Panaji is the capital of Goa, the state headquarters of the North Goa district and a prime destination for national as well as international tourists. The coastal city is located in the Tiswadi Block of North Goa district. Panaji has the Mandovi river on its northern border, the Arabian sea on its northwest and a few villages on its eastern and southern sides. The city has coastal plains with marine land forms on the west (coastal area). The high volume of tourists and a floating population drawn by tourism is emerging as one of the key economic drivers in the city.

Demographics

Population
40,017 (MC), 1.14 Lakhs (UA)
5000-15000 persons per day
(Floating population)

Area
8.12 sq. km.

City Type
Tier-II

Vehicles Registered*

In Panaji, two wheelers comprise of almost 59% of the registered vehicles. The percentage of EVs vs other vehicles increased from 0.1% in 2019 to almost 8.5% in 2022. The registration trend of vehicles in Panaji from 2019 to 2022 is shown below:

*Information source: VAHAN Dashboard, accessed on 30th September, 2022

This documentation is a part of the ICLEI South Asia’s initiative ‘Support Indian cities to take leadership on EVs’: Ten cities including Coimbatore, Gangtok, Kochi, Lakshadweep, Meerut, Nagpur, Panaji, Rajkot, Shimla and Surat were visited and the status of EV transition (till September 2022) was documented.
The electric mobility revolution is gaining momentum in Indian cities and is being promoted by the central government through various incentives to reduce the country’s reliance on fossil fuels and to reduce Greenhouse Gas (GHG) emissions from the transport sector. Indian cities are also aiming to integrate sustainable and low emission alternatives in urban transport. But long-term actions are required for mass adoption of e-mobility in Indian cities. ICLEI South Asia embarked on an initiative to “Support Indian Cities in Taking Leadership on Electric Vehicles (EV)” to aid the cities in identifying priority interventions and to take necessary steps towards an accelerated transition to EVs.

This initiative included several interactions and discussions with the city stakeholders during visits to 10 project cities - Coimbatore, Gangtok, Kochi, Lakshadweep, Meerut, Nagpur, Panaji, Rajkot, Shimla and Surat. Consultations were held with major stakeholders impacting the EV transition in cities, such as advisory groups, industry experts including the advocacy group, charging infrastructure developers, vehicle technology/OEMs and financial institutions. As part of the initiative, the ICLEI South Asia team visited Panaji on 8th – 9th September, 2022 to interact with the stakeholders, understand the existing EV transition situation in the city, as well as the challenges and opportunities and to suggest a way forward for the city.

### EV related developments in Panaji

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 2021</td>
<td>Goa Electric Mobility Promotion Policy-2021 Introduced</td>
</tr>
<tr>
<td>June 2022</td>
<td>State government plans to set up 50 electric charging stations.</td>
</tr>
<tr>
<td>July 2022</td>
<td>EV Subsidy discontinued from effective date of 31/07/2022. July 2022</td>
</tr>
<tr>
<td>October 2022</td>
<td>First Solar electric hybrid ferry boat inaugurated to be used operate on the Chorao-Panaji route only for passengers</td>
</tr>
<tr>
<td>November 2022</td>
<td>GEDA invited EoI cum tender for 40 Public charging stations</td>
</tr>
</tbody>
</table>
Key stakeholders

The stakeholders in Panaji that are related to the EV transition and with whom interactions were held during city visit are as follows:

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Roles</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>State Government</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Gujarat Energy Development Agency (GEDA) | - Responsible for renewable energy related policy development and implementation  
                                              - Implements sustainable energy program across the state  
                                              - Publish tender for charging station development |
| Kadamba Transport Corporation (KTC)      | - Intercity and intra city bus operation  
                                              - Lead the procurement of e-buses when city decides for the same |
| Electricity Department, Government of Goa| - Electricity generation, transmission and distribution  
                                              - Provides approvals for electricity connections  
                                              - Ensure timebound access of required load of electricity  
                                              - Finalises tariff of charging electric vehicles |
| Town & Country Planning Department, Goa  | - Regulation of construction of buildings, plans approval, monitoring the constructions process and allotment of housing sites in urban areas  
                                              - Amendment in building byelaws/rules to include EV provision |
| RTO, Panaji                              | - Registration of EVs and prioritise through single-window clearance. |
| **City Government**                      |                                                                      |
| Corporation of the City of Panjim (CCP)  | - Finalising EV targets for the city  
                                              - Land Owner- Demarcate land for charging infrastructure |
| Imagine Panaji Smart City Development Limited (IPSCDL) | - Implementing projects under Smart City Mission (SCM)  
                                              - E-bus procurement under SCM  
                                              - Planning locations for charging depot of e-buses procured under SCM |
| Others                                   |                                                                      |
| Vehicle Technology/ OEMs                 | - EV and its parts manufacturing and supply |
| NGOs                                     | - Cater to the technical trainings and capacity building needs of the officials |

State EV Policy

Goa state EV policy key points:

- **Vision** is to establish Goa as a model state of International Standards for EVs across passenger and commercial segments along with supporting charging infrastructure
- **Effective for 5 years from the date of notification**
- Target of 30% of vehicles registered in Goa from 2025 to be electric. 50% of ferries, jobs creation, encourage start-ups, service units for repair of vehicles and batteries
- **50% of new public transport buses to be EVs (2021-25)**
- Promote conversion of diesel powered marine fleet trawlers, (fishing boats, ferry boats, etc.) into hybrid (solar+ electric)
- **Encourage new e-autos instead of ICE equivalents, e-rickshaws and e-carts, electrification of low capacity, short haul delivery LCVs and e-four wheelers**
- Ride hiring service providers shall be allowed to operate e-two wheeler taxis, operators renting two wheelers to tourists, to switch to electric two wheelers by 2025.
- **Specific areas to be identified like – Panjim Smart City, Heritage Zones, Tourist Zones, Airport and Railway stations etc. which will move towards 100% mandatory electric vehicles by 2025.**
- Changes in building byelaws for EV ready parking  
  Charging station at every 25 km on highways and 3 km within city limits.
City- EV related actions-status*

This information was collected through interactions and discussions with government and private stakeholders related to EVs during the city visit.

**Policy and Advocacy**
- State level Policy- Yes
- City level Policy- No
- Initiatives- Yes (Charging Infrastructure- Concessional land for charging stations)

**Charging Infrastructure**
- Public charging stations(PCS)- Yes (6 PCS existing in the city, 8 locations finalised, EoI for installing more PCS underway)
- Electric bus charging - No (E-buses not operational, 2 locations for bus depot identified, 36 charging points for e-bus planned)

**Financial Incentives**
- State level - No (Financial incentives withdrawn w.e.f 31.07.2022)
- City level- No

**Vehicle Technology**
- Charging locking system creates problems when mud deposits on that setup.
- Fire safety hazard

City Readiness

Panaji EV readiness was synthesized after the parameters impacting the EV transition were assigned scores. **Twenty- five parameters were listed under 6 categories**, which are supporting regulatory ecosystem, supply chain preparedness, consumer willingness*, public charging infrastructure, EV readiness in buildings and electricity load implication awareness. The scoring of the city was based on the information collected during city visits. The readiness of the city was assessed as follows:

*Consumer willingness rating is based on the responses from dealers of EV and discussion with the city government officials.
Panaji is taking initiatives for adoption EVs which include procurement of two-electric two wheelers by CCP, development of PCS, pilot of solar-electric hybrid ferry, finalise location of 8 PCS and 2 e-bus depot with 36 charging points, plan for development of charging stations and procurement of 150 e-buses by CCP and 48 e-buses by the IPSCDL for city and state operations. Electric three wheelers are also being used for last mile delivery of goods in the city by private players. The observations from city readiness assessment includes the following:

**Observations**

The key challenges identified after visiting Panaji and interacting with the stakeholders are as follows:

- **Finalising strategic locations of bus depot and PCS**
- **Lack of awareness among users and operators related to EV performance, operation and charging**
- **High cost of EV restraining buyers to buy EVs without subsidy**
- **Lack of clarity related to the roles of stakeholders**
- **Loan for EV is disbursed on ex-showroom price while for ICE, it is for the on-road price**
- **Lack of mandate for the government fleet to transition to EVs**
- **Losses to the Electricity Department - Supply electricity at a subsidised rate (INR 3.5/unit) to the PCS developer and develop supporting infrastructure also.**

The suggestions from the city which may be useful in EV adoption include a guidance document for estimating the approximate cost of designing and developing a bus depot in different parts of India considering different soil types and terrains, guidance by the Government for expected rise in electricity load as per the expected rise in EVs, matching the VAT from ICE vehicles with the revenues from the charging stations.
Following steps of discussion and consultation with city stakeholders during city visits, industry experts and advisory group was followed to develop the six step approach:

1. Strategise
Set Vision and level on ambition for future, including goals across different area

2. Deliberate
Focus on long-term goals to drive the approach

3. Collaborate and Engage
Stakeholder mapping; define criteria for identifying and prioritizing stakeholders, and select engagement mechanisms.

4. Act
Develop action plan, identify opportunities from feedback and determine actions

5. Evaluate
Review goals, and plan next steps for follow-up and future engagement.

6. Accelerate
Scaling up of the initiative based on the priority area of the city

Identification of key focus areas after consultation and discussions with city stakeholders and industry experts

Development of an engagement framework to select the cities

Identification of the principles to guide the EV engagement approach

Validation of approach through interaction with city stakeholders

Six-step approach developed and discussed with industry experts and advisory group

Create linkages between the need for the city's engagement to identify the steps of approach

The six-step approach which Panaji should preferably follow to address the challenges identified above are as follows:

As per discussions, Panaji is currently focusing on the step of 'ACT' through EV procurement and deployment with a partial focus on the step of 'DELIBERATE', further focus is required on the other steps of the approach along with a clear set of targets and strategies for Panaji.
The city should appoint a nodal person/nodal team which leads the EV initiative and is assigned with all the tasks related to EV adoption. Further, planned electrification of rental two wheelers and finalising strategic locations for citywide network of charging stations, are two major recommendations as per the analysis of city readiness, challenges and opportunities. The description of these two strategies as per the 6-step approach recommended for Panaji is as follows:

**Stategise**

Vision- Envisage Panaji as model EV tourist city

**Goal 1**

Planned electrification of rental two wheelers for tourists

**Goal 2**

Finalising priority locations for citywide network of charging stations

### Goal 1

**Planned electrification of rental two wheelers for tourists**

<table>
<thead>
<tr>
<th>Deliberate</th>
<th>Collaborate and Engage</th>
<th>Act</th>
<th>Evaluate</th>
<th>Accelerate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand analysis</td>
<td>CCP</td>
<td>Documentation of existing rental fleet size and willingness of owners to transition to EVs</td>
<td>Impact of transitioning from ICE to EVs</td>
<td>Develop a plan for phased transition of existing tourist vehicles to EVs</td>
</tr>
<tr>
<td></td>
<td>RTO, Panaji</td>
<td>Understand the expected demand for the number of EVs, charging infrastructure and electricity</td>
<td>Percentage increase in willingness to transition to EVs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Third party consultant</td>
<td>Incentives for transitioning the fleet to EVs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rental two wheeler owner/operators</td>
<td>Awareness sessions for the rental fleet owner/operator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting charging infrastructure</td>
<td>CCP</td>
<td>Finalise the location for PCS in consultation of relevant stakeholders of EVs</td>
<td>Charging points at major tourist locations developed as per demand and functioning</td>
<td>Setting up more charging stations as per the demand</td>
</tr>
<tr>
<td></td>
<td>Electricity Department, Goa</td>
<td>Approvals from CCP, Electricity department, Town Planning department</td>
<td>Percentage of utilisation of these EV chargers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Town &amp; Country Planning Department</td>
<td>Additional power infrastructure required (if any) and attached financial obligations of each stakeholder</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Charge Point Operators (CPOs) and E-Mobility Service Provider (e-MSPs)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phased transition of rented two wheelers to electric two wheeler</td>
<td>CCP</td>
<td>Develop an action plan/strategy for a phased transition of rental two wheelers to EV</td>
<td>Transition of all the existing rental two wheelers to EVs</td>
<td>Strategy for centralised electric two wheeler renting system for accelerated transition to EVs</td>
</tr>
<tr>
<td></td>
<td>Electricity Department, Goa</td>
<td>Consultation with all the stakeholders to ensure acceptability</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rental two wheeler owner/operators</td>
<td>Pilot project to improve confidence among the rental two wheeler operator/owners.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Charge Point Operators (CPOs) and E-Mobility Service Provider (e-MSPs)</td>
<td>Ensure supply of expected electricity demand for charging infrastructure</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Goal 2

Finalising priority locations for citywide network of charging stations

<table>
<thead>
<tr>
<th>Deliberate</th>
<th>Collaborate and Engage</th>
<th>Act</th>
<th>Evaluate</th>
<th>Accelerate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location and accessibility</td>
<td>CCP</td>
<td>Finalising location as per data driven analysis of EV charging demand</td>
<td>Visibility and all time access from roads to the charging stations</td>
<td>Scaling up the charging network to locations in and around Panaji</td>
</tr>
<tr>
<td></td>
<td>Electricity Department, Govt. of Goa</td>
<td>All time accessibility to the charging locations</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Town &amp; Country Planning Department, Goa</td>
<td>Finalise locations considering major tourist spots in and around Panaji.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Goa Hotel &amp; Restaurant Association (GHRA)</td>
<td>Collaboration with restaurants/cafe/ hotels to setup charging facility in their premises.</td>
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<tr>
<td></td>
<td></td>
<td>Guideline for designing the charging station integrating recreational spaces where the users may wait/utilise their time till their vehicle is charged.</td>
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<tr>
<td></td>
<td></td>
<td>Fast/slow charger installation decision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approvals and additional infrastructure</td>
<td>CCP</td>
<td>Ensuring effective electricity grid readiness</td>
<td>Percentage of usability of charging stations</td>
<td>Scaling up the charging network to areas in and around Panaji</td>
</tr>
<tr>
<td></td>
<td>Town and Country Planning Department, Goa</td>
<td>Approvals from CCP, Electricity department, Town &amp; Country Planning</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Charge Point Operators (CPOs) and E-Mobility Service Provider (e-MSPs)</td>
<td>Ensure timebound access of required load of electricity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GHRA</td>
<td>Additional supporting infrastructure required and its implications on related stakeholders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation and billing</td>
<td>Charge Point Operators (CPOs) and E-Mobility Service Provider (e-MSPs)</td>
<td>Finalising the operational model</td>
<td>Sustainable operation of charging stations</td>
<td>Scaling up the charging network to areas in and around Panaji</td>
</tr>
<tr>
<td></td>
<td>GHRA</td>
<td>Operation and maintenance</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Tariff and tariff collection</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Safety and security of equipment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Way Forward

Panaji should have a clear set of targets and prioritise on the following actions for accelerate EV adoption:

- **Strategy for centralised bike/car sharing system and phase out the existing rented tourist vehicles and transition to EVs**

- **Strategy for finalising priority location for citywide charging infrastructure network**

- **Guidance for financial and locations considerations for PCS and e-bus charging depot**

- **Awareness programs to sensitise public about the do's and dont's related to EVs**

- **Mandate for Electrification of Government fleet (Municipal Corporation vehicles)**

- **End of life solution for batteries of EV**

- **Solar-Electric hybrid ferries for passenger transport pilot on more routes**

- **Encourage a mix of alternative fuel for vehicles**

## Acknowledgement

ICLEI South Asia would like to express its sincere gratitude to the officials from Corporation of the City of Panaji, Imagine Panaji Smart City Development Limited (IPSCDL), Town & Country Planning Department, Goa, Gujarat Energy Development Agency (GEDA), Kadamba Transport Corporation (KTC), Electricity Department Govt. of Goa, RTO Panaji and OEMs in Panaji for their insights and guidance. The inputs from the Advisory Group members were crucial in finalizing the document.

## Disclaimer

This document includes preliminary recommendations and the way forward, based on interactions, fieldwork and background research and may require detailing as per the dedicated studies.

For more information, please contact:

**ICLEI - Local Governments for Sustainability, South Asia**

C-3 Lower Ground Floor, Green Park Extension, New Delhi 110 016
Tel: +91-11-4974 7200, Fax: +91-11-4974 7201, Email: iclei-southasia@iclei.org