area	Police Bazaar, Nongmensong, Nongmensong.																			
	Day to day Travel																			
No. of days operational in an year	300																			
Average distance travelled per day	50																			
Places travelled in a Day	Police Bazaar, Nongmensong, Nongmensong.																			
Major pickup points	"																			
Major frequent destinations	10 times.																			
No. of airport drops																				

Challenges and Adoption	
What concerns, if any, do you have about switching to an electric car?	No demand incetive, No EVCI's, Upfront Cost.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250
What kind of support or incentives would encourage you to transition to an electric car?	Charging access & convenience.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	Safety.

Fleet Driver Name: Nur Islam Khan.



WS 2 — Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date		Name of city	Shillong																		
General																					
Name Of Fleet																					
Vehicle Type	Electric												ICE								
Vehicle Segment	2W		3W		4W								2W		3W		4W				
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model					
Vehicle Body Type																					
Operating area	101, Barapathar, PB, Civil, Jail Khana.																				

Alto K10 – 2018

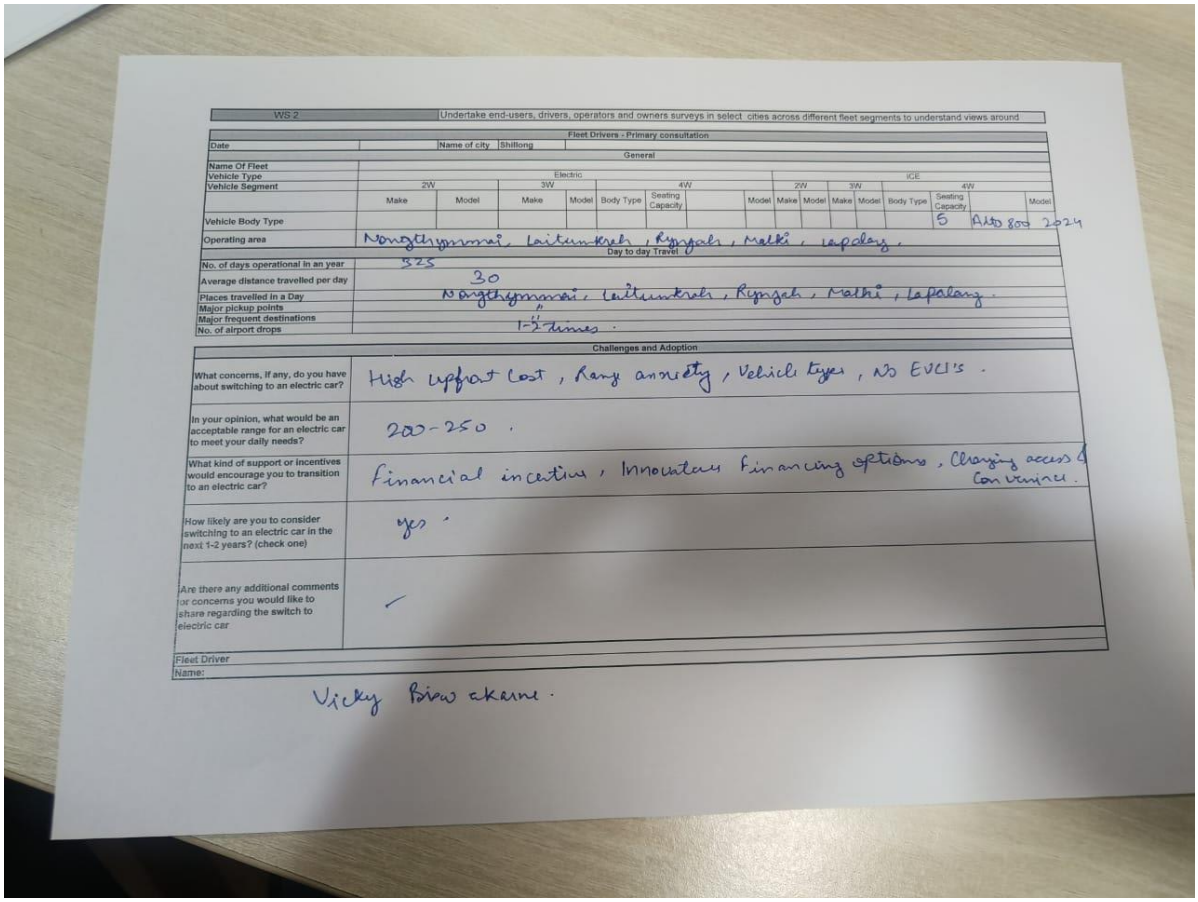
Day to day Travel

No. of days operational in an year	300
Average distance travelled per day	50
Places travelled in a Day	101 Area, Barapathar, PB, Civil, Jail Khana
Major pickup points	"
Major frequent destinations	"
No. of airport drops	1-2 times

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	High upfront cost, No EVCI's.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	150-200.
What kind of support or incentives would encourage you to transition to an electric car?	Financial incentive
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	Maybe.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	No.

Fleet Driver Name: Meban Lyndoh.



WS 2 — Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date		Name of city	Shillong																		
General																					
Name Of Fleet																					
Vehicle Type	Electric												ICE								
Vehicle Segment	2W		3W		4W								2W		3W		4W				
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model					
Vehicle Body Type														5							
Operating area	Nongthymmai, Laitumkrah, Rynjah, Malki, Lapalang.																				

Alto 800 2024

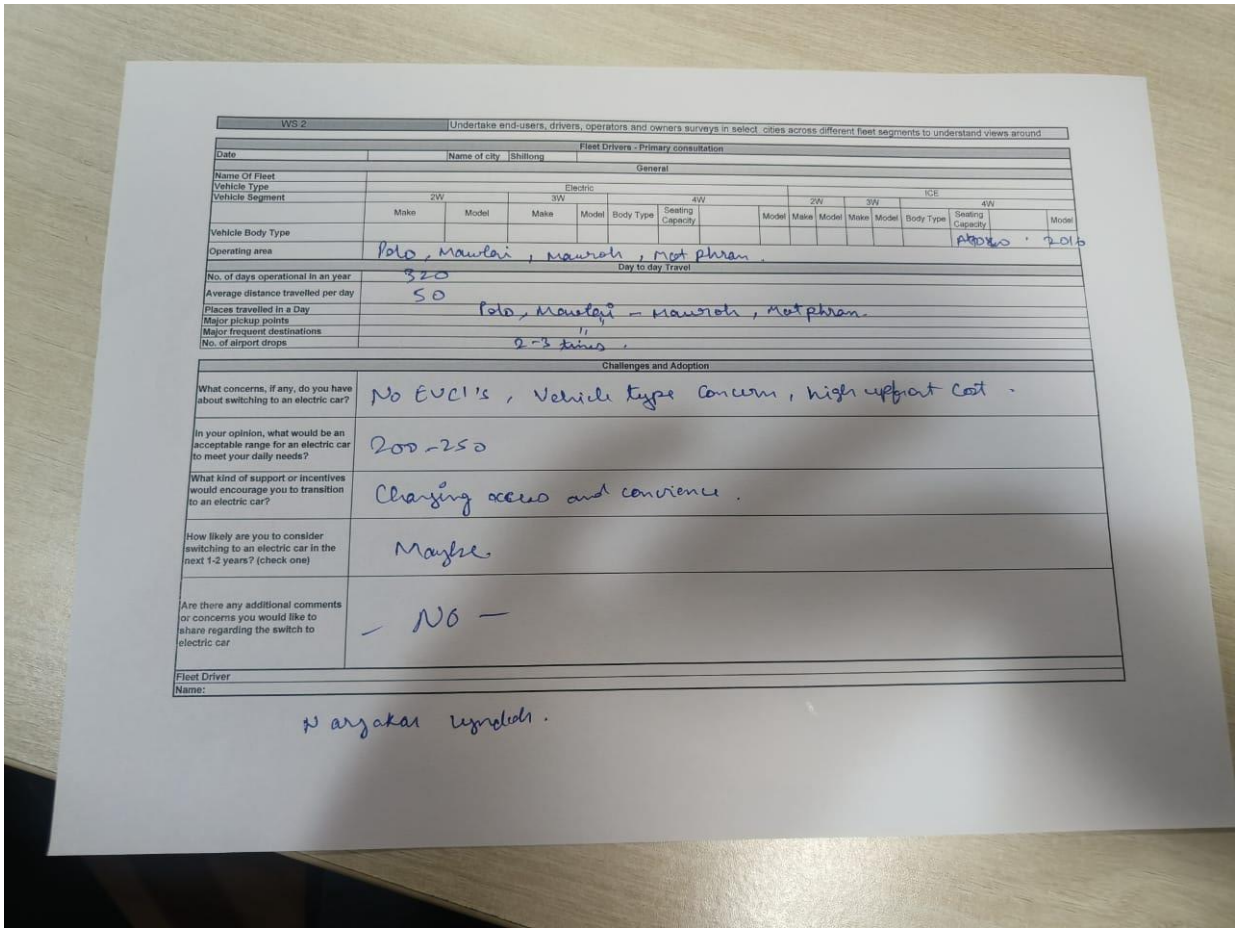
Day to day Travel

No. of days operational in an year	325
Average distance travelled per day	30
Places travelled in a Day	Nongthymmai, Laitumkrah, Rynjah, Malki, Lapalang.
Major pickup points	"
Major frequent destinations	"
No. of airport drops	1-2 times.

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	High upfront cost, Rang anxiety, Vehicle types, No EVCI's.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250.
What kind of support or incentives would encourage you to transition to an electric car?	Financial incentive, Innovative financing options, Charging access & Convenience.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	✓

Fleet Driver Name: Vicky Biswakarma.

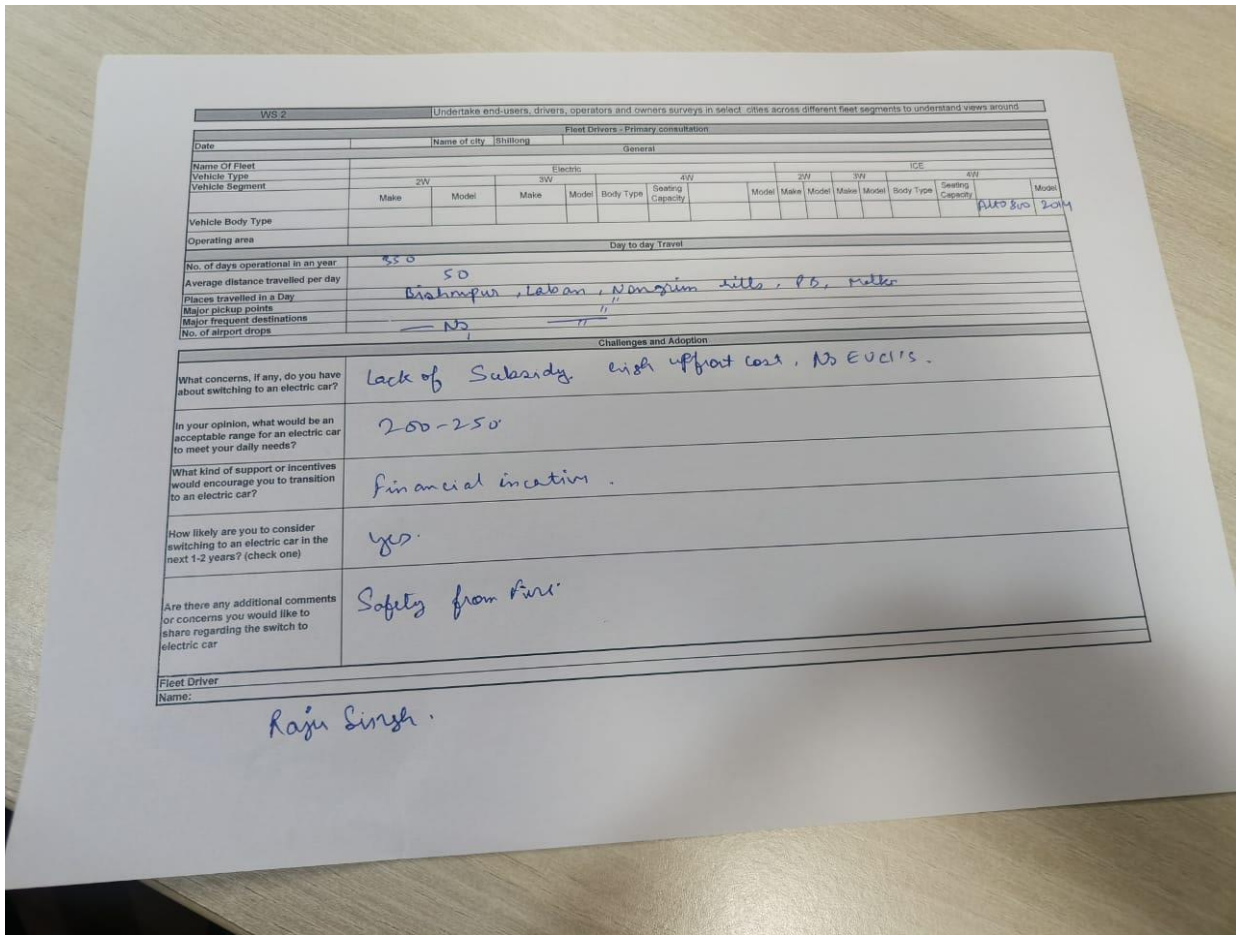


WS 2	Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date		Name of city	Shillong															
General																		
Name Of Fleet																		
Vehicle Type	Electric									ICE								
Vehicle Segment	2W		3W		4W					2W		3W		4W				
	Make	Model	Make	Model	Body Type	Seating Capacity		Model		Make	Model	Make	Model	Body Type	Seating Capacity		Model	
Vehicle Body Type																Alto 800		2016
Operating area	Polo, Mawlai, Mawroh, Motphran.																	
Day to day Travel																		
No. of days operational in an year	320																	
Average distance travelled per day	50																	
Places travelled in a Day	Polo, Mawlai – Mawroh, Motphran.																	
Major pickup points	"																	
Major frequent destinations	2-3 times.																	
No. of airport drops																		

Challenges and Adoption	
What concerns, if any, do you have about switching to an electric car?	No EVCI's, Vehicle type Concern, high upfront cost.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250
What kind of support or incentives would encourage you to transition to an electric car?	Charging access and convience.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	Maybe.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	— NO —
Fleet Driver Name:	Narjakai Lyngdoh.

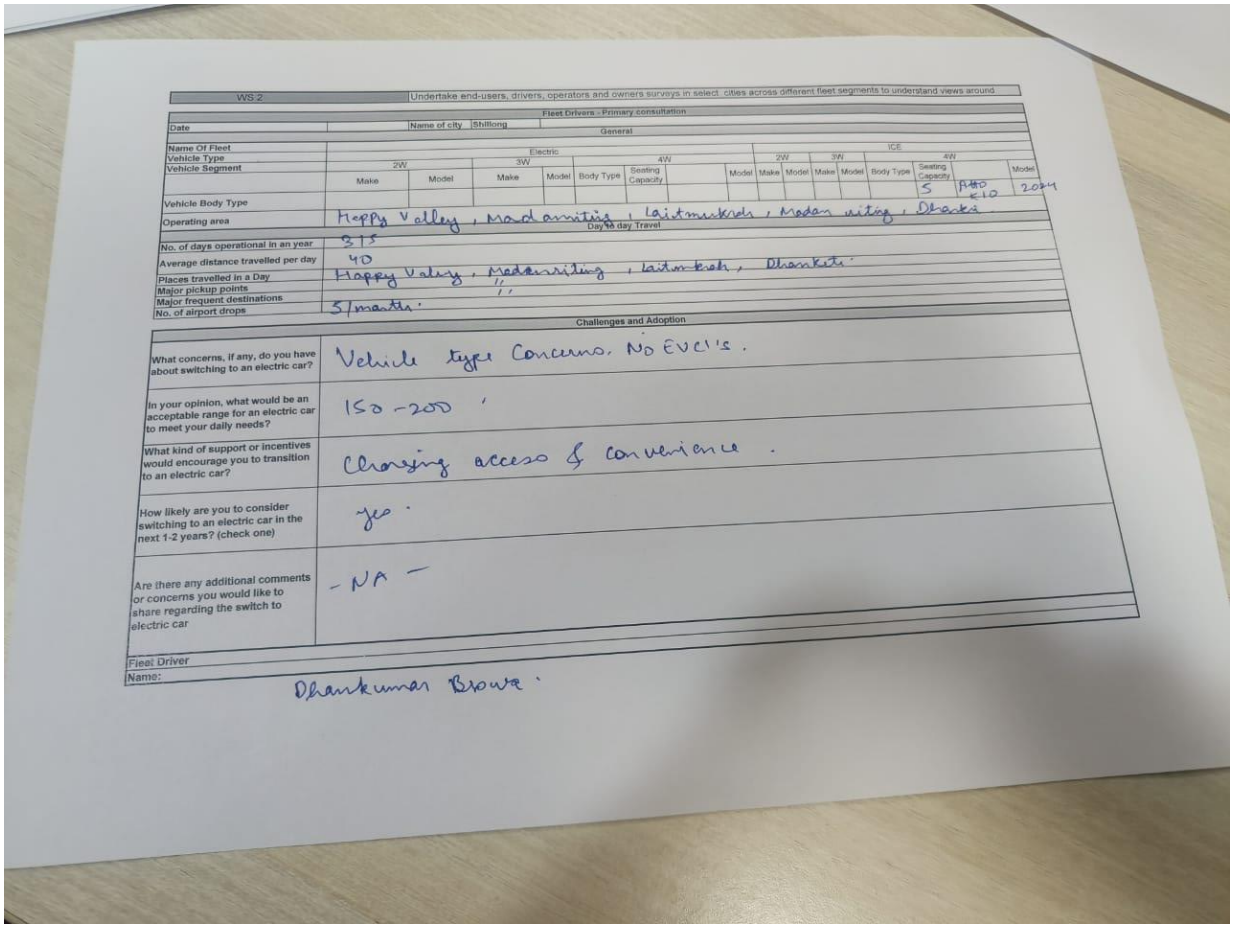


WS 2	Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date		Name of city	Shillong															
General																		
Name Of Fleet																		
Vehicle Type	Electric									ICE								
Vehicle Segment	2W		3W		4W					2W		3W		4W				
	Make	Model	Make	Model	Body Type	Seating Capacity		Model		Make	Model	Make	Model	Body Type	Seating Capacity		Model	
Vehicle Body Type																Alto 800		2014
Operating area																		
Day to day Travel																		
No. of days operational in an year	350																	
Average distance travelled per day	50																	
Places travelled in a Day	Dishnapur, Lotoan, Nongrim hills, PB, Pollok																	
Major pickup points	"																	
Major frequent destinations	— No —																	
No. of airport drops																		

Challenges and Adoption	
What concerns, if any, do you have about switching to an electric car?	Lack of Subsidy. high upfront cost, No EVCI's.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250
What kind of support or incentives would encourage you to transition to an electric car?	Financial incativ.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	Safety from fire.
Fleet Driver Name:	Raju Singh.



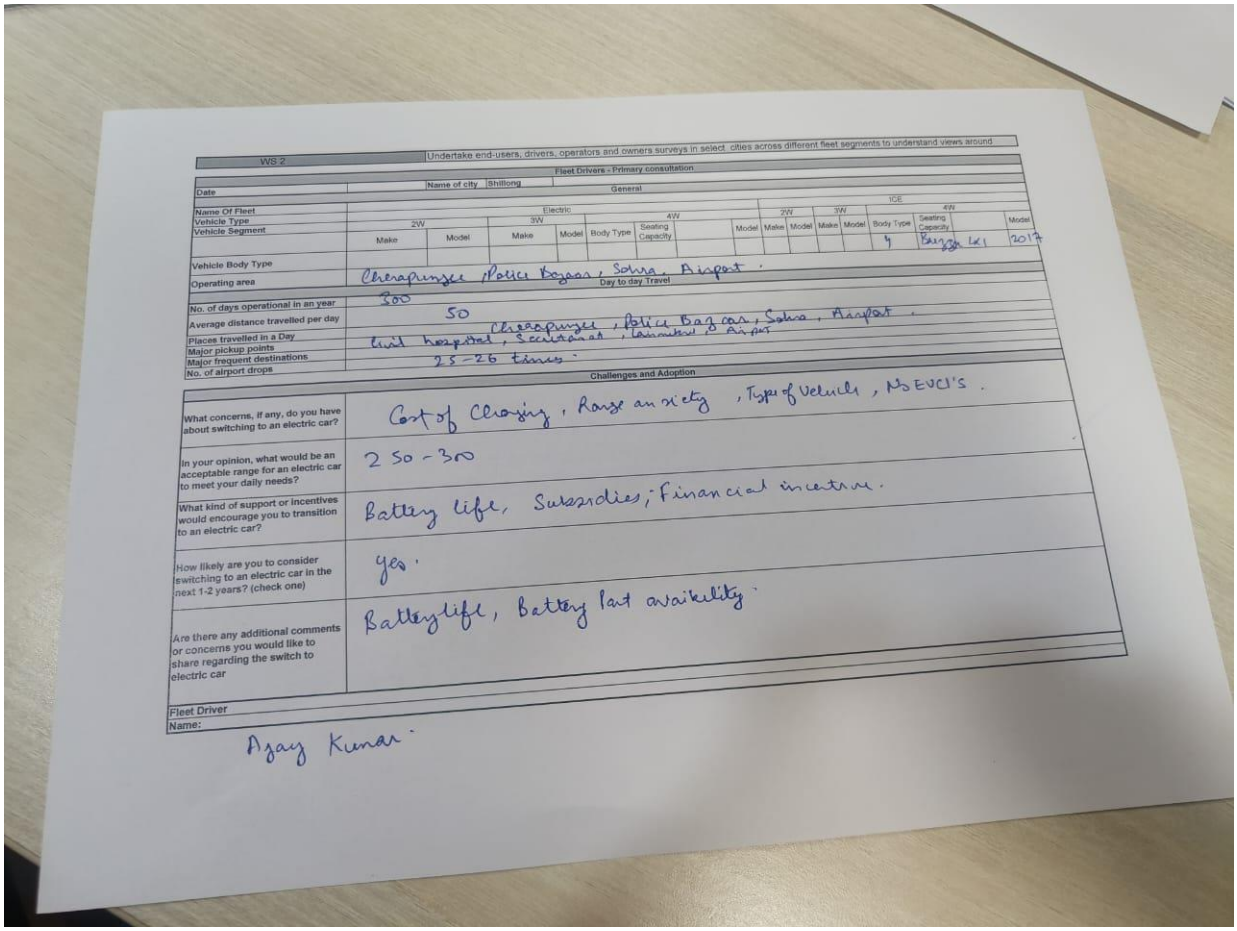
WS 2 | Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date	Name of city: Shillong																		
General																			
Name Of Fleet	Electric													ICE					
Vehicle Type	2W		3W		4W					2W		3W		4W					
Vehicle Segment	Make	Model	Make	Model	Body Type	Seating Capacity				Model	Make	Model	Make	Model	Body Type	Seating Capacity			Model
																5	Auto E10		2024
Vehicle Body Type																			
Operating area	Happy Valley, Modernriting, Laitmukrah, Modan uiting, Dhanki.																		
Day to day Travel																			
No. of days operational in an year	315																		
Average distance travelled per day	40																		
Places travelled in a Day	Happy Valley, Modernriting, Laitmukrah, Dhanki.																		
Major pickup points	" "																		
Major frequent destinations																			
No. of airport drops	5/month.																		

Challenges and Adoption	
What concerns, if any, do you have about switching to an electric car?	Vehicle type Concerns. No EVCI's.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	150-200
What kind of support or incentives would encourage you to transition to an electric car?	Charging access & convenience.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	- NA -

Fleet Driver Name: Dhankumar Browa.



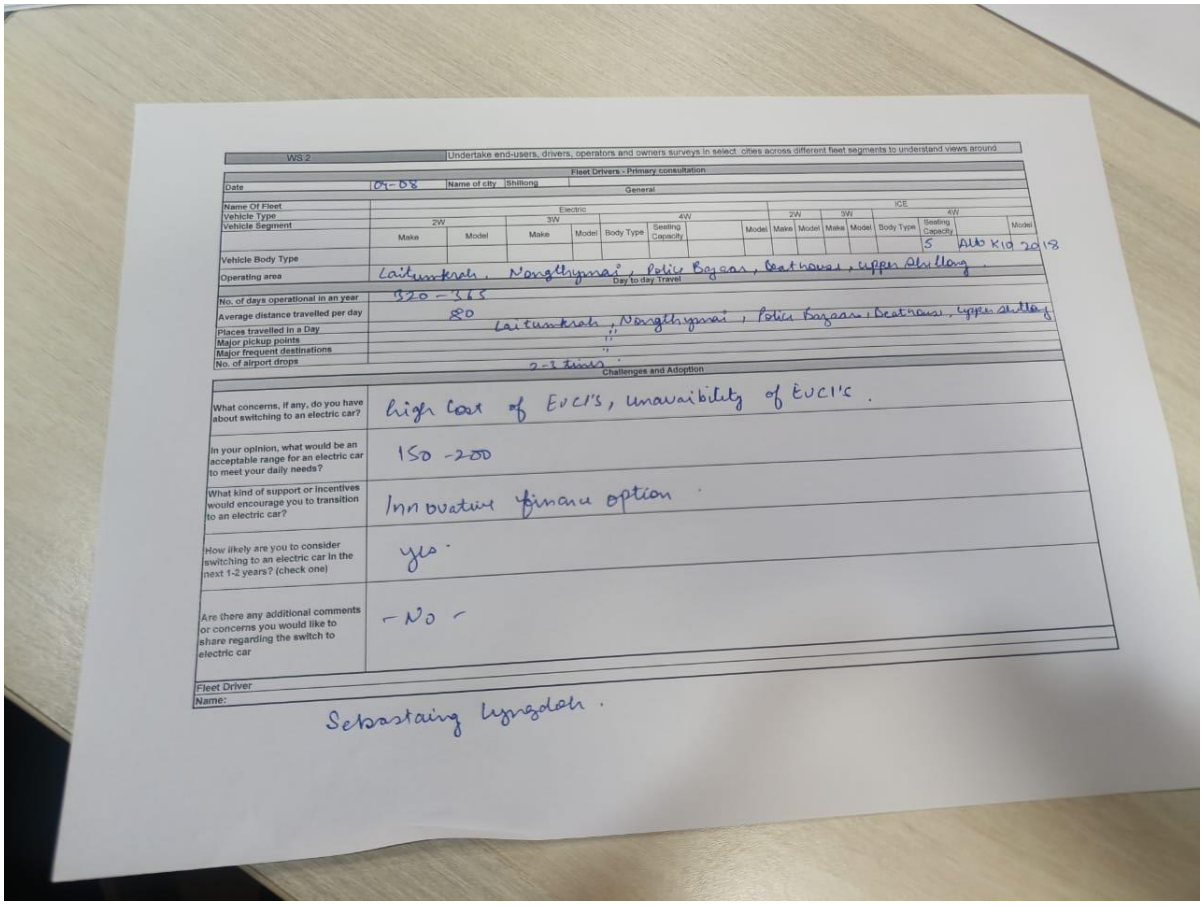
WS 2 | Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date	Name of city: Shillong																		
General																			
Name Of Fleet	Electric													ICE					
Vehicle Type	2W		3W		4W					2W		3W		4W					
Vehicle Segment	Make	Model	Make	Model	Body Type	Seating Capacity				Model	Make	Model	Make	Model	Body Type	Seating Capacity			Model
															4	Bezza 1.2L			2017
Vehicle Body Type																			
Operating area	Cherapunjee, Police Bazaar, Sohra, Airport.																		
Day to day Travel																			
No. of days operational in an year	300																		
Average distance travelled per day	50																		
Places travelled in a Day	Cherapunjee, Police Bazaar, Sohra, Airport.																		
Major pickup points	civil hospital, Secretariat, Laitumkrah, Airport																		
Major frequent destinations																			
No. of airport drops	25-26 times.																		

Challenges and Adoption	
What concerns, if any, do you have about switching to an electric car?	Cost of Charging, Range anxiety, Type of Vehicle, No EVCI's.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	250-300
What kind of support or incentives would encourage you to transition to an electric car?	Battery life, Subsidies; Financial incentive.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	Battery life, Battery fast availability.

Fleet Driver Name: Ajay Kumar.



WS 2 | Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

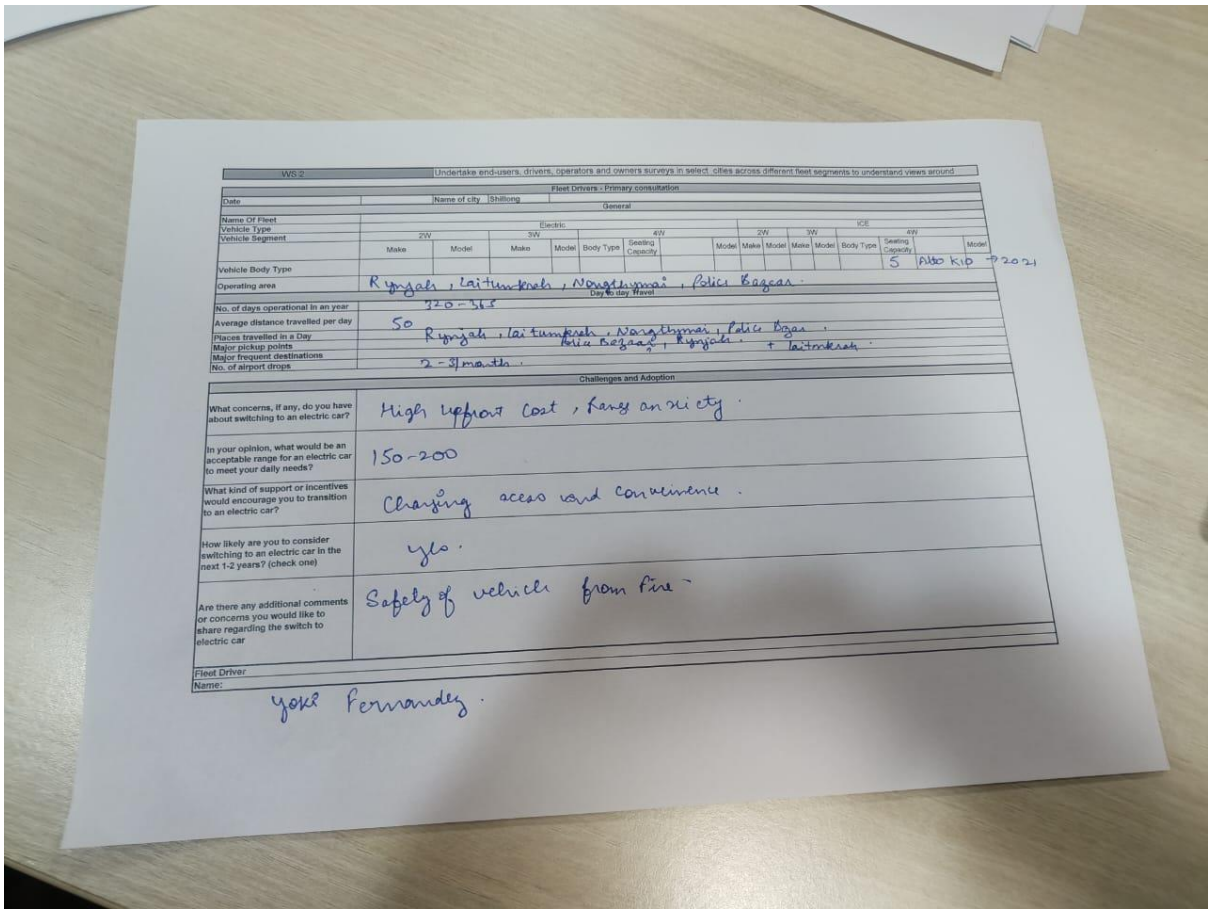
Fleet Drivers - Primary consultation

Date	09-08	Name of city	Shillong																		
General																					
Name Of Fleet																					
Vehicle Type	Electric													ICE							
Vehicle Segment	2W		3W		4W					2W		3W		4W							
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity	Model						
Vehicle Body Type														5	Alto K10 2018						
Operating area	Laitumkrah, Nongthymmai, Police Bazaar, Beat House, Upper Shillong.																				
Day to day Travel																					
No. of days operational in an year	320-365																				
Average distance travelled per day	80																				
Places travelled in a Day	Laitumkrah, Nongthymmai, Police Bazaar, Beat House, Upper Shillong																				
Major pickup points	"																				
Major frequent destinations	"																				
No. of airport drops	2-3 times.																				

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	High cost of EVCI's, Unavailibity of EVCI's.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	150-200
What kind of support or incentives would encourage you to transition to an electric car?	Innovative finance option.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	- No -

Fleet Driver Name: Sebastaing Lyngdoh.



WS 2 | Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

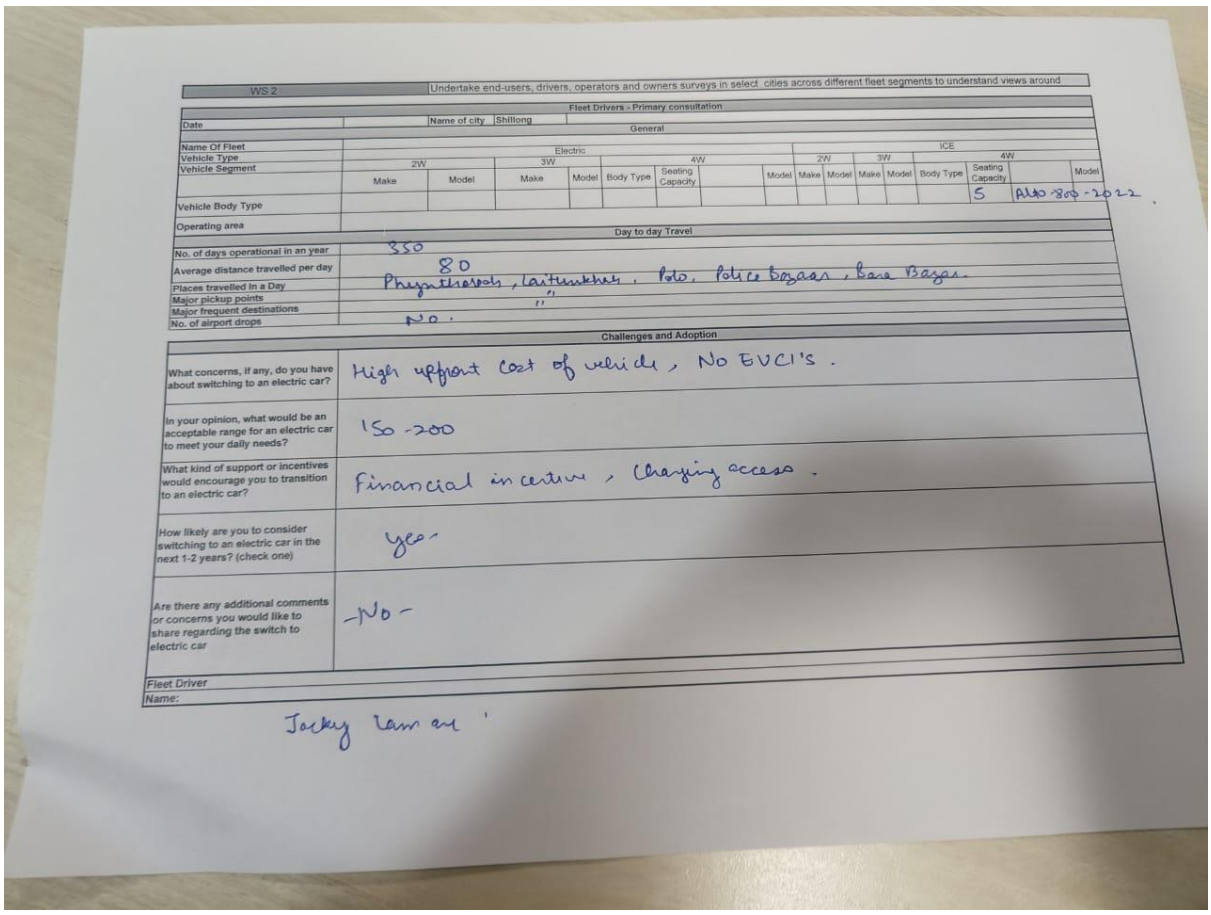
Fleet Drivers - Primary consultation

Date		Name of city	Shillong																		
General																					
Name Of Fleet																					
Vehicle Type	Electric													ICE							
Vehicle Segment	2W		3W		4W					2W		3W		4W							
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity	Model						
Vehicle Body Type														5	Alto K10 2021						
Operating area	Rynjah, Laitumkrah, Nongthymmai, Police Bazaar.																				
Day to day Travel																					
No. of days operational in an year	320-365																				
Average distance travelled per day	50																				
Places travelled in a Day	Rynjah, Laitumkrah, Nongthymmai, Police Bazar.																				
Major pickup points	Police Bazaar, Rynjah. + Laitumkrah.																				
Major frequent destinations																					
No. of airport drops	2-3 month.																				

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	High upfront cost, Range anxiety.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	150-200
What kind of support or incentives would encourage you to transition to an electric car?	Charging access and convenience.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	Safety of vehicle from fire.

Fleet Driver Name: Yoshi Fernandez.



WS 2	Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date		Name of city	Shillong

General

Name Of Fleet																		
Vehicle Type	Electric								ICE									
Vehicle Segment	2W		3W		4W				2W		3W		4W					
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model		
Vehicle Body Type														5	Alto 800 - 2022			
Operating area																		

Day to day Travel

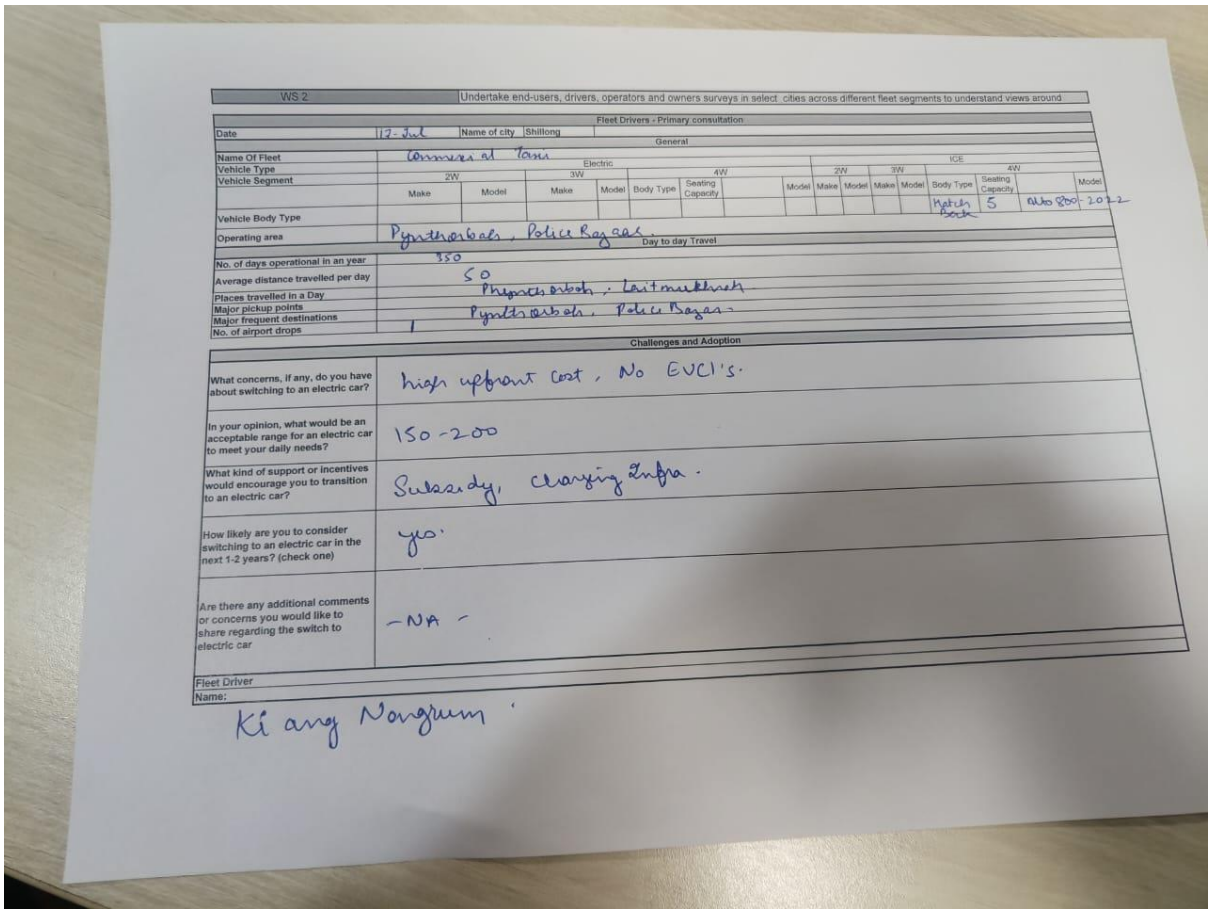
No. of days operational in an year	350
Average distance travelled per day	80
Places travelled in a Day	Phyngthorbah, Laitumkhrah, Police Bazaar, Bara Bazar.
Major pickup points	"
Major frequent destinations	"
No. of airport drops	No.

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	High upfront cost of vehicle, No EVCI's.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	150-200
What kind of support or incentives would encourage you to transition to an electric car?	Financial incentive, Charging access.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	-No-

Fleet Driver
Name:

Jacky Lamare '



WS 2	Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date	12-Jul	Name of city	Shillong

General

Name Of Fleet	Commercial Taxis																	
Vehicle Type	Electric								ICE									
Vehicle Segment	2W		3W		4W				2W		3W		4W					
	Make	Model	Make	Model	Body Type	Seating Capacity		Model	Make	Model	Make	Model	Body Type	Seating Capacity		Model		
Vehicle Body Type													Hatch back	5	Alto 800 - 2022			
Operating area	Pyngthorbah, Police Bazaar																	

Day to day Travel

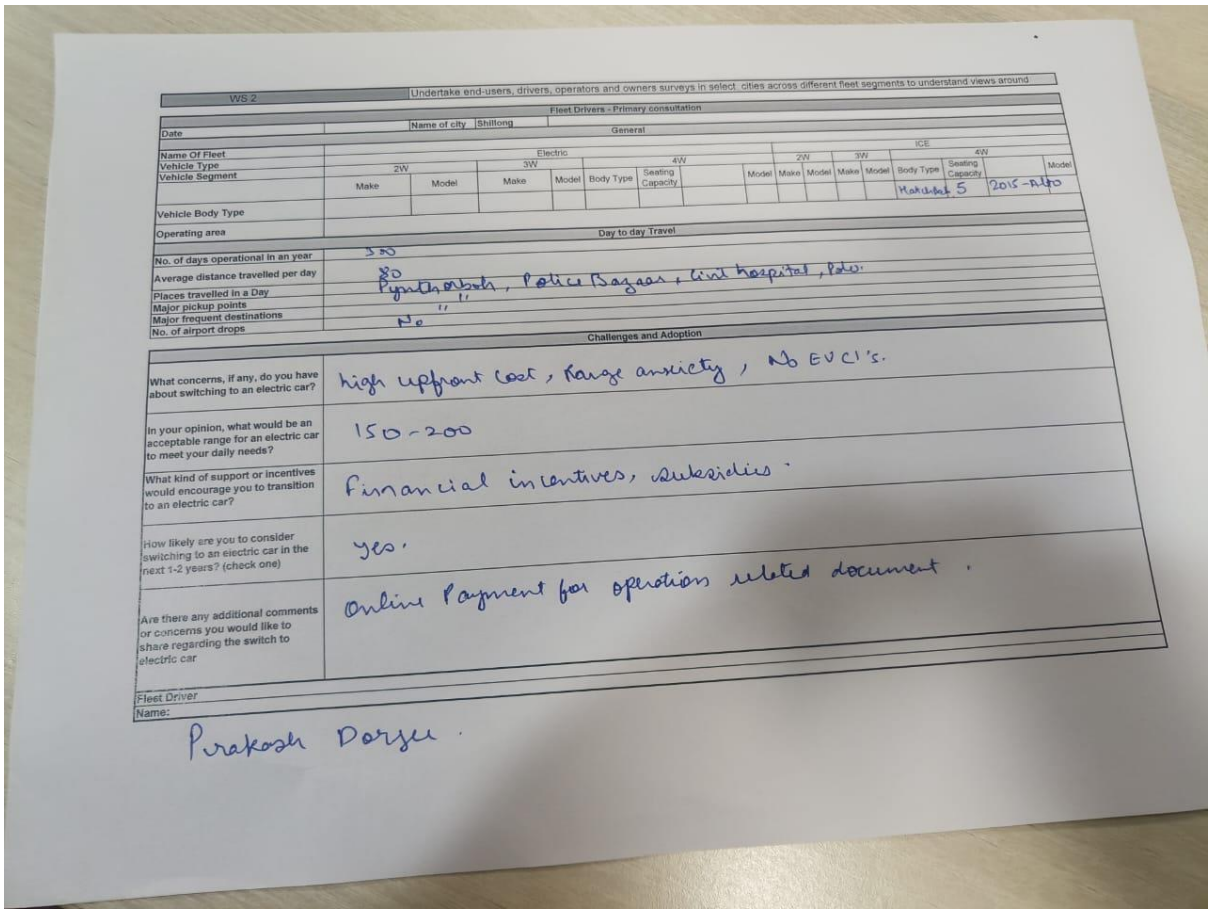
No. of days operational in an year	350
Average distance travelled per day	50
Places travelled in a Day	Phyngthorbah, Laitumkhrah
Major pickup points	Pyngthorbah, Police Bazaar
Major frequent destinations	
No. of airport drops	1

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	high upfront cost, No EVCI's.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	150-200
What kind of support or incentives would encourage you to transition to an electric car?	Subsidy, charging infra.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	-NA-

Fleet Driver
Name:

Kiang Nongrum '



WS 2 | Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date		Name of city	Shillong																
General																			
Name Of Fleet																			
Vehicle Type	Electric														ICE				
Vehicle Segment	2W		3W		4W					2W		3W		4W					
	Make	Model	Make	Model	Body Type	Seating Capacity		Model		Make	Model	Make	Model	Body Type	Seating Capacity		Model		
Vehicle Body Type															Hatchback	5	2015-Alto		
Operating area																			

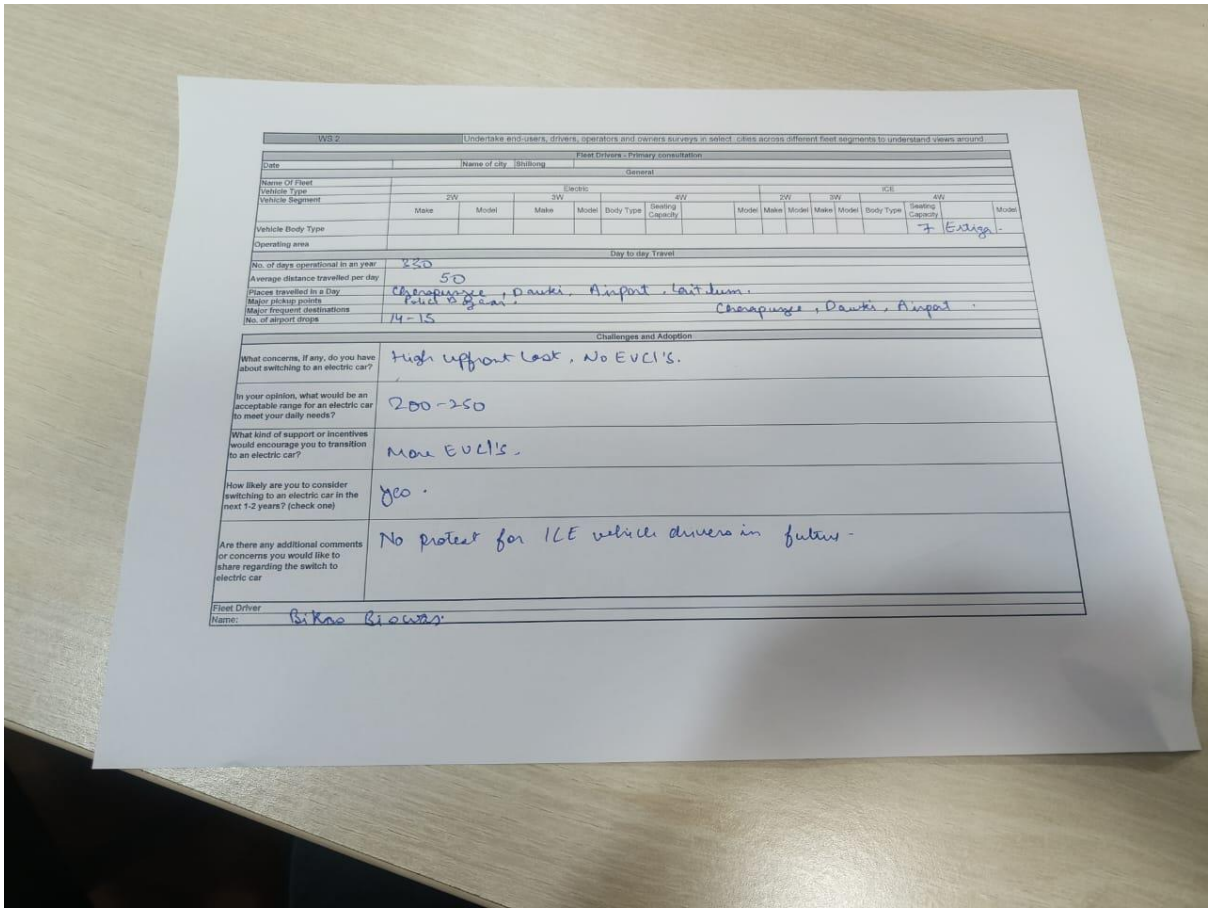
Day to day Travel

No. of days operational in an year	300
Average distance travelled per day	80
Places travelled in a Day	Pynthorbah, Police Bazaar, Civil hospital, Polo.
Major pickup points	" "
Major frequent destinations	" "
No. of airport drops	No

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	high upfront cost, Range anxiety, No EVCI's.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	150-200
What kind of support or incentives would encourage you to transition to an electric car?	Financial incentives, Subsidies.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	Online Payment for operations related document.

Fleet Driver Name: Prakash Dorjee.



WS 2 | Undertake end-users, drivers, operators and owners surveys in select cities across different fleet segments to understand views around

Fleet Drivers - Primary consultation

Date		Name of city	Shillong																
General																			
Name Of Fleet																			
Vehicle Type	Electric														ICE				
Vehicle Segment	2W		3W		4W					2W		3W		4W					
	Make	Model	Make	Model	Body Type	Seating Capacity		Model		Make	Model	Make	Model	Body Type	Seating Capacity		Model		
Vehicle Body Type															7 Ertiga.				
Operating area																			

Day to day Travel

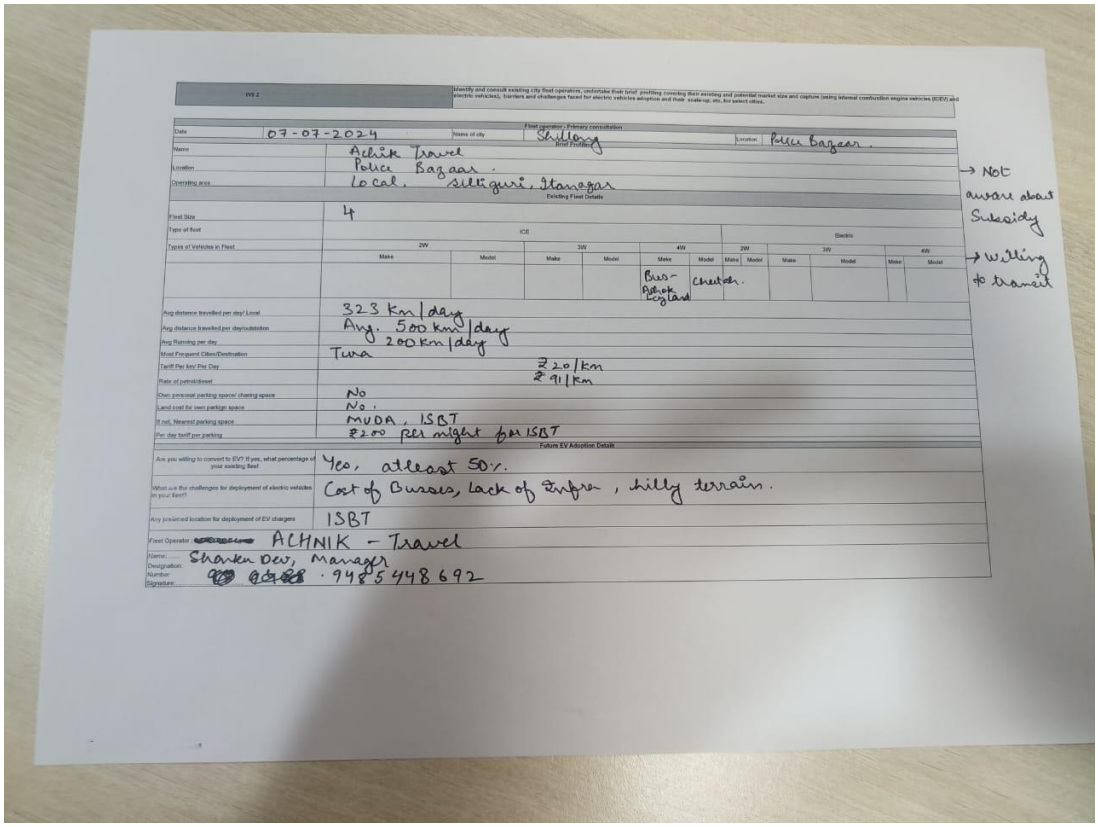
No. of days operational in an year	250
Average distance travelled per day	50
Places travelled in a Day	Cherapunjee, Dawki, Airport, Iaitlum.
Major pickup points	Police Bazaar.
Major frequent destinations	Cherapunjee, Dawki, Airport.
No. of airport drops	14-15

Challenges and Adoption

What concerns, if any, do you have about switching to an electric car?	High upfront cost, No EVCI's.
In your opinion, what would be an acceptable range for an electric car to meet your daily needs?	200-250
What kind of support or incentives would encourage you to transition to an electric car?	More EVCI's.
How likely are you to consider switching to an electric car in the next 1-2 years? (check one)	yes.
Are there any additional comments or concerns you would like to share regarding the switch to electric car	No protest for ICE vehicle drivers in future.

Fleet Driver Name: Bikas Biswas.

Fleet Operators



WB 2 — Identify and consult existing city fleet operators, undertake their brief profiling covering their existing and potential market size and capture (using internal combustion engine vehicles (ICEV) and electric vehicles), barriers and challenges faced for electric vehicles adoption and their scale-up, etc. for select cities.

Fleet operator - Primary consultation

Date	07-07-2024	Name of city	Shillong
Location	Police Bazaar.		

Brief Profiling

Name	Achik Travel
Location	Police Bazaar.
Operating area	Local, Silliguri, Itanagar

→ Not aware about Subsidy

Existing Fleet Details

		ICE						Electric					
Fleet Size	4												
Type of fleet													
Types of Vehicles in Fleet		2W		3W		4W		2W		3W		4W	
		Make	Model	Make	Model	Make	Model	Make	Model	Make	Model	Make	Model
						Bus - Ashok Leyland	Canter.						

→ Willing to transit

Avg distance travelled per day/ Local	323 km/day
Avg distance travelled per day/outstation	Avg. 500 km/day
Avg Running per day	200 km/day
Most Frequent Cities/Destination	Tura
Tariff Per km/ Per Day	₹20/km
Rate of petrol/diesel	₹91/km
Own personal parking space/ charing space	No
Land cost for own parkign space	No.
If not, Nearest parking space	MUDA, ISBT
Per day tariff per parking	₹200 per night for ISBT

Future EV Adoption Details

Are you willing to convert to EV? If yes, what percentage of your existing fleet	Yes, atleast 50%.
What are the challenges for deployment of electric vehicles in your fleet?	Cost of Busses, lack of Infra, hilly terrain.
Any preferred location for deployment of EV chargers	ISBT

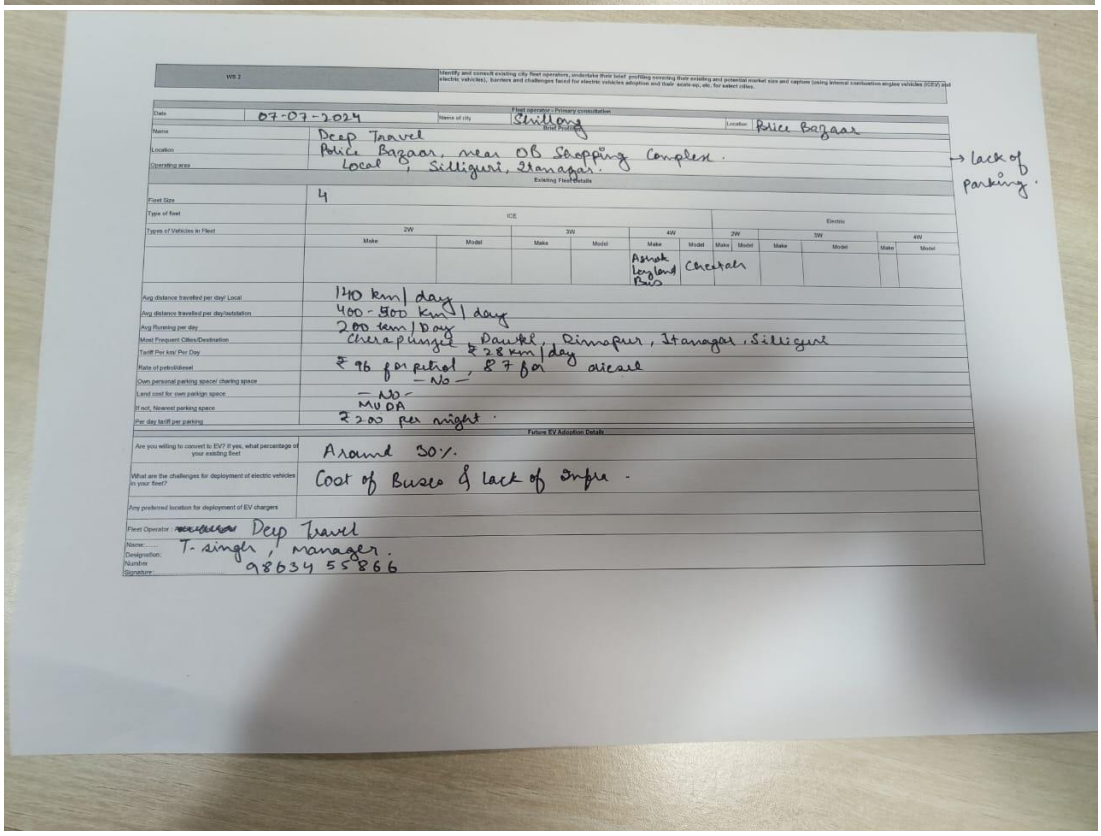
Fleet Operator: [redacted] ACHNIK - Travel

Name: Shanker Dev, Manager

Designation:

Number: [redacted] 9485448692

Signature:



WB 2 — Identify and consult existing city fleet operators, undertake their brief profiling covering their existing and potential market size and capture (using internal combustion engine vehicles (ICEV) and electric vehicles), barriers and challenges faced for electric vehicles adoption and their scale-up, etc. for select cities.

Fleet operator - Primary consultation

Date	07-07-2024	Name of city	Shillong
Location	Police Bazaar		

Brief Profiling

Name	Deep Travel
Location	Police Bazaar, near OB Shopping Complex.
Operating area	Local, Silliguri, Itanagar.

→ lack of parking.

Existing Fleet Details

		ICE						Electric					
Fleet Size	4												
Type of fleet													
Types of Vehicles in Fleet		2W		3W		4W		2W		3W		4W	
		Make	Model	Make	Model	Make	Model	Make	Model	Make	Model	Make	Model
						Ashok Leyland Bus	Canter						

Avg distance travelled per day/ Local	140 km/day
Avg distance travelled per day/outstation	400-500 km/day
Avg Running per day	200 km/Day
Most Frequent Cities/Destination	Cherapunjee, Dawki, Dimapur, Itanagar, Silliguri
Tariff Per km/ Per Day	₹28 km/day
Rate of petrol/diesel	₹96 for petrol, ₹87 for diesel
Own personal parking space/ charing space	— No —
Land cost for own parkign space	— No —
If not, Nearest parking space	MUDA
Per day tariff per parking	₹200 per night.

Future EV Adoption Details

Are you willing to convert to EV? If yes, what percentage of your existing fleet	Around 30%.
What are the challenges for deployment of electric vehicles in your fleet?	Cost of Buses & lack of Infra.
Any preferred location for deployment of EV chargers	

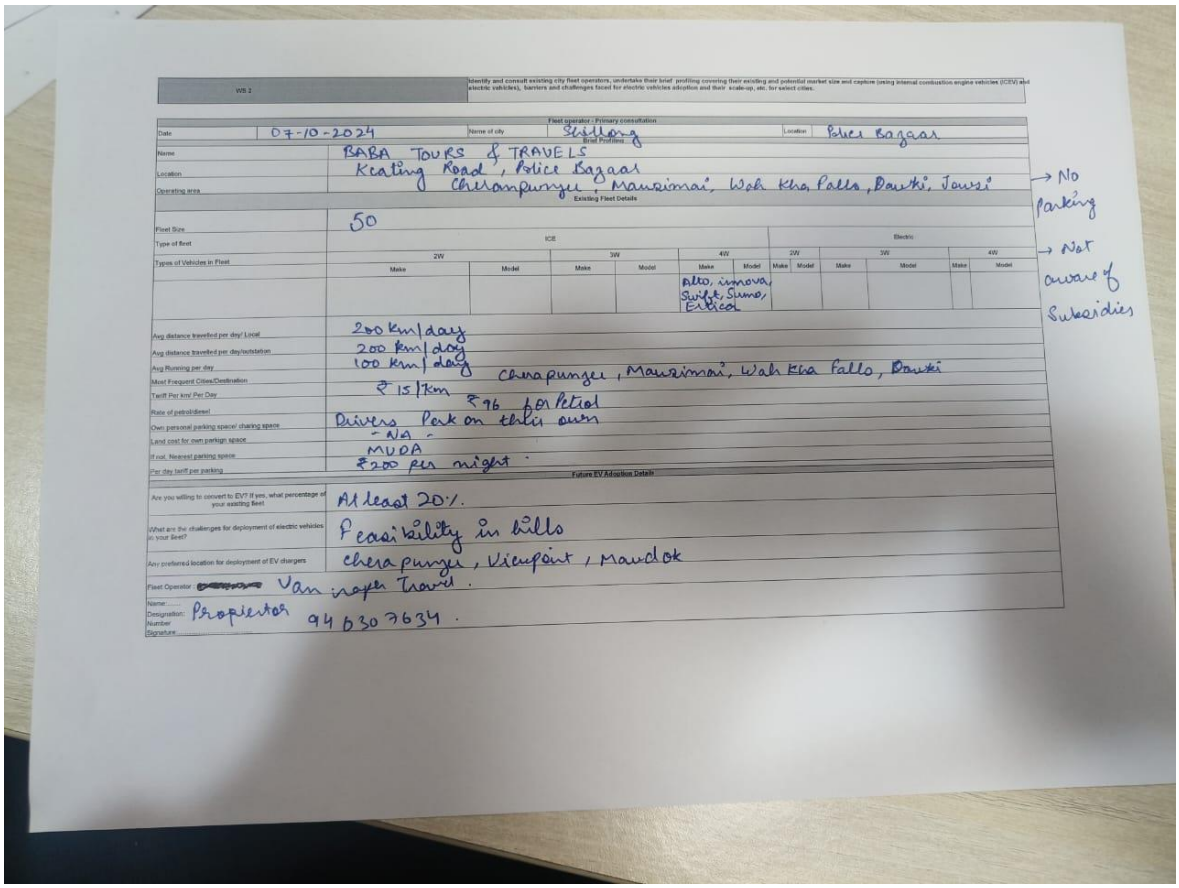
Fleet Operator: [redacted] Deep Travel

Name: T. singh, Manager.

Designation:

Number: 98634 55866

Signature:



WS 2 — Identify and consult existing city fleet operators, undertake their brief profiling covering their existing and potential market size and capture (using internal combustion engine vehicles (ICEV) and electric vehicles), barriers and challenges faced for electric vehicles adoption and their scale-up, etc. for select cities.

Fleet operator : Primary consultation

Brief Profiling

Date	07-10-2024
Name of city	Shillong
Location	Police Bazaar
Name	BABA TOURS & TRAVELS
Location	Keating Road, Police Bazaar
Operating area	Cherrapunjee, Mawsimai, Wah Kha Falls, Dawki, Jowai

→ No parking

Existing Fleet Details

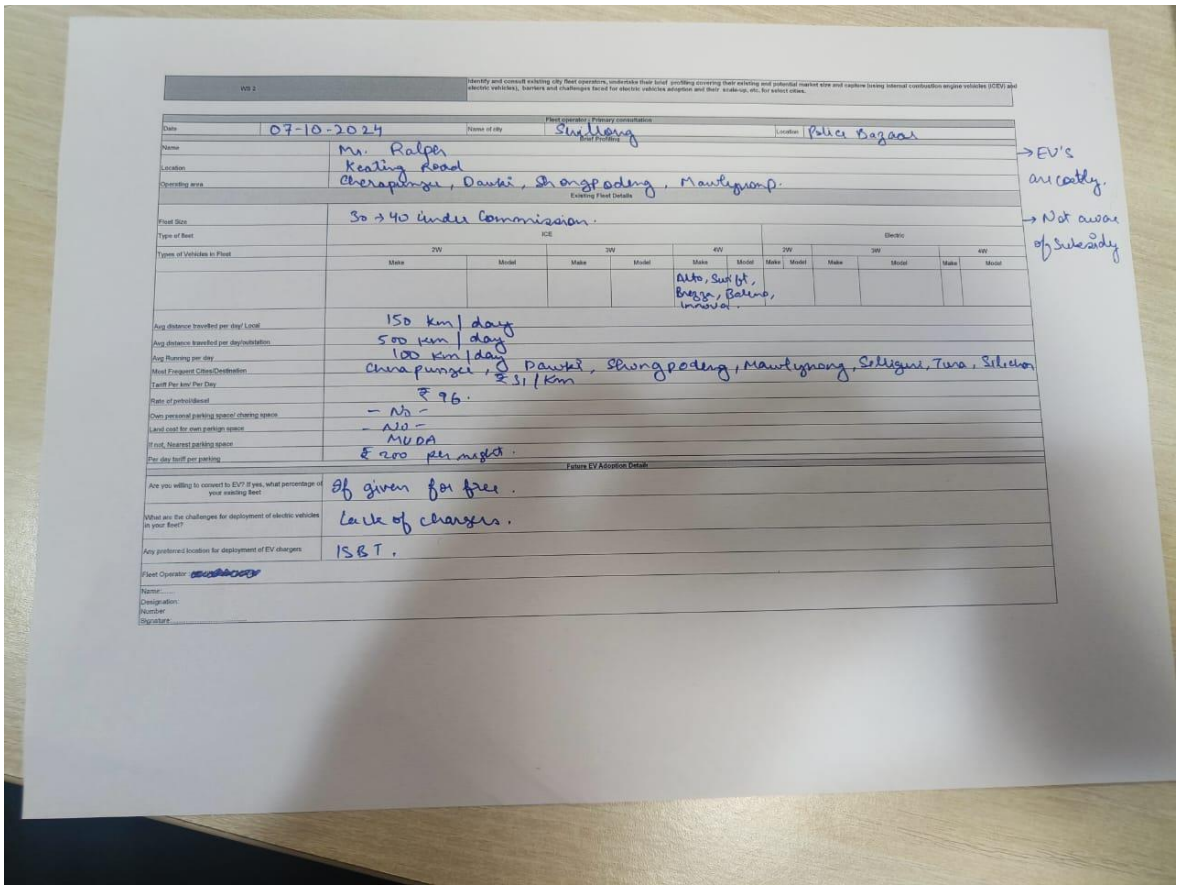
Fleet Size	50
Type of fleet	ICE
Types of Vehicles in Fleet	4W: Alto, innova, Swift, Sumo, Ertiga

→ Not aware of subsidies

Avg distance travelled per day/ Local	200 km/day
Avg distance travelled per day/outstation	200 km/day
Avg Running per day	100 km/day
Most Frequent Cities/Destination	Cherapunjee, Mawsimai, Wah Kha Falls, Dawki
Tariff Per km/ Per Day	₹ 15/km
Rate of petrol/diesel	₹ 96 for Petrol
Own personal parking space/ charing space	Drivers Park on their own
Land cost for own parkign space	- NA -
If not, Nearest parking space	MUDA
Per day tariff per parking	₹ 200 per night.

Future EV Adoption Details

Are you willing to convert to EV? If yes, what percentage of your existing fleet	At least 20%.
What are the challenges for deployment of electric vehicles in your fleet?	Feasibility in hills
Any preferred location for deployment of EV chargers	Cherapunjee, Viewpoint, Mawdok
Fleet Operator: [redacted]	Van inger Travel.
Name:	
Designation: Proprietor	
Number	9463037634.
Signature	



WS 2 — Identify and consult existing city fleet operators, undertake their brief profiling covering their existing and potential market size and capture (using internal combustion engine vehicles (ICEV) and electric vehicles), barriers and challenges faced for electric vehicles adoption and their scale-up, etc. for select cities.

Fleet operator : Primary consultation

Brief Profiling

Date	07-10-2024
Name of city	Shillong
Location	Police Bazaar
Name	Mr. Ralph
Location	Keating Road
Operating area	Cherapunjee, Dawki, Shongpodeng, Mawlynnong.

→ EV's are costly.

Existing Fleet Details

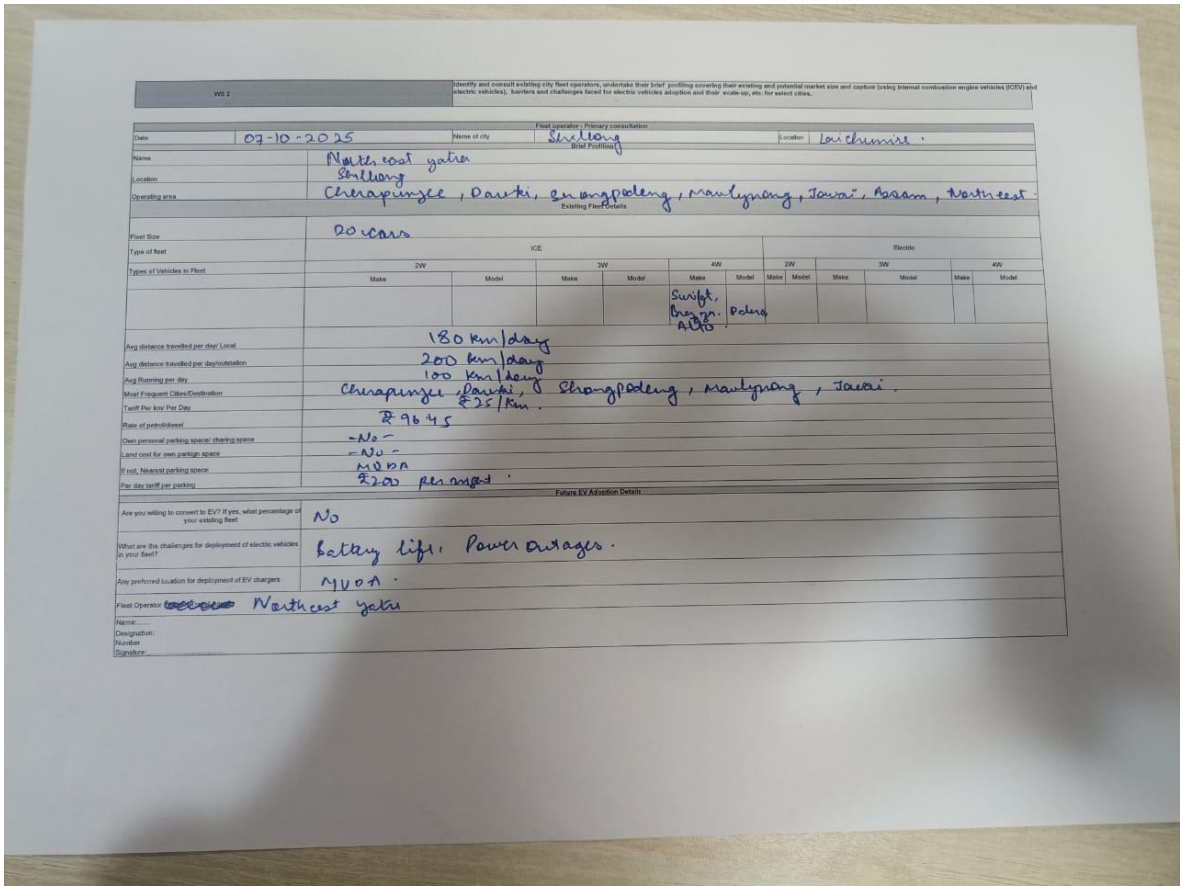
Fleet Size	30 → 40 Under Commission.
Type of fleet	ICE
Types of Vehicles in Fleet	4W: Alto, Swift, Dzire, Baleno, Innova.

→ Not aware of Subsidy

Avg distance travelled per day/ Local	150 km/day
Avg distance travelled per day/outstation	500 km/day
Avg Running per day	100 km/day
Most Frequent Cities/Destination	Cherapunjee, Dawki, Shongpodeng, Mawlynnong, Sohliguri, Tura, Silchar
Tariff Per km/ Per Day	₹ 31/km
Rate of petrol/diesel	₹ 96.
Own personal parking space/ charing space	- No -
Land cost for own parkign space	- NO -
If not, Nearest parking space	MUDA
Per day tariff per parking	₹ 200 per night.

Future EV Adoption Details

Are you willing to convert to EV? If yes, what percentage of your existing fleet	If given for free.
What are the challenges for deployment of electric vehicles in your fleet?	Lack of chargers.
Any preferred location for deployment of EV chargers	ISBT.
Fleet Operator: [redacted]	
Name:	
Designation:	
Number	
Signature	



WS 2

Identify and consult existing city fleet operators, undertake their brief profiling covering their existing and potential market size and captism (using internal combustion engine vehicles (ICEV) and electric vehicles), barriers and challenges faced for electric vehicles adoption and their scale-up, etc. for select cities.

Fleet operator - Primary consultation

Brief Profiling

Date	07-10-2025	Name of city	Shillong	Location	Laitumkhrah
Name	North east yatra				
Location	Shillong				
Operating area	Cherapunjee, Pauthi, Smongpdeng, Mawlynnong, Jowai, Assam, North east.				

Existing Fleet Details

Fleet Size	20 cars											
Type of fleet	ICE						Electric					
Types of Vehicles in Fleet	2W		3W		4W		2W		3W		4W	
	Make	Model	Make	Model	Make	Model	Make	Model	Make	Model	Make	Model
					Swift, Dezire, Alto,	Petrol						
Avg distance travelled per day/ Local	180 Km/day											
Avg distance travelled per day/outstation	200 Km/day											
Avg Running per day	100 Km/day											
Most Frequent Cities/Destination	Cherapunjee, Pauthi, Shongpdeng, Mawlynnong, Jowai.											
Tariff Per km/ Per Day	₹25/Km.											
Rate of petrol/diesel	₹ 96.45											
Own personal parking space/ charing space	-No-											
Land cost for own parkign space	-No-											
If not, Nearest parking space	MIDDA											
Per day tariff per parking	₹200 per night.											

Future EV Adoption Details

Are you willing to convert to EV? If yes, what percentage of your existing fleet	No
What are the challenges for deployment of electric vehicles in your fleet?	Battery life. Power outages.
Any preferred location for deployment of EV chargers	MIDDA.

Fleet Operator ~~[illegible]~~ North east yatra

Name:
Designation:
Number
Signature:


CHARGING
STATION
ELECTRIC
CAR PARKING
ONLY WHILE
CHARGING
chargepoint

ANNEXURE VIII: List of Contributors

MePDCL	Shri Sanjay Goyal, IAS, Chairman & Managing Director Shri. F. Myrtong, Executive Engineer Shillong East Shri .F. Langste , Suprindent Engineer
TRANSPORT DEPARTMENT	Shri. David D. Sangma, IAS., Secretary of Transport Shri. Maxwell, State Admin Transport Shri R. Hinge, District Transport Officer and Secretary RTA Shri. Jobhit, Senior Associate, PMU Shri. Kiran, Associate, PMU
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SHILLONG MUNICIPAL BOARD	Shri F.B. Chyne, Executive Engineer Shri. Andrew Umder, Deputy Manager
CESL	Shri. Rajneesh Rana, Head Shri. Amit Sood, Head Commercials Shri. N Mohan, Head EVCI
ADB	Shri. Samrat Ray Shri. Vikas Atre
ERNST & YOUNG LLP	Shri. Somesh Kumar, Partner & Leader, Power and Utilities Shri. Shobhit Saxena, Vice President Shri. Siddarth Dhar, Senior Associate Smt. Kiran Singh, Senior Associate Shri. Sarthak Sharma, Associate Shri. Sameer Damai, Associate

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Ground Floor, 'A' wing
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Transport department, Meghalaya

The Transport Department of Meghalaya is tasked with the administration, regulation, and development of the state's transportation systems. Its responsibilities include managing public transport services, enforcing road safety measures, and ensuring compliance with vehicle and traffic regulations. The department also works on initiatives to improve connectivity, modernize infrastructure, and promote sustainable and efficient mobility solutions to meet the growing needs of the state's population.

Convergence Energy Services Limited

Convergence Energy Services Limited (CESL), a subsidiary of EESL, focuses on renewable energy, electric mobility, and climate change. CESL delivers renewable energy solutions for agricultural pumps, lighting, and cooking appliances in rural India. It also promotes battery-powered electric mobility and infrastructure to boost electric vehicle adoption. CESL is also the implementing agency for ADB GEF7 program.