

A high-speed train is shown traveling on a track that curves through a lush green landscape. The train is white with blue accents and is moving towards the right side of the frame. The background is a dense forest of green trees under a clear sky.

# Political Economy of Transportation Infrastructure Development in China

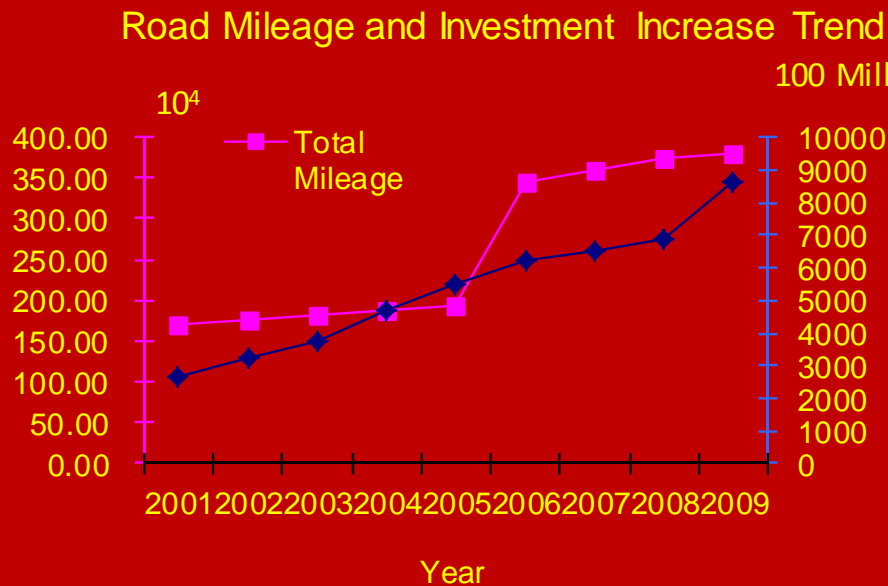
**Samuel R. Staley, PhD.**

**Managing Director, DeVoe L. Moore Center  
Senior Research Fellow, Reason Foundation**

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International Transportation Planning & Development  
Florida State University  
February 4, 2013**

# Highway Growth in China: 2001-2009

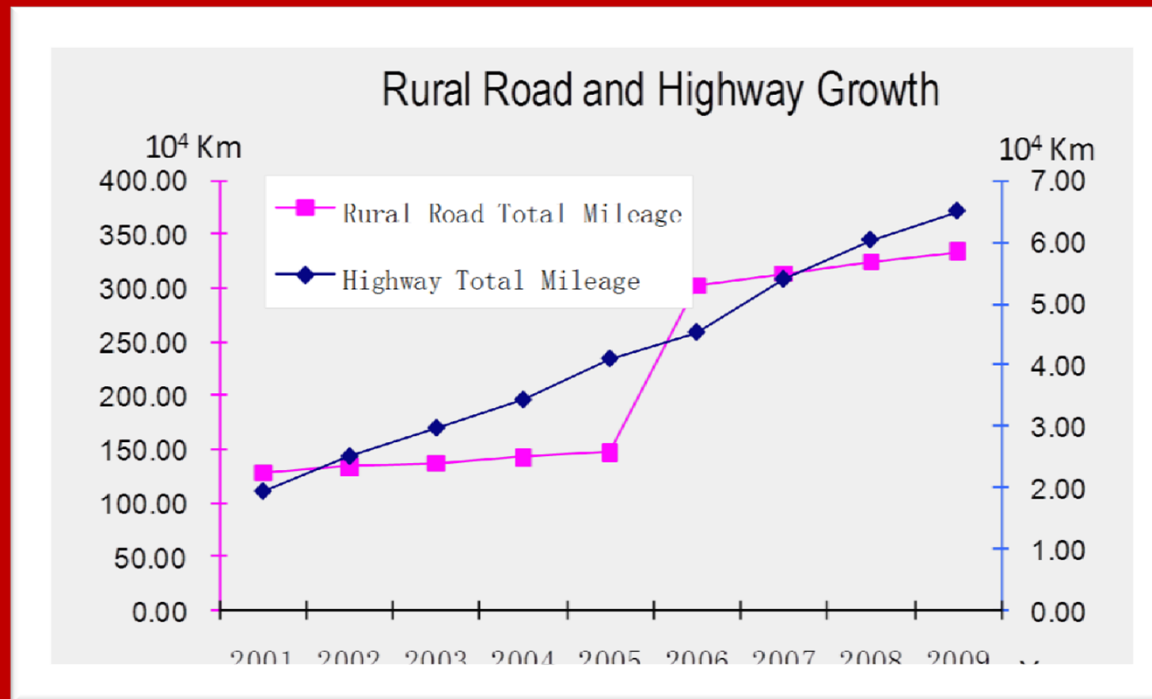
- As of November 2009, the annual total investment on highway fixed assets has reached 865.8 billion RMB—3.2 times the amount in 2001.



Note: Village Roads are included in total mileage since 2006. Therefore, total road mileage has increased significantly since then

# Roads in rural areas have not been ignored

- As of 2009, rural roads and expressway mileages have reached 3.34 million km and 65,000km respectively.
- More than 10,000km of expressways are under construction, with investment more than one trillion RMB.



Note: Village Roads are included in total rural road mileage since 2006. Therefore, total road mileage has increased significantly since then



Beijing-Tianjin Expressway



Shaanxi Desert Highway



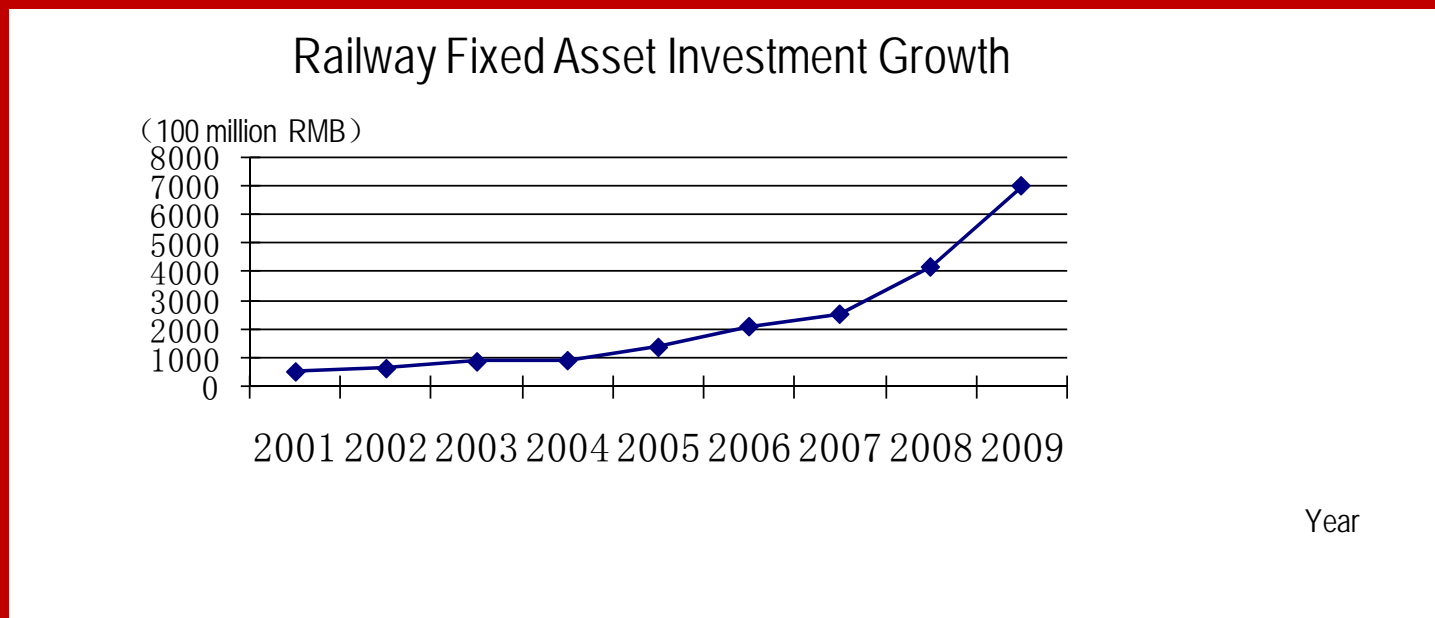
4 Feb 2012 Jiangxi Rural Roads



Staley, Transportation Finance in China Su-Tong Bridge

# Railways

- Centerline mileage increase of railway network is relatively small.
- The investment is mainly used for double-track capacity expansion, electrification, and high-speed railway construction, increasing investment substantially.
- As of 2009, double-track rate and electrification rate have reached 38% and 43%, respectively;
- Railway fixed asset investment is 700 billion RMB, which is 13 times higher than the amount of 2001. 30,000km new railways are currently under construction, involving a total investment of 2 trillion RMB



# High-Speed Railway

Name of Railways	Origin-Destination	Operating Mileage (km)	Open Date	Design Speed (km/h)
Beijing-Tianjin Intercity Railway	Beijing-Tianjin	113.5	2008.8	350
Wuhan-Guangzhou Dedicated Passenger Line	Wuhan-Guangzhou	968	2009.12	350
Zhengzhou-Xi'an Dedicated Passenger Line	Zhengzhou-Xi'an	456.6	2010.1	350
Qinhuangdao-Shenyang Passenger Dedicated Line	Qinhuangdao-Shenyang	404.6	2002	250
Shijiazhuang-Taiyuan Passenger Dedicated Line	Shijiazhuang-Taiyuan	189.9	2009.4	250
Jinan-Qingdao Passenger Dedicated Line	Jinan-Qingdao	362.5	2009.9	250
Hefei-Hankou Railway	Hefei-Hankou	359.4	2009.4	250
Ningbo-Wenzhou Railway	Ningbo-Wenzhou	282.4	2009.8	250
Wenzhou-Fuzhou Railway	Wenzhou-Fuzhou	298.4	2009.12	250
Fuzhou-Xiamen Railway	Fuzhou-Xiamen	273.4	2009.11	250



Qinghai-Tibet Railway



Nanjing Dashengguan Railway Bridge



Beijing-Tianjin Intercity Rail

4 Feb 2012

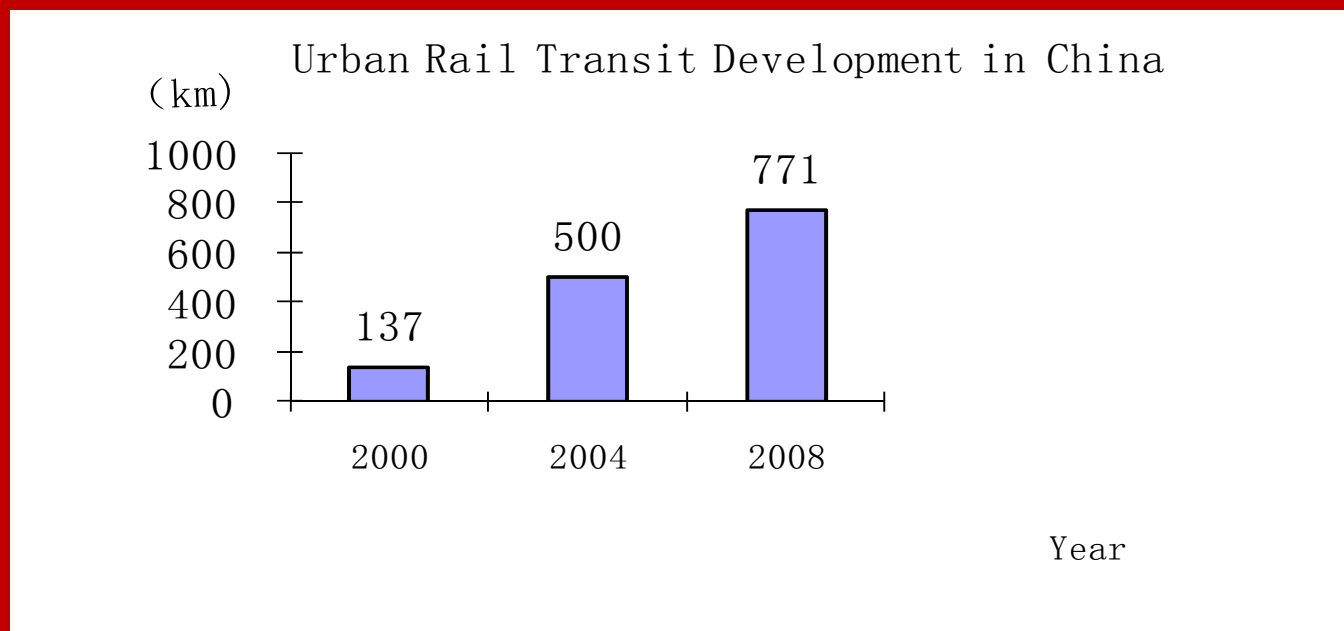


The New Beijing South Railway Station

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# Urban Transit

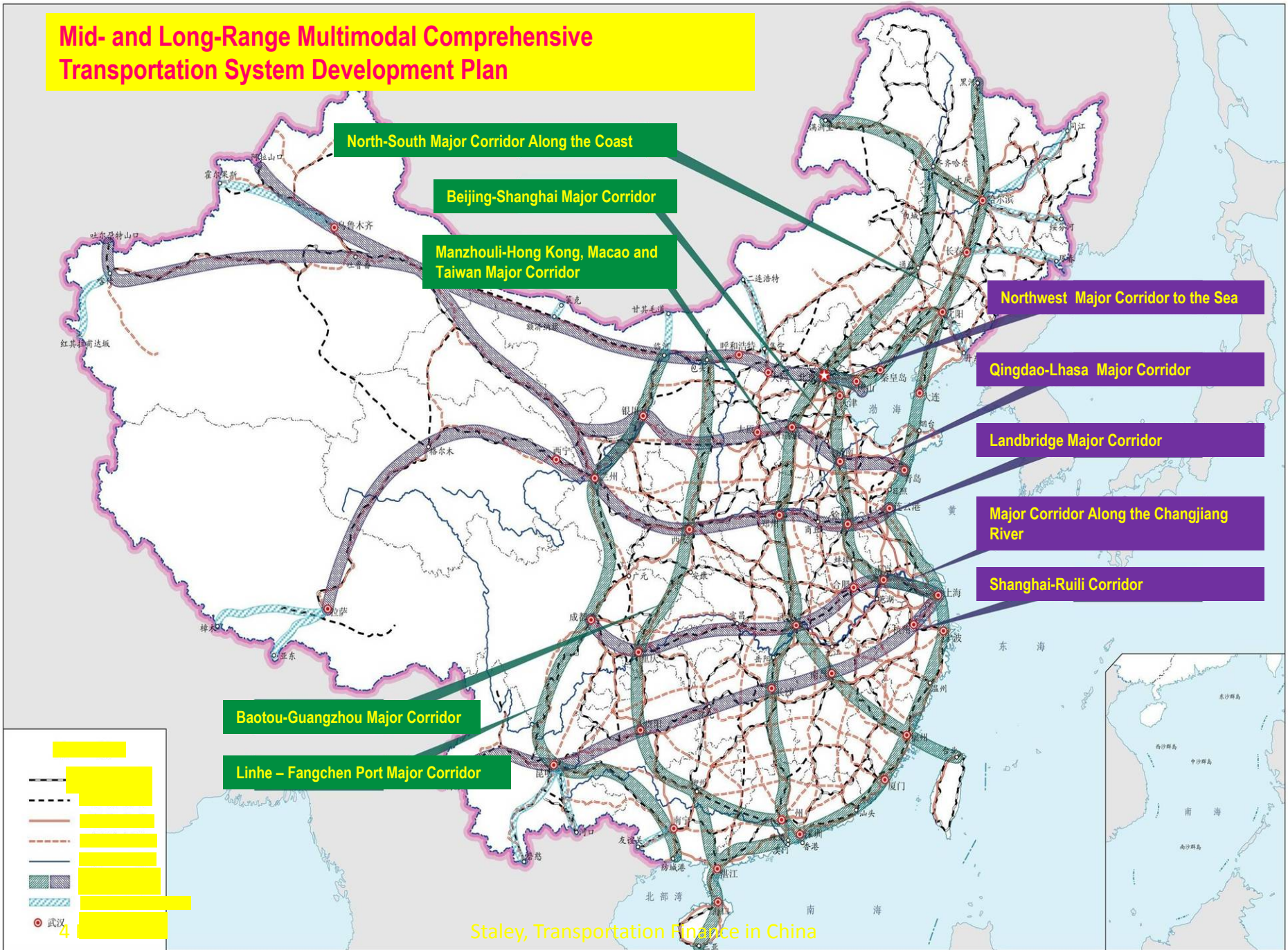
- From 2001 to 2007, urban mass transit network operating length shows a growing trend. In 2007, public transit operating length is over 140,000km. There are 370.4 thousand standard transit vehicle units across the country.
- Since 2000, urban rail transit system has been developed rapidly, and its operation mileage has experienced fast growth.



# China's Transportation Vision: Comprehensive Multimodal Transportation System Plan

- By 2020, total mileage of the multimodal transportation system will reach 3.38 million km, excluding air, sea routes, urban streets, rural and village roads mileage
- The multimodal surface transportation system is comprised of:
  - 3 million km of highways (excluding village roads), including 650,000 km of Class II or higher grade highways and 10,000 km of expressways;
  - 120,000 km of railways. Double track rate and electrification rate to reach 50% and 60%, respectively. Dedicated passenger rails and intercity rail lines to reach 15,000 km;
  - 2500 km of urban rail transit lines.

# Mid- and Long-Range Multimodal Comprehensive Transportation System Development Plan



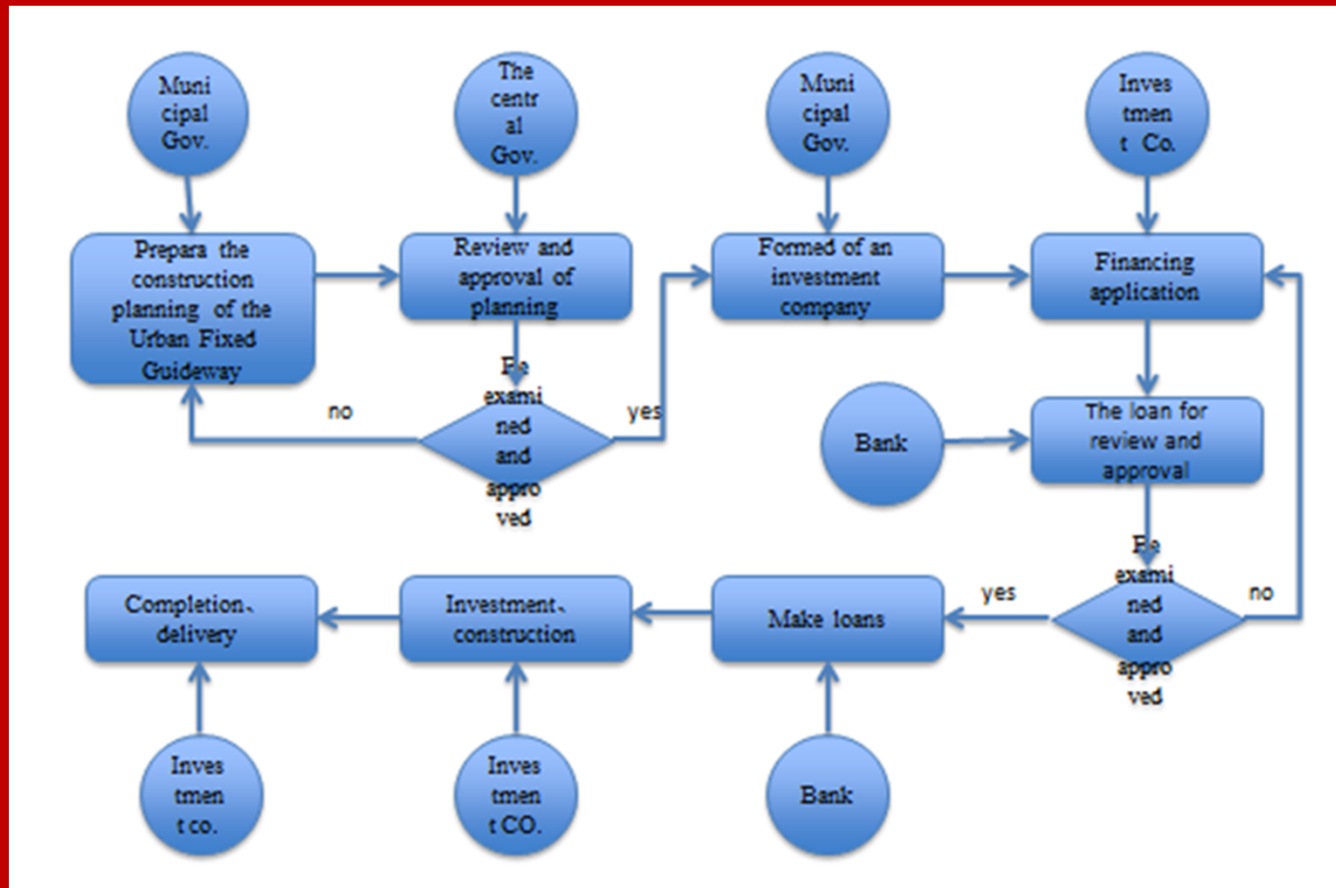
# Projected Capital Investment Funding Needs

- **Highway capital investment  $\approx$  2.4 trillion RMB.**
  - Annual investment  $\approx$  600 billion RMB before 2015, and 300  $\approx$  billion RMB from 2015 to 2020.
- **The needed railway capital investment by 2020 is expected to be 5 trillion RMB.**
  - 2.5 trillion RMB investment is expected from 2009 to 2012, with an annual investment of 600 billion or more.
  - Another 2.5 trillion investment is needed from 2013 to 2020, with an annual investment of at least 300 billion.
- **The needed urban fixed guideway transit investment is on the order of 700 billion RMB before 2015, with an annual investment of around 120 billion.**
- **Total annual capital investment on surface transportation  $\approx$  1.4 trillion RMB before 2020.**

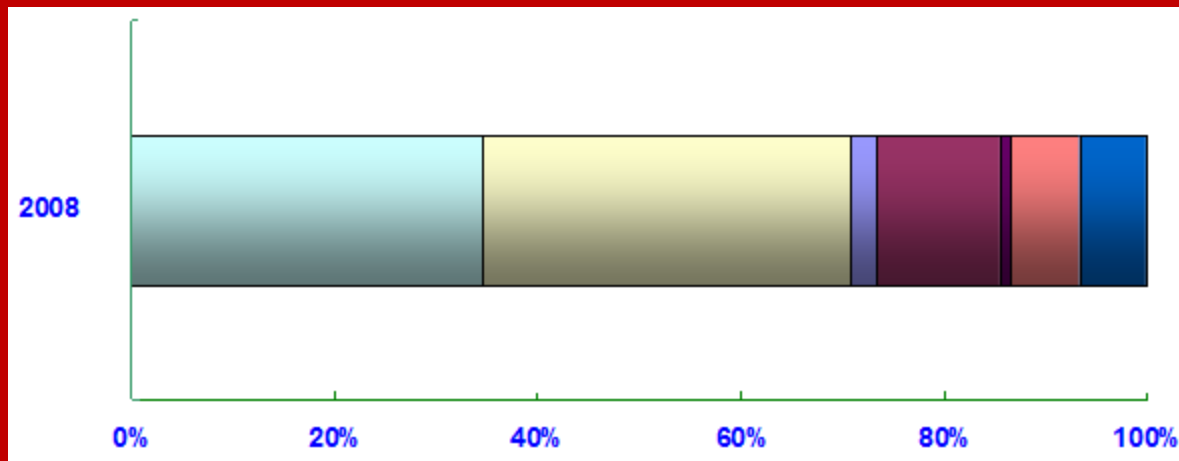
# Financing Framework

- **Local governments are limited in their ability tax and issue debt**
  - **Focus on planning**
- **State-owned enterprises**
  - **Issue debt**
  - **Build systems**
  - **Sell real-estate**
  - **Develop land**
- **Expressway model**
- **Extensive outsourcing**

# Planning & Financing Infrastructure in China



# Highway Construction Funding Sources



	2008
■ Previous Year Balance & Other Funds	6.50%
■ Enterprises Investment	7.00%
■ Foreign Investment	1.00%
■ Vehicle Purchase Tax	12.10%
■ State Budget Fund	2.50%
■ Domestic Loans	36.40%
■ Local Self-Financing	34.80%

# Highway Financing Modes and Characteristics

- **Over 90% of expressways (as well as some class I and II roads) directly apply tolls**
- **Debt financing**
  - **Dominated by medium and long term loans from domestic banks**
  - **Supplemented by short-term loans, foreign bank loans and corporate bonds.**
  - **Domestic bank loans account for over 2/3 of total loans and 50% of total investment.**
- **Equity financing**
  - **Total asset of 200 billion RMB in 2009.**
  - **Listed highway companies have become an important part of highway financing.**

## Summary of Some Listed Highway Companies in China ( Source: 2009 Annual Report of Listed Companies )

No.	Company Name	Area	Listing Location	Total Assets (100 million yuan)
1	Fujian Expressway	Fuzhou	Shanghai	110.9
2	Jiangxi-Guangdong Expressway	Nanchang	Shanghai	140.2
3	Jiangsu Expressway	Nanjing	Hong Kong	247.8
4	Shandong Expressway	Jinan	Shanghai	144.5
5	Shenzhen expressway	Shenzhen	Shanghai, Hong Kong	234.4
6	Anhui Expressway	Hefei	Shanghai, Hong Kong	90.7
7	Wuzhou Expressway	Nanning	Shanghai	40.0
8	Zhongyuan Expressway	Zhengzhou	Shanghai	209.0
9	Chongqing Road & Bridge	Chongqing	Shanghai	48.5
10	Hainan Expressway	Haikou	Shenzhen	27.3
11	Huabei Expressway	Beijing	Shenzhen	38.5
12	Xiamen Port	Xiamen	Shenzhen	29.0
13	Xiandai Investment	Changsha	Shenzhen	55.5
14	Guangdong Expressway	Guangzhou	Shenzhen	94.1
15	Northeast Expressway	Changchun	Shanghai	52.9
16	Zhangzhou Economy Development	Zhangzhou	Shenzhen	12.9
17	Tibet Tianlu	Lhasa	Shanghai	21.3
18	Chutian Expressway	Wuhan	Shanghai	34.8
19	Sichuan Expressway	Chengdu	Hong Kong, Shanghai	98.4
20	Zhejiang Expressway	Hangzhou	Hong Kong, London	252.8
21	Total			1,983.6

# Highway Financing Modes and Characteristics (Cont')

- **Primary financing modes: BOT (Build-Operate-Transfer) and evolution formation, such as BT (Build-Transfer), TOT (Transfer-Operate-Transfer), BOO (Building-Owning-Operate), etc.**
  - BOT and BT are mainly used for highway construction; TOT is mainly applied to toll road operation rights transfer; BOO is mainly used for transport station construction
  - Currently, more state-owned enterprises than foreign-funded and private enterprises use BOT and other projects. From 2007 onward, project financing has received rapid development.
- **PPP(Public Private Partnership )、 PFI(Private Finance Initiative)、 ABS (Asset Backed Securitization)- these modes are still at the initial stage in China, but they are very good reference and possible directions for investment and financing system reform in the public investment field**

# Summary of Some Highway Project Financing Modes in China

No.	Project	Area	Total Mileage	Total Investment	Starting Time	Mode
1	Xiang-Jin Highway	Hubei	185.4	44.9	1999	BOT
2	Yi-Hou Highway	Shanxi	66.8	25.0	2005	BOT
3	Guang-Ming Highway	Guangdong	42.0	31.4	2005	BOT
4	Gui-Yun Highway	Guizhou	81.0	67.9	2007	BOT
5	Yu-Shen Highway	Shanxi	107.0	37.1	2007	BOT
6	Mian-Sui Highway	Sichuan	176.0	64.0	2008	BOT
7	Yi-Yu Highway	Sichuan	157.0	95.0	2008	BOT
8	Na-Qian Highway	Sichuan	130.0	83.0	2008	BOT
9	Nei-Sui Highway	Sichuan	119.0	61.0	2008	BOT
10	Liang-Qian Highway	Chongqing	227.0	91.1	2010	BOT
11	Long-Bai Highway	Guangxi	68.0	42.0	2007	BT
12	Fengxiang Road and Qingqi Road project, Wuxi city	Jiangsu	14.5	27.3	2007	BT
13	Chaotianmen Yangtze River Bridge	Chongqing	4.9	29.0	2004	BT
14	Xiangjiang Bridge Four, Zhuzhou City	Hunan	3.6	4.4	2005	BT
15	Qiezixi Pier in Dadukou Operation Area	Chongqing		9.5	2007	BOO
16	Liudusiwei Pier in Yunfu Port	Guangdong		3.3	2006	BOO

# Guangdong Province



# Road development in Guangdong Province

- Roadway mileage increased from 2,523 km in 1950 to 27,323 km in 2008
- Expressway mileage started at 0 in 1978 and now includes 3,823 km.
- First expressway opened in 1989 (Guangfo Highway)



# As snapshot of Guangdong highway construction & finance

- **Guangdong Dept of Transportation**
  - Focused on planning, managing funding, supervising construction
- **Guangdong Transportation Group**
  - State-owned enterprise
  - Owns 69% of all highways in province
  - Owns 3,338 km of highways
- **Guangdong Highway Co., Ltd.**
  - Construction company
  - 11 institutions and agencies
  - 14 holding companies
  - 11 joint stock companies
  - 1,700 km of expressways

# Guangshen Highway



# Highway Finance: Guangdong Province

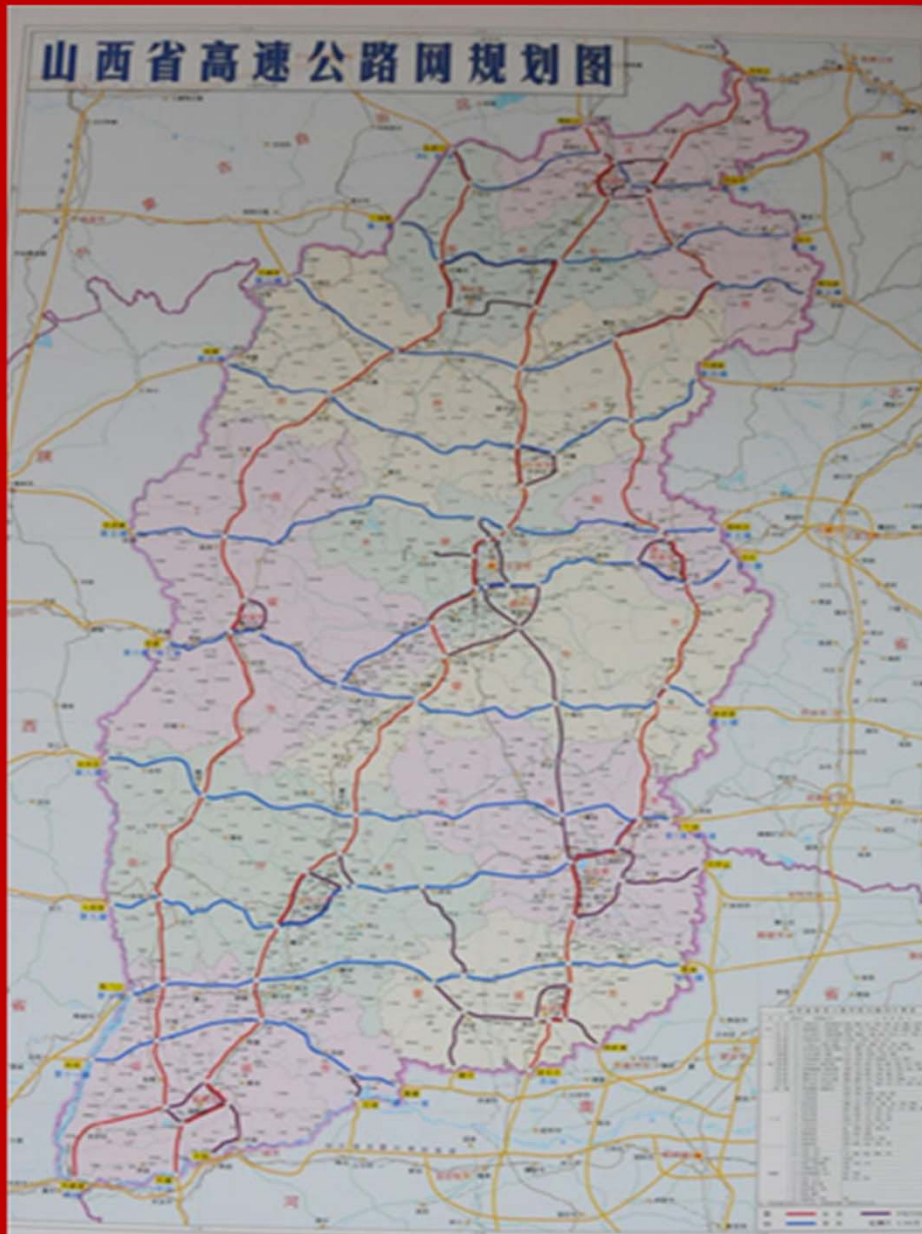
- Asset Securitization.
  - Highway assets are pooled to create a financial instrument that can be sold to private investors.
  - Zhuhai Highway Company, Ltd was one of the first successful cases of asset securitization in China when the company was registered in the Cayman Islands by Zhuhai People's Government.
  - Zhuhai Highway Co used local vehicle management fees and by-pass fees to support the issuance of \$200 million in bonds for highway construction on terms more favorable than loans from commercial banks.

# Guangdong Province Financing (Continued)

- **Public Private Partnerships (P3s)**. The provincial government has approved several highway projects for public bidding as a way to improve operations and finance new construction.
  - Four projects will bring a total investment of 23.9 billion Yuan and construct 322 km of expressway.
  - The 53 km Jiangmen-Zhuhai Highway is operated as a 25-year Build-Operate-Transfer P3 with Zhuhai Yangtze River Construction and Investment Co. Ltd.
- **Bond Finance**. The province continues to encourage highway development with the support of the national government through bond financing undertaken by the GTG.

# Case Study: Shanxi Province





**Highway construction began in 1993, but slow until 2002**

**Mileage increased 24% annually between 2001 and 2005**

**Toll revenue increased 53.6%**

**From 2006-2010, road construction increased 4.2% per year while toll revenues increased 29.9%**

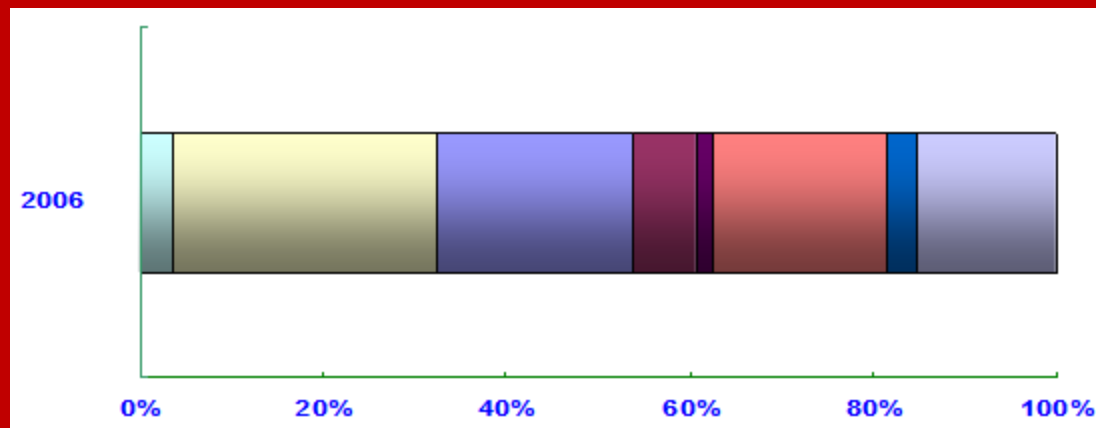
# Shanxi Province Highway Financing

- **Build Operate Transfer (BOT).**
  - This standard public private partnership arrangement includes three major highway sections in Shanxi: Beijing-Datong, Xingfu Highway, and Gaoling highway.
  - Private companies are responsible for the design, construction, operation and maintenance of the road facility over the franchise period and entitled to the toll revenue from the roads.
  - The private companies pay the province managing fees, into a Water Fund, and a quality guarantee fee.
- **Build Transfer.** Build-Transfer agreements include the 130 km Youngzhou Highway with a total investment of 5.4 billion Yuan.

# Shanxi Province Highway Financing (continued)

- **Stock Transfer Financing.** Shanxi Province also allows equity financing for major road projects. The largest project includes an Equity Investment Agreement with the Ping An Trust and Shanxi Transportation Development and Investment Corporation signed in July 2007.
- **Transfer of Management Rights.** The Beijing-Datong Highway, the first highway constructed and managed completely based on a market-oriented operation
  - Province builds the road
  - transfers the operation and management of the facility to a private company.

# Railway Construction Funding Sources



	2006
Investment by Local Govt and Enterprises	15.3%
Self-financing by Enterprises	3.1%
Railway Construction Bonds	19.0%
Foreign Investment	1.8%
Railway Special Funds	6.9%
Bank Loans	21.6%
Railway Special Foundation	28.9%
Budget Funds	3.4%

# Railway Financing Modes and Characteristics

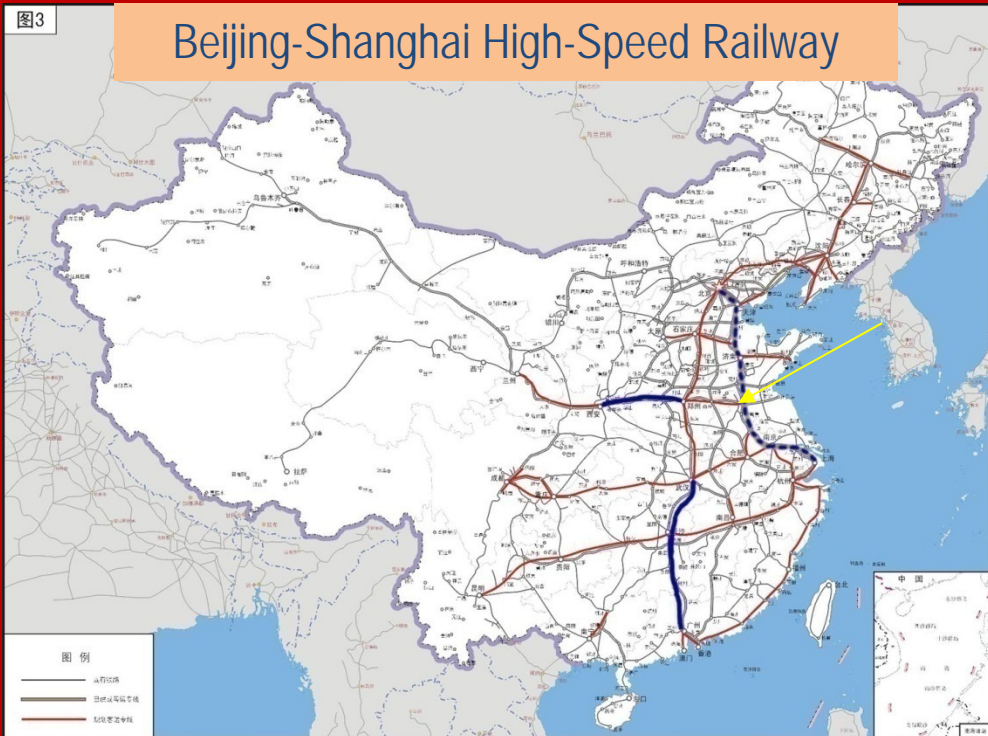
- **Railway investment and financing system in China has the following features: government-led, diversified investment and market-oriented operation**
- **Management and organization of railway in China is unified in planning and operation**
  - railway financing mainly applies debt financing, equity financing, local government and strategic enterprises direct investment, etc.
- **Debt financing is dominated by medium and long term domestic bank loans and railway bonds, supplemented by short term loans, bank loans and short-medium term notes.**
  - Domestic banks account for the largest proportion, which is around 50%. Debt financing has maintained an annual growth size of 20 billion RMB since 2006. In 2009, it reached 100 billion RMB
- **Equity financing: Rare but a few listed railway companies in China (i.e., Daqin railway, Guangzhou-Shenzhen railway and Tielong company)**
- **The main form of railway financing is direct investment from Ministry of Railways, local government and strategic partners.**
  - As of 2008, 102 joint-venture railway companies, and new joint-venture railway mileage will add 30 thousand km, with the investment scale of 2 trillion RMB. Example: Beijing-Shanghai high-speed railway

# Beijing-Shanghai High-Speed Rail

- Beijing-Shanghai High-Speed Rail Company Ltd. is established in 2007 by 11 organizations
- The proportion of company funds is: China Railway Construction & Investment Company accounts for 78.9%, and other investors 21.1%. Among them, Ping An Asset Management Co., Ltd. invests 13.93%, which makes it the second largest shareholder.
- Beijing-Shanghai High-Speed Railway started construction on April 18, 2008. It's expected to open to traffic in June 2011.
- As of January 7, 2010, Beijing-Shanghai high-speed rail project has cumulatively received 122.4 billion RMB investment, which amounts to 56.2% of total investment.

图3

# Beijing-Shanghai High-Speed Railway



Beijing South Railway Station



Yellow River Bridge of Beijing-Shanghai High-Speed Rail



Nanjing South Railway Station

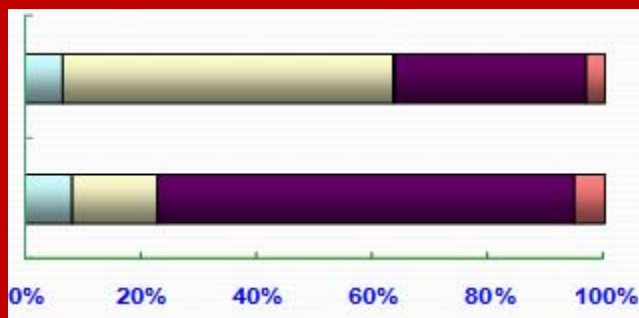


Hongqiao Hub

# Urban Transit Construction Funding Sources

Urban Fixed Guideway Transit

Urban Public and Electric Vehicles



	Urban Public and Electric Vehicles	Urban Fixed Guideway Transit
State Budget Funds	8.1%	6.5%
Domestic Loans	14.8%	57.1%
Bonds	0.0%	0.0%
Foreign Capital	0.0%	0.2%
Self-financing	71.9%	33.2%
Other Funds	5.2%	3.0%

# Transit Agencies Operate With Deficits

Cities	Cash Flow in 2010 (100 million)	Debt in 2020	New Debt in 2020	Mileage in 2020 (km)
		(100 million)	(100 million)	
Beijing	-320	3,000	2,000	1,050
Shanghai	-250	1,500	1,900	877
Guangzhou	-93	1,100	671	677
Nanjing	-114	1,300	725	280
Shenzheng	-33	750	250	425
Tianjin	-125	2,200	680	827
Xi'an	-155	750	250	251

# Debt Per Kilometer for Fixed Guideway Transit Systems

Per Km	Cash Flow (million Yuan)	Debt in 2020 (million Yuan)	New Debt in 2020 (million Yuan)
Beijing	-30.5	285.7	190.5
Shanghai	-28.5	171.0	216.6
Guangzhou	-13.7	162.5	99.1
Nanjing	-40.7	464.3	258.9
Shenzhen	-7.8	176.5	58.8
Tianjin	-15.1	266.0	82.2
Xi'an	-61.8	298.8	99.6

# Debt as Share of Regional GDP

Cities	GDP in 2020	Ratio of Debt to GDP in 2020
	(100 Million)	
Beijing	28,657	17.45%
Shanghai	32,283	10.53%
Guangzhou	20,592	8.60%
Nanjing	9,739	20.79%
Shenzheng	19,081	3.93%
Tianjin	17,903	16.09%
Xi'an	6,223	16.07%

# Short Term Financing Strategies

- **The Nanjing Finance Bureau appropriates 150 million Yuan for its subway operating loss every year;**
  - Budgets fiscal revenue growth according based on a percentage allocated to a rail transit development fund.
- **Guangzhou Municipal Government committs 5.5 billion Yuan to support near-term construction of Urban Railway Transport;**
- **Wuhan Municipal Government repaying interest and principal on loans on the initial operation and committed to pay 100 million Yuan for operating losses each year;**
- **The Beijing Municipal Government appropriated 1.52 billion Yuan to cover the operating losses for its subway in 2009 and nearly 4 billion in 2010.**

# Conclusions & Summary

- **China is committed to a comprehensive multimodal strategy**
- **Private and foreign capital were critical to building early infrastructure**
- **Private companies provide critical benefits to managing, operating and building critical infrastructure**
- **Financial solvency is far from assured, particularly for transit**