The public transport in the city consists of city buses and intermediate public transport (IPT). Sustainable modes of transport account for over one-third of the commuting, with 25% of public transport (bus and IPT) and 12% of non-motorised transport modes like walking and cycling. In recent years, the city has been witnessing an average annual growth of 10.4% in registration of cars and 11% for two-wheelers, which means about 100,000 vehicles are added each year. The increase in private modes of transport leads to issues related to traffic congestion and pollution. The efforts to move towards electric mobility have been initiated in public and private transport for improving the air quality of the city.

Bhubaneswar is the capital city of the state of Odisha and is situated on the eastern coastal plain with an average altitude of 45 m (148 ft) above sea level. It is the largest city in the state and the center of economic and religious importance in the region. Bhubaneswar is called the Temple city of India, since it has large number of magnificent temples and architectural heritage. The city has emerged as a major center for the IT industry, higher education and advanced medical care, along with the boom in the metals and metal processing industries in recent years. In the past decades, the city has shown rapid growth and expanded in the outskirts.

Land area: 186 km²
Average temperature: 26.6°C

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BUS SYSTEMS OUTLOOK

Bus Trips Features

- Number of bus trips: 63,086 (2019), 63,912 (2021)
- Average time: 25 min
- Average distance: 201 km

Buses are responsible for 8% of the total commuter trips in the city. The buses are used by people belonging to all age groups and includes working class, school going children and others. The main bus users are mostly captive in nature and travelling to the activity centers of the city. As per LCMP for Bhubaneswar, half of the bus passengers use bus services daily, while around 30% use it 2-3 times per week. The travelling time on the bus varies for every user with different origins and destinations; although, on average, it takes around half an hour for the bus to complete its route.

Fleet and Infrastructure

- Number of buses: 290
- Number of bus stops: 864
- Number of routes: 44
- Number of bus depots: 4

Quality of Service

The bus network of forty four routes spreads in all directions of the city. Buses operate in the periphery of low income areas to make travel convenient for them in the city, although some slums are not well connected to the bus network. The bus service is available during the day time but the night service is not operational which causes inconvenience to the users commuting in the city during night time. During peak hour, the travel time using the city bus service exceeds from scheduled time due to heavy traffic on the road that leads to congestion and delays. The fare is considered affordable and concessions are available for children, senior citizens and people with disabilities in bus services. Riding in the bus is comfortable but during peak hours, buses are overcrowded.
**Existing Business Model**

<table>
<thead>
<tr>
<th>Model A</th>
<th>Model B</th>
<th>Model C</th>
<th>Model D</th>
<th>Model E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertically integrated, private operator in BRT/integrated system</td>
<td>Divided responsibilities in BRT/integrated system</td>
<td>Large, more formal, private operator in traditional service</td>
<td>Small, informal, private operator in traditional service</td>
<td>Government-run system</td>
</tr>
</tbody>
</table>

Capital Region Urban Transport (CRUT) as a public sector company owns and maintains the buses in Bhubaneswar. The city has adopted the Gross Cost contract (GCC) model via public concession for the operation of buses through private operators. CRUT, Bhubaneswar is responsible for the construction and maintenance of Bus Queue Shelters. The investment for buses and other infrastructure has been borne by the state government by providing grants and budgetary allocation to CRUT. The fare collection and advertisement revenue are used for the operating cost of buses.

**E-BUS ADOPTION APPROACH**

- **August 2019**: 50 buses sanctioned under FAME – II
- **October 2020**: First e-bus trial run happened in the city
- **June 2022**: First batch of 10 electric buses delivered to CRUT
- **February 2020**: Agreement signed by CRUT and PMI
- **February 2022**: Final Prototype Inspection done
- **July 2022**: Electric buses came into Operation

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4 Based on Accelerating a market transition in Latin America: New business models for electric bus deployment, P4G, Zebra and Dalberg, 2020
E-bus Fleet Technical Features

- **Number of e-buses:** 35 (Foton PMI, model Lito)
- **Passenger capacity:** 30 pax
- **Battery features:**
  - **Capacity:** 150 kWh
  - **Range:** 168 km/charge

E-bus Business Model

CRUT is a special purpose vehicle incorporated by the Housing and Urban Development Department, Government of Odisha, which is responsible for the operation and maintenance of electric buses. The electric buses are operating on the GCC model and CRUT pays per km cost for the operation to a private firm, PMI India. There is financial support from the National government for the procurement of electric buses under the FAME-II scheme. The Electronic ticket machines have been provided to conductors of the private operator for fare collection. The fare revenue from buses has been used for the operation of electric buses. CRUT is responsible for deciding fares, routes and scheduling of these buses.

Opportunities and Challenges to Scaling E-Bus Fleets

**Opportunities**

- The existing and planned routes of the bus network spread throughout the city have provided a good base network for the electrification of routes. The characteristics and ridership on these routes help CRUT in identifying the priority routes for the electrification of bus transport.
- The share of public transport in Bhubaneswar is 8 percent and it is estimated to reach up to 32 percent by 2040 as per LCMP. There is a lot of opportunity to shift towards public transport, especially with buses, so in the case of electric buses.
- The city has access to funds and technical assistance from the Central government through the FAME-II scheme, which has provided a chance for the city to enhance, streamline and extend e-bus operations.

**Challenges**

- The investment is huge for electric buses at the initial stages and the subsidy of FAME-II scheme made it possible for operators to introduce electric buses in city bus operations. Due to the unavailability of funding for more electric buses, it is a challenge for the authorities to shift towards electric buses.
- Due to the lack of availability of skilled manpower, Original Equipment Manufacturer (OEM) support and knowledge regarding charging infrastructure among the depot staff and electric bus operation staff creates difficulties in the operation of electric buses. So, it acts as an obstacle in the transition process with electric buses.

Disclaimer

ICLEI developed this profile in consultation with project cities but cannot guarantee the accuracy of the information and therefore cannot be held responsible for any consequences of its use. The publication should be cited in full as: “ICLEI – Local Governments for Sustainability (2022). TUMI E-bus Mission City Network – Profile: Bhubaneswar, India. Bonn, Germany”.

About the TUMI E-Bus Mission

Funded by the German Ministry for Economic Cooperation and Development (BMZ), a core group of organizations supports cities in their transition toward electric bus deployment. For more information please contact: tumi–network@iclei.org or visit https://sustainablemobility.iclei.org/tumi/