

CITY FEATURES



Belo Horizonte is a Brazilian municipality and the capital of the state of Minas Gerais. Its estimated population by IBGE (2021) was 2,530,701 inhabitants, making it the sixth most populous municipality in Brazil. With an area of approximately 331 km², it has a diverse geography, with hills and lowlands. Since the beginning of the 21st century, Belo Horizonte has stood out for the development of the tertiary sector of the economy: commerce, services and high technology sectors (biotechnology and information technology particularly stand out). Some of the recent investments in these sectors include the implementation of the Technological Park of Belo Horizonte, the Google Research and Development Center for Latin America and the Expominas convention center.



Population
2,530,701
 (2021)



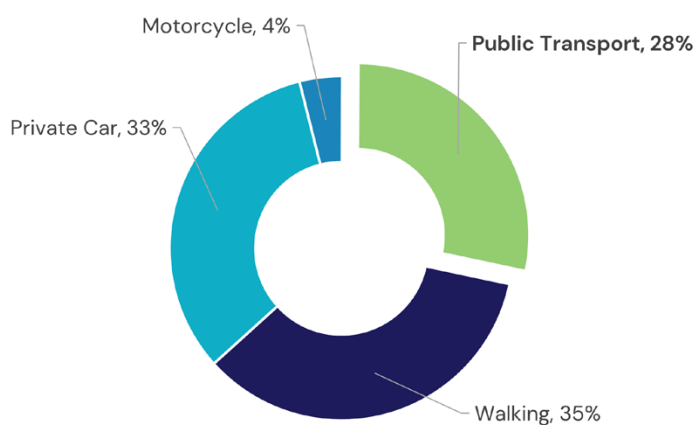
Land area
331.5 km²



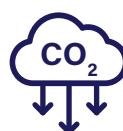
Average temperature
22°C

TRANSPORT FEATURES

Modal Split



GHG Emission Levels



Total GHG emissions
3,187,153 tCO_{2eq}
 From road transport
1,405,088 tCO_{2eq}

Air Pollutant Levels

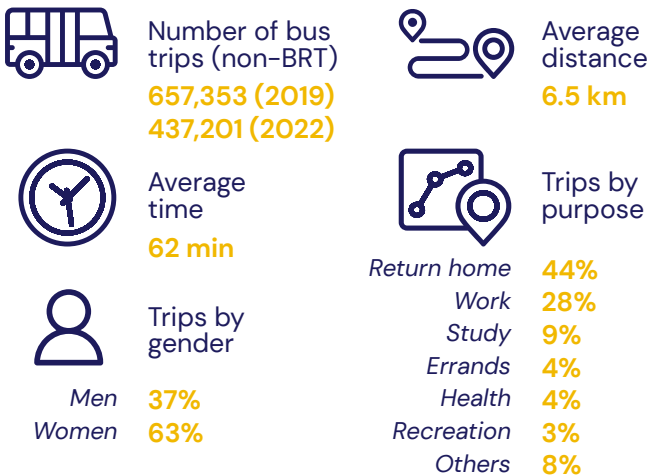


PM 2.5	16.55 µg/m³	NO ₂	17.95 µg/m³
PM 10	30.34 µg/m³	SO ₂	2.47 µg/m³

Downtown is the major attraction area for trips because it has a high concentration of commercial activities. Besides, there is a tendency to reduce the use of public transport and to increase the use of private transport (especially motorcycles). The main challenge is meeting people's travel needs while reducing emissions. Thus, key strategy should be to reduce motorized trips and make public transport more efficient. To this end, we study the inclusion of non-polluting vehicles in the transport system, the tax incentive/ exoneration of low-emission vehicles and the restriction of the circulation of private vehicles.

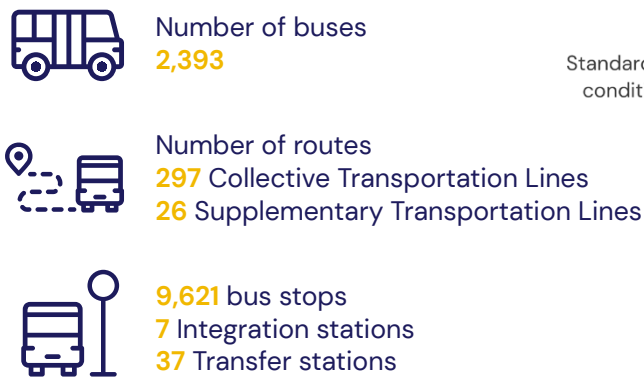
BUS SYSTEMS OUTLOOK

Bus Trips Features

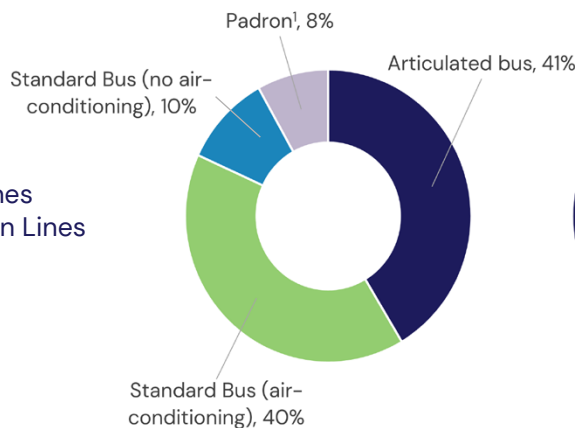


The users of Belo Horizonte’s buses are, in majority, young and middle-aged women (18–29 years) who commute to work or to school in the central or commercial districts, leaving home in the morning (8am) and returning at peak hours – early to late afternoon (12pm–5pm). The duration of a bus trip varies depending on traffic and the number of transfers that some users need. On average, a trip covers 6.5 km, with commutes that last about 1 hour. The users of bus-lines are, mostly, medium to low-income citizens (76%). It is observed that the higher the income, the higher the use of individual motorized vehicles. The trips are well distributed in the territory, having less origins/destinations in east and north districts.

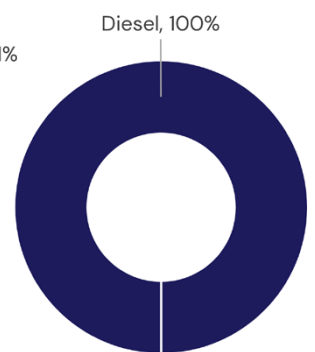
Fleet and Infrastructure



Buses by fleet type



Buses by fuel type



Quality of Service

The bus network is very spread out, being very dense in the central area. However, the peripheral areas do not have easy access to sufficient number of lines or an efficient route to popular destinations, thus, making transfers necessary. The quality and frequency of buses is mostly good, with air-conditioning in bus rapid transit system (BRT) and real-time commuting information. However, there are some drawbacks like lack of sufficient buses during peak hours or compromised schedules due to unforeseen circumstances like traffic jams and accidents. The fares for the bus lines are reasonably priced, with the possibility of paying by cash, with a bus card, or as an integrated fare for multiple public modes of transport used. The buses are easily accessible and safe, with security camera and police patrolling lines that have has previous occurrences of assault.



1 Padrón - non-articulated bus with capacity for 90-100 persons; 12 meters length

Existing Business Model²

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

A

Model A was implemented in 2014 to operate the BRT - MOVE system lines through concessions. The network of lines has physical and fare integration, with regularity, speed, comfort, and safety as the operational result. Payment is made before boarding, with the option of the BHBUS card. Information about the lines' operation is offered to the user in real time. The fleet is made up by padron-type and articulated vehicles, both types with air conditioning and automatic exchange. The vehicles with greater transport and operation capacity are monitored by intelligent systems through the Operational Control Center.

C

Model C operates the feeder, circular, diametric, radial, semi-express and trunk lines of the feeder trunk systems that are not part of the MOVE system. This entire model also operates through a 20-year concession contract (2008 to 2028). The line network has fare integration.

D

The Model D implemented since 2003 is operated by minibuses, making the connection between neighborhoods. They are not allowed to operate in the central area of Belo Horizonte. It is a system of autonomous operators that follow timetables, fares and routes established by BHTRANS. Although this system is not integrated with any other transportation system in the capital, the fare can be paid using the BHBUS card.



© Antonio Salaverry / Shutterstock.com

² Based on Accelerating a market transition in Latin America: New business models for electric bus deployment, P4G, Zebra and Dalberg, 2020

OPPORTUNITIES AND CHALLENGES FOR ADOPTION OF E-BUS FLEETS



Opportunities

- Existing infrastructure in the city (location of garages, bus stops, existence of a BRT, etc);
- Technical interest in the subject (reinforced by means of targets set in the Master Plan for Urban Mobility – PlanMobBH–2030 and the Greenhouse Gas Reduction Plan – PREGEE);
- Access to external funds as a result of the national and international recognition of Belo Horizonte as well as from international policies related to sustainable urban mobility and climate (e.g.: BRT Amazonas Project that will be funded with resources from the World Bank).



Challenges

- High initial investment (vehicles, batteries and infrastructure), in addition to the difficulty of obtaining lines of financing without government guarantees;
- Business culture based on the lowest cost of capital and resistance of operators. The technology is new in Brazil so there is fear regarding maintenance, spare parts and technical support. There is also added concern regarding the culture of reuse and resale of vehicles powered by diesel oil.
- Questions about the life of the batteries; political will and doubts about the compatibility of topography and routes with the performance of the electric bus (ramp x consumption x autonomy).



© Ronaldo Almeida / Shutterstock.com

Acknowledgements

Authors: Leticia Borges, Raisa Soares (ICLEI South America)
Contributors: Thiago Tartaglia de Souza (CESP/ BHTRANS)
Editors: Sajili Oberoi, Alyssa Chenault, Laura López (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: Belo Horizonte, Brazil. 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/>