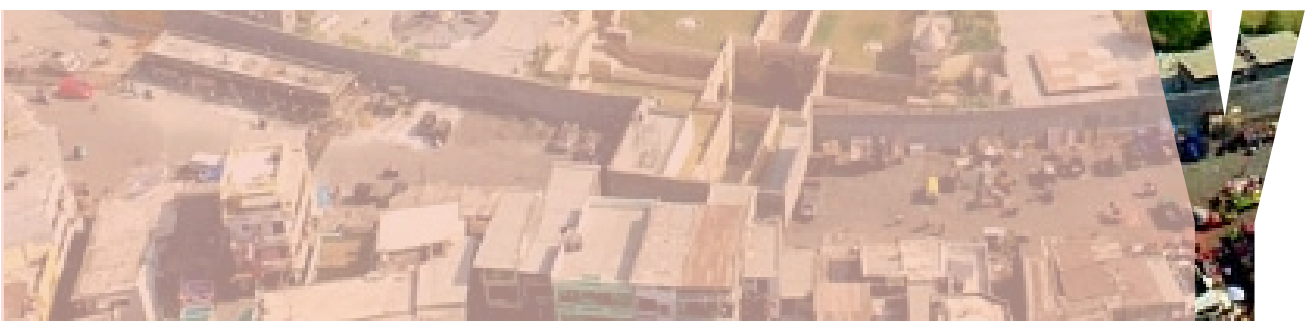
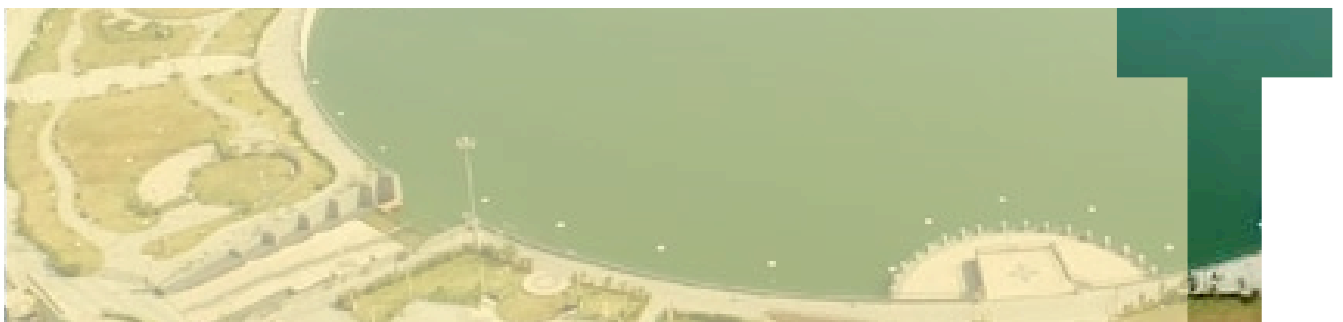


## SURAT, INDIA



## CITY FEATURES



Surat, located in Gujarat, India, is a rapidly growing city with a population of 8,232,085 and an area of 462.14 km<sup>2</sup>. Known as "The Silk City" and "The Diamond City," Surat has a vibrant present and a rich historical legacy. Once a major port, it attracted traders from over 84 countries. The Dutch and Portuguese left lasting influences, still visible today. Surat is among India's cleanest cities and a key hub for textiles and commerce. Its urban expansion has primarily been towards the east, south, and southwest. The city's core is highly dense, housing major markets and transport terminals. Surat follows a mixed land-use pattern, blending residential, commercial, and industrial zones for balanced development.



Population<sup>1</sup>  
8,232,085  
(2024)



Land area<sup>2</sup>  
462.14 km<sup>2</sup>



Average temperature  
27°C

## TRANSPORT FEATURES

### Status quo and urban mobility trends<sup>3</sup>

Surat has experienced rapid motorization, with registered vehicles rising from 0.62 lakh in 1980 to 30.09 lakh by March 2018. The annual vehicle growth rate is 9%, led by two-wheelers, followed by cars and three-wheelers. In three years, two-wheelers per 1,000 people increased from 260 to 280, while four-wheelers grew from 41 to 48. Historically, limited public transport led to increased personal vehicles and shared auto-rickshaws, causing congestion. Personal vehicles may rise from 18 lakh in 2016 to 72 lakh by 2046.

To promote sustainability, Surat launched the Electric Vehicle Policy 2021, installing 50 public EV charging stations and six e-bus stations, with 500 more planned. Surat had 1,007 EVs in June 2021, aiming for 40,300 by 2024. Surat Sitilink Ltd has deployed 450 electric buses.

As India's 8th most populous city, with 26% migrant workers, Surat's growth is shifting southeast due to projects like the Dedicated Freight Corridor. The Multi-Modal Transport Hub is planned to improve connectivity, but road fatalities rose from 240 in 2011 to 301 in 2023. Electrification challenges persist, especially in the textile industry.



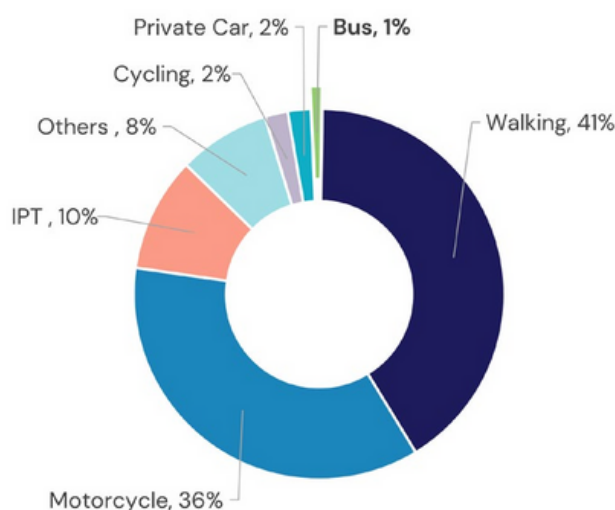
<sup>1</sup> Election Department, Surat Municipal Corporation (Estimated Data, 2024)

<sup>2</sup> Election Department, Surat Municipal Corporation.

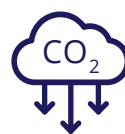
<sup>3</sup> Surat Municipal Corporation. (2021). Surat City Electric Vehicle Policy 2021.

## TRANSPORT FEATURES

### Modal Split<sup>4</sup>



### GHG Emission Levels<sup>5</sup>



Total GHG emissions

From road transport

**2,946 tCO<sub>2</sub>eq per day**

### Air Pollutant Levels<sup>6</sup>



PM 2.5

**49 µg/m<sup>3</sup>**

NO<sub>2</sub>

**23 µg/m<sup>3</sup>**

PM 10

**113 µg/m<sup>3</sup>**

SO<sub>2</sub>

**19 µg/m<sup>3</sup>**

In Surat, the modal split reflects a strong reliance on non-motorized and two-wheeler transport. Walking is the dominant mode, accounting for 40.3% of trips, followed by motorcycles at 35.6%. Autorickshaws, a major paratransit mode, contribute 10.3%, while private vehicles and cycling each make up 2% of trips. Public transport usage remains low at 1.4%, reflecting past gaps in infrastructure, though efforts to expand electric buses aim to improve this. The other category, covering 8.4%, includes shared mobility services, e-rickshaws, and informal transport. Taxis remain an unquantified mode but likely represent a minor share.

### Bus Trips Features



Number of bus trips per day<sup>7</sup>

**17 trips/day** City Bus

**12 trips/day** BRTS



Trips by purpose

Work **43.8%**  
Study **30.2%**  
Others **26%**



Average distance covered per day

**916 Km** City Bus

**305 Km** BRTS



Average time

**1min – 1hr**



Average cost per travel by bus

**₹5 – ₹30**

(BRTS & City Bus)

Surat's public bus system, operated by Surat Sitilink Limited, facilitates daily commutes through BRTS (12 trips/day) and city buses (17 trips/day). Bus trips primarily serve work commuters (43.8%), students (30.2%), and other purposes (26%). Buses are widely used by middle and lower-middle-income groups, including students, office workers, and daily wage earners, as an affordable mode of transport.

BRTS, with dedicated corridors, offers faster and more reliable services, while city buses cover 210 km of routes, linking residential zones like Adajan, Varachha, and Udhna to commercial and industrial hubs such as Ring Road, Pandesara, and Hazira. Peak hours are 8:00–11:00 AM and 5:00–8:30 PM, with trips lasting 1 min to 1 hour. Fares range from ₹5–₹30 (€0.05–€0.34), ensuring accessibility.

4 Comprehensive Mobility Plan Surat, 2046

5 Sustainable Urban Transport Index Surat, 2018

6 Central Pollution Control Board, Delhi, 2022

7 Sitilink Limited, Surat Municipal Corporation

## BUS SYSTEMS OUTLOOK

### Fleet and Infrastructure



Number of buses  
-409 BRTS (Electric)  
-466 City Bus  
(425 Diesel + 41 Electric)



Number of bus routes  
13 BRTS  
45 City Bus

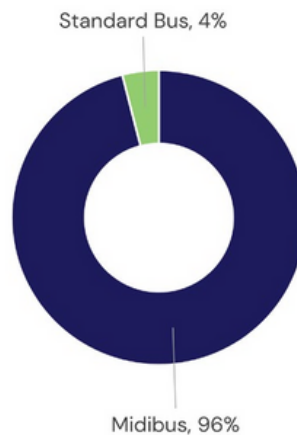


Number of bus stops  
1056 in total 177 BRTS  
879 City Bus

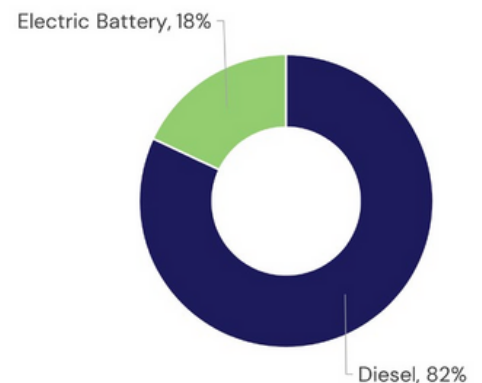


Number of bus depots  
6 BRTS  
4 City Bus

Buses by fleet type



Buses by fuel type



Surat's public transportation system operates 875 buses, comprising 409 BRTS buses and 466 city buses. The fleet mainly consists of midibuses (96%) with a capacity of 40–60 passengers, while standard buses make up 4%. The fuel mix includes 88% diesel buses and 12% electric buses, with increasing electrification efforts. The city has 13 BRTS routes and 45 city bus routes, supported by 164 BRTS and 854 city bus stops. There are four BRTS and five city bus depots, equipped for maintenance and operations. A Multi-Modal Transport Hub (MMTH) is planned at Surat Railway Station to integrate GSRTC regional services with urban transit. Surat's BRTS network spans 108 km across 13 dedicated corridors, serving 1.59 lakh daily passengers. The system is modernized with GPS tracking, Intelligent Transit Management, and adaptive traffic controls at 218 junctions. These advancements ensure efficient, safe, and sustainable urban mobility for the city's growing population.

### Quality of Service

Surat's BRTS and city bus networks are well-planned, connecting major residential, commercial, and industrial areas. However, public transport usage remains low, with only 0.52% of work trips made by buses, while 28% use two-wheelers. Bus routes serve diverse trip purposes, but further expansion is needed to reduce private vehicle dependence. Efficiency varies; BRTS corridors provide faster travel, while city buses face delays due to traffic congestion. The 108 km BRTS network and 15 km High Mobility Corridor (HMC) enhance connectivity, with future expansion planned. Bus fares are affordable, averaging ₹9.13 (€0.92) for city buses and ₹14.11 (€0.16) for BRTS. An integrated ticketing system simplifies fare payments. Buses offer modern amenities, though overcrowding is a challenge. Safety features include CCTV monitoring and well-lit bus stops, while accessibility is improved with ramps, reserved seating, and wider doors for the elderly and differently-abled passengers.





## Existing Business Model<sup>8</sup>

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

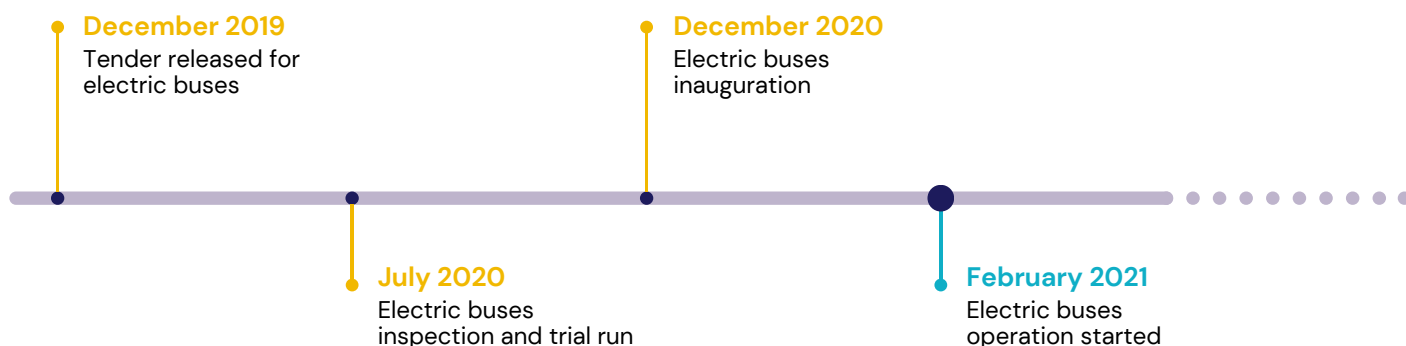
**Model E:** Government-run system

B

The city's public transport initiatives operate under a Public-Private Partnership (PPP) model, supported by the state government through the Viability Gap Funding scheme. The subsidy provided is Rs.18 per km for diesel/CNG buses and Rs.30 per km for electric buses. Additional funding for electric buses is also sourced from the FAME-2 scheme of the Government of India, emphasizing Surat's commitment to sustainable and efficient urban transit solutions.



## E-BUS ADOPTION APPROACH



<sup>8</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



### Model/Brand

Type A	Type B	Type C
<b>K7D eBuzz</b> (BRTS 9m)	<b>Regio</b> (BRTS 9m)	<b>ECO-LIFE e12</b> (BRTS 12m)



### Number of buses with this Technology

Type A	Type B	Type C
<b>150</b>	<b>150</b>	<b>150</b>



### Passenger capacity

Type A	Type B	Type C
<b>25+D</b>	<b>25+D</b>	<b>33+D</b>



### Charging System

Type A	Type B	Type C
<b>AC (flow) &amp; DC (fast)</b>	<b>DC (fast)</b>	<b>DC (fast)</b>



### Battery features

	Type A	Type B	Type B
<b>Capacity</b>	<b>195 kWh</b>	<b>151.55 kWh</b>	<b>261 kWh</b>
<b>Range</b>	<b>200 km</b>	<b>120 km</b>	<b>200 km</b>

## E-Bus Business Model

Surat's electric bus fleet is funded through the FAME-II/PM E-Drive Bus Sewa scheme, with a ₹30 per km subsidy. The Surat Municipal Corporation (SMC) oversees fare collection, while Sitilink regulates operations under a Public-Private Partnership (PPP) model. Bus infrastructure, including stops, depots, and lanes, is managed by SMC and private operators under contractual agreements. The government controls routes, fares, fleet specifications, and schedules. Positives: Government support, financial sustainability through subsidies, and lower operational costs. Challenges: High initial investment, dependency on subsidies, and infrastructure challenges like charging station expansion and grid capacity limitations.

## Opportunities and Challenges to Scaling E-Bus Fleets



### Opportunities

- **Environmental Benefits:** E-buses significantly reduce greenhouse gas emissions and air pollution, improving urban air quality.
- **Financial Incentives:** Surat's electric vehicle policy provides subsidies and tax breaks, making e-bus adoption attractive for fleet operators and manufacturers.
- **Operational Cost Reduction:** The state offers up to 25% subsidy on operational costs, accelerating the transition to cleaner transportation.
- **Long-Term Savings:** Electric buses have lower fuel and maintenance costs than diesel buses, ensuring financial sustainability over time.
- **Government Support:** Policy-driven initiatives encourage private participation, fostering a smoother shift to e-mobility in Surat's public transport system.



### Challenges

- **Charging Infrastructure Challenge:** Expanding charging stations to support the growing e-bus fleet remains a major hurdle.
- **Scaling Up:** While Surat has made progress, more investment is needed to meet future demand.
- **High Initial Costs:** Electric buses are costlier than diesel buses, requiring significant upfront investment.
- **Long-Term Savings:** Despite higher purchase costs, lower operational expenses balance the investment over time.
- **Infrastructure Development:** Setting up charging stations and grid upgrades requires substantial funding and strategic planning.
- **Government and Private Investment:** Public-private partnerships (PPP) can help finance the expansion of charging infrastructure efficiently.

## OVERALL FRAMEWORK

### Policy

Surat's transition to sustainable mobility involves multiple stakeholders, including state and city-level transport departments responsible for planning and EV initiatives. The Surat Municipal Corporation (SMC) implements policies, while private operators support fleet electrification. The Surat City Electric Vehicle Policy 2021 aligns with Gujarat's broader EV strategy, targeting 20% electric vehicle adoption by 2025. Mobility planning is integrated into the city's master plans, with provisions for charging infrastructure expansion and public transport electrification. Surat has committed to adding 450 new electric buses in 2024–25, reinforcing its commitment to sustainable urban transport and meeting state and national clean energy goals.

### Financing

Surat has leveraged multiple financing schemes to support the electrification of public transport and promote sustainable mobility. The Indian government's FAME II (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles) and PM-eBus Sewa initiatives provide subsidies and financial incentives for electric buses. The PM-EDRIVE initiative further promotes EV adoption through targeted subsidies. Additionally, state-level programs like the SWARNIM Scheme and the Chief Minister's Urban Bus Service Scheme offer financial assistance to enhance public transport infrastructure. Surat also utilizes Public-Private Partnerships (PPP) and concessional finance models to expand its electric bus fleet and charging infrastructure efficiently.

### Impact

Surat pursues climate action and sustainable mobility through the Clean Air Action Plan, aiming for zero emissions from public transport, and the Comprehensive Mobility Plan 2046, focusing on safe, accessible transport. Emission studies guide data-driven interventions, and the city aims to become India's first EV Smart City with its Comprehensive Electric Mobility Plan. By May 2023, 50 public charging stations were installed, supporting 33,500 EVs. Agreements with the Ministry of Heavy Industries and GIZ promote e-mobility initiatives, including urban e-bus depots, digital ticketing, and green corridors. Inclusive engagement with marginalized communities ensures equitable transition, while workers receive support amid electrification.





# TUMI E-bus Mission City Network – Profile

## SURAT, INDIA



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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.

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