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# China: Building Institutions for Sustainable Urban Transport



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First in a series of policy notes on  
**Emerging Urban Transport Challenges: A Perspective**

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## ACRONYMS

ADB	Asian Development Bank
BRT	Bus Rapid Transit
CIP	Capital Improvement Plan
CNG	Compressed Natural Gas
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Green House Gas
ICT	Institute for Comprehensive Transportation
JBIC	Japan Bank for International Cooperation
MOCn	Ministry of Construction
MTOE	Million Tons Oil Equivalent
SRA	Strategic Rail Authority
TFL	Transport for London
UTC	Urban Transport Center
UNHCS	United Nations Center for Human Settlements

# CHINA

## **Building Institutions for Sustainable Urban Transport**

**Abstract:** Based on a number of background studies on the urban transport problems facing China's large cities, this report summarizes the diagnostic analyses of these problems with a focus on the associated institutional issues, and recommends policy directions and short- to medium-term institutional development actions for sustainable urban transport. In particular, it examines the changing nature of urban transport problems in a broad context of urbanization and fiscal decentralization, and calls for the national government to re-define and strengthen its role in dealing with the spillover effects of urban transport problems. The report is intended to contribute to the current debate on urban transport issues and to serve as a technical input to the government policy making process, especially at the national level.

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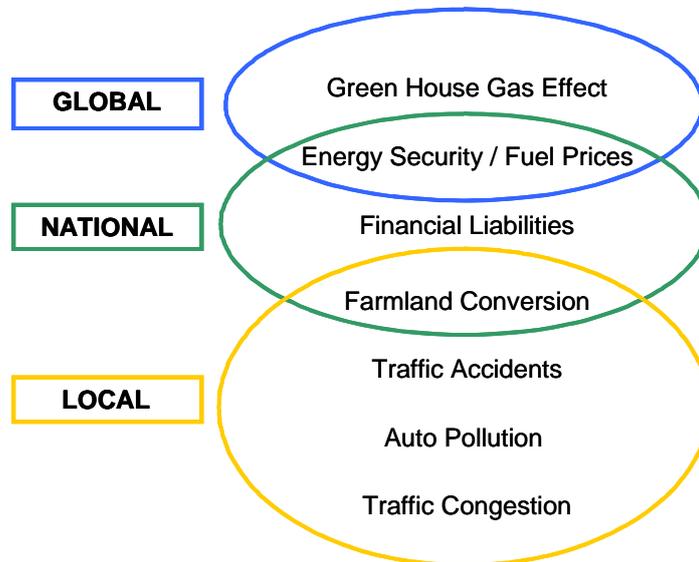
## I. The Urban Transport Problems: Dimensions and Trends

*China has succeeded in developing a world class automotive industry within 10 years...*

1. In its Eighth Five-Year Plan (1991-1995), the Government of China designated the automotive industry as one of the pillar industries of the national economy. This was followed by the promulgation of an automotive industrial policy in 1994. The policy made it clear that the development of the automotive industry should rely on the domestic market for private cars. Within a decade, China has now become the world's fourth largest automobile producer and third largest consumer. Annual production capacity has reached five million automobiles. The number of registered cars increased exponentially from around one million in 1994 to five million in 2001, and to 16 million in 2004. The value-added from the auto manufacturing alone exceeded RMB 300 billion yuan (or US\$37 billion equivalent) in 2004. Auto makers are getting ready to export China-built cars to Western markets. Obviously, the automotive industrial policy is a major success in driving the national economic growth and capturing the domestic market.

*Automobiles have enhanced mobility but they are also a source of a range of urban transport problems...*

2. Automobiles also bring enormous benefits to the economy and users by enhancing mobility. To a great extent, the rapidly growing demand for automobiles, especially private cars, is a manifestation of the mobility benefits. However, associated with these benefits is a range of unprecedented problems that is causing serious concerns not only at the city level, but also at the national and even international level (Figure 1). Most passenger cars are now privately owned (over 65 percent) and are used in cities, especially the more affluent large cities of the coastal region. The city-level problems—**traffic congestion**, **motor vehicle pollutions**, and **road trauma**—emerged in only a few of the largest cities in the early 1990s, but are now common and serious in almost all large cities (Box 1). They are fast eroding the quality of urban life and the efficiency of urban economic activities. While these problems are not uncommon around the world, they seem to be growing out of proportion in most Chinese cities, where private car ownership is still at a relatively low level.



**Figure 1: The Urban Transport Problems in China**

**Box 1. Highlights of the Urban Transport Problems in China**

In Beijing, private cars increased from 0.17 million in 1996 to 1.4 million in 2004. Average peak-hour vehicle speeds on the arterial roads between the Second and the Third Ring Roads have declined from 45 km per hour in 1994, to 33 in 1995, 20 in 1996, 12 in 2003, and less than 10 in 2005. Congestion is spreading well beyond the Third and Fourth Ring Roads and along the major radial arterial roads.

In Shanghai, private cars increased from 9,200 in 1996 to 250,000 in 2004. Vehicle speeds were recently found to be less than 20 km per hour on most of the 29 major roads and as low as 15 km per hour on nine of them. Peak-hour vehicle speeds on the city center roads ranged from 9 to 18 km per hour.

In Shenzhen, traffic accidents have been the top killer over the past three years, according to a report from the city's medical emergency center. Forty percent of those killed in traffic accidents were aged 20 to 40.

The State Environmental Protection Administration has estimated that the amount of carbon monoxide and hydrocarbons from auto emissions accounts for 79 percent of the total in urban areas nationwide in 2005.

Sources: Finance and Economy (2004), Shanghai Metropolitan Transport Development Report (2004), Xinhua News Agency (2004), Shenzhen Daily (2005).

3. The rapid motorization allows little time for the municipal governments to prepare strategically effective responsive actions. As a result, they have been chasing demand for road space by investing heavily in road capacity. Few cities have drawn up a coherent urban transport strategy to manage the motorization process. Those with a strategy have not been able to stick closely to it due to lack of supporting institutions and policy environment. The approach adopted in most cities is thus piece-meal and *ad hoc*. Cities make way for car driving not only by building more roads and adding flyover highways along congested corridors, but also by dismantling existing bicycle rights-of-way, pedestrian sidewalks, and even rows of roadside trees. Meanwhile, many cities have also made significant road investment outside the city center areas and often in advance of demand. Most of the investment projects are associated with land development initiatives intended to attract foreign direct investment and have little relevance to the urgent need for alleviating congestion in the city centers, but they are clearly a key factor driving the urban sprawl.

*There are no clear winners, and the poor are suffering the most...*

4. Despite rapid growth in private cars, the majority of urban households are car-less and likely to remain so for the next 10-15 years. Their mobility needs have been seriously under-served by the established practice that commits much of the available resources to meeting the demand for auto-mobility. In fact, they fall victim to the practice that makes way for car traffic at the cost of their once convenient and safe travel environment. In the largest cities and the metropolitan areas, the number of migrant workers has grown to 20 to 40 percent of the total population. Their transport needs receive little attention; few cities have analyzed travel patterns in the planning process. Ironically, the practice favoring cars also fails to satisfy the longer-term mobility needs of the car-owning population. The freedom of mobility enjoyed by them is short-lived and many motorists find themselves frequently sitting in gridlock during the peak hours. However, these problems do not seem to deter the growth of car ownership and use. The auto-dependent, low-density, suburban life-style is taking shape in a few major cities, but this is accompanied by an overall reduction of mobility quality for almost all income groups.

*Public bus transport is at a fragile point...*

5. Now that the national leadership places a new emphasis on people-centered development, municipal governments will face increasing political and financial pressure to improve mobility for all, especially for low-income people. The solution to the complex urban transport problems lies in the development of an efficient and affordable public transport system. This has long been recognized by policy makers and transport planners, and emphasized in every transport policy statement. But real actions have been far from adequate. Since the early 1990s, public transport has generally benefited from bus enterprise reform, increased investment in fleet capacity, and implementation of bus priority schemes, as well as urban population growth that helps maintain strong demand. Many cities have witnessed gains in both ridership and operating efficiency during the second half of the 1990s. These gains are now seriously threatened by the rapidly growing road congestion and the continuing shift to private cars. Most cities fail to guide transit-oriented land use development. The road network—instead of the public transport network—is commonly used in urban master plans as an instrument to shape the urban land use structure. Bus operations and the future guided mass transit systems are given little consideration in road design. The peri-urban land development is not planned in a way that would create a market for public transport. Few cities have taken concrete steps to reform the sector structure as a basis for the development of a viable industry. As a result, the sector remains financially fragile in most cities. The operating subsidies to Beijing's public bus company amount to RMB 0.8 to 1.0 billion a year (over \$100 million), which accounts for 1.5 percent of the municipal budget revenues (Institute for Comprehensive Transportation --ICT, 2004). The situation in many other cities is even worse.

*Financial capacity to develop a rail-based mass transit system is limited in most cities...*

6. This is particularly alarming, as most cities will have to rely on bus transport for the foreseeable future. Many cities aspire to a mass rail transit system, but only a few have the financial capability in the short to medium term to develop such a system as the center piece of their transport system. Currently, only Beijing, Tianjin, Shanghai, Guangzhou, Changchun, Wuhan, Nanjing and Dalian have subways (rail based, mostly underground), with a total route length of 360 km. A few more cities are constructing their first metro lines. It is estimated that by 2010 a total of 1,600 km will be constructed nationwide, with a total investment of RMB 558 billion or US\$69 billion equivalent (Urban Transport Center --UTC, 2004a). Experience from all these cities shows that implementation of mass rail transit takes a long time and incurs high public debt. Shanghai's current three subway lines have a total fixed asset value of RMB 26 billion, of which RMB 16 billion are financed by debt (UTC, 2004a). Underground metros, which typically cost US\$60-100 million per km to build, are successful only in the corridors with very high traffic density—typically 30-40,000 passengers in one direction in the peak hour. 'Success' in this case can be defined as 'attracts enough riders to reduce above-ground traffic congestion perceptibly, without encumbering the city with operating deficits and debt service that may be unsustainable, comparing favorably with other options.' Most cities need to find alternatives to mass rail transit that can be implemented far more quickly, such as bus rapid transit (BRT)—the high end of which can carry almost as much traffic as a low-end rail-based metro but for a capital cost of only \$5-10 million per km. This is also true for the mega-cities, where the rail-based system can be more viable in the longer term. International experience demonstrates that efficient and effective bus services are always a pre-requisite for an effective rail-based system. A major challenge for the Chinese cities now is how to develop an efficient bus transport system before the critical mass of motorists is formed and shapes an irreversible, auto-dependent land use pattern.

7. The urban transport problems in China are beginning to transcend the local dimension. A few issues associated with urban transport are causing increasingly serious concerns at the national level. The first is the **threat to the efficiency of the urban**

*Spillover effects are threatening overall sustainability while travel mobility is declining...*

**economy.** China's urban sector contributes 80 percent of the national GDP. The large cities and metropolitan areas have been the engines of the economy and are expected to be so in the future. Maintaining the efficiency of the urban economy—a key element in any sustainable economic growth strategy—will not only be in the interest of cities but also the country as a whole. As international experience shows, traffic congestion reduces urban productivity through its impact on the effective size of the urban labor market, which can be measured as the number of people who can access jobs at a reasonable time and money cost. The larger the effective labor market, the better match of labor demand and supply, thus the greater the labor productivity (Prud'homme and Lee, 1999).

8. The second concern is the **excessive conversion of agricultural land** for urban development. Conversion of farmland is needed to accommodate urban population growth and the associated spatial expansion, where the development of transport infrastructure is an integral part of the process. However, it becomes excessive due to distorted incentives. Cities offer discounted or free land to attract foreign direct investment (FDI) and businesses on the one hand, and give land concessions for industrial and real estate development in return for financial gains on the other hand. The financial incentives arise mainly from the need to cover the gaps between municipal expenditures and revenues, but they distort the planned land use and transport structure, causing excessive conversion of farmland and under-utilization of urban land, and encouraging low-density suburban development that is far more costly to service with infrastructure. China is short of good farmland; its per capita arable land is only one third of the world average. Land conservation has long been a national policy, but it is inadequately enforced at the local level.

9. The third issue is **financial liabilities** (explicit and hidden) incurred by subnational governments for investment in urban expressways, ring roads, and subways. The primary funding sources—from the lease of land use rights and quasi-fiscal instruments such as borrowing by government-owned urban infrastructure investment companies with local government guarantees—are unlikely to be sustainable. The former is being exhausted, and the latter has incurred sizable contingent liabilities.

10. The fourth issue is **energy security**. The perceived crisis of long-term energy security, once remote, is becoming a real concern. China has become the second largest oil consumer, changing from an exporter of crude oil to an importer. One third of all fuels are imported. China has 21 percent of the world's population, but only three percent of its oil reserves and five percent of the world's oil production capacity (He et. al, 2005). Petroleum consumption by motor vehicles is still a small share of total consumption at less than 10 percent, but it is growing fast. The future of national energy security has to be seriously considered at a time when world oil prices are hovering above US\$50 a barrel. The world is also concerned with the growth of petroleum demand from China and worries that it would drive up the world prices of fuels.

11. Finally, the growth of **green house gas** (GHG) emissions from the use of fossil fuels by automobiles is not only a national but also an international concern. As GHG emissions contribute to long-term global climate change, the international community is increasingly concerned with China's surging demand for oil consumption, which accounts for over 40 percent of the growth in world oil demand. While the magnitude of the GHG effect from China's motorization (relative to thermal power plants and other sources) is a subject for debate, increasing motorized travel in China will certainly contribute towards the growing GHG emissions.

12. It must be noted that despite the various problems discussed above, there are notable achievements. Over the last 10 years, almost all large cities have accorded a high priority to

*While cities are able to mobilize resources for urban transport, lack of sustainability is at the core of the urban transport issues...*

dealing with traffic congestion. Significant capital investment has been made to expand the capacity of transport infrastructure, especially the street network. The amounts of resources mobilized over a short period of time are unmatched by most developing cities around the world. The urban transport investment in Beijing, for instance, accounted for five percent of the municipality's GDP, a very high rate by world standards (ICT, 2004). Nationwide, traffic management has received greater emphasis. Modern traffic management techniques including bus priority schemes are increasingly being adopted. A few cities (e.g. Kunming, Shijiazhuang, and Beijing) have started to develop, some with initial success, a bus rapid transit system. All major cities have established motor vehicle inspection and maintenance programs. While most cities have adopted Euro-II emission standards, a few are moving to Euro-III. All these demonstrate that the large cities are indeed capable of resource mobilization and action implementation. Most of them, however, fail to yield sustainable outcomes, and end up chasing the growing and emerging problems one by one. The central issue is lack of **sustainability** consideration in the planning and decision making processes.

13. Sustainability is about progress that meets the needs of the present without compromising the ability of future generations to meet their needs (Brundtland Commission, 1987). No one would dispute that sustainability is critically important for the future of China, a country with a huge population, limited natural resources, and regional and income disparities. In 1994, the Government approved and published a landmark white paper on population, environment, and development. It set the sustainable development of population, resources, and environment as one of the national policies governing the formulation of the medium and long term economic and social development plans (including the Ninth and Tenth Five-Year Plans and Plan 2010) and the urban master plans.

*Knowledge on sustainable urban transport has not been effectively translated into actions...*

14. International knowledge about sustainable urban transport is widely available. In 1995, shortly after the automotive industrial policy was promulgated, a joint study by the Chinese government, the World Bank and the Asian Development Bank was completed on urban transport strategy for China. The study examined a wide range of interrelated issues, including motorization, auto pollution, urban transport management, bicycles, mass rapid transit, public transit reform, the role of the private sector, transport pricing, and urban transport planning (Stares and Liu, 1996). Sustainability was at the core of the issues examined. However, knowledge of this kind has not been effectively translated into actions. Opportunities exist for more proactive management of the motorization process and promotion of public transport, but these are mostly missed due to shortsightedness stemming from distorted institutional incentives. As will be discussed later, the lack of sustainability in China's urban transport development has much to do with the inadequacies of institutional capacity and incentives to translate good knowledge into effective actions.

*All problems are expected to increase with motorization and urban growth unless public policy begins to address them...*

15. The challenges ahead will be tremendous. The current practice, if continued, would result in fast exhaustion of fossil fuels, clean air, and valuable farmland and space, and the widening of social inequality. By all indications, however, the economic forces are so strong that continuing motorization is inevitable. The primary driving force behind motorization—the growth of household incomes—is expected to remain strong in urban China. The costs of owning a car do not seem to be a major factor to slow down the process. In fact, prices of owning a car have been declining. A new automotive industrial policy was launched by the national government in 2004. The government will continue to promote the industry not only for domestic demand, but also for entering the global market on a larger scale by 2010. Due to intensifying market competition, the auto manufacturers are making every effort to keep prices low and make car loans more accessible to urban households. Since China's accession to the World Trade Organization in 2001, tariffs on imported automobiles have declined sharply from the previous 100 percent to close to the

2006 target of 25 percent. Even though imports account for less than 10 percent of new-car sales, this has put pressure on domestic manufacturers to lower their prices. It is estimated that car ownership will reach 170 million by 2020 under a business-as-usual scenario. As a consequence, the fuel consumption would reach 100 million tons oil equivalent (MTOE) from about 10 MTOE in 2005 and GHG emissions, 102 million tons, by 2020 (Shipper and Ng, 2004).

16. At the city level, private car ownership and use are determined not only by household incomes, but also city-specific factors such as land use patterns, traffic conditions, availability of alternative transport modes, and public policy interventions. Beijing and Shanghai are two mega-cities with comparable per capita incomes and population size, but Beijing has far more private cars than Shanghai. While the land use and transport conditions differ between the two cities, local policy interventions such as tight control of car ownership in Shanghai appear to have helped slow down the growth of private cars there. It is clear that the growth of private car ownership in cities will continue to be driven strongly by household income growth, but its pace could be guided by local public policies if desired by individual cities.

17. There are few predictions of car ownership at the city level for China. According to one forecast, urban car ownership for a typical large city by 2020 will be between 130 and 220 cars per 1,000 persons, depending on scenarios of income growth and urban population density (10,000 to 15,000 persons per square kilometer) (Stares and Liu, 1996, p. 50). This is equivalent to at least one car for every three urban households, assuming an average household size of 2.5 persons. As a comparison, the current level of car ownership in Beijing—a pacesetter in terms of motorization—is already near 100 cars per 1,000 persons. Obviously, for most other cities where the current car ownership is way below 50 cars per 1,000 persons, a growth of car ownership to the range of 130-220 per 1,000 persons in the next 15 years would pose an enormous challenge to the municipal governments.

*The urban transport problems are associated with urbanization and decentralization...*

## **II. The Causes of Urban Transport Problems: A Diagnostic Analysis**

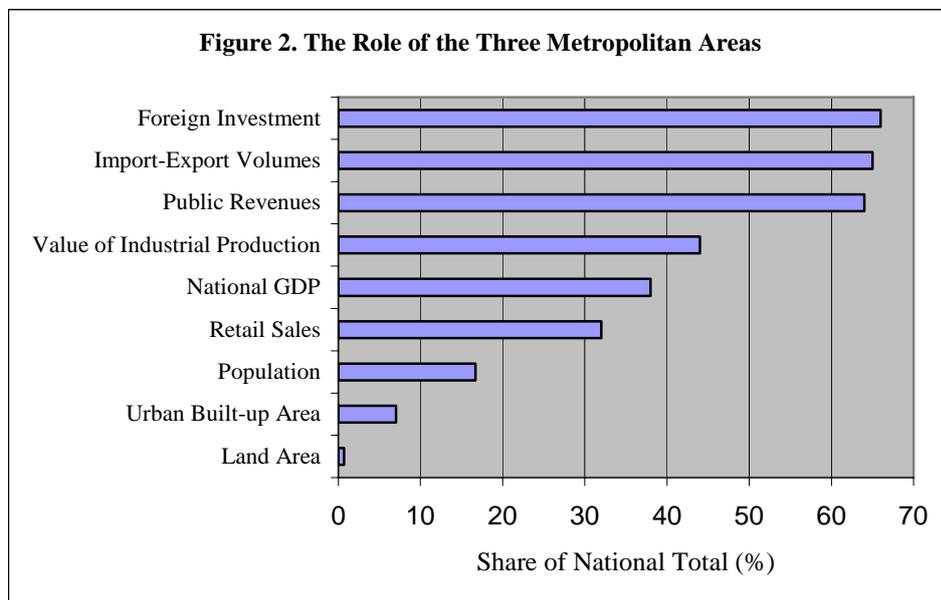
18. The urban transport problems facing China's large cities are in many ways similar to the experiences of most other countries. The Chinese experience is also unique, however. Few countries have experienced the kind of extraordinarily rapid pace of motorization seen in China. No other country has ever in history seen the shift of 300-400 million people from rural to urban life within just one generation. More importantly, the rapid motorization in China occurred during a crucial period of social transformation characterized by the strong dynamics of globalization, urbanization, fiscal decentralization, and the transition from central planning to a market-based economy. To a great extent, all these factors have shaped the urban transport problems and contributed to the success and failure of urban transport development.

*Urbanization is accompanied by rising incomes, transformation of farms to firms, and structural changes in living style and urban land use...*

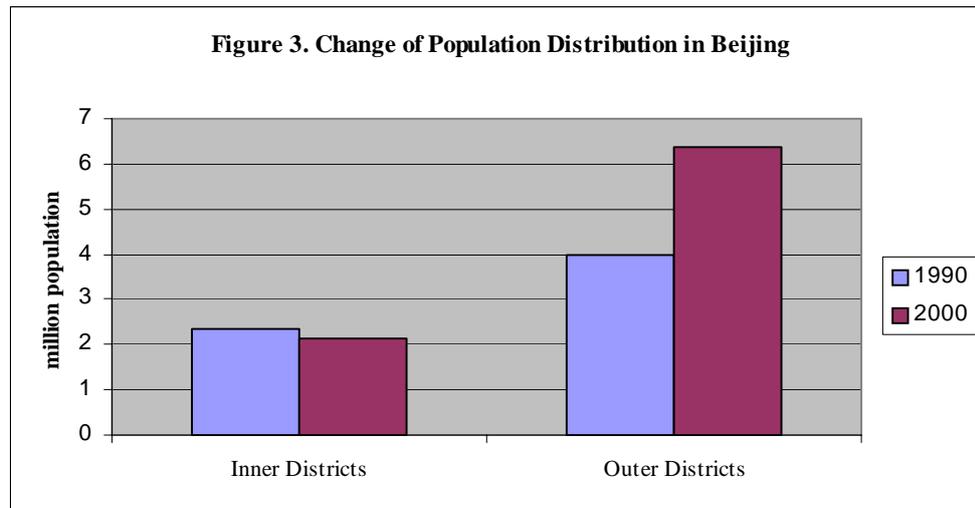
19. China has been urbanizing rapidly over the last 10 years, and the growth of urban population increases the total demand for urban transport services. The urban share of total population grew from 26.2 percent in 1990 to 36.1 percent in 2000 and almost 40 percent in 2005. This implies an increase of urban population of almost 250 million over the last 15 years.<sup>1</sup> The process is mainly driven by the rapid growth of urban manufacturing and service sectors, productivity increases in the rural sector releasing surplus labor, and the physical expansion of cities to the outlying rural areas, with on-site conversion of rural to urban population. Recognizing that urbanization is the outcome of globalization and national economic growth, many municipal governments have quietly relaxed various policies previously designed to limit rural to urban migration. However, thanks to some of

these policies such as the *hukou* system, China has so far avoided the spontaneous creation of large shanty towns on the city outskirts that are common to almost every large city in Latin America, for example.

20. Across the country, the increase of urban population is more concentrated in the more affluent regions such as the southeastern coastal provinces. The big cities are growing bigger. Among China's 690 cities, some 40 have a population over one million and house a total of 200 million people, or 40 percent of the nation's city dwellers. In particular, three metropolitan areas are taking shape: the Pearl River Delta Region, the Lower Yangtze River Delta Region, and the Beijing-Tianjin-Tangshan Region. Altogether, with only one percent of the national land area, they contribute to roughly 40 percent of the national GDP and are integrating rapidly with the global economy (Figure 2) (Wang, 2004; UTC, 2005). In these metropolitan areas and other large cities, the rapid growth of the middle-income class, the aging of the residential population, and the influx of low-income young laborers pose an increasingly diversified range of demand for urban transport services in terms of quality, trip patterns, and affordability.



21. While the national population is steadily concentrating in urban areas especially the big cities, population within cities is suburbanizing. In Beijing, for example, the residential population declined in the four inner districts but increased substantially in the four outer districts over the period 1990-2000 (Figure 3, which is based on population census data). Other cities are undergoing similar structural changes in land use, with increasing job density in the city centers and declining gross population density city wide. During the last few years, the total built-up area of all Chinese cities has increased over 20 percent, faster than the urban population growth (Qiu, 2004). As a result, home-to-work trips are gradually getting longer and walking or biking is becoming less feasible. Other new trends are now emerging, for example, residential locations by income sorting, large-scale residential development in suburban areas for middle- and high-income groups, and the formation of large informal residential settlements for the floating population in the urban-rural fringe areas. All these changes increase the travel distances of most trips, especially the commuting, and create a new pattern of travel demand that is increasingly dependent on motorized transport.



*Decentralization is changing the ways of governance at the local level, particularly urban management and modes of service delivery...*

22. The last 10 years of rapid motorization coincide with the crucial period of China's **decentralization** that devolves a range of functional and fiscal responsibilities from the national to subnational governments, especially the municipalities. This has a fundamental impact on the ways that the national and subnational governments manage urban development. More importantly, the decentralization is an on-going process and a largely unfinished business. Many problems that emerged due to decentralization are yet to be fixed. For example, local governments are assigned expenditure responsibilities much more than their revenues could bear. These create incentives for local governments to raise funds through whatever ways are possible, only to meet the short-term needs.

23. As decentralization continues, governments at all levels are redefining their role and learning (by doing and through trial and error) how to play it more appropriately and effectively. Institutions, including their rules and procedures, are in the process of adjustment, readjustment and reform. Some of the urban transport problems discussed earlier occurred and persist due to a lag of institutional reform in response to the rapidly changing urban context. With the deepening of institutional reform and fine-tuning of decentralization, institutions will eventually evolve to become more effective to address most of the urban transport problems. The challenge is how to find ways to shorten the lag. Meeting this challenge is important, as the current problems are serious in magnitude and inaction or slow action for any period of time would be costly to the urban economy and society.

*Institutions have not kept pace with decentralization and remain weak to address the spillover effects...*

24. Under the decentralized arrangement, the municipal governments take primary responsibilities—both functional and fiscal—for urban infrastructure, including urban transport. The responsibilities of the national government are limited to the review and approval of urban master plans and large urban transport investment projects (including mass rail transit), setting technical standards and policy guidance, promoting knowledge exchange, and facilitating capacity building. However, the increasingly rapid economic and spatial changes at the local level make it increasingly difficult for the national government to review and approve the urban master plans and investment projects. For example, the approval process for an urban master plan is supposed to take approximately half a year (ICT, 2005), but in most cases, it actually has taken more than two years. One case took seven years. The effectiveness of the national government in carrying out these responsibilities is seriously compromised by the limited national budget available for urban

transport. Central monitoring and supervision is limited at the local level where planning and policy implementation is carried out. To some extent, this situation creates an **institutional void** in addressing the spillover effects of urban transport problems. The presence and growth of the spillover effects, as discussed earlier, justifies a reconsideration of the role of the national government in urban transport.

*Inadequacies in urban institutions and their policy making are affecting the efficiency of cities and their travel conditions...*

25. At the local level, most large cities are able to make decisions and implement them. But do they have the right incentives to make strategic decisions that do not compromise the long-term interests of the cities and the nation? Is the urban planning practice adequate for rapid urbanization and motorization? Are there adequate checks and balances that would make sure a good strategic plan gets implemented? Are the financial means adequate and sustainable? Our diagnostic analysis below suggests that the inadequacies of four mechanisms—incentives, planning, checks and balances, and financing—are the main reasons that prevent the translation of good knowledge into actions and hampers the development and adoption of a sustainable urban transport strategy, with a consequent declining quality of urban mobility and travel conditions across almost all major cities.

26. **The incentive mechanism.** Due to the transitional nature of decentralization, the municipal governments face a number of unprecedented management problems. The mayors are held accountable not only for the provision of urban public services, but also for the performance of the urban economy including, among other things, reforming the state-owned enterprises, running (indirectly as the majority share holder) the local financial intermediaries such as the urban commercial bank, and seeking business investment from outside. They all face tough choices between rapid GDP growth and more balanced, sustainable development. The central and provincial budget support is shrinking, the local revenue base is at an early stage of development, and cities compete ever more fiercely for FDI through infrastructure improvement. When the incentive is strong for a city to rapidly improve the transport infrastructure conditions in order to attract FDI and employment, the sustainability consideration and other long-term interests of the residents are at the risk of being compromised. For many years until very recently, the performance of mayors has been rated by the annual urban GDP growth. The single-minded pursuit of GDP growth has unintentionally caused substantial damage to the environmental and social sustainability. The excessive conversion of farmland that contributes to a non-transit friendly urban sprawl is a case in point. Fortunately, this is beginning to change, thanks to the green-GDP and people-centered development concepts recently promoted by the national government.<sup>2</sup> However, a great deal of effort is needed to operationalize these concepts.

27. **The urban planning mechanism.** The urban planning process is supposed to provide a blueprint for sustainable urban transport development. However, it has its own weaknesses. A challenge facing most large cities in China is how to overcome the **inherent rigidity** of the urban master plan to provide necessary flexibility required for meeting the rapidly growing demand for urban services. Currently, the process produces a 20-year urban master plan, a short-term implementation plan, and a number of associated sectoral master and implementation plans for a planning area defined by jurisdiction. As illustrated by the case of Guangzhou (Box 2), urbanization has grown so rapidly in many cities that actual urban population exceeds in just a few years the planned population target for the entire time horizon of the master plan (i.e. 20 years), and the actual urban functional area expands beyond jurisdiction boundaries. At present, there are no effective cross-jurisdiction coordination mechanisms (UTC, 2005b). The only effective way to handle the problem so far is adjustment of municipal jurisdiction boundaries, such as the case in Guangzhou. But this has often come years after the problem occurred.

### **Box 2. The Problems and Evolution of Guangzhou's Urban Planning System**

The 14<sup>th</sup> Urban Master Plan of Guangzhou Municipality was approved by the State Council in 1984, three years after its completion. By 1989 the spatial expansion of the city had already exceeded the limit set by the Plan for 2000. It was then decided to start the 15<sup>th</sup> urban master planning process. It took a few years to complete, and was submitted to the State Council for approval in 1996. However, the Plan had not been approved until 2003. This extraordinarily time-consuming process was mainly due to the increasing difficulties in sectoral and jurisdictional coordination and a number of previously unexpected changes that would fundamentally affect the direction of urban development. For example, the conversion of two neighboring municipalities into municipal districts of Guangzhou, which was sanctioned by the Provincial Government in 2000, opened up new opportunities for Guangzhou to reshape its land use structure in line with the development of the actual urban functional area. The emergence of land use proposals for large-scale logistics centers, IT centers, a university city and the like also forced planners to revisit the draft urban master plan again and again.

Source: Dai and Duan (2003).

28. It is now recognized that a strategic planning process (also known as conceptual planning) is needed to look into the longer term (30-50 years) socio-economic and spatial development possibilities of a potential urban functional area, not necessarily a jurisdiction area (Qiu, 2005). Guangzhou has adopted this approach, putting the future development in a much broader context of globalization, regional integration, and ecological preservation (Li, et al. 2002). The strategic plan has allowed a higher level of flexibility by focusing on spatial structure and cluster development instead of the specific use of every land parcel, thus helping alleviate the rigidity problem of the urban master plan. A main constraint for most other cities is lack of technical capacity and practical experience in strategic planning.

29. Another weakness of the current urban planning process is that planning is still very much an art of the technocracy (Qiu, 2005). **Public participation and monitoring** in the planning process is still at the early stage of experiment. While professional technical competence is needed for the planning practice, it is not sufficient. Effective and meaningful public participation and monitoring is an essential element to protect the long-term interest of the city and the interests of disadvantaged groups. This is especially important at the time of rapid growth that often requires modification of the master plan. Due to the lack of it, there are numerous incidents where planners have to modify the master plan in a manner that compromises the long-term interest to accommodate the short-term initiatives. This is somewhat related to the **weak enforceability** of the master plans. An urban master plan, once approved by the higher authority, becomes a law enforceable by the local People's Congress. However, the associated detailed implementation plan and sectoral plans (such as city street network plan) are not required to be approved by the higher authority. This creates opportunities for some cities to push for the implementation of investment projects that are not consistent with the urban master plan (ICT, 2005). This also explains how some cities are able to build image projects excessively, crowding out the financial resources that could be used more efficiently for meeting the urgent need for transport infrastructure services.

30. The most serious weakness is perhaps the **de-linkage between the urban master plan and the city's expected budget**. The linkage between planning and financing, if any, is further weakened by the lack of sustainable financing mechanisms for urban infrastructure. The urban master planning process in most cities often presumes essentially

unconstrained demand for urban infrastructure improvements required for city build-out. There is no financial feasibility analysis or “hard budget constraint” analysis on the supply of capital for plan implementation.<sup>3</sup> Urban infrastructure improvements foreseen in the urban master plan are implemented on an *ad-hoc* basis as and when funding is secured for specific projects.<sup>4</sup> Few cities have included a Capital Improvement Plan—a common practice in many other countries—in the planning process. This greatly reduces the realism of urban planning, and often makes it difficult to implement.

31. This *ad-hoc* case-by-case process is impacted by several constraints in the funding environment. The nested hierarchical system of public finance in China makes it difficult for lower-level local governments to plan multi-year operating and capital expenditures. Higher-level governments, such as the provinces, have the authority to change the rules regarding the allocation of revenues to lower-level government units, even though these governments must follow the general principles established by the Ministry of Finance regarding revenue assignments. Allocation formulae can shift from year to year, making it difficult to plan investments and operating expenses more than one year at a time and certainly over the life of a loan. Unless this process changes, it will be difficult to develop a “hard budget constraint” that insures fiscally sustainable cities.

32. **The checks and balances mechanism.** Mechanisms are needed to ensure that an appropriate procedure is in place for municipal decisions to take into consideration the interests of the majority of the urban residents. The urban planning and implementation process in China is kept in checks by the higher level authority and the local People’s Congress. In recent years, the process is also gradually open up for monitoring by the mass media and the general public. However, the mechanism remains largely incomplete. It is generally reactive to problems that occur in the planning implementation stage, instead of more active in the early stage of the planning process. This arises from the lack of clarity on the roles, responsibilities and accountability of all parties involved in the process, and lack of due procedure for resolution when concerns or disputes occur. There is no adequate and clear accountability system in place to hold decision makers responsible for the social and environment consequences of their decisions. While public consultation is adopted by many cities, it is sometimes manipulated by the planning authorities. The rapidly growing demand for urban services also creates a sense of urgency for the municipal governments to make decisions and take action speedily. This is often accomplished through bypassing the constraint of the urban master plan. The results are mixed—some succeed in overcoming the rigidity of the master plan while others meet the short-term needs at the heavy cost of long-term interest. Much remains to be done in improving the checks and balances mechanism to ensure sensible decisions are made on a broadly informed, transparent basis.

33. **The municipal financing mechanism.** The cost of providing urban transport infrastructure to carry the growing traffic is high. At the same time as the explosive urban growth has increased demand for urban transport services, decentralization has shifted much of the responsibility for providing these services to local governments, who are faced with the burden of increased expenditures without the power to raise revenues on the scale needed. In 1994 China adopted a tax reform and introduced a Tax Sharing System, where the central government and subnational governments had separate tax-collection powers over certain categories of taxes. However, due to the asymmetry between fiscal power and expenditure assignment, the ratio of subnational revenues to the total revenues has averaged around 50 percent, while the ratio of local fiscal expenditure to the total remained high at about 70 percent. The gap has been filled mainly through off-budget funds, which include borrowing through municipal government-owned infrastructure investment companies, municipality-imposed surcharges, donations by beneficiaries, and land concessions. These

off-budget funds help bridge the gap between the limited municipal budgetary revenues and the growing expenditures, and are critical to financing urban transport infrastructure (Peterson, 2004). Cities spend, on average, 45 percent of their urban infrastructure budget on new roads. But this is only a fraction of the total capital spent on roads. The balance is made up mainly by the off-budget funds.

34. There are various problems with off-budget funds. Lack of transparency and the resultant hidden financial liabilities are a major concern to the national government. From the perspective of urban transport financing, relying on off-budget funds is not a sustainable practice. Land concessions, for example, are a major source of off-budget revenues for urban transport, but they are not a sustainable source of revenues. In the current practice, the urban land price is determined by market perceptions (sometimes inflated) of its value in future urban use, whereas compensation to the farmer is determined as the present value of a few years' crops grown on it. This big gap creates strong financial incentives for local governments to acquire farmland for land concessions, often more than necessary. New and more stable sources of local revenues are needed. Property taxes, betterment charges, and municipal borrowing—important sources of funding for infrastructure in many developed cities—are either at the early stage of development or not permitted by law.

*The political context is shifting in favor of institutional reform for sustainable urban transport...*

35. The institutional weaknesses—namely the institutional void between the national and municipal levels and the inadequacies of incentives, planning, checks and balances, and financing mechanisms—have been recognized for some time, but have not been systematically addressed through policy and institutional reforms. An opportunity has just emerged. After a decade-long pursuit of rapid GDP growth, there is now a much stronger recognition at the national and municipal levels of the sustainability element of the growth agenda. In response, the current leadership is promoting the green-GDP concept and is placing a new emphasis on people-centered development.

36. This shift in policy emphasis is also starting to influence the urban transport agenda. It is becoming clearer to the Chinese government that road expansion alone is not an adequate answer to motorization and traffic congestion. There is an unprecedented interest at different levels of government in issues related to public transport and the adequacy of planning and financing mechanisms. There are signs of recognition for a stronger role of the national government in urban transport. Serious attention has been given to public transport by the top government leaders. The Ministry of Construction (MOCn) issued guidelines on public transport development in April 2004. In May 2004, Premier Wen Jiabao made it clear that “giving priority to urban public transport development is a correct line of strategic thinking that suits the reality of China’s urban and transport development.” On September 23, 2005, the State Council issued a document (No. 46 in the year 2005 series) endorsing an opinion by the MoCn on priority development of urban public transport. The debate on urban transport policy is increasingly covered by the mass media. With increasing recognition of the energy and environmental problems (including loss of agricultural land) associated with rapid urban motorization, the national government is considering the amendment of a Land Administration Law and the drafting of a Land Planning Law as a means to clean up the excessive land development at the local level. After 10 years of practically staying away from urban transport matters, the national government clearly sees that it still has a crucial role to play. The question is how to define the role appropriately and how to play it effectively.

37. Political trends also appear to be favorable for institutional reform for sustainable urban transport. Chinese society is becoming increasingly open. Civil organizations for environment and the disadvantaged are developing and increasingly influencing public opinion. Mass media, particularly the internet, are becoming a rather healthy critic of local

government policies and practices. The internet often picks up the problems which the national government policy monitoring mechanisms fail to pick up. The government, techno-bureaucracies, and civil society are all calling for more openness and accountability in the planning and decision making process.

### III. Priority Actions for Institutional Development

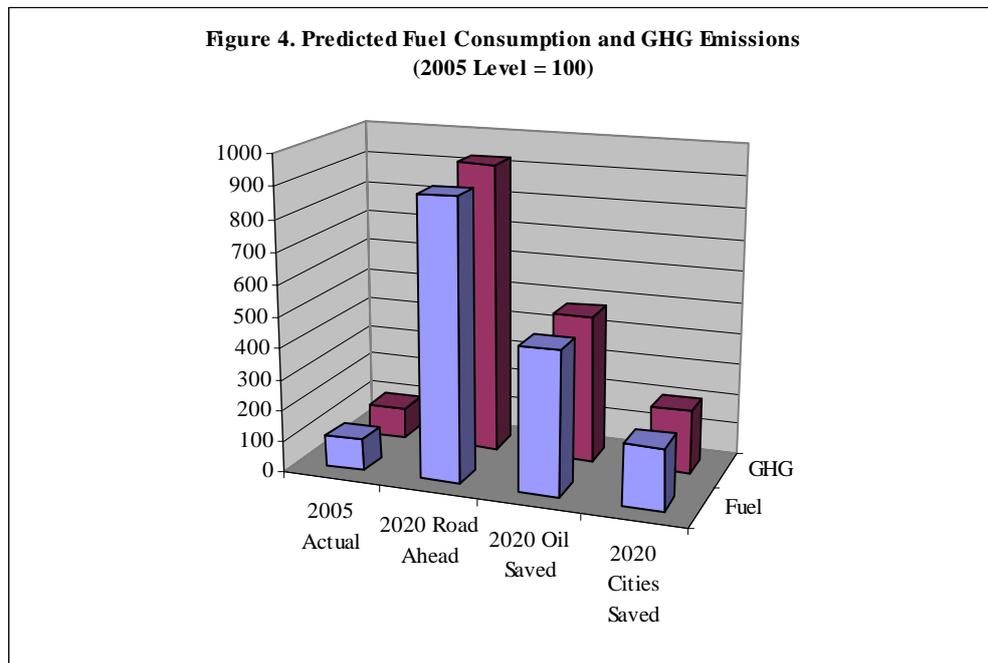
*Technological solutions exist but strong institutions matter the most...*

38. As the above diagnostic analysis indicates, China's large cities are generally able to mobilize resources to build and maintain urban transport infrastructure, but the emerging complexities of the urban economy and related demand for travel mobility require forward looking institutions which are adaptive to changes and capable of managing a sustainability agenda for their cities. At this stage of rapid development and social transformation, institutions matter the most. This note proposes some strategic directions and short- to medium-term priority actions for developing effective institutions to promote sustainable urban transport.

39. The strategic directions should be linked with the **expected outcomes**. A major dilemma facing the national government is the apparent conflict between the automotive industrial policy and the sustainability concerns. Is there a win/win strategy? The answer is yes, according to recent analyses. One study estimated the levels of fuel consumption and GHG emissions under three hypothetical scenarios defined below (Shipper and Ng, 2004; Ng and Shipper, 2005):

- A **road-ahead** scenario assumes the current growth rate of motorization and current fuel prices, with conventional gasoline vehicles as the dominant vehicular technology.
- An **oil-saved** scenario assumes the current growth rate of motorization, but allows hybrid electric vehicles to gain 15 percent of the market by 2010 and a more significant 50 percent by 2020. Apart from conventional gasoline vehicles, the market penetration of compressed natural gas (CNG) and small electric vehicles will also be relatively high. The scenario also assumes a higher share of smaller vehicles in the fleet and higher fuel prices that would reduce average vehicle utilization. The advanced technological options assumed for the scenario are those already adopted or being adopted by some developed countries. More importantly, the scenario assumes the Japanese/European level of taxation on fuels.
- A **city-saved** scenario takes one more step beyond the oil-saved scenario, allowing a lower level of vehicle utilization as a result of compact city development and better public transport services. In this scenario, small and fuel-efficient vehicles will play a considerable role in reducing fuel consumption and emissions reduction. Hybrids, together with small electric and CNG vehicles, will dominate the market, with conventional gasoline vehicles constituting only 30 percent of the total market. There will also be an increase in the use of small electric cars (e.g. "smart" cars) out of the 30 percent. In addition to the Japanese/European level of taxation on fuels, there would be significant charges on vehicle use in cities.

40. The simulation results are striking (Figure 4). They show the possibilities for enormous savings in energy and reduction in GHG emissions without compromising the automotive industrial development objective. Although the estimates are subject to further refinement and debate, they nonetheless point to a huge potential pay-off if a city-saved



scenario could be created. It should be noted that the simulations of the oil-saved and city-saved scenarios are based on the proven performance of the advanced technologies and policy instruments. Allowing for further technological advancement in the next 15 years, the pay-off by 2020 could be even larger. In addition to the savings in energy and reductions in GHG emissions, the city-saved scenario also encompasses some other desirable features of sustainability. For example, farmland could be saved and the efficiency of the urban economy could be maintained if compact cities with higher densities, efficient public transport, and fuel pricing are designed and encouraged.

*Energy efficient vehicle technologies and clean fuels can be part of the near-term solutions...*

41. It is not difficult to see the policy directions China should take. The 2004 automotive industrial policy encourages the development of energy-efficient and low-emission vehicles, and more effort to research and develop low-sulfur vehicular fuels and alternative fuel vehicles such as hybrid electric vehicles. Clearly, the policy is heading in the right direction. In the context of sustainable urban transport, perhaps the policy should be refined to encourage the development and production of small electric vehicles that would be suitable for low-speed driving in dense urban environments.

*But overall sustainability would depend on capable institutions and their instruments to manage urban dynamics and resulting travel demand...*

42. Much remains to be done in developing institutions for promoting sustainable urban transport. Most of the current policy directions for urban planning and urban transport development as stated in the government guidelines and directives (such as giving top priority to public transport development) are good and should be re-emphasized. But they should be made more specific for the purpose of implementation. Compact cities with efficient public transport should be encouraged. Road development should be carefully planned, not only for meeting the growing traffic but also for achieving the desirable land use/transport patterns. The primary objective of urban transport development must be to move people and goods, not vehicles. Public participation in urban transport planning should be made mandatory and ensured by law. Municipal government decisions should be made open to public scrutiny.

43. The sustainable urban transport strategy is about how to make the desirable long-term outcomes achievable. As discussed earlier, knowledge on options for sustainable urban

transport is not lacking in China. There are many planning and policy instruments that could be used to develop public transport and to manage motorization.<sup>5</sup> The key is if we have the supporting policies and institutions to ensure the application of these instruments in an integrated manner. Therefore, the key emphasis of the policy directions should be on the development of supporting institutions and institutional procedures that could facilitate both the national and municipal governments to make choices that would meet the **four criteria**: environmentally sustainable, socially acceptable, economically viable, and financially feasible.

*A new framework for urban transport development is needed...*

44. **A new framework for infrastructure** recently proposed by the ADB, the Japan Bank for International Cooperation (JBIC) and the World Bank can be fittingly applied for institutional development for sustainable urban transport in China. The framework is based on an extensive study of infrastructure development experience in recent years in East Asia (ADB, JBIC, and World Bank, 2005). It has four basic components: **inclusive development** as the goal, and improved **coordination, accountability** and **risk management** as the means to achieve the goal.

45. Inclusive development is about improving the lives of all members of society, particularly the poor, by generating economic growth, sharing its benefits, and enhancing access to services. Coordination is about the state's ability to generate strategic vision and translate that vision, through service delivery, into infrastructure outcomes. This requires making trade-offs between multiple objectives, particularly when multiple actors are involved. Who makes those trade-offs is important, and so is how leadership and participation are balanced in that process. Accountability and risk management are about what happen lower down in the service delivery process. When various players—consumers, communities, service providers, regulators, investors, government and nongovernmental organizations—are involved in service delivery, it is important to ensure that their interactions result in the desirable infrastructure outcomes. This requires accountability mechanisms to reward good performance and punish bad, and risk management mechanisms to ensure that potential costs and benefits are equitably and sustainably allocated.

46. By putting the new infrastructure framework into the context of urban transport development in China, we are able to identify the priorities for institutional development actions (Box 3). To achieve inclusive development, cities in China need to address the mobility needs of the poor and those without vehicles. A strong institutional framework

### **Box 3. Proposed Priority Actions for Institutional Development**

- Redefine the role of the national government in urban transport to enhance coordination and risk management;
- Develop accountability mechanisms and a strengthened local governance structure for urban transport;
- Build up the institutional capacity for strategic planning, as a basis for effective coordination;
- Establish the linkage between urban transport planning and financing, to enhance coordination and accountability;
- Develop a sustainable and transparent financing mechanism, as a foundation for financial risk management;
- Develop a viable public transport industry as a center piece of urban transport services for inclusive development.

is needed for effective coordination between the national and local governments under decentralization, and between local governments within a metropolitan region, and between various parts of a local government. Appropriate accountability mechanisms should be put in place, so that participation and transparency in planning and budgeting become an integral part of the sustainability agenda. And most critically, both national and local governments should play key roles in managing the various risks—environmental, social, and fiscal—associated with urban transport development.

**Action 1. Redefine the Role of the National Government in Urban Transport**

*The national government has a role despite decentralization...*

47. The national government should strengthen its role in urban transport, to provide policy directions and reward good practices. This is essential to re-align the incentives of municipal governments so that the long-term interests of the cities and the nation are appropriately considered in the local decision making process. While urban transport should remain the primary responsibility of the local government, national budget support should be considered to encourage and reward best practices at the local level. As the recent successful experience of Human Settlement Environmental Award demonstrates (Box 4), rewards from the central government—either moral or financial—can be a powerful tool for re-aligning the incentives of the municipal governments. In relation to the incentives created by the central government, an urban transport performance benchmarking and evaluation system should be developed to monitor how cities are performing in city development including urban transport (Box 5).

**Box 4. The Human Settlement Environmental Award**

In 2000 China's Ministry of Construction set up an annual Human Settlement Environment Prize to honor cities that have made outstanding contributions in promoting sustainable development and improving environmental quality and overall functions of cities. The award is based on the public appraisal of some 28 selected indicators of air and environmental quality. The winners would be recommended to the United Nations Center for Human Settlement for its "Human Settlement Award" and "Dubai's International Best Practices to Improve the Living Environment." In 2001, five cities—Shenzhen, Dalian, Hangzhou, Shihezi, and Nanning—won the award. The award is now widely regarded by the mayors as one of the highest honors.

Source: People's Daily website: <http://english.peopledaily.com.cn>, January 11, 2002.

*The national government can promote incentives for changes and reduce risks...*

48. The national government has been driving the decentralization process. It should continue its strong role, initiate and guide the deepening of municipal finance reform (especially the expansion of the local revenue base) and help create conditions for municipal borrowing. Moreover, the national government could play a strong role in institutionalizing a standardized local urban transport planning process (content, procedure, consultation, etc.) which is fully integrated into the urban planning process, fiscally constrained and regularly updated. The national budget support proposed should be linked to the successful implementation of the agreed planning process. Moreover, national budget support may be considered for the large cities in the central and western regions. These cities face similar urban transport problems to the large cities in the coastal region, but have much weaker financial and technical capacity for addressing the problems.

### **Box 5. Urban Transport Benchmarking: An Initiative in Europe**

The concept of benchmarking has been used widely by many different types of organizations seeking to learn more about their operational shortcomings. The process of benchmarking involves comparing operational performance in similar institutions, organizations or enterprises in order to gain some understanding of the best practices employed within a given industry. Once performance differences across an industry are understood, then each participating organization has the potential to integrate best practices within the scope of its own operations in order to attain measurable performance improvements. The benchmarking process is usually centered upon performance indicators, which operate as a means of self analysis and help to identify key differences between participating organizations. Once the benchmarks have been established, it is up to individual participants to implement the process changes that should improve performance levels.

An urban transport benchmarking initiative is now going on in Europe. It develops and compares the common indicators and thematic data indicators among participating cities. The common indicators provide a quantitative data set of the general features of each of the participating cities' transport systems. The thematic data indicators are grouped into five themes: (i) behavioral and social issues in public transport; (ii) city logistics; (iii) cycling; (iv) demand management; and (v) public transport organization and policy. The themes are chosen by individual participating cities in order that the benchmarking reflects their interests in terms of urban transport systems in cities.

Sources: <http://www.transportbenchmarks.org/benchmarking/urban-transport.html>.

49. The national government may also consider developing a **national urban transport development strategy**, as a vehicle to work out the details of the above recommendations and build nation-wide consensus on policy directions. It should be formulated in line with the national land, environment, energy, and fiscal decentralization strategies. The strategy should be comprehensive, clarifying the elements of the urban transport governing structure and addressing issues relating to the roles and responsibilities, incentives, financing, implementation, monitoring and enforcement mechanisms. It should also suggest specific policy directions for urban transport related matters, including urban transport planning, public transport industry, land conservation, energy efficiency, motor vehicle emission standards, and road safety regulations. The policy directions and the strategy should be formally adopted after wide consultation, especially with a variety of municipal governments.

50. For the national government to play a more effective role in urban transport, we recommend support to a **pilot demonstration program** at local level. The program would be based on a central/local partnership. The national government may develop technical guidelines for urban transport under the framework set by the national urban transport development strategy. A few large cities should be selected to develop and implement their city-specific strategy, institutional reforms, and transport development projects in line with the national urban transport strategy and policy directions. The program will be a test ground to demonstrate how sustainable urban transport results can be achieved at the local level. National government budget support for the program will be an important leverage to encourage buy-in from the selected cities.

## Action 2. Develop Accountability Mechanisms and a Local Governance Structure for Urban Transport

*Much could be done to improve local governance for urban transport...*

51. There is scope for improving the incentive structure of the municipal governments. The performance of a city should be evaluated more comprehensively, not only in terms of GDP, foreign direct investment and employment growth, but also environmental quality, urban livability and local capacity building. The national programs such as the Human Settlement Environment Award will help re-align incentives, but the improvement of the local governance structure is the foundation for getting the incentives right.

52. First of all, a comprehensive performance indicators system should be adopted at the city level. And the performance of the municipal government should be monitored not only by the higher authorities, but also by a local institution that represents the long-term interest of the city residents and that could safeguard the due procedures for conflict resolution. One example of such institutions is the municipal councils in the USA. According to the current political structure of local governance in China, the **local People's Congress** should assume this role. In fact, this would be consistent with the on-going political trends at the local level. Some local People's Congresses are already actively involved in the development and enforcement of local laws and the review and approval of key municipal appointments.

53. Specifically for urban transport, the functions of the local People's Congress should include: (i) review and approval of major municipal development policies; (ii) monitoring of the process of planning and policy implementation; (iii) safeguard of the urban community's long-term benefits; (iv) evaluation of the performance of municipal leaders; and (v) approval and disapproval of the appointment of mayors and municipal bureau directors. To effectively carry out these functions, moreover, the local People's Congress should be strengthened to have better representation of all stakeholders.

54. The openness of the municipal decision-making process through **public participation**, consultation and monitoring is another important element of the local governance structure for urban transport. Public participation throughout the decision making process should be made mandatory and ensured by law. It would be desirable if public participation is organized by the local People's Congress instead of the municipal government and associated agencies. Other channels for direct feedback from the public to the municipal government and local People's Congress, such as the mayor's hot line, internet, town hall meetings, and local mass media, are increasingly adopted by cities, and should be further encouraged.

## Action 3. Strengthen the Institutional Capacity for Strategic Planning

*Strategic planning should be adopted as the basis for effective coordination and risk management...*

55. The urban planning process should be reformed so as to ensure that long-term urban land use and transport strategic planning are part of the urban planning process and interactive with urban master planning. The strategic planning should provide key inputs for the urban master plan. All large cities should be required, perhaps through amendment of the Urban Planning Law, to carry out strategic planning. The initial experience from Guangzhou, described earlier, demonstrates the value of strategic planning in helping deal with the development uncertainties created by rapid economic dynamics, and overcome the inherent rigidity of the urban master plans. Much could also be learned from international experience (Box 6). This will be a major **capacity building** effort. Despite the availability of strategic planning tools, only a few large cities have hands-on experience in strategic planning practice. The national government has a role in local capacity building. It could provide and facilitate training, and take a lead in disseminating international and domestic knowledge and best practice.

### **Box 6. Strategic Transport Planning in London**

Greater London is a metropolitan area covering an area of 1,560 square kilometers and with a population of over 7.5 million. The responsibility for transport strategic planning rests with the directly elected Mayor. Transport for London (TfL) is the agency responsible for implementing the Transport Strategy for London. It is formally a statutory corporation, a functional body of the Greater London Authority, which reports to the Mayor. It has recently been granted extensive borrowing powers for transport development. TfL is accountable for both the planning and delivery of transport facilities for which the Mayor has responsibility. This includes the management of London Buses, management of the underground railway service (maintenance of the infrastructure and rolling stock is concessioned to the private sector), light rail and trams; the regulation of the taxi and hire car trade; and the management of a 580 kilometer network of main roads and all of London's 4,600 traffic signals. It works with the London boroughs (the bodies responsible for local roads), the Strategic Rail Authority (which oversees services into London on the national rail network) and the Police.

The London Boroughs receive their funding primarily from their own local tax sources and grants from central government. However, TfL, through its Borough Partnerships Group, provides funding to the Boroughs (140 million pounds in 2003/4) for a range of schemes considered to be of strategic importance, including principal road maintenance and bridge strengthening; local safety schemes; walking, cycling, bus stop accessibility and local bus priority measures; area based pedestrianization schemes, controlled parking zones and environmental improvements.

The congestion charging scheme which applies to a relatively small area of Central London and the West End has reduced traffic by 16% and reduced congestion by 30% in that area during the charging hours. TfL procures bus services from private sector suppliers under a system of competitively tendered franchising. Its buses now carry more passengers than at any time since 1969 and operate the highest number of bus kilometers since 1963.

Mainline rail services are procured by the Strategic Rail Authority (SRA) under a similar competitive concessioning arrangement. A London Rail Partnership Agreement has been set up between TfL and SRA to ensure the same sort of integration achieved in cities such as Paris, which have a single authority with power to develop strategy and to specify and fund all commuter rail services. There are suggestions that the function of procurement for suburban rail services should be transferred to TfL.

TfL is funded primarily (51%) from its trading revenues (including the revenues from its road pricing scheme), 48% from transfers from central government and 1% from transfers from the Greater London Authority.

Source: contributed by Kenneth Gwilliam.

### **Action 4. Establish a Link between Urban Transport Planning and Financing**

*Transparency in planning and budgeting would enhance sustainability...*

56. Given limited resources, cities have to prioritize their urban infrastructure expenditures. This will be based on careful assessment of the demand for funds. The first step is to understand the magnitude of urban infrastructure improvements that a local government will require and how it can fund them. Cities should adopt a planning process that establishes funding priorities and rations them in favor of the most cost-effective investments.<sup>6</sup>

57. One of the most critical steps in creating hard budget constraints is the **Capital Improvement Plan** (CIP). Such a plan prioritizes urban infrastructure improvements by sector (e.g. transport, water and sewerage, power, recreation, education). This process is necessary to determine resource allocation priorities between urban transport and other sectors, while maintaining the city's fiscal integrity and the "hard budget constraint". A city may adopt a policy that defines the social benefits expected from the capital improvements as the basis for setting priorities. For example, priority may go to expansion of core city streets to accommodate higher bus volumes, including dedicated bus ways. Or the city may choose as its priority to provide quality education to its citizens, as measured by specific scores on standardized tests (or some other measure of output performance). A social benefit/cost analysis determines the most cost-effective urban infrastructure investments, which are then incorporated into the multi-year CIP.

*Asset management  
remains a top  
priority...*

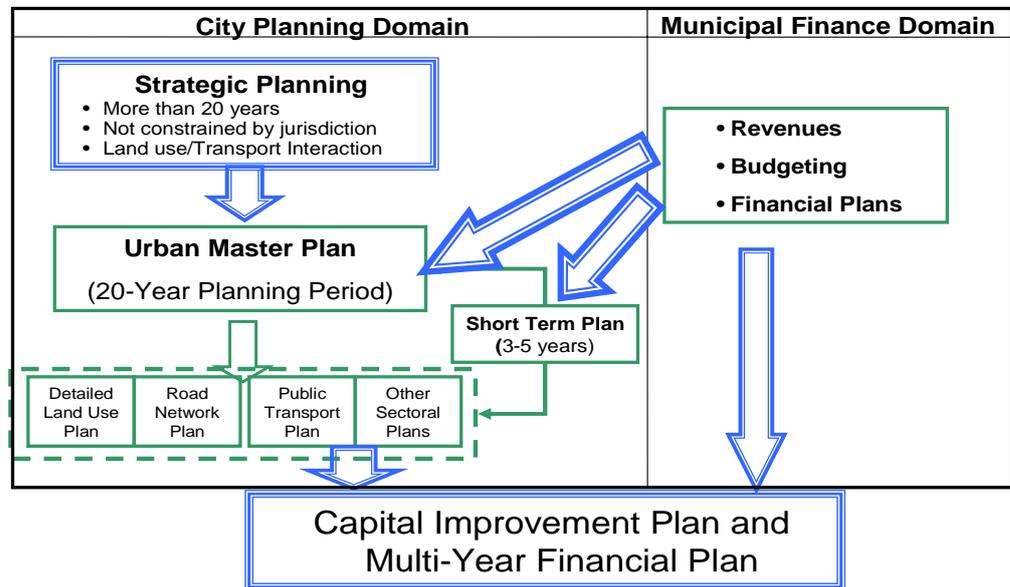
58. However, on-going city services should have the first claim on city revenues, and only the surplus should be allocated for capital investment. To maintain fiscal integrity, this will require the city to first estimate its multi-year operating expenditures and determine the level of net operating surplus available for infrastructure investment. These surplus revenues are then combined with revenues from specific sources for capital programs, such as funding available from the national government for programmatic purposes, such as waste water treatment plants. Each urban infrastructure sector then produces a financing plan, including debt secured by net operating revenues and/or earmarked revenues only available to a sector.

*Only a fiscally  
constrained plan  
can be real...*

59. The city then produces a **Multi-Year Financial Plan** that demonstrates how it will fund the priority infrastructure investments, including urban transport, and what sources of revenue are available for these improvements. Prudent financial planning will ensure that a city complies with its operating budget mandate to provide services and have sufficient revenues to continue to build and maintain its urban infrastructure to support economic growth. The Multi-Year Financial Plan—made up of the multi-year operating plan and multi-year capital improvement plan—demonstrates to lenders how the city expects to maintain its creditworthiness in the period matching the likely duration of commercial bank loans (i.e. five to ten years). Each year the city revises the Multi-Year plan based on annual outcomes; i.e. the actual level of revenues received vs. forecasted revenues and operating and capital expenditures. The Multi-Year Plan is also used in the annual budgeting process in an iterative fashion to confirm that sufficient operating and capital revenues are available in the medium term to maintain city services and expand its infrastructure base while protecting its fiscal health. This proposed planning and budgeting process is illustrated in Figure 5.

60. To prevent aggregate over-spending by local governments, the national government has long controlled the size of local investment through its review and approval process. However, this control has proved to be ineffective as over-spending has tended to occur from time to time. Part of the reason is that the approval process has applied to mega-projects only, instead of each city's whole CIP. The introduction of CIP, along with the hardening of the budget constraint at the local level, would help the national government keep the potential risk of local financial liabilities in check.

Figure 5. A Proposed Planning and Budgeting Process



### Action 5. Develop a Sustainable and Transparent Financing Mechanism

*Sustainable financing mechanisms should be developed, to correct wrong incentives and enhance risk management...*

61. The lack of sustainable financing mechanisms is a major constraint for China's cities. After almost a decade of rapid growth in off-budget funds for urban transport, it is time for the cities to develop such mechanisms. The pre-requisite is a municipal infrastructure finance framework.<sup>7</sup> As transport is a large part of the infrastructure in most Chinese cities, what applies to infrastructure in general also applies to transport in particular.

62. A sustainable infrastructure finance mechanism should start with the strengthening of the self-financing discipline of the public entities that supply infrastructure services. Infrastructure assets are by their nature long-term, up to 20-30 years and more. Demand is generally stable or steady in its growth. They need stable, predictable sources of income. There is a strong *prima facie* argument that users should pay. In fact, the users-pay principle has been increasingly adopted in many urban infrastructure services in China. The main complication is that, given the lumpiness of capacity increments, it may not be reasonable to ask today's users to pay for capacity required for the next generation. Hence the case for long-term debt. The relative stability of urban transport markets means that commercial risks are not large and technologies evolve only slowly. A high ratio of debt to equity is therefore acceptable.

63. A city's budget is an appropriate source of equity, given its interest in serving its 'customers' and in some cases bearing market risk (such as in building a street and sewer network before suburban land gets built up). Private equity, at its best in competitive markets and in financing innovation, has shown itself efficient in construction but offers no great advantage in design and management of urban infrastructure where public interests weigh heavily.

64. At the moment, municipal borrowing is not permitted by law. A municipal infrastructure finance framework should be established around the assumption that

municipal borrowing for infrastructure will be possible before too long. A number of actions should be started now to introduce more stable local revenue bases (such as property tax), improve the quality of municipal financial management, harden budget constraints, make municipal finance transparent, and build up creditworthiness. The extra-budgetary fund process that is heavily used in infrastructure financing should be formalized and made transparent.

65. To help transform the current *ad-hoc* infrastructure planning process into a CIP as discussed earlier, China should advance revenue and expenditure assignment reforms started with the 1994 Tax Reform. Efforts are needed to reduce the uncertainties associated with raising revenues and the shifting expenditure requirements of the cities. For example, the Ministry of Finance makes annual adjustments to the revenue equalization process to balance revenues among provinces. This creates a great deal of uncertainty for local governments regarding the amount of funding available from Central Government to the provinces, and subsequently, from the provinces to sub-provincial government units for their annual operating and investment expenditures. Unless the central government establishes transparent, stable, enforceable, expenditure and revenue assignments for annual operations at all levels of sub-national government, it is unlikely that local governments can use “hard budget constraints” to plan for their urban infrastructure requirements.

66. As noted above, before local governments can use their “full faith and credit” pledge to repay loans, creditors must understand, in detail, how they plan to fund on-going services and whether there will be sufficient surplus revenues to service the debt associated with borrowing for the Capital Improvement Plan. Today this analysis is not possible because of the fluctuating nature of revenues based on shifting revenue assignments and lack of clarity and predictability in the equalization and inter-governmental tax revenue transfer process. Until there is greater predictability in the rules governing this process, it is not prudent to allow cities to borrow using a “full faith and credit” pledge of city revenues, through city-owned companies, or even from foreign donors intermediated by the Ministry of Finance.

#### **Action 6. Develop a Viable Public Transport Industry**<sup>8</sup>

67. There is little disagreement that the centerpiece of China’s sustainable urban transport strategy will be a much improved and differentiated public transport industry, one capable of providing services both affordable and basic for the poor non-car-owning families and attractive to the more affluent, particularly for radial work and business trips. The difficulty lies in the conflicting objectives derived from the Chinese government aspirations that all families will eventually have access to a private car and that public transport will increasingly be provided as a market driven service, with a limited burden on the public budget. Many countries in the western world such as the U.S. have failed to reconcile these conflicting objectives. Only in cases where the authorities have been willing to restrain the use (but not necessarily ownership) of private cars and give priority to public transport in the use of scarce infrastructure, as in Zurich, has it been possible to reconcile the objectives. Hong Kong and Singapore are successful examples in Asia: the two cities impose high taxes on private car ownership.

68. The key lesson from this international experience is that a successful urban transport policy needs to combine actions in urban transport infrastructure investment and traffic management with actions in the public transport operations. The road and traffic policy part of this combined strategy might include bus segregation or priority schemes, restraint of car traffic in congested areas or times, and charging for the use of roads through congestion pricing. Some large cities in China are heading in this direction. But more effort is needed to improve the commercial and operating environment for public transport.

*A healthy and efficient public transport industry is central to enhancing urban travel mobility...*

69. In particular, cities should seriously consider a number of measures, including: (i) physical improvements in public transport infrastructure (which will increase the attractiveness of public transport); (ii) introduction of competitive incentives for suppliers (which will reduce costs and improve operational performance); (iii) fare and subsidy policies to focus assistance on those deemed to need it most (which will increase the effectiveness of any subsidy); and (iv) creation of a stable and predictable commercial environment for suppliers (which will help attract private and foreign capital into the sector).

70. The national government has recently issued two policy documents directly relevant to the problems of further development of the urban transport sector. The first relates to the context in which public transport is supplied, and recommends that public transport should be given priority in urban transport development.<sup>9</sup> The second relates specifically to the way in which the municipal public utilities operate and recommends the franchising of operations of municipal enterprises.<sup>10</sup> Both are critical to the establishment of a reform strategy for public transport.

71. The challenge is to find a supply system which can simultaneously meet a set of objectives: maintaining public transport as an integrated system; reconciling social objectives with efficient commercial operation, maintaining control over quality; and finding an appropriate relationship between the private and public sectors. In practice, there are many ways in which urban passenger transport services can be supplied – a spectrum running from the administered public supply model, to the regulated market model, and to the free market model. What model would be appropriate for a city should be worked out case by case. But the national government should clarify the policy directions for resolving the current conflict between the government's social objective and the public transport enterprises' financial objective. At the local level, initial steps should be taken to meet the main requirements for an efficient, market oriented, urban public transport planning and management system. These steps may include: (i) integrating public transport planning within a broader strategic urban land use and transport framework; (ii) separating planning responsibilities from those for supply of services; (iii) designing an efficient franchising system; and (iv) developing an appropriate legal framework for competitively tendered franchising.

#### **Political Commitment to Real Actions**

72. Political commitment to real actions is key to success. Implementation of the above recommended actions will not be easy. In addition to the auto industry, a few other sectors, such as banking, insurance, and real estate, have strong business interests in supporting motorization. These could make the development of compact cities difficult. Reforms of fiscal systems and intergovernmental fiscal relations to harden the local budget constraint are urgent but will also be difficult. Capacity building for strategic planning and financial planning will take time. All these point to a need for strong political commitment to the immediate actions.

*Bank can be a partner in promoting government's agenda for urban transport sustainability...*

#### **IV. The Role of the World Bank**

73. The World Bank assistance to China's urban transport sector started in the early 1990s. Since then, the Bank has undertaken eight urban transport lending operations in a total of nine client cities (Shanghai, Guangzhou, Shenyang, Anshan, Fushun, Shijiazhuang, Tianjin, Urumqi, and Wuhan). These are followed by a strong lending pipeline for at least three more cities and a proposed **Urban Transport Partnership Demonstration Program**, partly funded by the Global Environment Facility (GEF) that aims to develop a national and

municipal partnership for institutional capacity building and financial support to selected pilot cities for sustainable urban transport development. Given the strong interest from the national government and some major cities for future collaboration, the expectation from the Government of China and within the Bank for better effectiveness and sustainability of Bank assistance is increased. Thus there is a need for the Bank to develop a new urban transport operational strategy, which should aim at scaling up assistance and improving development outcomes. This policy note serves as a basis for the development of the Bank operational strategy.

74. As a point of departure, the role of the Bank should be to bring together the best practices of institutional building and transform them into Chinese reality, support China with their adopted vision and strategy (e.g. green GDP and people-centered development) and transfer experience on good practices of urban transport management. There are several specific areas where the Bank can be a development partner in promoting the government's agenda for urban transport sustainability.

75. Firstly and at the national level, the Bank should continue and **strengthen policy dialogue with the national government**, and work more extensively with relevant ministries and agencies in policy analysis and on the formulation and dissemination of advice to subnational governments on implementation of the national policy directives. By bringing in relevant international experience, the Bank could advise the national government on development of a national urban transport strategy, policies, and legislation. Similar to the support to the GEF Partnership Demonstration Program, the Bank could also **support initiatives originated at the national level** to provide technical and administrative guidance to cities, as well as centrally funded incentives to cities to adopt good policies and actions. One particular policy area for collaboration would be a national-level initiative to develop practical applications of the 'green GDP' concept, robust enough to serve as a performance evaluation system for mayors.

76. Secondly, at the city level, while the Bank should continue the **city-specific lending operations** to meet the investment needs of client cities, the future lending operations should be identified within the strategic framework being developed under the GEF Partnership Demonstration Program. Technical assistance associated with the lending operations should respond to the client needs for institutional development to promote sustainable urban transport. More importantly, the Bank should work with the national government to ensure that all city-specific lending programs pilot new policy initiatives that have potential for scaling up throughout China. Large cities in the central and western regions should command priority for Bank lending operations..

77. Thirdly, as the analysis presented in this policy note indicates, the urban transport problems are not stand-alone issues. They are closely related to the current municipal finance and management framework. The solutions to urban transport problems rest in the broader fiscal reforms, financial reforms, and land use and transport management reforms. As a first step, the Bank's transport sector unit should collaborate across sectors with the urban, environment, social, and economic sector units to help the national government develop a **sustainable municipal infrastructure finance** framework, which are then applied to the Bank-funded urban projects. Moreover, through the cross-sector collaboration and the non-lending instruments, the Bank should help the national government analyze the **urban sprawl issues** and develop planning and policy framework and technical guidelines for the development of energy-saving and transit-oriented compact cities.

78. Fourthly, non-conventional types of lending operations should be considered for meeting the needs of the more economically dynamic cities. While the GEF Partnership

Demonstration Program represents a new type of multi-city operation with a potential to achieve a country-level impact, an **adaptable program loan** could also be considered for the more advanced cities. The Bank could consider providing technical assistance to these advanced client cities on a cost-sharing formula (i.e. the client cities would pay for consultant services and the Bank would contribute the inputs of its staff). Moreover, the Bank's future lending program should include a **multi-jurisdictional metropolitan area project** to help find ways to address the transport problems specific to metropolitan areas and conurbations.

79. Finally and most critically, the Bank lending and non-lending operations should give real priority to **public transport**, by supporting the development of a viable public transport industry and bus-rapid transit systems. Any such operation should also be seen as a pilot for testing approaches that have potential for scaling up throughout China. This should start with an analytical work on public transport reform, to be followed by collaboration with the national government to develop a policy framework paper for public transport sector, and technical advisory services to selected cities for public transport industry reform.

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<sup>1</sup> The 1990 and 2000 data are from Population Census, and 2005 data are estimated.

<sup>2</sup> The green-GDP is defined as the traditional GDP minus the costs of environmental and social damage. A green-GDP index system is being set up jointly by the State Statistical Bureau and the State Environmental Protection Administration.

<sup>3</sup> As a concept applied to municipal infrastructure financing, "hard budget constraint" means the fiscal limits to urban infrastructure spending. It implies that the local government has a financial planning process in place that takes into account multi-year financing requirements of urban infrastructure using "acceptable" revenue and expenditure assumptions regarding the tax base and urban service responsibilities.

<sup>4</sup> In the current practice, the local Development and Reform Commissions (LDRC) prepare a list of "key projects" over a five-year planning horizon, but financing for a project is only done in the annual budget. Once the local government selects a project to proceed to the feasibility study stage, the LDRC must identify the sources of funding for the project and present their request to the local Finance Bureau to include the project in next year's budget and allocate revenues to the city departments associated with the project.

<sup>5</sup> Most of these instruments are discussed in Stares and Liu (1996).

<sup>6</sup> The discussions from Para. 57 to Para. 66 on hard budget constraint, capital improvement plan, multi-year financial plan, and local government borrowing draw heavily from a background paper prepared by Ben Darche (2005) for this study.

<sup>7</sup> It would be more appropriate to start with a municipal finance framework. However, the discussion on municipal finance is beyond the scope of this policy note.

<sup>8</sup> The discussion from Para 67 to Para. 71 draws heavily from a background paper prepared by Ken Gwilliam (2005) for this study.

<sup>9</sup> The Opinion of the Ministry of Construction on the Priority Development of Urban Public Transport, 2004.

<sup>10</sup> The Regulation on Administrative Methods in Franchise Operations of Municipal Public Utilities, 2004.

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