

## CITY FEATURES



Rajkot is an industrial hub of the Saurashtra region in the state of Gujarat. It is situated in the western part of Gujarat and is the fourth most populous city in the state. The city's topography is mostly flat and the river Aji passes through it. Historically, the development of the city was driven by industrial activity. It has many small and medium industries related to manufacturing, metal and automobile, among others. The central part of the city is dense and has mixed land use. The city has witnessed rapid urbanization in the last decade. The growth is mostly in the outskirts of the city, along major roads that surge the demand for multistory buildings for future growth.



Population  
**1,286,678**  
 (2011)



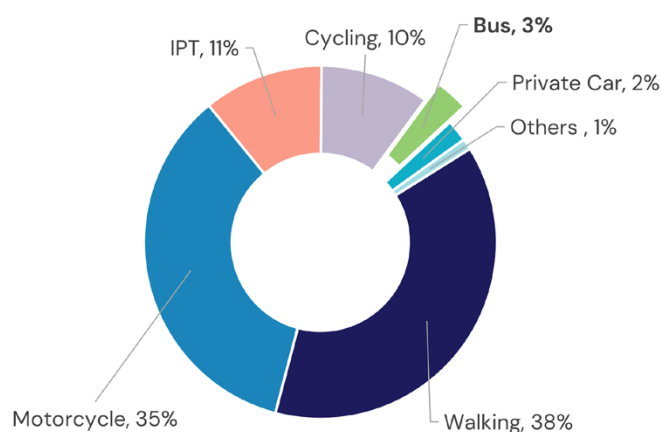
Land area  
**161.86 km<sup>2</sup>**



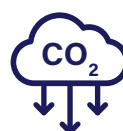
Average temperature  
**26.4°C**

## TRANSPORT FEATURES

### Modal Split<sup>1</sup>



### GHG Emission Levels<sup>2</sup>



Total GHG emissions  
**2.615 million tCO<sub>2eq</sub>**  
 From road transport  
**0.55 million tCO<sub>2eq</sub>**

### Air Pollutant Levels<sup>3</sup>



PM 2.5	NO <sub>2</sub>
<b>32 µg/m<sup>3</sup></b>	<b>20.3 µg/m<sup>3</sup></b>
PM 10	SO <sub>2</sub>
<b>89 µg/m<sup>3</sup></b>	<b>13.3 µg/m<sup>3</sup></b>

In the city, sustainable modes of transportation account for more than 60% of all commuting trips; walking and cycling comprises 48% of trips and public transportation accounts for 14% of trips, including intermediate public transport (IPT). The city has a bus rapid transport and an urban bus system to reach from one place to another, using public transport. Apart from that, the motorcycle is considered the most preferred private mode for travelling by the city's population. The issues related to traffic jams and rising pollution are reaching worse levels, due to the surge in private modes of transportation. Despite this, the city is making efforts to transition to electric mobility in both private and public transport modes.

<sup>1</sup> Low Carbon Comprehensive Mobility Plan, Rajkot 2014

<sup>2</sup> CapaCITIES Project- Rajkot GHG Emission Inventory, 2020

<sup>3</sup> Gujarat State Pollution Control Board

# BUS SYSTEMS OUTLOOK

## Bus Trips Features



Number of bus trips

2019	2021
21,323 BRT	14,751 BRT
33,933 Non-BRT	21,569 Non-BRT

Only three percent of the bus trips out of the total trips have been used by commuters to serve their travel needs within the city. Although, people belonging to all the different age groups use buses as a mode of transport for end to end connectivity and to reach activity nodes of the city. The trips using the city bus service which runs through the major part of the city are more, compared to the trips by buses operating in the bus rapid transit network. On average, buses in the bus rapid system take around half an hour to complete their trips, while trip by city bus service takes more time to reach their destination.



Average time

30 min BRT  
— Non-BRT



Average distance

217 km BRT  
166 km Non-BRT

## Fleet and Infrastructure



Number of buses  
139

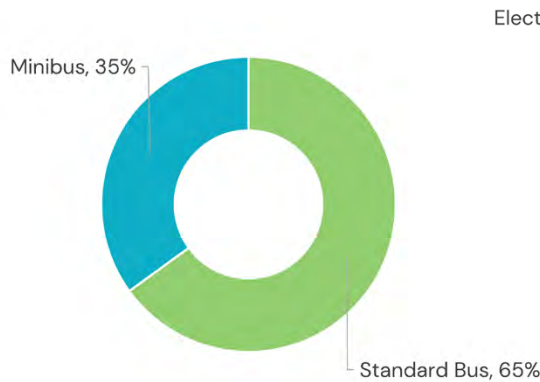


Number of bus routes  
1 BRT  
45 Non-BRT

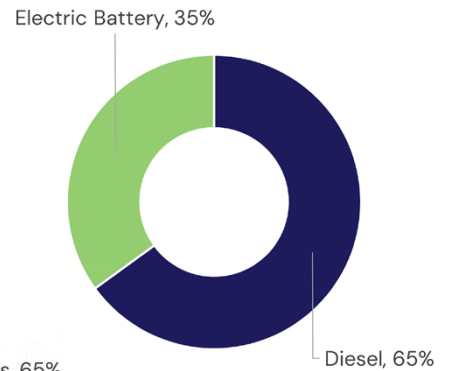


18 BRT bus stops  
495 Non-BRT bus stops  
3 Bus depots

Buses by fleet type



Buses by fuel type



## Quality of Service

Bus transport is convenient and connects all the major origin and destination points of the city. The buses reach upto fringe areas and cover the core of the city. The existence of bus rapid transit routes which run on a dedicated corridor make travel faster and passengers reach their destination on time. However, city buses use the shared carriageway, thus facing jams during peak hours that delays travel time by 10-15 minutes on these routes. The fare structure is considerably affordable to all sections of society. Passengers are, though, inconvenienced during peak hours because of overcrowding in the buses. Even so, due to GPS tracking and cameras, buses are safe for all categories of people.



## Existing Business Model<sup>4</sup>

Rajkot Rajpath Limited (RRL) is a special purpose vehicle incorporated by Rajkot Municipal Corporation, which is responsible for providing an efficient public transport system in the city. The buses are operating on the Gross Cost contract model and Rajkot Rajpath Limited pays per km cost, including the maintenance of buses to the private operators. The Rajkot Rajpath Limited and Rajkot Municipal Corporation are responsible for the construction and maintenance of bus stops. The investment for procuring buses and other infrastructure is from the State Government through multiple schemes and through the Central Government FAME-II scheme. The revenue from fare collection has been used as operational cost and subsidy from the State Government for electric buses supported the electrification of public transport in the city.

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

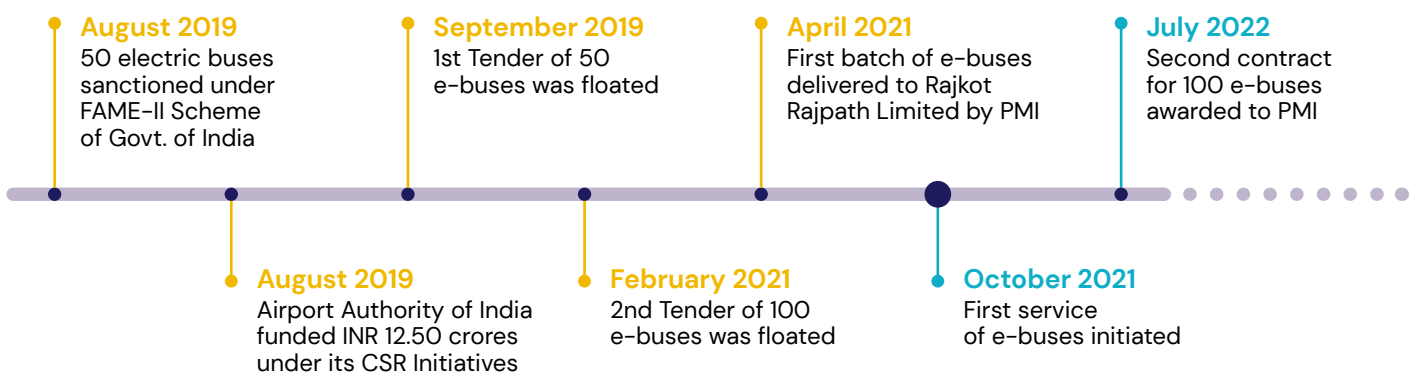
**Model E:** Government-run system

**B** With the divided responsibilities, the public sector owns the bus fleet and the private sector is responsible for the operation and maintenance of the buses via public concession. The ownership of the fleet will remain with Rajkot Rajpath Limited after the end of the contract.



© Rajkot Rajpath Limited

## E-BUS ADOPTION APPROACH



<sup>4</sup> 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  
**48** (PMI, model Lito)



Passenger capacity  
**30 pax**



Battery features

Capacity **102 kWh**  
Range **150 km/charge**



© Rajkot Rajpath Limited

## E-bus Business Model

Rajkot Rajpath Limited (RRL) is responsible for running electric buses in the city. The RRL pays per km cost under the Gross Cost model to the private company PMI India for operating and maintaining the electric buses. The fare is collected by conductors provided by the operator through an electronic ticketing machine. There is support from the National and State government through multiple schemes to cover the cost of buses. The decision regarding fares, routing and scheduling has been taken by Rajkot Rajpath Limited.

## Opportunities and Challenges to Scaling E-Bus Fleets



### Opportunities

- The subsidy under the Chief Minister Urban Bus Service Scheme for the operation of electric buses, has reduced the cost of operation substantially as it offers INR 25 per km for the operation of buses.
- There are bright opportunities to switch to public transport, especially, since according to LCCMP Rajkot, electric buses should account for more than 20 percent of buses in the share of public transport, even though buses account for a mere 3 percent share of public transport.
- Previous deployment of electric buses and lower operating costs than Internal Combustion Engine buses offer potential to increase the proportion of e-buses in public transport.



### Challenges

- Due to supply shortage, lack of technical and operational knowledge on electric buses among private operators makes them feel at risk about this technology. So, strengthening of the electric bus fleet is a challenge for the city.
- The transition to private modes due to changes in people's perception towards using public transport buses is posing a threat to public transportation, and as a result, electric buses.
- Due to the lack of a long term financial roadmap for electric buses, it is tough for private players to take up the electric buses confidently.

### Acknowledgements

**Authors:** Sumit Kumar Agrawal (ICLEI South Asia), Shivam Arora (ICLEI World Secretariat)

**Contributors:** Alpana Mitra (Rajkot Rajpath Limited), Vijay Saini, Nilesh Prajapati (ICLEI South Asia), Laura López (ICLEI World Secretariat)

**Editors:** Sajili Oberoi, Alyssa Chenault (ICLEI World Secretariat)

**Design:** Olga Tokareva, Laura López (ICLEI World Secretariat)

### Publisher

ICLEI – Local Governments for Sustainability. e.V. © 2022  
Kaiser-Friedrich-Straße 7, 53113 Bonn, Germany  
All rights reserved

### 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: Rajkot, 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](mailto:tumi-network@iclei.org) or visit <https://sustainablemobility.iclei.org/tumi/>