

CITY FEATURES



Panaji is the state capital and the district headquarters of the North Goa district. It is the largest urban centre in terms of population in the North Goa district. It is Goa’s third largest city after Vasco and Madgaon. It has rich historical, political, commercial, educational, cultural and tourist importance. Panaji is a well known national and international tourist hub, attracting tourists from around the world. It was upgraded from Municipal Council to Corporation in 2002. Panaji lies on the bank of the river Mandovi and is also bounded by two creeks, locally called Poi. It is at an average elevation of seven meters above mean sea level (MSL). Over the years, tourism based economic activities have increased with the city’s prominence as a travel destination.



Population
40,017
 (2011)



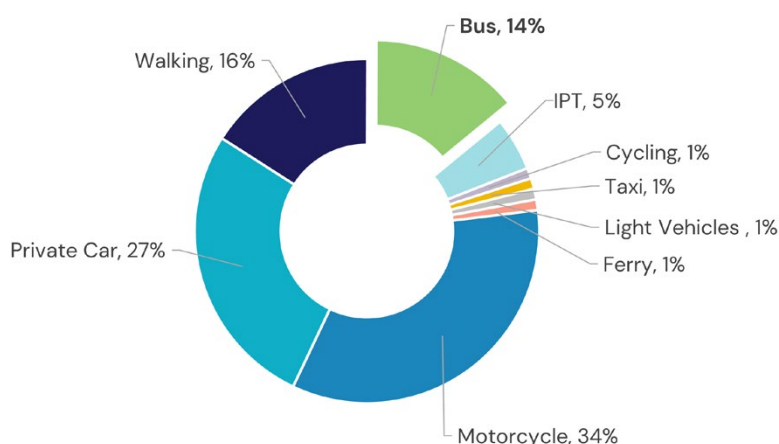
Land area
8.12 km²



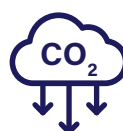
Average temperature
26.5°C

TRANSPORT FEATURES

Modal Split¹



GHG Emission Levels



Total GHG emissions
144,599 tCO_{2eq}
 From road transport
55,406 tCO_{2eq}

Air Pollutant Levels³



PM 2.5	NO ₂
23 µg/m³	12 µg/m³
PM 10	SO ₂
56 µg/m³	2 µg/m³

The city’s people commute mostly by private motorized modes, with a share of 62 percent, 34 percent from two wheelers and 28 percent from four wheelers. Public transport has a share of 20 percent, including 14 percent of bus trips, 5 percent of IPT trips and 1 percent of ferries. The spread of city and urbanization has pushed the use of private motor vehicles. As per the Revised City Development Plan 2041, the city has experienced about 9.3% growth in vehicular population from 2008 to 2013. The maximum increase is observed in auto rickshaws, taxis, goods vehicles and two wheelers. The increase in the number of private vehicles also resulted in an increase in the GHG emissions of the city.

1 Low Emission Development Strategies (LEDS) for Panaji City

2 Central Pollution Control Board, Delhi, 2021

BUS SYSTEMS OUTLOOK

Bus Trips Features

The city bus service provides services in Panaji and peri-urban areas. To complete one route, the bus takes around 45 minutes. The bus services run by the city are used by city visitors, students, businessmen and government sector working people, because it is well connected to all institutional and tourist attraction points in the city. It also serves the needs of people of different age groups and gender, with senior citizens also among the travellers of city bus services. It connects all major origins and destinations, including Panaji Margao and Panaji Vasco routes. The majority of bus passengers are regular users and tourists.



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Fleet and Infrastructure

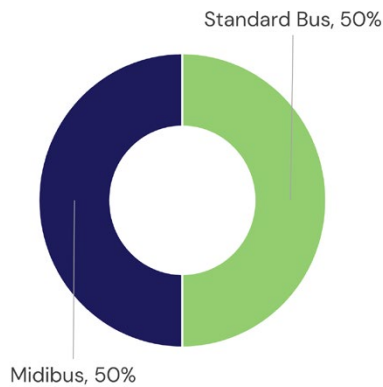


Number of buses
107

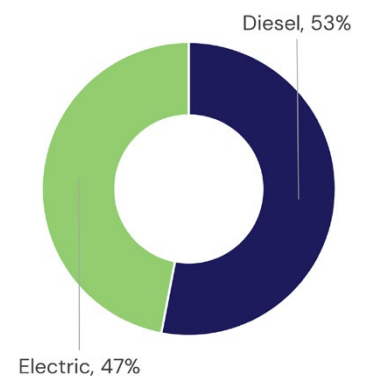


Number of bus stops
4

Buses by fleet type



Buses by fuel type



Quality of Service

The city bus transport system is spread across the city and is considered convenient for the riders. The bus service covers the corporation of the city of Panaji and the outskirts of the city. Due to higher ownership of motorised vehicles (almost every family owns a vehicle), the traffic condition is very poor during peak hours and due to traffic jams, each bus trip adds more than 15 minutes to the usual scheduled time. The fare of a city bus is reasonable for commuters because socioeconomic factors have been taken into consideration while fixing the fare of buses. The city bus journey is comfortable, but during peak hours, buses are more crowded than usual. The public transport journeys are safe and accessible for women, children, and elderly people.



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Existing Business Model³

A

Model A: Vertically integrated, private operator in BRT/integrated system

B

Model B: Divided responsibilities in BRT/integrated system

C

Model C: Large, more formal, private operator in traditional service

D

Model D: Small, informal, private operator in traditional service

E

Model E: Government-run system

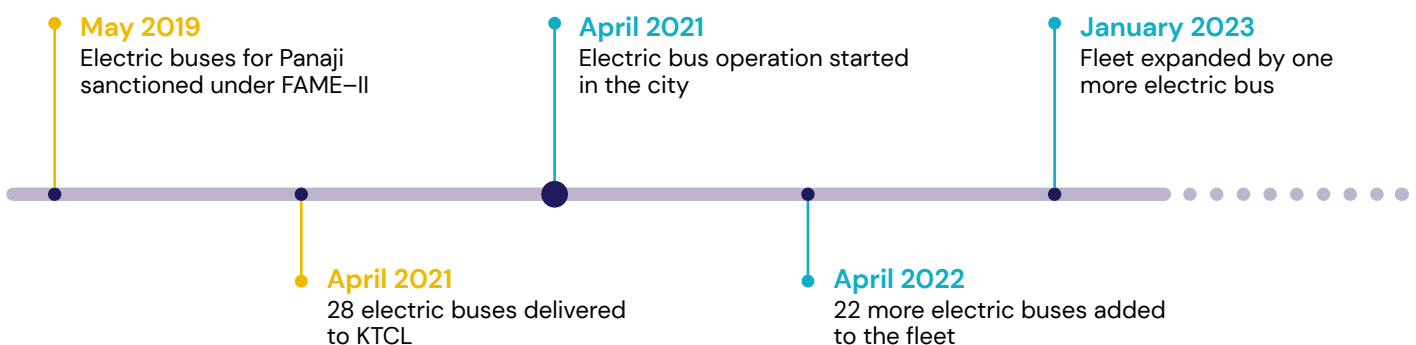
B

Kadamba Transport Corporation Limited (KTCL) is a nodal agency responsible for the management of public transport in the city. The public sector owns and maintains the fleet and the private sector operates the buses via public concession. The bus stops are owned by the Public Works Department (PWD) and local authorities. The main bus stand is owned by the Department of Transport, Goa and leased to KTCL for the operation and maintenance of public transport buses. The fare is collected by conductors, which KTCL employs. The positive aspects of KTCL include good commuter potential and ridership, while the negative points are high opex cost and increase in staff salary cost.



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E-BUS ADOPTION APPROACH



³ 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

51 (8 operational from Panaji Depot)

Olectra, model EBuzzK9D



Passenger capacity

34 and 48 pax



Battery features

Capacity **276 kWh**

Range **250 km/charge**

E-bus Business Model

Kadamba Transport Corporation Limited (KTCL) is responsible for the operation of the public transport system in the city. The electric buses are operational on the Gross Cost Contract (GCC) model. The bus stops, dedicated lanes and bus depot have been managed by KTCL and CCP, Panaji. The route planning and scheduling is done by KTCL and scheduled routes are operated by Evey Trans Private Limited, a private operator. The fare was usually collected by the private operator. FAME-II has helped the city to procure electric buses as it provided a financial subsidy to the authority. Kadamba Transport Corporation Limited is providing per km cost as contracted in the GCC model.

OPPORTUNITIES AND CHALLENGES FOR ADOPTION OF E-BUS FLEETS



Opportunities

- The push from the national government through financial and technical support under the FAME scheme and policy interventions by the state government for electric vehicles has laid the foundation for the local authority to initiate the transition towards electric buses.
- The small area of Panaji corporation makes it more suitable for the operation of buses as the primary mode of public transportation, which also acts as a catalyst for the switch to electric buses.
- The zero tail pipeline emissions that will directly benefit the environment of Panaji, act as a push factor for the authority to introduce electric buses.



Challenges

- The capital expenditure for procurement of electric buses is higher and the private operators are not so comfortable with the transition to this technology.
- Though identifying and installing charging stations is a challenge, the government has been making efforts to increase skilled manpower at depots, which can be helpful for identifying suitable locations for charging stations.

Acknowledgements

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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/>