

Lanzhou's Bus Rapid Transit System Brings Quick Relief to Busy City

Highlights

- The City of Lanzhou in the People's Republic of China wanted to reduce the negative effects of urban sprawl by developing a second city center in the Anning District, one of its four development zones.
- The city's expansion plan evolved from urban road network expansion into a sustainable urban transport project, with a bus rapid transit (BRT) system at the center, complemented by support for the Clean Development Mechanism, nonmotorized transport, tree preservation, and traffic and parking management.
- Since commencing operations, the Lanzhou BRT has improved and promoted mobility, contributing to sustainable transportation, economic growth, and environmental preservation.

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BACKGROUND

Lanzhou as Transport Hub. As the capital and largest city of Gansu Province in the People's Republic of China (PRC), Lanzhou is a highly urbanized city that serves as a transport hub between the eastern and western parts of the PRC. It has three distinct development zones on the south side of the Yellow River—Xigu, Qilihe, Chengguan—and one on the north side, Anning. Economic activity and population are heavily concentrated in these four urban zones, which occupy only 8.5% of the city's land area but account for 63% of its population, roughly 3.6 million.¹

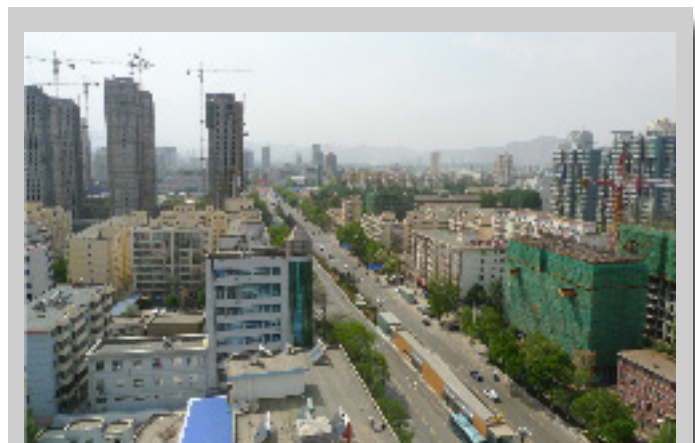
The busy city center area has been experiencing significant congestion and pollution. Thus, in 2009, the municipal government designed an urban master plan to decongest the city. This involved the development of a second city center in the Anning District.

Lanzhou Urban Master Plan. The master plan faced many challenges—from the acquisition of land necessary for the new city center and the associated resettlement issues, to environmental and other sustainability considerations. A key issue was how to respond to the growing transport demand, given that private vehicle usage was already rising by 20% per annum.

Originally, the master plan focused on urban road network expansion. However, this would not have solved the challenges expected to arise—traffic congestion, road and pedestrian safety issues, air and noise pollution, and more. The Asian Development Bank (ADB), through policy dialogue, assisted the municipal government in redesigning its master plan. The emphasis of the plan changed from improving the urban road network to establishing a sustainable urban transport system in Lanzhou. One important element of the refined plan was the Lanzhou bus rapid transit (BRT) system.

APPROACH

BRT System: An Introduction. A BRT system is an innovative, high capacity, and lower cost public transport



The Lanzhou Sustainable Urban Transport Project is creating new growth opportunities in the city. Photo by the Institute for Transportation and Development Policy

solution that significantly improves urban mobility. It is a permanent, integrated system that uses buses running in dedicated lanes that quickly and efficiently transport passengers to their destinations. BRT systems are flexible and can easily be customized in response to community needs. They incorporate state-of-the-art, low-cost technologies that result in high passenger throughput and less congestion.²

Initially, the municipal government was uncertain whether BRT would work in Lanzhou. One factor was PRC's prevailing preference for rail-based mass transit systems. Ultimately, the government selected the BRT based on studies of demand for public transport, taking into account the needs of passengers and operational requirements of bus operators.³

Lanzhou's BRT: Special Features. The initial stage of the Lanzhou BRT system features 15 fully closed stations to protect passengers from adverse weather conditions and six routes along a 9-kilometer corridor. It uses an advanced traffic control system for optimizing signal time. Station sizes are customized according to corridor conditions,

¹ ADB. 2009. *Report and Recommendation of the President to the Board of Directors: People's Republic of China Lanzhou Sustainable Urban Transport Project*. Manila. www.adb.org/projects/documents/lanzhou-sustainable-urban-transport-project-rfp.

² K. Kim. 2013. *Lanzhou BRT: Solution for Sustainable Urban Transport*. Lecture presented at Insight Thursday, Manila, 4 April.

³ Footnote 1.

operational design, and passenger demand levels. There are currently 50 special 12-meter (m) low-floor BRT buses running on environment-friendly compressed natural gas, with doors on both sides, and 20 18 m BRT buses. Each bus has a global positioning system unit that provides passengers information on the next bus arrival time. Overall, the BRT provides passengers in Lanzhou with a faster, greener, and more convenient way to commute within the city.

BRT as Part of a Sustainable Urban Transport System. Lanzhou's BRT system includes special components on the Clean Development Mechanism (CDM), nonmotorized transport, environmental preservation, and traffic and parking management that further enhance its contribution to the city's sustainable urban transport system. As a certified CDM project, it earns certified emission credits by supporting increased bus usage and reducing private vehicle usage.

The nonmotorized transport component provides dedicated bicycle access lanes 3.5–5 m wide between sidewalks and carriage lanes. Bicycle parking facilities are also available at the BRT stations. For pedestrians, walkways were constructed with widths ranging from 3 m to 7 m. Underground passageways that promote accessibility were also constructed at various points along the BRT corridor.

This project took care to preserve trees during construction. It was assessed at the onset that the BRT corridor could potentially affect 280 trees along Gunhuang Road in Qilihe. Instead of cutting them down, the project integrated them into the corridor. They now line the separation belts dividing motorized from nonmotorized traffic in Qilihe.

RESULTS

The Lanzhou BRT has quickly demonstrated its worth. Officially opened on 28 December 2012, it is one of the three high-capacity BRT systems in Asia, and is the first BRT in the world with split stations, enabling buses running in the same direction to stop on both sides of the platform, easing congestion. In January 2013, it carried 110,000 passengers a day. This had risen to 290,000 by September 2013.

Convenience and Safety. A preliminary impact study of the project showed that commuters along Anning Road experienced reduced waiting time, from 10 minutes

before the transport system was launched to 3 minutes currently. Pedestrian volume along the BRT corridor also increased. The same study showed that the average number of passengers per hour in the morning at the Liujiabu BRT station increased from 174 in January 2012 to 558 in March 2013. During this period, the number of passengers at the Peiliguanchang BRT station rose from 554 to 1,690 while at the Xizhan station, passengers increased from 1,340 to 1,403. Bike usage at stations also generally increased. In addition, 32% more pedestrians and 30% more cyclists said that they feel safer walking and biking along Anning Road after the BRT became operational.

Livelier Economy. The BRT has contributed to a more vibrant economy in the city. The municipal government saw the increasing number of commuters, bikers, and pedestrians as an opportunity to stimulate business. Initial hesitation on the BRT was transformed into all-out support as evidenced by the underground passageways and shopping malls developed along the BRT corridor. In addition, the BRT spurred greater local development, as new mixed-use buildings are being built along the route.

Reduced Emission and Pollution. The sustainable transport system has helped reduce emissions. Nine months after opening, the BRT was able to reduce carbon dioxide emissions by an estimated 11,804 tons. The municipal government is currently working on adding an air pollution monitoring system along the bus routes, which will further improve air quality monitoring in the city.

The Lanzhou sustainable transport system has already produced notable benefits a mere 9 months after it began operation. It has proven that integrating sustainability in city development plans is a cost-effective strategy. In a city that was facing the ill effects of rapid urbanization, it has helped improve the mobility, health, and economy of Lanzhou and is contributing to sustainable economic growth, effective environmental improvement, and an overall improved quality of urban life.

Related Link

- Bus Rapid Transit Project to Cut Greenhouse Gas Emissions in PRC
www.adb.org/news/bus-rapid-transit-project-cut-greenhouse-gas-emissions-prc



KNOWLEDGE CONTRIBUTOR

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