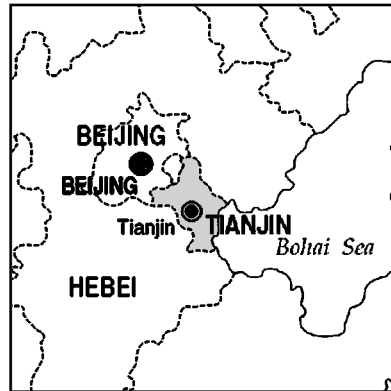


# URBAN TRANSPORTATION

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## TIANJIN MUNICIPAL GOVERNMENT

**T**ianjin has rapidly become a modern city where opportunities and challenges coexist. On the one hand, the municipal government has poured a great amount of investment into infrastructure, especially transportation facilities. Although Tianjin, unlike cities in developed countries, cannot afford to invest 2 percent or more of annual GDP in infrastructure, its authorities recognize infrastructure as the power that will drive its development. About Y3.26 billion were invested in transportation in the 1990s, beginning with a 3-ring and 14-radial road network. When the city's master plan was updated recently, transportation development strategies were reviewed and the networks of urban roads and rapid mass transit modified in order to meet the needs of the 21st century.



On the other hand, rapid economic development, continuous expansion of urban areas, and urban population explosion have created a high demand for transportation, which current facilities cannot meet despite the amount of money the municipal government has poured into infrastructure. Traffic jams are worsening. Poor transportation hinders the city's development, and conventional engineering or technical methods offer no speedy solutions.

However, lessons can be drawn from the experience of cities in developed countries. One is that no city has managed to balance capacity supply and travel demand through construction of facilities alone, no matter how developed its economy or how advanced its methods. Many studies show that any balance between supply and demand is relative and temporal. The solution lies in travel demand management, which involves employing measures of controlling and adjusting demand through policies, institutions, mechanisms, pricing and charging, infrastructure investment, construction, and so on.

Experts in the People's Republic of China (PRC) are searching for ways to develop urban transportation in a sustainable manner. With the number of motor vehicles increasing, not even building more viaducts and interchanges can ease traffic congestion. The only workable strategy is to expand public transportation while strictly controlling motor-vehicle ownership. The objective of transportation is to move people and goods, rather than vehicles.

Sustainable development has many definitions. Essentially, however, it means that the resources necessary to achieve development must be used in a way that they will not be exhausted. Sustainable development of urban transportation ensures that future generations will have sufficient and reliable transportation.

How is sustainable development of urban transportation achieved? Anthony Pellegrini, director of infrastructure and urban development at the World Bank, writes that three criteria should be used to evaluate transportation policies and actions: economic sustainability, social sustainability, and environmental sustainability.

*Economic sustainability.* Economic sustainability is a result of the efficiency and effectiveness of infrastructure operations. Investment should be sufficient to maintain and expand the transportation system. Payback of system costs should come from user charges. Industrialization and marketing of the urban transportation system, especially public transit, are essential to achieving economic sustainability.

*Social sustainability.* Social sustainability depends on realistic transportation planning and implementation programs. They should be accepted by the public and should generally satisfy the needs of different user groups. Land-use and transportation planning must be integrated with each other, with public-transit riders, bicyclists, and pedestrians given equal importance.

*Environmental sustainability.* The purpose of inducing people to use public transit, ride bicycles, and walk instead of drive is to decrease the use of motor vehicles and thus lessen fuel consumption and emissions, which will improve the environment and people's health.

Tianjin will soon emerge as the economic center of Bohai Bay and even northern PRC. How should it approach urban transportation development? Besides updating the city's master plan, the authorities should consider the following strategies:

*Optimize urban land use and the transportation system.* Land-use and layout patterns and transportation modes interact with and affect each other. Changes in transportation modes will therefore cause changes in land use. If land-use patterns conform to transportation modes, the city will develop in an orderly and stable manner. Otherwise, it will be chaotic and distorted until a new land-use pattern emerges that conforms to transportation modes.

Over the past several years, the Tianjin municipal government has done much to restore the old city. Most polluting factories in the city center have been relocated to the fringes and even outside the city, while development proceeds eastward toward the port. Several large residential areas were built between the middle-ring and outer-ring roads. Unfortunately, commercial development unexpectedly intensified while restoration was going on. Large office buildings, recreation centers, and shopping centers were built without the necessary traffic impact analysis, causing traffic jams and worsening the city center's environment.

To balance the requirements of development and transportation, the urban layout should be decentralized and have multiple centers. A mixed land-use pattern should be adopted and the spatial distribution of residences and working places balanced. Development should be encouraged along the transportation corridors and around the transportation hubs and other highly accessible areas.

*Prioritize the development of a mass rapid public transit system.* State policies require that urban layout give priority to the development of a public transit system. In the mid-1990s, the use of Tianjin's public transit system dropped to its lowest point, with bus rideshare, for example, at 4 percent. The system improved gradually, however, and now the bus fleet is bigger and its routes are longer.

The updated master plan incorporates the following changes:

- Short-range transportation modes will include bus routes and a conventional bus system.
- Medium-range modes will consist of a surface operation system of mass bus transit and a conventional bus system.
- Long-range modes will consist of rail transit and a conventional bus system.

*Develop a hierarchical and systematic road network.* The implementation of a travel demand management policy does not exclude the construction of a road system. Compared with cities in developed countries, Tianjin has a low level of road construction. The road network should be developed proportionately to land use, population, motor-vehicle ownership, and economic growth. A hierarchical road network will meet the needs of different travel modes. A systematic network will not only make the most of the operational efficiency of certain facilities, but will also offer high accessibility and convenience to the different areas of the city.

In the coming decade or two, the ring and radial network in Tianjin City proper will not be changed greatly. But as the city develops, people will demand more economical, reliable, rapid, comfortable, and safe transportation. Urban transportation must there-

fore become more hierarchical, systematic, integrated, efficient, and energy efficient.

Road construction projects will focus on improving the arterial roads, widening the minor ones, and connecting the distributors. The authorities will endeavor to harmonize the increase in motor-vehicle ownership with the policy of controlling car use.

*Pay equal attention to policy, technology, and management.* Experience shows that urban traffic congestion cannot be solved by technical measures alone. While road and bridge construction may alleviate traffic congestion in some areas, sometimes it simply transfers the problem to other points. As observed in many cities in developed countries as well as in the PRC, the more roads are constructed, the more serious the traffic congestion becomes.

Only continuous, coordinated, and comprehensive management will solve the problem of traffic congestion and lay the basis for a sustainable urban transportation system.

*Rationalize transportation investment policies.* Under the planned economy, urban transportation was considered a right, and users did not pay for it. But now, it is considered a commodity. The municipal government should therefore explore multiple investment channels, including integrated land development, individual investment, build-operate-transfer arrangements, taxation, imposition of impact fees on large public building projects, and charging tolls on large facilities, while stabilizing the amount and source of investment. Finally and fundamentally, capital investment should be put into urban road construction, management, and maintenance.

*Stress on management of the transportation system, travel demand, and traffic congestion.* Good management of the transportation system, travel demand, and traffic congestion is the best way to alleviate traffic congestion. The function of transportation system management is to make the most efficient use of the existing road network. Travel demand management regulates people's travel behavior by enforcing policies, laws, and regulations. Traffic congestion

management uses pricing measures to regulate the time and spatial distribution of travel demand.

Effective management of the transportation system, travel demand, and traffic congestion will do much to minimize the consumption of land and other resources, and also rationalize the development of the city's built urban form.

Urban transportation planning must meet the needs of modernization and of the city residents. It must select the transportation modes that will foster sustainable socioeconomic and environmental development. Transportation modes should not merely meet ever-growing travel demand or simply conform to the behavior of individual riders. They should also efficiently allocate available resources such as land, road surface, and parking space to guarantee the long-term efficiency and effectiveness of transportation development strategies.

Sustainable development strategies must provide for high-quality facilities and for efficient, effective, and stable systems. It is easy to "modernize" urban transportation, but it is difficult to rationally allocate limited resources or to keep system operations running smoothly.