

CASE STUDY

How to Move Nearly 30,000 People per Hour Across a City



Find out why Guangzhou Bus Rapid Transit, Asia's first gold-standard BRT, performs better than most metro systems in the world.

Overview

The Guangzhou Bus Rapid Transit (BRT), which opened in 2010, is breaking passenger records and revolutionizing perceptions of BRT in the People's Republic of China (PRC) and Asia. Designed to meet the high-volume transport needs of a fast-growing city, the system averages 850,000 passengers daily and manages a peak capacity of 28,000 commuters per hour per direction as of 2013, which is higher than most metro lines in the world. The BRT is integrated with other modes of transport in the city and the first in the world to directly connect to a metro system.

This case study outlines the key elements that make the Guangzhou BRT the gold standard in BRT systems in Asia.

Project snapshot

Dates	<ul style="list-style-type: none"> • 2005: Conceptual design • December 2008: Constructed • February 2010: Start of operations
Cost	<ul style="list-style-type: none"> • CNY30 million (\$4.4 million by 2010): Infrastructure cost per km
Institutions and Stakeholders	<p>Financing</p> <ul style="list-style-type: none"> • Government of the People's Republic of China <p>Planning and design</p> <ul style="list-style-type: none"> • Institute of Transport and Development Policy (ITDP) • Guangzhou Municipal Engineering Design and Research Institute (GMEDRI) <p>Executing agency</p> <ul style="list-style-type: none"> • Guangzhou city government <p>Operating agency</p> <ul style="list-style-type: none"> • GZ BRT Management Company and seven private bus companies

Context

Guangzhou, the third largest city after Shanghai and Beijing, is a trade and transport hub in south PRC. It is one of the megacities in the PRC with a population of more than 10 million people and absorbs a large influx of rural migrants looking for jobs.

Several cities in the country, including Beijing, Hangzhou, Xiamen, Dalian, Chongqing, Jinan, and Changzhou, have put up BRT systems earlier than Guangzhou, as a solution to worsening traffic congestion and air pollution. Unlike rail projects, building bus-only lanes do not need state or legislative approval as long as the project has the support of the local leadership. BRTs are also less costly and faster to implement than light rail or subway projects.



Aside from Guangzhou, other cities in the People's Republic of China have put in place bus rapid transit systems to ease traffic congestion.

Challenge

Traffic gridlock and vehicle pollution

Before the Guangzhou BRT was launched in 2010, travel a long Zhongshan Avenue, one of the city's main routes, was slow because of the rising number of private vehicles on the road. The public bus system was inefficient. The fast-growing city needed a high-capacity, high-quality mass transit that could help reduce traffic jams as well as pollution from vehicles.

Poor project preparation and planning

Some BRT systems already operating in the PRC were poorly planned and designed. Not enough time or resources were given to the planning process. A BRT system requires not just a physical design but also a business planning model and system design to ensure its operational and financial success.

Public debate over right-of-way

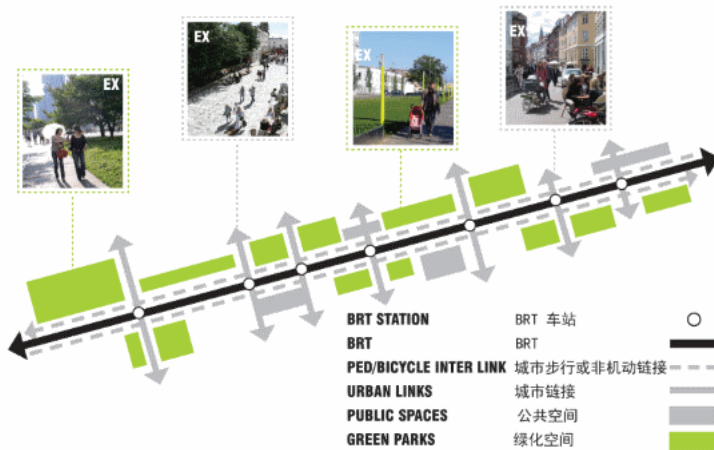
BRT projects in the PRC have faced strong opposition from the public, particularly car owners who protested the reduced road space for their vehicles. This includes the BRT lane that opened in Chongqing in 2008, which was thought to have made traffic congestion worse. The busway was eventually torn down.

Solutions

Provide cost-efficient, low-carbon alternatives to cars

The Guangzhou BRT is at the core of a strategy to promote the use of mass transit and nonmotorized transport (e.g., walking, cycling) to improve mobility and air quality in the city. The 22.5 km BRT corridor at the center of Zhongshan Avenue was designed as part of a multi-modal transport plan, which includes direct access to the metro system and bicycle parking and bike sharing at stations. Pedestrian-friendly

and accessibility features include public and green spaces on both sides of the BRT corridor, escalators, wheel-chair lifts, and bridges connecting nearby buildings with the BRT stations.



广州BRT将成为世界级的公共空间地标

在每一个BRT站应具备完善的城市衔接，这个衔接为行人、自行车到达毗邻地方提供一个具有宜人的、有导向性的和让人感到安全和便利的环境。

设计的绿化空间应该是吸引人的和具有多样性的公园，同时要创造能方便到达城市各个地方的链接网络。

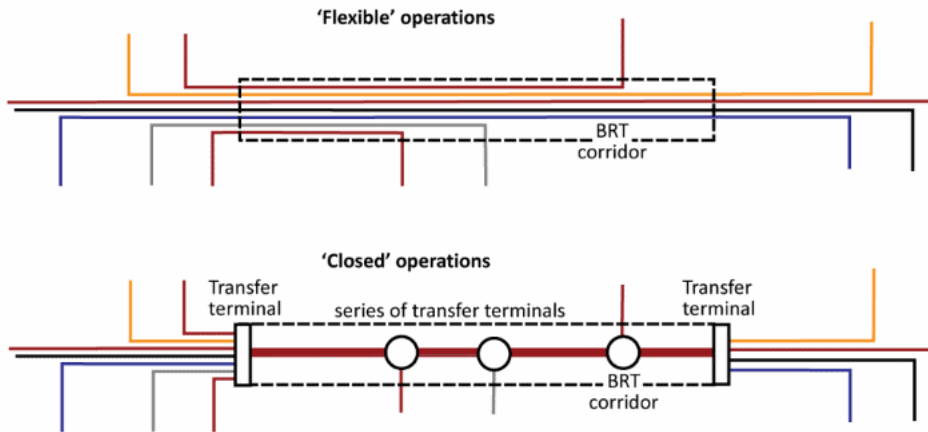
BRT可视为城市长远发展投资的系统，它为市民提供一个以人为本的可持续发展的环境。

Source: K. Fjellstrom. 2010. High-Capacity BRT Planning, Implementation & Operation: Case Study of the Guangzhou BRT. Slideshow presentation by Institute for Transportation and Development Policy at the Environmentally Sustainable Transport Forum of the UN Centre for Regional Development in Bangkok.
<http://www.uncrd.or.jp/content/documents/5EST-B2B3.pdf>

Design the system for efficiency and financial viability

The local government invested in project preparation by studying successful BRT systems in South America and enlisting the help of the Institute of Transport and Development Policy (ITDP), which has international expertise in BRTs, and the Guangzhou Municipal Engineering Design and Research Institute (GMEDRI). The local office of ITDP and GMEDRI drafted the concept plan and carried out demand analyses and corridor comparison. They also drew up the operational and traffic plan, which included opening the BRT to more than one bus operator and allowing the buses to run both inside and outside the BRT corridors.

Operational mode (trunk-branch vs. 'flexible' or 'direct-service')



Source: K. Fjellstrom, High-Capacity BRT Planning, Implementation & Operation: Case Study of the Guangzhou BRT (Bangkok: ITDP, 2010).

Conduct a public outreach campaign

According to the ITDP, public communication is a critical part of any BRT project. In Guangzhou, outreach activities, including user surveys, helped turn around public opinion toward the project as well as improve the quality of BRT services. The city mayor and other public officials also endorsed and helped promote the BRT.



Numbers and facts

26 BRT Stations

880 meters average distance between stations

22.5 km dedicated bus lane

22.5 km of mixed traffic portions

1st system to integrate BRT with metro, bike sharing, and greenways

Results



Key statistics

850,000 average daily ridership

28,000 passengers per hour

350 buses past peak demand point

6.6 minutes saved per passenger

32 million passenger-hours each year

480 million renminbi saved each year

3 times the next highest capacity system in Asia

2nd highest capacity BRT in the world (behind Bogota's TransMilenio)

85,000 tons of carbon dioxide saved annually

Lessons

Study available BRT systems, pay attention to design detail

Good project preparation was key to the success of the project. The city government studied successful BRT systems in South America. With GMEDRI, the local office of ITDP led the planning, design, and implementation from the conceptual design in 2005 through detailed engineering design and construction.

Encourage competition among operators

Most BRT systems in the PRC only have one bus operating company. The Guangzhou BRT has seven bus operators. This has helped introduce competition and improve the quality of service. Reduce transfers for passengers

Guangzhou BRT provides direct service.

Buses operate both inside and outside the BRT corridor, which means fewer transfers for passengers.



Resources

- Guangzhou BRT Guangzhou
- BRT Gold Standard Status
- United Nations Guangzhou BRT
- The City Fix



Institute for Transportation and Development Policy

This case study is from a series of virtual study tours created by The Institute for Transportation and Development Policy (ITDP) as part of a South-South Cooperation Project that facilitates the sharing of best practices in sustainable transport.

Last updated: May 2016