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# STRATEGY FOR ELECTRIFICATION OF INTERMEDIATE PUBLIC TRANSPORT (IPT) IN AHMEDABAD

Strategic Actions for E-3W  
Transition

Supported by  
Ahmedabad Municipal Corporation



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## ABOUT UKPACT Project Partners

UK PACT (UK Partnering for Accelerated Climate Transitions) is a programme funded by the Secretary of State for Business, Energy and Industrial Strategy, Government of UK. This programme supports countries that strive to overcome barriers to clean growth and have high emissions reduction potential to accelerate their climate change mitigation efforts.

Under UKPACT funding, CRDF-CEPT University, Gujarat Energy Research Management Institute (GERMI), University of Leeds and Brunel University, UK are supporting Ahmedabad Municipal Corporation and District Collectorate Mahesana on the project "Strategy and action plan for electrification of public transport and intermediate public transport in the cities of Ahmedabad and Mahesana".



## PROJECT DESCRIPTION

This report presents the key findings in terms of enablers and constraints for transitioning conventional fuel CNG-3W in Ahmedabad to E-vehicles. Detailed IPT operator surveys and meetings were carried out for an understanding the existing services and operational economics. Concerns of IPT operators were identified and workshops were organized to connect relevant stakeholders to address some of these issues. The study identified School Autorickshaw Association as the target group in the city. This network of responsible 3W drivers/operators ferry children to and from school on a daily basis and have gained trust of parents over the years.

# STUDY APPROACH for Electrification of IPT System

## 1. Base Situation Assessment



The baseline diagnostic study was conducted to identify operational services, routes and stops of IPT service in the city and to understand the operational and socio-economic characteristics of IPT drivers/operators.

## 2. Mapping of Stakeholders



Several meetings/workshops were organised with the project stakeholders to strengthen working collaborations and creating buy-in on the electrification strategy.

## 3. Assessment of 3W Ecosystem



An assessment of the 3W ecosystem to understand the available technologies, their features, existing policies and regulatory context at the national and state level was carried out to assess the feasibility for E-Transition.

## 4. Strategic Actions for E-3W Transition



Based on the market, technology and economic assessment actions for IPT electrification in Ahmedabad were outlined.

## 5. Dissemination



The dissemination of project findings and outputs from the IPT electrification project in Ahmedabad was organized through social media networks including Twitter, Instagram and ESAP website.

# BASE SITUATION ASSESSMENT OF 3W SERVICES

## Operational and financial details



**CNG 3W**

**School 3W**

**SAVAAR-E \***

IPT vehicles operating as a hail and hire service, as per the contract carriage (distance based fares) or providing shared services on fixed routes with fixed fares.

Auto rickshaws associated with schools and which operate on a school auto rickshaw permit (maximum occupancy of 7 students) issued by RTO.

Shared E-rickshaws introduced by Ahmedabad Janmarg Limited to provide last-mile connectivity and enhance BRTS ridership.



Type of Vehicle

CNG 3W

CNG 3W

E-3W with lead acid battery (4kwh)



Type of Operations

Hail & Hire +  
Shared

School +  
Shared

Shared



Approx. number of vehicles in the city

1,85,600

6,500

60



Daily Vehicle km Operated

80-100

60-70  
(School Service)  
80 - 100  
(School + shared service)

70-80  
(with opportunity charging)



Average no. of passengers carried in day

55

30  
(School Service)  
40-45  
(School + shared service)

70



Average purchase cost of a vehicle in INR  
(Considering old and new vehicle cost)

0.18 million

0.16 million

NA \*



Average EMI Amount (in INR)

6,000

4,000

NA



Average monthly maintenance (in INR)

1,800

1,000

NA



Fuel (CNG/Energy) cost per day (in INR) (Range)

250-350

200-250

INR 5 per unit  
(Included in daily rent-  
INR 400)



Average Gross monthly income (in INR)

36,000  
(Only for Shared 3W)






25,000

27,000




\* Vehicles owned by private operator & given on rent for operations

# BASE SITUATION ASSESSMENT

## E-3Ws in Market

E-Auto	Characteristics	E-Rickshaw
7-8 kwh	 <b>Battery Size</b>	up to 4 kwh
45 to 55 kmph	 <b>Max. Operating Speed</b>	25 kmph
85 to 130 km	 <b>Operational Range</b>	60 to 85 km
INR 0.33 million	 <b>Cost of Vehicle (W/O Subsidy)</b>	INR 0.2- 0.25 million
<b>INR 0.28 million</b>	 <b>Cost of Vehicle</b> (after FAME II & Gov. of Gujarat subsidies)	<b>INR 0.18 million</b>

The key difference between E-auto and E-rickshaw is the maximum speed which impacts the daily operational kilometers. The E-auto model provides a maximum speed ranging from 45-55 kmph, whereas E-rickshaw has a top speed of 25 kmph. The E-3Ws are equipped with plug-in charging technology, and E-auto models have higher charging time than E-rickshaw due to higher battery capacity. All E-3W manufacturers currently provide 36 months or up to 80,000 km battery warranty on E-autos and 36 Months or 40,000 km on E-rickshaws.

E-Auto	Subsidy under	E-Rickshaw
 INR 68,000	 <b>FAME II</b>	INR 38,000
 INR 48,000	<b>Government of Gujarat</b>	INR 38,000

E-3Ws are eligible for subsidy under the Central government FAME II scheme and Government of Gujarat (GoG) subsidy, which is provided at INR 10,000 per kWh. It is capped at INR 68,000 under the FAME-II scheme and INR 48,000 by GoG per vehicle. E-3W with lead acid battery technology are not eligible for Central and state government subsidies.

With the subsidies, the on road price of an E-Auto has come down by 33%\* and is only 12% higher than the conventional fuel vehicle value

\* in Gujarat

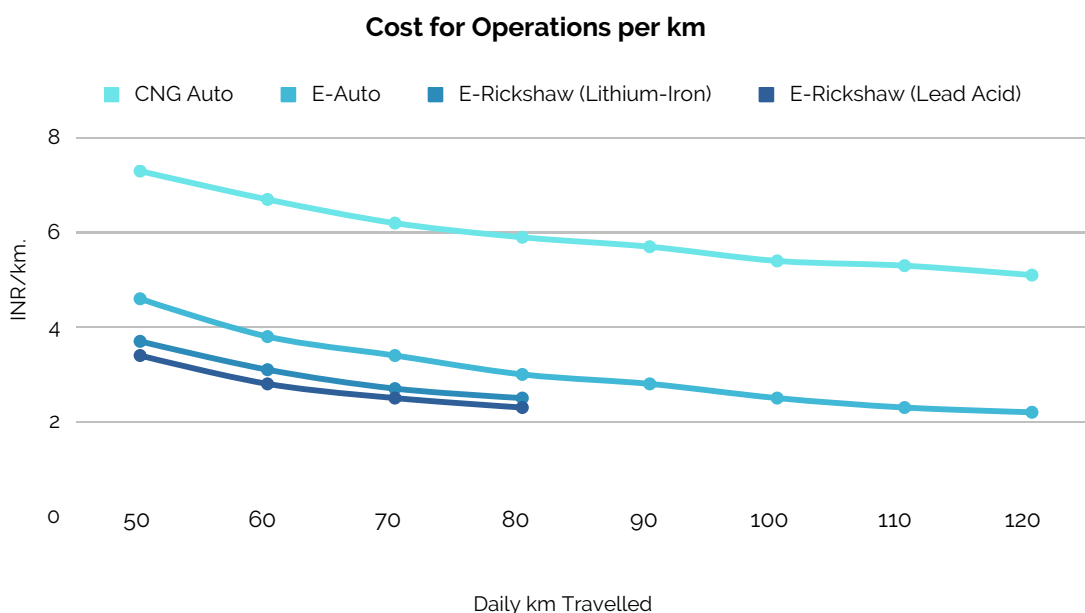
## COST ECONOMICS

### of CNG-3W & E-3W Variants

Input	CNG Auto	E- Auto	E-Rickshaw (Lithium-ion)	E-Rickshaw (Lead acid)
<b>Basic Cost (in INR)</b>	2,22,000	3,63,000	2,63,000	1,50,000
<b>GST @ 5%</b>	11,100	14,750	11,250	7,500
<b>Other Charges</b> (Registration, Insurance, HSRP, Tax)	19,050	20,875	19,125	19,500
<b>Total on road price (in INR)</b>	2,52,150	398,625	293,375	1,77,000
<b>Government of Gujarat Subsidy + FAME II (in INR)</b>	0	116,000	76,000	0
<b>Actual (on-road) Price (in INR)</b>	2,52,150	2,82,625	2,17,375	1,77,000

E-Rickshaws with Li-ion and lead acid batteries have speed constraints (up to 25kmph). This considerably restricts the operational distance of E-rickshaws to about 70km daily. If total cost of operations are considered, this low operational km means lower ridership and lower income levels.

An E-Auto can be compared to a CNG 3W in all operational aspects. However, E-Auto is nearly 50% cheaper compared to CNG 3W, considering daily operational km of 100 km in a single charge. This is likely to improve the drivers' income/savings significantly.





# STRATEGY FORMULATION AND POLICY INTERVENTIONS

- Stakeholder buy-in is an initial step towards strategy formulation. Apart from the Regional Transport Office (RTO) and Traffic police, school rickshaw associations and E-3W Original Equipment Manufacturers (OEMs), were identified as the key stakeholders.
- Creating awareness among IPT operators about E-3W vehicles was critical. Meetings and workshops were organized to present the benefits of an E-3W in comparison to existing CNG 3Ws..
- Policy-level interventions were identified to scale-up E-3W adoption.

### Stakeholder buy-in



Connecting stakeholders (city authorities, 3W drivers, auto rickshaw associations and vehicle manufacturers)

### Awareness workshops



Awareness creation workshops for autorickshaw drivers/operators

### Action Areas



Addressing operational constraints



# AWARENESS WORKSHOPS

The workshops aimed to create awareness among IPT operators about increasing share of E-Vehicles in the IPT segment and their overall benefits to IPT operators.

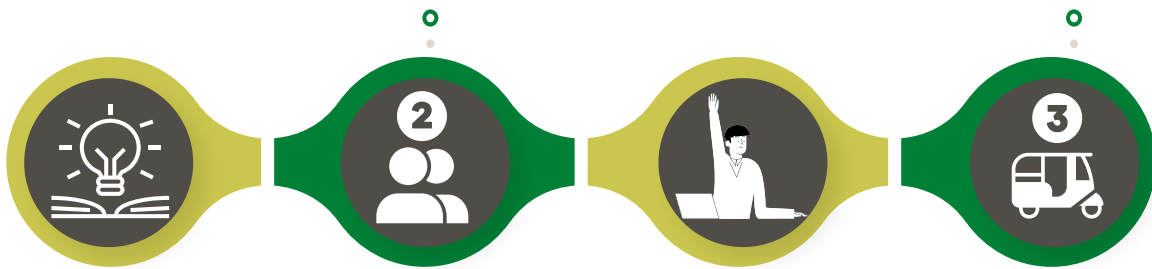
Two half-day workshops were conducted on 2nd October 2022 and 18th December 2022, with the support of AMC, RTO, Traffic police and the School Rickshaw Association to spread awareness on E-Vehicle technology.

- The workshops exhibited plug-in variants of E-3W models and encouraged drivers to take test drives and experience ride and drive quality.
- Around 200 drivers attended the workshops and undertook test rides. Three on-spot bookings were also done in the 2nd workshop.



Two IPT associations expressed interest in this project

Three E-3Ws booked in the 2nd workshop.



Improved the knowledge of E-3W such as technology, cost and revenue and overall benefits to the city among wider group of stakeholders.

The workshops proved to be a good platform where IPT drivers could interact with all the stakeholders and highlight their concerns.

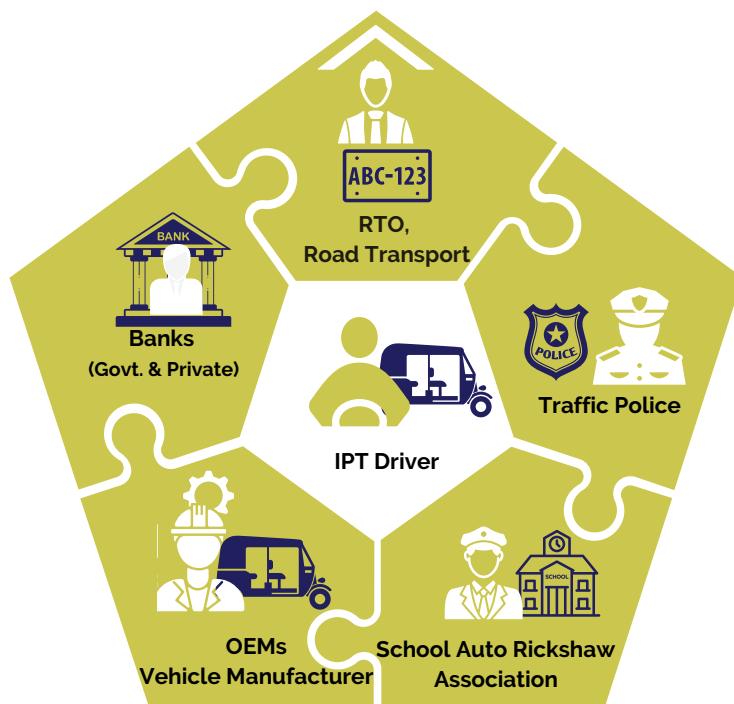
# STAKEHOLDER PARTNERSHIP

## Creation of a robust stakeholder network for enabling successful transition to E-3Ws

A series of meetings and workshops were organized as part of this project, which helped create a strong network of stakeholders in this initiative.

The two E-3W awareness workshops helped to identify and bring the stakeholders, such as RTO, Traffic police, AMC, formal banks, auto rickshaw associations, existing E-3W drivers, and OEMs, together to deliberate on electrification possibilities, contributions and action areas.

The President of the Mahesana District Auto Rickshaw Association also participated in the event and shared the learnings from the UKPACT project undertaken in Mahesana during the first phase of the project. The workshop helped create awareness of E-3Ws amongst CNG auto-rickshaw drivers and also highlighted economic benefits as a result of this transition.



## ACTION AREAS



- 1 The current study has targeted School Rickshaw Association as a target group for E-3W electrification awareness.

Auto Rickshaw Drivers Cooperative Society Limited has also come forward, expressing interest in this initiative.



- 2 Non-Banking Financial Companies (NBFCs) are charging higher interest rates of about 24% as compared to banks which charge 12%. This changes the entire economics and may spread a negative message among the drivers/operators. Sharing awareness about the availability of loans through public sector banks is crucial to maintain the economic benefits to drivers,

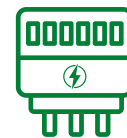


- 3 A single charge in E-Auto provides an average operational km range of 80-100 km which is suitable for most drivers doing school runs. Creating charging facilities at major IPT nodes would address range anxiety for drivers operating more than 100 km in a day.

- 4 Gujarat EV policy's overall subsidy framework does not include criteria for availing subsidy for developing charging infrastructure facilities. Some policy interventions should provide subsidies to develop charging infrastructure specific to 3W. Also, a public charging stations being set up by the city may include charging plugs for E-3Ws.



- 5 Creating an operating model for exclusive E-3W charging facilities is critical. This needs to be studied further with the support of IPT associations/RTO/AMC to formulate a suitable model for charging facilities.



- 6 Some options are emerging in the Indian market for retrofitting existing CNG 3Ws to E-3Ws. As this market develops and retrofitting options become available, it can help scale up adoption of E-3Ws at more affordable costs.



- 7 Branding of E-3Ws operating in the city will help improve visibility and also raise awareness about electric mobility. Simple messages like "I am a green warrior" or "I ride on a green vehicle" on E-3Ws can create an impact especially on children.

## END NOTE

The project on "Strategy and action plan for electrification of public transport and intermediate public transport in the cities of Ahmedabad and Mahesana" is working towards E-vehicle transition and increasing the share of E-3Ws among IPT vehicles. The socio-economic impacts of the initiatives undertaken under this project are numerous including creation of livelihood opportunities, improvement in economic status of E-3W drivers/operators, and air quality improvement in the city. In addition, awareness on E-Vehicles and environment is being built among the children using these E-3Ws. This is likely to influence their or their family's transport-related choices (regarding owning/using an E-Vehicle) in the future and help in building E-mobility warriors for a greener future.



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