

# MODERN TRANSPORTATION SYSTEM IN THE 21<sup>st</sup> CENTURY

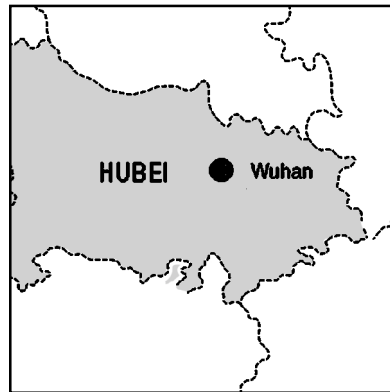
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## WUHAN MUNICIPAL GOVERNMENT

In collaboration with the United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), and United Nations Commission on Human Settlements (UNCHS), the Wuhan municipal government is implementing its Sustainable City Plan, which addresses four problems: water pollution, air quality, garbage, and urban traffic.

### OVERVIEW

Wuhan, the capital of Hubei province, is a megacity in central People's Republic of China (PRC). It administers 11 urban districts and 2 suburbs. The Changjiang and Hanshui rivers intersect at the city center, dividing the city into three towns: Hanhou, Hanyang, and Wuchang.



The city area is 8,467 km<sup>2</sup>, including an urban area of 235 km<sup>2</sup>. By end-1998, the city had a population of 7.3 million, including a non-agricultural population of 4.3 million (59 percent of the total), and an agricultural population of 3 million (41 percent). Its floating population is over 1.5 million, including a resident population of 700,000, mostly in seven main urban districts.

Wuhan has been known since ancient times for its “thoroughfares to nine provinces.” The main south-north railways such as the Beijing-Wuhan-Guangzhou line, and the main telecommunications cable of Shanghai-Lingxia-Wuhan-Chongqing intersect at Wuhan. The future Beijing-Zhuhai highway will also intersect the Shanghai-Guangzhou highway at Wuhan. Wuhan Tianhe Airport is the largest airport in central PRC and is open to foreign flights. Wuhan has the largest first-class inland river port open to foreign ships. The Wuhan Postal Bureau is one of top seven national bureaus and eight airmail centers, and the biggest mail-distributing center in central-western PRC. Wuhan Telecommunications Bureau is one of the top eight hubs of long-distance telephone lines.

Wuhan is the PRC’s main inland center for commerce and trade. With retail sales of consumer products totaling Y52.73 billion, it follows Shanghai, Beijing, Tianjin, Chongqing, and Guangzhou. It is a vital financial center. Financial activities in Hubei, Hunan, and Jiangxi provinces are directly supervised and administered by the China People’s Bank in Wuhan. Wuhan has over 2,200 financial agencies; the main domestic commercial banks have all set up local agencies in the city, and foreign banks have set up two branches and seven representative offices. In addition, stock brokering and other financial activities are quite lively.

Wuhan is an important science, technology, and education center. It has 123 independent research institutes, 34 universities and colleges, 142 technical schools, 81 continuing education institutions, and almost 500 high schools.

Wuhan has a strong industrial base. Its total industrial output value in 1998 amounted to Y124 billion, mainly from black-metal smelting, traffic and transportation facility manufacturing, oil processing and refining, electronics and communication facility manufacturing, and hot water supply.

In 1990, while the Pudong region in Shanghai and the Three Gorges were being developed, 14 cities outside the economic belt along the Changjiang River, including Wuhan, emerged as strategic to the development of central-western PRC. Wuhan built the East Lake High-tech Development Zone and the Zhuankou Economic

and Technology Development Zone. Wuhan now cooperates with 27 cities and regions in Hubei, Hunan, Jiangxi, and Henan provinces. By end-1998, it had 348 approved joint ventures and 175 operating enterprises. Foreign capital investment amounted to \$5.71 billion.

In 1991-1998, the economy grew at the average rate of 15.4 percent per annum, much higher than the national average of 4.6 percent. Wuhan's GDP was Y101.6 billion; its fiscal income, Y10 billion; its GDP per capita, Y13,800.

**TRAFFIC SITUATION**

Although statistics show that road supply generally meets demand, the situation is different on the ground. In 1998, the Wuhan municipal government started building a database and a traffic-prediction model. It found that within the intermediate-ring road and neighboring regions, roads over 5 m wide had a total length of 1,227 km, covering 21.37 million m<sup>2</sup>, and that the ratio of trunk to branch roads was 1:1.2. These data indicate that Wuhan roads are below the national standard.

In 1989-1998, automobiles increased by an average of 11 percent per annum to 285,000. In 1997-1998 alone, automobiles increased by 46,000. They are predicted to number about 600,000 by

**Table 1.** Selected Data on Urban Roads in Wuhan

	Road length (km)	Road area (10,000 m <sup>2</sup> )	Road density (km/km <sup>2</sup> ) (%)	Area ratio of road (km/km <sup>2</sup> )	Density of trunk road (%)	Road area per (m <sup>2</sup> )	Trunk road/branch road
Current situation of roads	1,227	2,137	5.3	9.2	1.9	5.3	1:1.2
National standards			5.4-7.1	15-20	2.4-3.1	7-15	1:1.3

2010. Road length and area, however, increased far more slowly than the rate of increase of automobiles.

While the road system in Wuhan is generally satisfactory, some main traffic corridors have obvious problems. Independent road lines are required in Hankou, Hanyang, and Wuchang, where 10 exit-road lines lead directly to areas around Wuhan. The three towns are linked by bridges and 18 ferries. Wuhan has one double-function bridge across the Changjiang River, one road bridge, three road bridges across the Hanshui River, one railway bridge, two road bridges across the Changjiang River, and two road bridges across the Hanshui River under construction. By the time the Second Changjiang Bridge was opened to traffic in 1995, the 28-km-long inner-ring road was completed, acting as a main artery. Traffic research found that the average driving speed on main trunk roads is 27 km per hour under normal conditions. But most automobiles travel on the bridges across the Changjiang and Hanshui Rivers, and related roads, crowding the internal roads of the inner-ring road so that traffic spills over to the old, narrow external roads of the inner-ring road, causing heavy traffic jams.

Of the 1 million automobiles that pass through the 12 main vehicular corridors, local vehicles make up 43 percent; those from other places, 57 percent. Of the latter, 61 percent stop in Wuhan, while the rest simply pass through on their way to other destinations.

Public transportation is developing as quickly as private transportation. The city is attempting to build more railway transportation facilities, but the main means of transportation is still public transportation. In 1998, there were 5,260 buses; 14 buses can carry 10,000 people. Public transportation covered 5,348 km and transported 2.49 million people. Bus routes are increasing too quickly compared to road construction. However, too many buses run the same route, encouraging the proliferation of taxis, motorcycles, energy-aided vehicles, and three-wheeled vehicles. In 1998, Wuhan had 13,000 taxis serving 840,000 people daily. While the residents benefit from private transportation, these vehicles leave little room for the buses, causing heavy traffic.

### Development Target in Urban Traffic

The State Council approved the Wuhan general plan (1996-2000) in February 1999. Its target is to achieve sustainable urban development, improve urban functions, and build Wuhan into a modern, economically powerful city offering advanced scientific education, quality service, good urban planning and infrastructure facilities, a pleasant natural environment, and a high level of culture.

The target in traffic construction and development by the early 21st century is to construct and improve the road system with 5 trunk roads from north to south, 5 trunk roads from east to west, 3 ring roads, and 10 roads leading out of Wuhan; develop high-speed rail transportation; and coordinate the urban road transportation system with the comprehensive transportation system.

The priority projects for urban traffic are the following:

- Projects worth Y4.9 billion to
  - improve transit ability in the inner-ring road;
  - construct a cloverleaf junction in the city proper;
  - construct roads in the south and north of intermediate-ring road;
  - construct roads at the city's entrance;
  - build a parking port;
  - build traffic management facilities; and
  - train technicians for traffic programming.
- The first phase of construction of the first route of light rail transportation, which covers 27.43 km, to be built at the cost of Y752 billion.
- The construction of south, west, and north sections of the urban intermediate-ring road. The Baishazhou Bridge is related to this project and is scheduled to open in June 2000. Totalling 50.8 km, not counting the 14 cloverleaf junctions, the project requires investment of Y4.4 billion.
- The second light rail transportation route, which includes the tunnel crossing the Changjiang River, which doubles as a road and railway. It is the first subway route from Tianhe

Airport to Wutaizha, totaling 37 km. Investment required is Y15 billion, including Y2 billion for the 1.43-km Changjiang tunnel.

- Tianxinzhou Changjiang Road Bridge, which originates from Pinanpu in Hankou, crosses the Changjiang River and Tianxinzhou, and stops at the third road in Qingsan, Wuchang, linking the city to Wuhan-Huangpi highway in the south, and the Daijiasa-Huangpi highway. Total investment is about Y3.05 billion.

#### FINANCING PATTERNS

The Wuhan government will adopt new financing patterns aside from the more conventional foreign loans, foreign commercial loans, World Bank loans, project financing, build-operate-transfer arrangements, etc.:

- Financing through the capital market, which means setting up a stock company that will invest in urban transportation, and then try to get listed on the stock market, and obtaining funds by issuing new stocks and bonds.
- Financing by issuing construction bonds at home or abroad, under the security provided by the government or insurance companies. Liability can be paid off using the profit obtained from the projects.
- Financing by issuing asset-backed securities, which will be entrusted to foreign investment banks.
- Financing from the industrial investment fund, which means enrolling in the national initial test place and setting up an industrial investment fund for infrastructure projects.