Chapter 3

Infrastructure Development in China

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Abstract

This report summarizes the current status of infrastructure development in China and the infrastructure construction demand for infrastructure development. The optional investments on infrastructure are described based on the poverty alleviation goal and economic trade goals. The finance investment mechanism for infrastructure in China is also depicted. The key issues in relate with infrastructure construction and infrastructure investments, infrastructure technology and management, policy issues, and institutional reform issues are discussed. Policy recommendations are made based on the discussion on key issues.

1. INTRODUCTION

Infrastructure development in China has rapidly upgraded within the last five years (the Tenth Five-Year Plan). Infrastructure investment has been the engine driving the economic growth of China. The gross domestic production of China reached 22 trillion yuan, increasing at an annual rate of 10.8 percent in 2006. Infrastructure development and economic growth are mutually pursued.

The economic structure has transformed into a socialist market-orientated economy since 1986, which has been consolidated in the early 1990s. Export-orientated economy supported by infrastructure development contributes largely to the economic growth.

2. CURRENT STATUES OF INFRASTRUCTURE DEVELOPMENT IN CHINA

2.1. Roads

Road length has increased 250,700 km in China from 2000 to 2005, reaching 1,930,5 00km in 2005. The layout of road network has further improved. The technical grades and road surface grades have been both upgraded. Highway construction has broken through the historical records. Road length in the counties and towns have continuously and rapidly increased. The road density has also increased, and the accessibility by roads has been improved. Passenger transport and freights through roads are up 26 percent and 29.2 percent, respectively, of the number of passengers transported by all the transport tools.

2.2 Railways

By the end of 2005, the length of running railways was 75,000 km, 9.9 percent up from 2000. It included double tracked rail of 25,000 km and electrified rail of 20,000km, 19.4 percent and 35.6 percent up, respectively, from 2000. Passengers by rail in 2005 reached 1.156 billion, which grew 1.92 percent from the previous year. The turnover of passengers was 606.2 billion in 2005. Freight and turnover both grew 10 percent.

2.3. Airline

The civil airline of China became the second large air transportation system in the world, next to the United States, in 2005, based on data on the total turnover of regular airlines by the International Civil Airline Organization of the Member States.

2.4. Waterway

The transportation capacity of the internal waterway increased from 20.37 million tons in 2000 to 30.35 million tons in 2004, 50 percent up. The average transportation capacity per ship rose from 104 tons to 216 tons. The fright capacity by sea rose to the fourth place globally, while finished freight by sea accounted for 7 percent of the

world's total.

2.5. Electricity

The electricity power industry has developed at a rapid speed with the increase in the electricity generation capacity from 1368.5 billion kilowatts in 2000 to 2497.5 billion kilowatts in 2005, growing at an annual rate of 12.8 percent. China has established six large-scale stable regional electricity networks, and formed a preliminary national connected networks except for Sinkiang, Tibet, Hainan, and Taiwan. The three corridors for electricity transmission from the west to the east have also been formed in northern China, in central China, and in southern China respectively.

2.6. Oil and Gas Pipes

The lengths of oil and gas pipes increased from 24,700 kilometer in 2000 to 44,000 kilometer in 2005. The piping capacity of oil and gas was estimated at 616.351 million tons in 2005, 68.4 percent more than the 2000 level. The flagship project to pipe gas from Xinjiang to Shanghai became operational in December 2004, which opened the main energy artery from the western China to the eastern China. It is also the symbol of the technological improvement in the field of natural gas pipe construction in China.

2.7. Infrastructures connecting with other countries

The Chinese government has exerted efforts toward regional integration in the field of infrastructure development. It has opened international road transports at more than 60 border gates, and 140 routes for passengers and freights with the neighboring countries. China has signed 10 bilateral transportation agreements with Russia, Mongolia, and other countries, and three multilateral agreements on transportation with the concerned countries. In addition, China has participated in facilitating efforts to reach an agreement among governments on the Asian road network, the transportation cooperation within the Great Mekong Sub-regional Economic Cooperation of (GMS) framework, as one of the member states of Shanghai Cooperation Organization. China has established a primary network of transportation corridors, made up of the following:

Guangxi International Corridor. Guangxi Province is becoming an international corridor connecting Southwestern China with ASEAN countries. Guangxi is neighbored with Vietnam, and has roads linking the Youyiguan border gate with Hanoi via Liangshan city of Vietnam, with total length of 180 km. Guangxi connects Central China with Hanoi by Xiang-Gui Rail with rail of Vietnam. There are 12 border gates including five first–grade national border gates and 25 border trade sites with roads leading to Vietnam. The five sea ports (Fangcheng Port, Qingzhou, Beihai, Zhengzhu, and Tieshan) with designed throughput more than 200 million tons have sea navigation through Hong Kong, Macao, and Southeast Asia, which are also connected to the southwest China provinces via rails and roads.

Asia-Europe Continental Bridge. China has strengthened the construction of highway and local main road networks as well as the improvement of roads at the border area to Russia. The main waterway has also been reinforced alongside the ports and berths.

Yunnan International Corridors. Yunnan province is located in the southwest of China, and neighbored with Vietnam, Laos and Myanmar. There are nine national-level border gates and eight provincial-level border gates opened to the three countries. Yunnan Province is the first province of China to have involved in GMS Cooperation mechanism. Kunming, the capital of Yunnan province is the hub of the North-South Economic Corridor of GMS. Yunnan international corridors consist in highways and railways depicted in the following tables.

a. Roads to neighboring countries

Table 1: Roads Connecting with Neighboring Countries

Name of the road	Length	Within China	The other country	The other country
Kunming-Hanoi	756 km	400 km of highway	296 km planned for four driveways in Vietnam	
Kunming-Lao-Bangkok	1818km	688km high standard way	240 km under improvement in Laos	890km of in Thailand
Kunming-Rangoon	1899 km	732 km	Mujie-Mandele –Rangoon 460+707 km	
Kunming-Myanmar-India (Reduo)	1220km	698km	477 km in Myanmar	45km in India

Source: "The Statistic Year Book on Tertiary Sector of China—2006", P154.

b. Rails to neighboring countries

Table 2: Rails Connecting Neighboring Countries

	Linking with
Kunming-Hekou-Hanoi	Eastern line of Pan- Asian Railway
Kunming-Mohan-Meding	Middle line of Pan- Asian Railway
Kunming-Ruili-Lashu of Myanmar	Western line of Pan-Asian railway
Baoshan-Tengchong-Myanmar –India	

Source: "The Eleventh Five-Year Plan on Railways" at http://www.china-mor.gov.cn/zizhan/guihuasi/

2.8. Infrastructure construction demand

Road construction demand. A total of 179 national road centers need to be constructed. The total roads length of China will be extended to 23 million km, including 70,000 km highway, which is the basis for forming the main road structure. The main road layouts consist of five longitudinal and seven altitudinal highways. These 12 national highways have a total length of 35,000 km, connecting Beijing to the provincial capitals and municipalities that are directly under the central government. More than 200 cities accounting for 93 percent of the large and medium-sized cities with above half a million

population are linked to form a road network.

An estimated 600 million people are covered by this road network. This number accounts for 44 percent of the total population in 2000. The average traffic speed of the national highways is expected to increase. The link between the national highway with the provincial backbone highways for priority economic development must be strengthened. China will also construct a highway that will be connected to the national high way network. The high way network of the eastern coastal region shall be improved to meet the demand for social economic development, and the highway network of the western non-developed region shall be expanded.

Rail construction demand. The goals of rail construction are to construct a new railway measuring 17,000 km (7000 km for passenger transportation) in length, to convert an 8000-km rail into double-tracked rail, and to electrify a 15,000 km route). The 90,000 km national rail, targeted as a multimodal transportation system, and double-tracked and electrified rail, shall comprise comprise the railway under construction.

The 90,000 km of national rail is targeted for MT (multi-modal management), and double-tracked and electrified rail shall amount up to 45 percent respectively.

The total length of the national railway will be increased to more than 20,000 km. The capacity of the rail corridor is to reach 1.8billion tons. The total length of the western railway network shall stretch to 35,000 km[1]. A rail container transportation system is to be formed around the country; the rail technology and equipment shall be modernized. The rail transportation system is targeted to facilitate safe, stable, sustainable, economic, efficient development. The rail assembling sets of 200 km /hour speed shall be produced domestically while the speed will be increased seven times. The annual passenger transportation is predicted to increase to 1.5 billion, with freight capacity of 3.5 billion

[1]Ou Yangjie: 2007. "Railways in the Western Region Scale up One Third" on *People's Daily.* 8 March.

tons, growing 30 percent than 2005[2].

Aviation infrastructure construction demand. Efforts are underway to strengthen the airport infrastructure over a period of five to ten years. More airports are to be built, bringing the number to 191 from the existing 50 airports as of 2005, including central airports, eight large-scale airports, 40 medium-sized ones, and 140 small-scale airports[3].

Waterways construction plan. Priority for waterway construction is on the construction of a ports system with a throughput of 5 billion tons. A 10,000 km river waterway is planned to be constructed by 2010. Rail and road transportation shall be constructed in tandem with ports. An integrated waterway management information platform and integrated ports logistic information service platform is also in the pipeline[4].

Electricity infrastructure construction plan. Power generation capacity including thermal power, micro-hydropower and nuclear power is targeted to upgrade to a new level. The technological improvement and equipments for desulphuration of thermal power generation and re-utilization of hydropower is targeted to improve. Electricity transmission network is planned to be expanded[5].

Energy infrastructure construction demand. In five to 10 years, the government plans to further develop the coal industry by building modern large-scale coal production bases. It will also work toward an effective and clean utilization of coal resource. It aims to upgrade coal production technology and equipment-making techniques. Coal mining construction is targeted to be high-capacity and high-efficiency. The government

[2] Lange Steel:2006, 'The Outline of Railway Eleventh Five-Year Plan of China" [online] http://info.steel.hc360.com/2006/10/27083630688.shtml

[3] State Bureau of Civil Airline : 2007, "The Eleventh Five –Year Civil Aviation Development Plan of China(2006-2010)", http://www.bbs.feeyo.com/posts/219/topic-0014-2197599.html

[4] State Bureau of Civil Airline:2007 "The Eleventh Five-Year Civil Aviation Development Plan of China (2006-2010)" [Online] http://www.bbs.feeyo.com/posts/219/topic-0014-2197599.html

[5] Ma Kai**:** 2006. " The Current Situation and Future Trend in Energy Development During the Eleventh Five-Year Plan In China", in " The People 's Daily." P.6 , 15 July, 2006.

will also develop liquid coal and coal gas, and extraction of coal gas.

It is targeted to further develop petrol oil and natural oil gas by increasing the production of petroleum and gas. The government also wants to improve the pipe network that will transmit petrol and gas, to construct petrol and gas reserve bases, to actively participate in international cooperation in petrol exploration.

Then, too, the government also wants to develop new alternatives and regenerative energies such as wind energy and biology energy, solar energy, underground thermal energy, and sea energy. Regenerative energies are targeted to grow 16 percent by 2020, from 7 percent in 2005 and 2006. In addition, it wants to strengthen the construction of joined infrastructure for supply and demand from the different kinds of energies such as coal, electricity, and petrol.

3. INFRASTRUCTURE DEVELOPMENT DEMANDS AND PLANS

3.1. Infrastructure development demand

Economic development goal. The Eleventh Five-year Plan of the government is targeted to raise the GDP of China from 18,200 billion yuan in 2005 to 26,100 billion yuan in 2010 an annual growth rate of 7.5 percent. The GDP per capita is projected to grow from 13,985 yuan in 2005 to 19,270 yuan in 2010.

Poverty alleviation goal. By 2010 the national rural poverty alleviation plan is targeted to assist 10 million poor rural folk to make sure their basic needs are met, and improve the living conditions of 250,000 rural poor households living with persons with disability. Under the Socialist New Rural Construction Plan, some 148,000 poverty stricken rural villages will benefit from skills training for farmers and improved village roads, electricity and water supply, provision of health services and broadcasting networks. A nine-year compulsory education is planned for enforcement in rural areas.
Foreign trade goals. Service trade is targeted to realize service import and export value of 400 billion US dollars by 2010, based on an annual growth rate of 20 percent. The

merchandise trade is projected to significantly improve its competitiveness, resulting in enormous social and economic benefits for all. These are intended to be achieved through better-quality goods and the pursuit of trade balance.

For processing trade, the enterprises chain is expected to extend to research and design, intensive development, and marketing and services. Technical innovation and technical transfer will be strongly encouraged to replace the simple processing trade agents. Efforts will also be made to adapt to the evolving trends and patterns in foreign trade.

3.2. Infrastructure investment demand

Evaluation on infrastructure investment demands. Investment in traffic infrastructure shall put in place safe, convenient, and efficient traffic and transportation system by upgrading the road layout, rails, airlines and shipping, and by improving the multi-modal transport. The investment priority is in development a railway, urban rail traffic, road network, airlines, waterways and piping.

The investment priorities of energy infrastructure are put on building large-scale coal production bases, improving middle and small-scale coal mining, making use of coal gas, and encouraging joint adventure of coal and electricity. It is also prioritized to optimize the investment on coal electricity with focus on large-scale high-efficiency assembling set. In addition, the investment on electricity network construction, utilizing hydrological power in ordered manner, encouraging nuclear power, and upgrading the scale to transmit electricity from the west to the east on the basis to protecting ecosystem.

The investment also shall strengthen the treatment of rivers and waterway, water resource distribution and water resource management .

Current investment plan and investment mechanism. The investment mechanism will integrate the improved investment adjustment and control mechanism, as well as the financial budget performance assessment system to facilitate the efficient use of public

funds. The transfer payment between central government and provincial governments shall be improved, and financial management system below provincial governments shall be defined. The reformed system for investment planning and budgeting is targeted to improve transparency and the regulations, together with the improvement on the budget performance auditing. The autonomous investment right of private sectors shall be implemented with a clear definition of the investment range of the governments. The system to investigate the responsibilities of the decisionmakers on the public investment shall be established.

The middle and long-term financial investment plan of China revolves around five objectives:

a. To support optimizing the economic structure of national importance and upgrading industries as well as key programs
b. To support the investment on social and public infrastructure construction
c. To support the investment on strengthening agricultural fundamental position such as large-scale ecological agriculture conservation programs, critical agriculture science and technology development, and large-scale grain and cotton production bases
d. To support the investment on industries underpinning the national economy such as mechanical industry, electronic industry, car industry, and petrol chemical industry.
e. To support the investment on the development of high-tech industries

4. ISSUES FACED BY INFRASTRUCTURE DEVELOPMENT IN CHINA

4.1 Infrastructure development

Infrastructure insufficiency persists. The general level of infrastructure development in China is still low. The infrastructure insufficiency has not been averted, impeding efforts toward national economic and social development. Average per capita infrastructure is comparatively low due to massive population and the widespread underdevelopment of

the infrastructure.

Regional infrastructure development is imbalanced. The infrastructure in the eastern region of China is more developed compared with the western and the central regions (for detail see table 2). Such imbalance in the level of infrastructure across the regions is barrier to the socioeconomic development of some regions. In particular, the remote mountainous frontiers and poverty-stricken areas are still suffering from poor transportation infrastructures and other facilities like telecommunication, water supply, drainage, electricity supply and etc.

Table 3: Imbalances in infrastructure development across the different regions of China

Index	The Northeast	West Reg.	Central China	The East
Working rail mileage	17.4 percent	37.7 percent	22.6 percent	22.3 percent
Road mileage	9.3 percent	36.55 percent	28.3 percent	25.9 percent
Highway mileage	7.4 percent	25.8 percent	26.1 percent	40.7 percent
Passenger turnover	8.3 percent	23.5 percent	27.8 percent	40.5 percent
Cargo turnover	7.5 percent	12.2 percent	12.8	67.8 percent
Post and telecommunication service	8.5 percent	19.6 percent	17.5 percent	54.4 percent

Source: "China Statistic Year Book –2007" published by China Statistic Press, in September 2007

National infrastructure development programs are piecemeal. Many national infrastructure programs, such as "transmitting western region's electricity to the east of China" and "Qinghai-Tibet Railway Construction Program," to name a few, are poorly linked with other infrastructure. As a result, the "flagship" infrastructure programs could not be effectively and efficiently utilized.

Extensive development pattern has resulted in a poor-quality, low-technology service and management. The infrastructure has been expanded rapidly within a short term in China. The road length in 1978 was 890,020 km, which was eventually extended to 3,457,000 km in 2006. The level of road technologies, however, remains low, and the

quality of infrastructure, service, and management is in a poor state.

Table 4: Comparison between Standard Roads and Non-standard road

Unit: 10,000 kilometer

Total road length in 2006	Standard roads					Non-standard roads length
	Highway length	Other Road Length	Grade-I road length	Grade-II road length	Subtotal length	
345.70	4.53	-	4.53	26.27	228.29	117.41
100 percent	1.31 percent	-	1.31 percent	7.60 percent	66.04 percent	33.96 percent

Source: "China Statistic Year Book –2007" published by China Statistic Press, in September 2007

4.2. Issues with the investment in infrastructure development

Public finance is grossly insufficient. The reform of tax system in the 1980s decentralized the power to manage public finance. Thus the central government is unable to afford all construction costs. The "finance-sharing system" for infrastructure development investment has been set up, and the central and the local governments at the different levels share the costs. In general, the central government assumes the cost of most investments in the national roads, while the provincial government does the same for provincial roads, the governments at the county and township levels for their own, and so on and so forth. Consequently, the poor areas couldn't afford the investment and thus give up construction, while the rich areas have rapidly improved the infrastructure.

The financial expenditure of the central government has increased more than the revenues recently. The demand for investments has created great pressure on the central government's revenues.

Table 5: Financial Deficit in 2006

Unit: billion yuan

National Revenuers in 2006	Expenditures	Financial deficit
3876.02	4042.273	216.253

Source: "China Statistic Year Book –2007" published by China Statistic Press, in September 2007

Table 6: Investment in fixed assets in 2006

Unit: billion yuan

Total investment in fixed assets	Investment in transportation, postal service, and logistics	Investment in electricity, gas and water supply	Water conservancy, environment protection, public facility management	Sub total of the three items
10999.82	1213.81	858.57	815.27	2887.65

Source: "China Statistic Year Book –2007" published by China Statistic Press, in September 2007

Increasing pressure and risk of repayment of commercial bank loans. Much of foreign investments and commercial loans are used for infrastructure construction in order to deal with the problem of insufficient public finance. The managers of infrastructure construction are under pressure and in increasing risk of running out of funs, particularly the provinces in the western region of China, which have weak self-investment capacity and limited capitals. They are dependent on commercial bank loans for infrastructure investment. For some regions, commercial bank loans account for 80 percent of the total investment in transportation. In addition, the repayment terms for infrastructure loan are relatively long, and the banks face the risk of incurring bad debts.

Investment structure is not rational and the investment efficiency is low. Investments in fixed assets of the urban regions account for the majority of the total while investments

in rural area account for 4 or 11 percent. Most investments are for new construction, and a small portion for maintenance and improvement. In 2006, 60 percent of the investments in fixed assets of urban region were used for new construction. The input in infrastructure construction is massive and the waste is serious due to an irrational investment structure.

4.3. Issues on technology and management

Management of infrastructure is ignored. Poor management of infrastructure has resulted in low transportation capacity of roads and railways, crowded cities**,** and overloaded traffic routes. Secondly, the construction, operation and management of infrastructure are mainly dependent on bureaucratic systems, where the role of the market is weak. In addition, a lot of enterprises steeped in outdated management systems have not adapted to the times. Thirdly, market protectionism and sector-orientated management systems have affected otherwise smooth delivery of freights and passengers. Fourthly, blind competition in transportation market has resulted in chaos.

Technological level is low. In the rail transportation system, double-track rail and electrified rail length accounts for a small portion of the total railway length. In regard to rail transportation(39.8 percent and 37 percent, respectively, as of 2006), while the level of centralized train-dispatching is low (6.6 percent). There are few computerized chain stations (23.3 percent). Well-equipped passenger trains account only for a small proportion of the total ; those with soft beds make up 7.84 percent; trains with hard beds, 32.52 percent; and hard seat-trains, 41.50 percent. The train speed for cargo is only 32.1 km per hour; and the speed for passengers is 65.4 km per hour (as of in 2006). Freight transfer takes 4.4 hours**,** and takes 15.2 hours to operate.

For road transportation, the total number of civilian vehicles (still as of 2006) is 36,973,500, including 26195,700 units for delivery, which are mostly small or mini-buses. There are 9,863,000 vehicles for freights, which are mostly light and small trucks.

Comprising the shipping system in 2006 were 157,805 powerboats in China . These had a net carrying capacity load of 98.2115 million tons and an average net carrying capacity load of 6.2255 million tons. The number of barges was 36,555; they had a net carrying capacity load of 12.0156 million tons and an average net carrying capacity load of 3.287 million tons. Berths at ports in the coastal areas of China numbered 3804, of which only 883 are 10,000 ton-grade or above berths accounting for 23.12 percent. The rivers have 7044 berths in 2006, of which only 225 were 10,000-ton or above-grade berths, which accounted for 3.19 percent.

Postal and telecommunication services have improved rapidly recently. However, many people still have no access to postal and telecommunication services. The number of towns with post offices in China accounts for 76.2 percent; the number of telephones and mobile phones per 100 persons is 63.40, and the number of mobile phone per 100 persons is 35.30. Around the whole country, 137 million people have access to the Internet while the majority do not.

Multimodal transport is still undeveloped. The combination of modes of transport is poor due to poor coordination among the different sectors of the governments administrating roads, railways, ships, and airlines separately, as well as lack of joint planning. In addition, communication between the administrative departments and the private sector is poor. The resulting poor combination of all transport infrastructure cannot ensure safety and quality service, because the operational efficiency of infrastructure is low. The rate of carry cargo by road is less than 50 percent, and carry cargo by rail, 54 percent.

Construction of software infrastructure lag behind the hardware. The low operational efficiency of infrastructure is mostly due to lagging behind software construction. The vehicles for cargo and containers are not standardized; the equipment for freight loading, package, storage, and transit are inadequate. Consequently, freight transit is time-consuming, and freights are easily damaged during transit. In addition, the management is poorly equipped with few computers, and the information flow is slow,

which affects the quality of customer service. There are two factors for this problem. One is that the governments have not built an efficient public information service platform, and that the logistic firms lack sufficient funds to promote the management software.

4.4. Issues on policies and regulations

Construction of infrastructure is monopolized by the government. The roles of foreign investors, private sector, and the society in general in infrastructure development in China is limited to certain fields, geographical region, and investment scales unlike in other sectors that have been the target of economic reforms. As a result, capital can't be mobilized through various channels, and resources can't be optimized. Governmental monopoly in infrastructure development calls for a reassessment at the very least.

The legal system is weak. The legal system for infrastructure development is still weak, and some vital laws are lacking. Where infrastructure construction is concerned, there are still no regulations for defining and identifying the investors and the basis for their entry into the market. There are also no regulations that help ensure fair trade and competition. The lack the regulation for market supervision, price system and service standards also get in the way of effective infrastructure management.

Policy system is incomprehensive. The national strategic planning is not supported by sectoral and the regional plans, so the layout of the infrastructure is not rational. An open orderly competitive market system has not been established, making it difficult to have joint ventures across regions and ownership systems. The macro-level regulation of the government is not effective. The mechanism for price forming system is not well established. Governmental monopolization and disorderly market exist side by side. Local governments raises construction funds by overcharging (for certain services) . The investment policy is skewed toward urban areas, and the infrastructure of the rural area lags behind urban areas. The massive infrastructure projects are concentrated in major areas (i.e., centers of political power, business districts, and adjacent sites), while remote parts are being neglected.

4.5. Issues on institutional reforms

Communication network is lacking. The absence of a communication network that will connect regions, sectors, and industries and ensure that resources can be optimized has not been set in place. An existing international information sharing mechanism needs to be improved, or inaccessible in some areas. Most infrastructure facilities were not built as joint undertakings with foreign counterparts. Communication and coordination with neighboring countries is inadequate, so many roads in border area are not connected with those other countries. China just has recently signed an agreement on transportation, investment and trade facility with ASEAN. The implementation of the agreement must be sustained on both sides.

Risk prevention mechanism is lacking. Infrastructure construction faces economic, social, political, ecological as well as security risks. The government seems to be concerned only with economic issues, which prevents it from addressing these other risks. Reliance, for instance, on huge borrowings to fund the construction or expansion of certain infrastructure projects entails risks. From a macroeconomic perspective, such an investment is going to pull up consumption or consumer prices. Then, too, once a foreign partner pulls out its investment in such an undertaking midway through the project, government will be left with a problem that could be too difficult to solve. In addition, destruction on the environment and the ecosystem, cultural relics, and the farmers' grieving for their lost lands caused by land acquisition for infrastructure construction are core social, political and ecological issues that need to be addressed as well. Illegal cross-border activities such as smuggling and human trafficking are other issues that pose grave threats to society and which require prompt attention from the government and which will help resolve the risks earlier identified.

Regional integration of infrastructure development is sluggish. The infrastructure development is imbalanced among the different regions of China, and the pace for regional integration of infrastructure development is sluggish. Little effort is put in coordination among different sectors and private sector, and the same to the combination

of the infrastructure for high efficiency. Pursuing for sectoral interests by setting tollgates to collect money has prevented the flows of freight, capitals, populations, and information.

5. POLICY RECOMMENDATIONS

Based on the foregoing discussion, the following are proposed actions for stakeholders, notably government, to consider:

Pursue infrastructure development as an investment priority for economic development. The long-term infrastructure deficit has not totally translated into rapid infrastructure development. Resources must be mobilized to cater to huge infrastructure demands.

Promote infrastructure integration and equitable development to narrow the regional disparities in China. Infrastructure disparities have driven a wedge between the western and eastern regions and resulted in unequal opportunities for the people. The development of infrastructure for the rural communities and the western and central regions should be given priority to resolve the disparities created by the lack of infrastructure integration.

Promote the viability of financing sources. Limited public finance cannot possibly meet the huge infrastructure demands. Infrastructure investments in 2006 reached 3 trillion yuan. These covered transportation, logistics, power supply, gas, and water, hydrology, environment and public infrastructure maintenance, and facilities for sports, education and recreation. The scale and viability of investments from the private sector should be mobilized, and policies for foreign investments in infrastructure should be further explored, among others to make to simplify otherwise complex procedures.

Institutionalize the financing mechanism. Financing for infrastructure construction in China is complex. It also suffers from poor coordination and lack of transparency among the different sectors involved. It is therefore not surprising if investment efficiency is low. Micro-level adjustment and control, planning of infrastructure development should be strengthened. The financing mechanism should be

institutionalized and regulated to promote resource integration. Innovative financing mechanism should also be pursued.

Strengthen the cooperation between governments and the private sector in infrastructure development. The increasing capacities of the private sector for investment in China has great potential for infrastructure development. The government should define clearly its roles and responsibilities of both alongside those of the private sector. The government should be service-oriented and seek to improve management efficiency in the bureaucracy. At the same time, efforts at supervision and evaluation of infrastructure development should be strengthened to correct the disparities between theory and practice.

Establish a regional cooperation mechanism for infrastructure development. The ongoing globalization and economic integration require cooperation and integration in infrastructure development to ensure coordinated action. In particular, coordination with Yunnan province must be pursued since it serves as a link between China and Eastern Asia, Southeastern Asia, Southern Asian with the other regions of China.

Promote logistic development. Improvement of infrastructures is the premise of logistics industry. To accelerate the growth of the logistics industry, government must give priority to improving the infrastructure for storage transit, refrigeration, transportation, and information sharing. Similar efforts must be extended to accommodation and restaurants facilities. Logistical hubs and multimodal transportation should be improved to facilitate trade development. Human resource development for the logistics industry should also be the target of appropriate measures.

Promote trade facilitation. The agreements between China and ASEAN on free trade economic zone, freight trade, and service trade have been the framework to promote trade development and investment. Trade between China and ASEAN reached US$160.8 billion 2006. The implementation of bilateral agreements should be consistently pursued by, among others, enforcing tariff reduction, zero tariff, facilitation of immigration procedures, freight transit, and custom and visa services.

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