

Task Force Report on Sustainable Transportation

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Chapter 1 Background

1.1 High Time to Implement Sustainable Transport Development Policy

Transport is fundamental to socio-economic development. It plays a key role in ensuring sustained, rapid, and healthy economic growth, in improving people's lives, in promoting land development, and in modernizing national defense. Since 1998, the government has been implementing active fiscal policies, which has successfully promoted the continuous and rapid growth of the national economy, enlarged the scale of transport investment, and made great achievements in construction of transport infrastructure, optimization of transport modes, and in the improvement of transport service quality. By the end of 2004, expressway mileage ranked second in the world and railway mileage ranked third in the world; meanwhile waterways, pipelines, and civil aviation also developed rapidly. Transport development facilitates the rapid socio-economic development in China, but it also faces many problems, such as energy shortages, environmental pollution, casualty and property loss, and distortions in social equity.

China is making much effort in establishing a "harmonious society" and has now a unique opportunity to go a sustainable pathway. The sustainable transport Task Force has conducted thorough research on economic sustainability, social sustainability, and environmental sustainability and learned from the international experience of sustainable transport development and their mistakes such as just concentrating on individual motorized transport. After two years' joint effort, the TF has put forward strategy and policy options for sustainable transport development in China to avoid various existing and potential risks during the development process. All these have great significance to promote the sustainable development of transport in China in the next ten years.

The eleventh five-year plan period is a critical phase to establish a sustainable transport system. Transport plays a very important role in sustainable development of China, a country with scarce resource but rapid economy growth. Integrating the sustainable development factors into transport will be beneficial for China to use less energy and environment costs and to meet the constant increasing transport demands.

1.2 New Challenges for Sustainable Transport Development in China

Social-economic development in China is now at a new stage of development. During the period, per capita GDP surpassed the USD1, 000 threshold in 2003 and the target for per capita GDP is more than USD3, 000 in 2030. Constant upgrades in the consumption structure will create great demand for economic growth. The adjustment

of industrial structure will provide sound supply basis for economic development. Rapid urbanization will provide great opportunity for China's economic development. However, bottleneck restrictions of resources and environment also become serious and income disparities between different social communities in urban and rural regions will be enlarged. With China's accession to WTO, Chinese economy plays a growing important role in the world. Internal competition becomes internationalized and international competition becomes internalized, with more and more serious competition pressure. Socio-economic development in China will bring both opportunities and challenges to the development of Chinese transport.

1.2.1 Transport Capacity Building and Mobility Management

As a whole, transport supply and demands are unbalanced. The rapid increase in the demand for passenger and freight transport generated by economic development, urbanization and motorization is causing ever-increasing congestion and delay throughout China, but especially in cities and other major economic growth centers. On the one hand, passenger and freight transport volumes will continue to increase rapidly. Estimated passenger transport demand in 2020 will be three times the 2000 level and freight transport demand will be twice the 2000 level. By 2020, the level of urbanization in China is projected to reach 57 percent. The total number of licensed vehicles is projected to reach 130 million, five times their current number. Of these, private cars alone will amount to more than 80 million. On the other hand, there are still many problems, such as the small scale of the network, low density, inadequate cross-regional trunk lines, low accessibility, and regional disparities. The continuing growth of goods and container transport and urban traffic congestion have become ever more serious. Poor capacity is still the primary issue. Clearly, high priority must be given to improving transport capacity to meet demand. Equally important is the need to manage mobility to reduce demand and avoid over expenditure on unnecessary or inefficient transport infrastructure

1.2.2 Improvement of Transport Service Quality

Compared with developed countries, personalization of passenger transport and logistics service in China lags much behind. Transport development should not only have a quantitative dimension, but also undergo a qualitative change. Transport services must be people-oriented, comprehensive, multifaceted, and of a higher quality to meet the needs of passengers and consignors. In the case of public transport, passenger transport should be "people-orientated" and meet the mobility needs of all citizens by offering convenience, comfort, and zero-distance transfers at an affordable price. In the case of freight transport, this means ensuring a seamless multimodal transport system that provides reliable, fast, efficient, door-to-door service at competitive market price.

China has the world's most serious traffic safety problems. It has the largest number of road fatalities in the world. In the year of 2004, 520,000 traffic accidents happened, causing 110,000 deaths, 480,000 injuries, and 2.4 billion Yuan of direct economic losses. Transport system should effectively reduce the traffic accident rate, casualties,

and property losses. It should also improve the emergency response capacity to deal with social emergencies and natural disasters.

1.2.3 Realization of Social Equity to Benefit Everyone

Transport should benefit everyone. Central and local governments should shift their focus from solving the traffic problems of vehicles to improving the public's traveling environment as well as the efficient flow of goods in order to facilitate the development of human societies.

In 2004, only 0.45 percent of the total population owned private cars in China. Although only 6 percent of the total population will own cars by 2020, they will consume a large amount of transport resources. We should give priority to meeting the transport demands of most people and developing popularized public transport modes to provide equal transport rights for different vehicle owners.

More convenient, economical, and safe traffic conditions should be provided for disadvantaged groups. Transport conditions in rural and poor areas should be improved to promote economic development, narrow the socio-economic gap between urban and rural areas, reduce poverty, and to improve living standard. Land compensation and resettlement issues should be resolved equitably and reasonably and the number of affected people should be kept to a minimum.

1.2.4 Improvement of Resource Use Efficiency

Energy resources, especially oil, are scarce in China. Oil consumption in 2003 reached 240 million tons, of which 91.12 million tons were imported. China ranks second in world oil consumption, only after the United States. China imports 36 percent of its crude oil consumption. Oil consumption by motor vehicles increases every year and occupies a large percentage of total oil consumption by the transport sector. In 2002, oil consumption by motor vehicles was 72.51 million tons, accounting for 33 percent of total oil consumption in China. According to forecasts by the State Council's Development Research Center (DRC), if no effective measures are taken, motor vehicle consumption share will reach 256 million tons in 2020, accounting for 57 percent of China's total consumption. In addition, fuel economy levels in China are lower than that of advanced countries by 10 to 20 percent. Stricter demand control measures on transport energy use should be adopted to decrease China's dependence on non-renewable energy resources, particularly on oil.

With seven percent of the world's arable land, China supports 23 percent of the world's population. Per-capita farmland in China is far less than the world average. According to current plans, land used for transport infrastructure will reach 4.6 million hectares by the year 2020, of which 2.91 million hectares are farmlands, namely, 3.06% of China's total farmland. Moreover, shoreline resources, especially the deepwater shorelines that can be used as ports, are extremely limited. The contradiction of supply and demands between natural land resources and shoreline resources has become an important factor restricting sustainable transport development. Therefore, resource use efficiency should be raised and resource conservative transport

modes should be developed.

1.2.5 Harmony Between Transport and Environment

The air pollution pattern in Chinese cities is transferring from coal burning emissions to vehicle emissions. The proportion of exhaust from vehicles is becoming much higher in big and middle-sized cities. Among urban air pollutants, motor vehicles account for two thirds of total urban carbon monoxide (CO) emissions, one third of total chlorofluorocarbon (CFC) emissions, and as much as one half of nitrogen oxide (NO_x) emissions. Moreover, the emission of greenhouse gases caused by transport increases every year.

Urban traffic noise levels exceed the standards very seriously. A 2003 survey of traffic noise in 401 cities shows that the percentage of cities with noise levels exceeding standards is as high as 20.9 percent. In 2003, the Department of Letters and Calls received a total of 201,143 letters that complained about noise pollution, accounting for 43 percent of all letters that complained about environmental pollution. This shows that noise pollution has shifted from an environmental problem to a social problem.

Transport infrastructure construction is damaging ecological systems and cultural heritage. The damage to swamplands and nature reserves and the soil erosion caused by construction are especially serious. The number of oil spills continues to rise.

Transport pollution must be decreased to protect the ecological environment and achieve the harmonious development between transport and environment. If these problems are not effectively resolved, the government's pledge to "ensure people breathe fresh air and have better working and living environments" will become an empty promise.

Chapter 2 International Experiences and Lessons in Sustainable Development

After the 1980s, while economic growth paced alongside growing environmental and resource restrictions, developed countries began to realize that the key problems of transport development does not merely mean meeting supply and demand for mobility. It also meant how to tackle the relationship between resource use, environment, and transport development by providing improved mobility of people and goods. According to the requirement of sustainable development, transport development strategy should be re-examined and adjusted from three aspects, namely economic sustainability, social sustainability, and environmental sustainability. Economic, regulatory, and technical measures should be adopted to ensure the healthy and balanced development between various transport modes and facilitate the integration of transport. Urban transport should be given priority to the sustainable development of urban transport to promote the healthy and harmonious development of cities and our whole society. Such measures as energy saving, alternative energy, and pollution

reduction should be taken to achieve the harmony between transport and environment.

Based on the international experiences and practices of sustainable transport development, the following six suggestions are put forward for sustainable transport development in China.

2.1 Adjustment of National Transport Development Strategies in Response to the Needs of Sustainable Development

After establishing transport systems that meet the demands of national economic development, many developed countries such as the United States, EU countries, Japan, and Canada have shifted the focus of transport development towards the development of sustainable transport systems and have adjusted their national or regional transport development strategies to solve the problems appearing in the development process and to mitigate the conflicts of transport with socio-economic development, resources, and environment. The major changes are as follows: improving mobility and accessibility, especially in meeting the transport demands of special and disadvantaged groups; facilitating national economic development and foreign trade; assuring passenger and freight transport safety; supporting national security strategies; reducing deaths and property loss caused by transport accidents; mitigating environmental pollution and the ecological damage arising from transport development; reducing resource consumption by transport development; and alleviating the dependence of transport on imported fuel.

2.2 Toward a Comprehensive and Integrated Transport System from a Segmented Transport System

In order to meet the demands of coordination between various transport modes in development planning, industrial relations, resource utilization, environmental protection, and safety supervision, the management structure in such developed countries as the United States, Canada, Great Britain, Germany, and Japan has evolved from a segmented departmental structure of transport management into a comprehensive management structure overseeing all transport modes. Moreover, this comprehensive structure also covers land use, safety, and environmental protection in some countries. The management mode of “Big Transport” has gradually taken the form of a comprehensive transport management system.

2.3 Measures Need to be Taken to Implement Sustainable Development

Integrate urban land-use planning and transport planning. In Curitiba, Brazil, the use of dedicated transit lanes and bi-articulated buses along high density residential and commercial corridors enables the public transport system to be more effective in meeting local residential demand for public transport. New York City in the USA has developed into a multi-centered metropolis, with the effect of reducing commuter trip distance, and alleviating the stringent situation of commuter transport and the pressure on the public transport system.

Aiming at a comprehensive and integrated urban transport system with public transport as its main body. Megacities in developed countries such as Paris, New York, and

Tokyo have developed their urban transport systems giving priority to rail transit which provides convenience to traveling. Many cities, such as Bogotá and Curitiba in South America, have adopted road based Bus Rapid Transit (BRT) systems. These enable the development of a high capacity, low cost, high frequency, and environmental friendly public transport system with good flexibility, fast speeds, and high reliability and quality services. They have provided a new mode for developing countries to address urban transport issues.

Implement demand management measures, such as congestion charging, to alleviate traffic congestion. Singapore, London and other cities have implemented congestion charging policies and electronic toll collection systems, combined with appropriate traffic management and mobility management, sidewalks, and parking systems. All these measures have effectively alleviated urban traffic congestion. At the same time, the fees collected provide an important source of funds for the improvement of transport facilities, including the quality of public transport services.

2.4 Improvements in Fuel Economy and the Promotion of Alternative Energy Use

Promote the formulation and implementation of laws that improve fuel economy. Fuel economy standards are recognized as one of the most effective ways to control vehicular air pollution. For example, in 2000, the U.S. Corporate Average Fuel Economy (CAFE) standards saved the country 190 million tons of oil and 92 billion USD. The Japanese government has established a set of fuel economy standards for gasoline and diesel-powered light-duty passenger and freight vehicles. By 2010, fuel economy for gasoline-powered passenger vehicles will be 15.1 km per liter, a 22.8 percent improvement over 1995 levels. The European Automobile Manufacturers Association (ACEA) has entered into a voluntary agreement with the European Commission to reduce CO₂ emissions from new light-duty passenger vehicles, with firm fleet-wide targets of 140 g CO₂ per km by 2008. This represents a 25 percent reduction from the 1995 average of 187 g CO₂ per km.

Use fiscal policies to promote the production and sales of fuel-efficient vehicles. The United States and Japan levy the fuel oil tax and other vehicle taxes (such as sales tax, value-added tax, property tax, registration tax, and other consumption taxes) and use all the revenues for road construction and environment protection in order to encourage the production and use of energy-efficient motor vehicles. All these measures help to raise transport energy use efficiency and reduce the consumption of non-renewable energy resources.

Such countries as the United States, Japan, Brazil, and Great Britain have formulated laws, policies, and plans for the development of alternative fuels. They clearly promote greater use of clean vehicles (such as alternative fuel vehicles, electric vehicles and fuel cell cars), thus facilitating the development of alternative fuels and the exploration of new motor vehicle technologies.

2.5 Implement Stricter Emission Standard and Strengthen the Participation of Local Government, Enterprises, and the Public

The emission standards for motor vehicles should be stricter to promote the development of environmental protection technologies of motor vehicles. Developed countries have adopted strict measures and established even stricter standards for new vehicles to deal with the pollution problems brought about by rapid increases in the number of vehicles over the past 40 years. The U.S. required average reductions in single vehicle emissions by 95 percent or more during these 40 years. The EU implemented its Euro 1 standard in 1991, and, when Euro 5 comes into effect in 2008, the EU will have cut vehicular emissions by 95 percent as well. Austria, the Netherlands and Germany have used economic tools to control vehicle emissions. Canada and Australia have used compulsory measures to require consumers to buy low emission vehicles. Experience from developed countries shows that only through stricter emission control laws and a strict management system for controlling motor vehicle pollution can the broader use of emissions control technologies and thus emission reductions be guaranteed.

Strengthen the participation of local governments, enterprises, and the public. Local governments in the U.S. and Japan have played important roles in the formulation of environmental policies for transport. In these two countries, local governments and businesses were both active in the policymaking process. A regular system of communication between them can allow for a more transparent policymaking process, and permit governments to gain a better knowledge of environment related public information so that plans are more realistic and feasible. Additionally, public and community participation plays an important role in environmental management, and non-governmental organizations can clearly articulate communities' demands.

2.6 Internalize the External Impact

Internalization of the external impacts of Transport refers to the process of bringing external influences of transport into market, with an aim to utilize energies effectively, reduce market failure, and to protect ecological environment. Policies that control the external influences of transport mainly include administrative order and economic instruments.

With transport development and its more and more serious negative effects on human society, developed countries began to realize that it is highly efficient to use economic instruments to deal with external influences of transport. On one hand, it can impel transport consumers to pay for the true cost, thus to raise the cost or price of transport products as a whole and depress the transport demands. On the other hand, it could encourage some of the transport consumers to travel by buses or subways instead of driving cars.

Various transport infrastructure costs in EU include not only maintenance and operation cost but also such external costs as noise, air pollution, climatic changes, traffic incidents and traffic congestion. According to White Paper on EU Transport Development Strategy, external costs of various transport modes are as follows:

highway 0.024 euro/ton km, short-distance ocean shipping 0.004 euro/ton km, railway 0.012 euro/ton km, and inland navigation 0.0005 euro/ton km.

After Singapore and London implemented effective congestion charging, many cities in developed countries prepare to carry out congestion charging and utilize the levied funds to encourage the development of urban public transport.

Chapter 3 Sustainable Transport Development Strategy of China in the New Age

3.1 Strategic Objectives

To build a safe, convenient, highly efficient, economical, equitable, environmental friendly, and integrated transport system in line with China's socio-economic development.

That is to say:

The transport system development should contribute to economic development needs. It should meet the demands for transport arising from building a well-off society, from rapid industrialization and urbanization, and from economic globalization.

The transport system should contribute to social development. It should be equitable and provide various transport mode choices to all citizens and consignors, achieving the objectives of safety, reliability, convenience, comfort, and cost-effectiveness.

The transport system should develop in harmony with the natural environment. It should be based on the circular economic concept, realizing efficient and circular use of resource use, controlling pollutants and greenhouse gas emissions to prevent serious damage to the natural ecological environment.

3.2 Strategic Approach

China's sustainable transport strategy can be summarized as moving toward a human-oriented, comprehensive, and integrated sustainable system based on the sustainable development concept. This strategy consists of the "two highs, five lows, and one adaptation" suitable to the Chinese situation, i.e. to set up an integrated administrative system suitable to sustainable transport development through the institutional reform; to establish a transport infrastructure network with high accessibility and coverage and a transport service system with high quality and efficiency through transport development and technological advance; to develop transport modes and equipments with low energy consumption, low pollution, low energy occupation, low accident rate and low financial burden by accelerating the internalization of external cost.

3.2.1 Establish an Integrated Administrative System

In order to meet the demands for a modern integrated transport system, the current segmented management and administration system should be reformed. Industrial monopolies should be eliminated; regional policies that are protectionist in nature should be revised to give incentives for innovations of administrative system and means. The overall decision making, network planning and transport management

could be improved to enable the governmental administrative system to adapt to the sustainable development of transport.

3.2.2 Build a Highly Accessible Transport Network

Problems of Chinese transport capability are mainly reflected in the number and capability of transport corridors that are critical to address the issue of capacity building for the entire system. Overall master planning should be improved, the network structure rationalized and optimized, transport capacity expanded, and a highly accessible transport network with broad coverage constructed, including international transport corridors, rural road networks, and urban public transport networks.

3.2.3 Develop High Quality, Reliable and Efficient Transport Systems

Freight transport and logistics systems should be well integrated into a seamless multimodal chain, to save energy and improve efficiency. Transport terminals and hubs should be designed and located in such a way as to achieve seamless connection and coordinated management.

Integrated passenger transport systems and facilities should be developed to realize zero-distance transfers and one-stop integrated service for passengers and public transport operators, thereby providing viable and attractive alternatives to private car use.

3.2.4 Promote Transport Modes and Vehicles with 5-low Principle

The 5-lows refers to the promotion of transport modes and Vehicles with low energy consumption, low resource occupation, low pollution, low accident rate and low burden on public finance.

We should, therefore:

Develop energy efficient transport modes and use transport vehicles that rely on alternative energy resources, especially promote bicycles and walking;

Set up an environmental friendly transport system to improve environmental quality by using transport vehicles and modes that pollute minimally;

Develop transport modes that utilize resources efficiently, particularly non-renewable resources;

Adhere to the concept and principle of Safety First, by giving priority to transport safety, strengthening safety management, and improving emergency response and first aid capability, in order to reduce the accident rate, deaths, injuries, and property losses;

Implement a transport system that places a low burden on public finance and support the development of low cost transport modes;

Transport modes that meet the requirement of 5-low Principle, like waterways, railways, urban public transport, bicycles, and walking, should be given priority.

3.3 Strategic Priorities

3.3.1 Accelerate the Construction of Transport Corridors and Optimize the Transport Network

Problems of Chinese transport capability mainly reflect in the number and capability of transport corridors that are critical to address the issue of capacity building for the entire system. We should speed up the development of comprehensive transport corridors of the transport network system with waterways, railways, and expressways as trunk routes, forming a national integrated transport network with railways and expressways as its main framework.

Rural road construction is a direct and efficient means for improving rural transport conditions, developing the rural economy, promoting urbanization and industrialization, narrowing gaps between cities and rural areas, improving the quality of life of peasants, and facilitating social development in the vast rural areas. Rural road construction should be accelerated to increase road network coverage and accessibility for the entire country.

Inland navigable waterway transport has a high potential for contributing to sustainable development; therefore, we should develop proper policies to support inland waterway transport development so as to fully exploit this resource.

Development of oil and gas pipeline transport should be developed rapidly owing to its inherent advantages such as low land occupation and pollution, large transport capacity and low cost. Optimize the oil and gas pipeline network to make it cover the whole country.

3.3.2 Strengthen the Construction of Integrated Transport Hubs

Development of integrated transport terminals and hubs should be given priority in those large and medium-size cities that are critical to domestic and international trade. These terminals and hubs should provide for seamless transfers and coordinated management of freight transport. Additionally, intermodal passenger and freight facilities should be developed. Transfer and exchange efficiency should be improved and zero-distance transfer and seamless connections should continue to be major objectives. In addition, an integrated real-time information service system should be established in order to provide “one-stop” integrated transport service.

3.3.3 Promote Transit Oriented Development

We should give priorities to the development of urban public transport. Synchronized master planning and comprehensive transport planning should be developed according to integrated land use and transportation policies and plans that incorporate Transit Oriented Development (TOD) measures (e.g. multiple-mode transport corridors). Bus rapid transit (BRT) and rail transit should be developed in such a way as to achieve a balance between transport demand and supply by optimizing the organization of transport provision to meet public demand.

3.3.4 Adopt Highly Efficient and Resource Conservation Concepts in Transport Development

We should develop transport modes and equipment with efficient resource consumption by effective transport restructuring and technological advancement. We should do this by such measures as recycling technology to maximize resource use efficiency. We should also employ such approaches as:

Less frequent use -- adopting plans to reduce the use of non efficient transport sources;

Appropriate use -- developing transport modes with low energy consumption, low energy occupation, and low financial burdens to reduce resource use and energy consumption;

Circular use -- adopting technical means and management modes in line with recycling concepts to maximize source efficiency as much as possible.

3.3.5 Control Pollutants and Greenhouse Gas Emissions, and Raise Environment Protection Awareness of the Public

The control of pollutants and greenhouse gas emissions should be strengthened to avoid serious regional and secondary pollution caused by transport emissions. The environment protection awareness of the leaders, decision makers, designers, and the public should be strengthened to achieve the minimum ecological damage and maximum ecological recovery.

3.3.6 Build a Transport Safety Assurance System

A transport safety assurance system should be established with dynamic and scientific management of national transport safety in order to steadily reduce traffic accidents and improve overall road safety in China. The emergence response and first aid system should be strengthened to form an effective and efficient safety management system that will minimize adverse impacts of transport accidents.

3.3.7 Develop a Transport Related High Technology Industry in China

Facilitate the development of intelligent, energy efficient, environmental friendly, effective, and safe transport. Promote the development of three major industries: a knowledge-based industry, which includes digital audio-visual technologies, GPS, and multimedia communication platforms; a system integration industry, which includes electronic payments, real-time travel information systems, and advanced public transport systems; and a knowledge-based service industry, which includes traffic information services and emergency response services.

Chapter 4 Policy Recommendations

4.1 Establish a Comprehensive Transport Administrative Institution through a Two-phase Reform Process

Since the construction of the integrated transport system can best be carried out as a

gradual process over a comparatively long period, we propose that a comprehensive transport administrative system be set up by stages:

(1) In the first stage, different modes of transport should continue to be managed separately and a centralized, comprehensive transport administrative organization — the National Integrated Transport Coordination Commission (NITCC) — should be established. The NITCC should improve the consistency and coordination in developing strategies, planning, industrial policies, and financial management of different transport modes. The NITCC, as suggested here, should make full preparation to facilitate sustainable transport development.

As the top level decision-making and coordinating body, NITCC's responsibilities should include: research on and development of integrated transport planning; strengthening the law and regulation system; drawing up strategies, policies, and rules to aid the development of an integrated transport system; drafting a national master transport plan and regional integrated plans; coordinating the growth of different modes of transport; centralizing the management of transport funds and matching their use with development priorities; strengthening the theoretical research for a comprehensive transport administrative system and building a theoretical foundation for the development of a new transport management institution; streamlining the management system for various transport modes by promoting the separation of government functions from enterprise management, establishing short and medium term targets for areas of major concern, and developing evaluation mechanisms to determine the degree to which those targets are met.

The State Council should appoint the committee members. A State Council official should be in charge of the committee. All relevant ministries and government organizations should have representatives in the committee. Ministers of key ministries should be committee members, and deputy ministers of other appropriate ministries and organizations should be appointed as representatives in the committee.

(2) In the second stage, when appropriate conditions have been created, an integrated organization for transport—a National Transport Commission or Ministry of Transport—should be organized. This commission or ministry should be responsible for a uniform management of transport system including railways, highways, waterways, aviation, pipelines, urban transport, and transport safety and environmental protection to realize a more efficient integrated transport system. The proposed transport administration system framework is shown in the following figure.

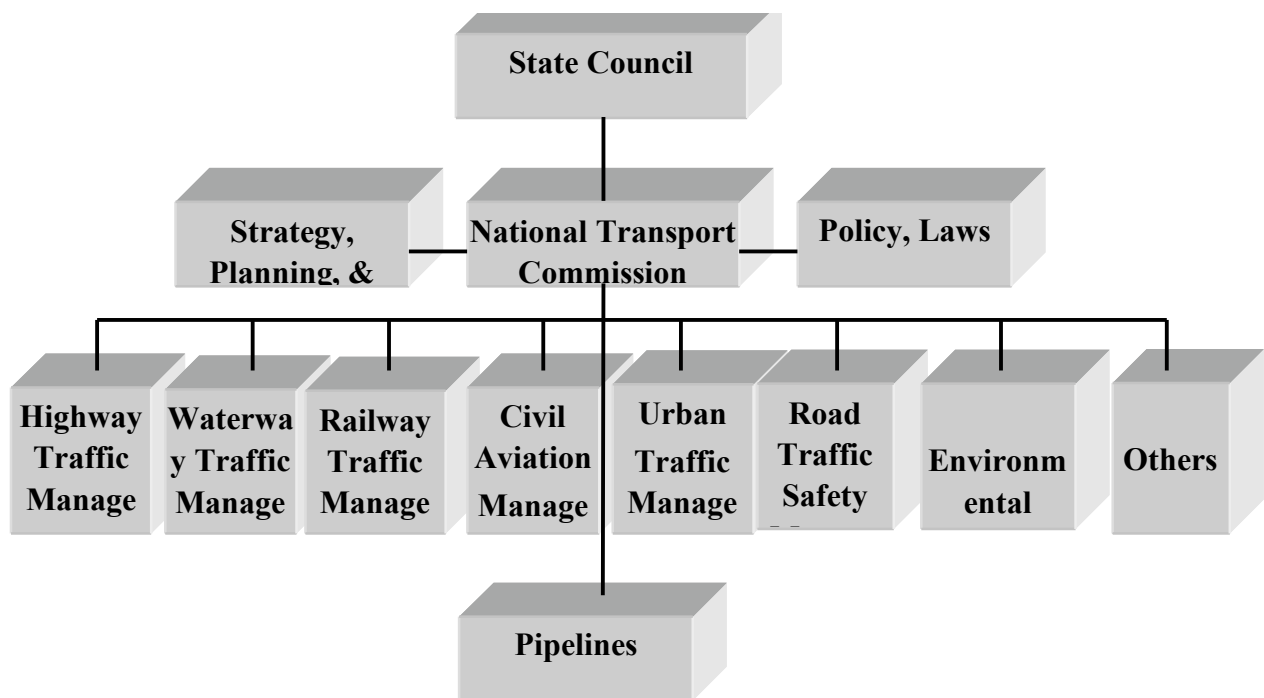


Figure 0-1 The Proposed Transport Administration System Framework

As the department responsible for transport administration, this organization should take responsibility for the leadership and administration of the transport system for the State. At the same time, special administrative organizations should be set up at different levels of government under the leadership of NITCC to ensure the implementation of government policies and functions in transport development. The national integrated economic administrative organizations, such as the National Development and Reform Commission, should pass on their original responsibilities for various transport modes to the newly built NITCC to ensure consistency and integrity in the transport administration.

In order to ensure the relative independence of professional administrations over different transport modes and to avoid overlapping in responsibilities and organization, non-transport related administrative organizations should also transfer their responsibilities for transport-related issues to professional transport administrative organizations in order to streamline the administrative system and improve administrative efficiency.

4.2 Utilizing Economic Instruments to Promote Sustainable Transport Development

4.2.1 Implement the Fuel Tax System

The fuel tax is an important means to reflect the “user-pay” principle, implement macroeconomic control over transport development, encourage the development of different transport modes and equipment for sustainable transport, curb “excessive consumption” of motor vehicles, develop alternative energy sources and new-type vehicles, and to provide a funding source for the development of sustainable transportation. China has passed laws to levy the fuel tax. Now, the pace of implementation should be quickened.

The total revenue of the fuel tax should be used for a transport maintenance fund and macro-control fund.

4.2.2 Establish “National Transport Fund”

National transport fund is the key to sustainable development. Specific implementation planning should be developed by NITCC (or led by National Development and Reform Commission and Ministry of Finance), and be implemented after the approval of the central government.

National Transport Fund should be established, which is composed of revenues from existing transport taxes, all the revenues from potentially forthcoming fuel tax, and a share of revenues from the proposed increase in the value added land tax.

NITCC, as suggested here, should centrally administer and allocate the fund, and oversee its use as well. To ensure transparency and accountability, the NITCC shall publish annually a statement outlining the planned expenditures of the Fund and the reasons for the selection of particular projects. It should also provide an evaluation of the progress of ongoing projects and of the impacts of completed ones.

The fund should focus on transport modes and relevant plans promoting sustainable transport development and in great need of assistance, which include urban public transport construction, rural road construction and maintenance, development of sustainable transport technology, transport for disadvantaged communities, and safer bicycle and pedestrian ways.

4.2.3 Internalize the external impacts

Appropriate subsidies and incentive policies should be granted to transport modes that have low external costs, such as railways, waterways, and urban public transport.

Un-sustainable transport imposes very high costs on society (delays, ill health, global warming, injury and death). These externalities should be taken into account in the cost accounting and pricing management of the transport modes according to the principle of the ‘Polluter Pays’. Only when prices reflect true costs will the market mechanism be able to ensure that individuals and businesses make sustainable transport choices.

Taxes should be levied on cars according to the costs that they impose upon the environment in regards to energy use, traffic congestion charging, pollutant discharges, and traffic accident losses.

4.3 Integrated Planning to Optimize Transport Restructuring

4.3.1 Develop an Integrated Spatial Planning System

The settlement structure and the developed infrastructure have a huge effect on the transport needs. By developing an urban structure, where all kind of services for the inhabitants is provided, less transport is needed. Furthermore, transport opportunities like good access to public transport can be better recognized during an integrated planning.

4.3.2 Develop Integrated Transport Planning

Integrated transport development planning must reflect government ideas and priorities

in developing various transport modes, with rational utilization of the “corridor resource” of the transport system, strengthening planning and construction of intermodal terminals and hubs, paying great attention to the harmonious development of transport and the social economic system, and coordinating the development of various transport modes in macro-economic, strategic and overall system terms.

4.3.3 Formulate New Technology Policies for Transport Industry.

Current transport technical policies were developed and issued in 1986. New technical policies for the transport industry should be drafted incorporating the concepts of scientific development and the circular and green economy so as to facilitate market innovation. Policies should be used to give guidelines to the transport sector restructuring, rational allocation of transport resources, the enhancement of overall quality of the industry, the modernization of the transport system, and facilitation of sustainable transport development.

4.3.4 Speed up the Railway Development through the Classified Railway Construction

Law and regulation system of Railways should be improved and the Railway Law should be amended to make clear the relationship between governmental function and commercial operation of railways, and to provide legal foundation for the further development of railway.

Promote the reform of railway investing and financing system and accelerate the marketization of railway investment. Multiple investing and financing channels should be adopted to facilitate the construction of high-speed railway for passenger transport, urban rail transit, and heavy transport corridors for energy transferring.

The current railway construction fund should be preserved as a stable and sustainable fund source for railway development by levying service fees of passenger and freight transport.

Increase the investment of the central government in railways. The government should have explicit responsibilities to provide financial support for the railway construction and operation relevant to the national defense, poverty reduction or key land development. The government should give more financial support within national debts and financial budget to Western China and channel construction for coal transport.

4.3.5 Support inland waterway transport

The central and local governments should establish special funds for inland waterway transport to ensure a stable source of funds for its development. At the same time, local governments should also provide financial contributions for the development of their waterways and port infrastructure.

The legal and regulatory system should be established as rapidly as possible. For example, the “Law of Navigation Channels” should be developed based on the

currently effective “Regulations Concerning Management of Navigation Channels” to provide a legal basis for the inland waterway investment and inland water transport.

Coordination should be strengthened and problems relating to water conservation and hydroelectric departments should be resolved appropriately to realize highly efficient utilization of water resources.

4.4 Transport Equity Policy

4.4.1 Enhance Public Awareness of Sustainable Transport and Strengthen Public Supervision and Participation in the Decision-making Process of Transport Planning

Education on sustainable transport should be carried out. This kind of education should be strengthened and expanded among pupils and students through the media or various educational activities, thus to form a whole-nation educational system for sustainable transport.

Enlarge public participation in the decision-making process. Public opinions should be absorbed into laws concerning sustainable transport development. The participation and supervision of the public and social organizations, including non-governmental organizations, should be strengthened in the process of law execution.

Share transport information with the public, combining law execution inspections and public supervision. Report the inspection results promptly and accurately in order to increase public awareness and participation so as to strengthen the inspection and regulatory process.

4.4.2 Enhance Public Consciousness of Transport Safety and Strengthen Accident Investigations and Accountability System

Education on sustainable transport, particularly publicity and educational activities regarding transport safety, should be carried out.

The transport safety management functions of government authorities at all levels should be consolidated and the accident investigations and accountability system strengthened as well. Corresponding laws and regulations should be developed and implemented. Strict supervision and management at each of the links in transport production should be strengthened to enhance the effectiveness of the safety management. An accident accountability system should be established. Those who are liable for accidents should be investigated according to the law.

4.4.3 Convenient Transport for Disadvantaged Groups

A proportion should be taken from the special fund for disadvantaged groups from the proposed established national transport fund for the following subsidies:

Laborers from rural areas with certificates should enjoy a favorable trip to visit family every year, the price of their tickets remaining unchanged.

The disabled and the elderly (over 60 years old) should enjoy discount rate bus ticket.

Compensation should be provided for people whose livelihood threatened by land expropriation and removal.

4.5 Public Transport Development and Transport Demand Management

4.5.1 Integrated Development between Transport and Land Use

Develop modern urban mobility management concepts and provide guidelines for the design of new cities and the development of existing cities. Synchronized master planning and comprehensive transport planning should be developed according to integrated land use and transportation policies and plans that incorporate transit orientated development measures (e.g. multiple-mode transport corridors).

Urban development should be strategically shifted to avoid overexploitation and densification of urban central areas and to minimize urban sprawl.

The traffic impact assessment system should be strengthened and the transport impact compensation mechanism should be formulated and implemented.

Integrated transport corridors with interoperability between different transport modes should be developed to ensure that public transport could guide urban and land development (the TOD model). Establish the mechanism that levies land value-add tax to feed back public transport investment.

Demands of public transport and non motor vehicles should be given priority in urban road design and planning to ensure their road resources.

Establish public hearing system for large-scale urban infrastructure and transport projects.

4.5.2 Development of Public Transport should be Given First Priority

Efforts to improve public transit should be integrated with a larger vision of the future city. Public transport infrastructure—including dedicated transit lanes, stations, hubs, and information facilities—should be improved, in order to create an efficient, integrated service network for public transport. The share of public transport should be set as an index to evaluate the achievements of major urban leaders.

Urban and inter-city rail transit should be promoted. Policies governing licensed operators should be adopted in areas along rail lines, in order to promote the development of rail transport in megacities and city clusters.

Bus Rapid Transit (BRT), deserves careful consideration because it is financially viable, increases speed and safety, and diminishes pollution. Promote BRT wherever it is possible.

Intelligent technology systems and other technologies should be utilized to improve the efficiency and quality of service of regular bus systems.

4.5.3 Managing Mobility Effectively to Avoid Congestion through Balancing Travel Demand and Supply

There can be no doubt that steps should be taken to encourage people to use public transit and/or non-motor vehicles to the greatest possible extent. Car use should be a choice not a necessity. This means managing mobility in such a way as to reduce demand for unnecessary travel and providing viable alternatives to car use.

Car users should pay the true cost of using the car in crowded urban environments either through parking charges, congestion charges or other forms of road pricing.

The time structure of traffic should be regulated and controlled and flexible work times should be used to stagger peak hours.

With advanced traffic management methods and intelligent transport system technology, updated transport information can easily be provided so that citizens who have to travel by car can choose the most appropriate routes to take before and during their travel so that they can reach their destination in the shortest possible time and not contribute to congestion.

4.5.4 Setting up a special account for urban transport

The account would be composed of the revenues from different taxes and fees including, for example, revenues from urban land lease, transport impact compensation fees, consumption taxes, and fixed asset taxes, vehicle purchase taxes (e.g. from a 2-5 percent surcharge for large volume limousines), congestion charges, parking fees, and fines imposed on traffic regulation offenders.

To ensure transparency and accountability, annual reports should be published to identify the measures that have been funded and the impacts of previously funded measures.

4.6 Adhere to Resource Conservative Principle to Promote a Transport System in Harmony with the Environment

4.6.1 Improve Transport Environmental Protection Systems and Strengthen governmental Monitoring and Supervision Capability

Implement Strategic Environmental Assessment (SEA) for policies, plans and programs to recognize environmental effects early in the decision-making process and therefore contribute to a cost efficient and highly benefited sustainable transport system.

Establish implementation guidelines for environmental impact assessment of integrated transport planning. Require environmental impact assessment during formulating national and regional integrated transport planning.

Strengthen the environmental protection responsibilities of transport management departments at all levels and establish the accountability system.

Strengthen public participation and promote the development of non-government

environmental organizations. Formulate environmental damage compensation laws and optimize the environmental dispute resolution regulations. Develop systems to disseminate environmental information and formalize public hearing on environmental issues.

4.6.2 Slow Growth in Transport Energy Use, Especially Oil Consumption

Optimize motor vehicle fuel consumption standards. Establish fuel oil consumption standards for all new-type motor vehicles by 2008 and enforce the *Limits of Fuel Consumption of Passenger Cars*. Fuel consumption of new motor vehicles should be reduced by 40-50% per hundred kilometers by 2015.

Develop policies for the research, popularization, and utilization of clean alternative energies. Clean alternative fuels should be first used in such vehicles as buses and governmental vehicles.

Optimize technical approaches for the development of advanced vehicles techniques and formulate relevant policies to focus on the introduction, research and industrialization of the hybrid synergy drive.

4.6.3 Land Use Conservation

Develop technical standards with a strong scientific basis for transport facilities. Based on the principle of full cost and environmental protection, flexible technical standards for the construction and maintenance of transport infrastructure should be established with a consideration of regional differences. Shorten the period of standard revision and ensure a practical, timely and authoritative technical standard.

Implement stricter utilization, compensation, and restoration systems for natural resources conservation. Amend the transport land compensation system and carry out onsite or off-site excess compensation for nature reserves and wetlands. Limitation for temporary land use should be used to the land occupation index of transport construction projects.

4.6.4 Air Pollution Control to Improve Urban Air Quality

Adopt and implement vehicle emission standards GB3 and GB4 including PM 10 as soon as possible to help the Chinese enterprises reach the technical level of vehicle emission control in developed countries.

Establish and carry out strict fuel quality standards to facilitate the implementation of emission standards for new motor vehicles. In particular, promote the supply of gasoline and diesel oil with sulfur contents below 150ppm and 350ppm respectively in the whole country in 2007, and with sulfur contents below 50ppm from 2010, and then oils with super-low sulfur contents that are below 10ppm.

Realize the coordination and cooperation between transport development and air quality improvement according to the local conditions. Implementation plans for reaching the pollutant emission standard in each city should be formulated through the joint efforts of different departments and the deadline to reach the standard should be

set to meet the overall demands of urban air quality.