

## Structure of Environmental Friendly Traffic System

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**Abstract.** A green transportation system contains that the layout of the community and urban functions should be driven by the industrial layout. A number of sub-centers are established on the basis of the industrial set with larger production relation in the city, so that reduce the flow of population and traffic. The corresponding main of the traffic tools is established for the urban population size. At the same time, the high carbon transport is effectively restricted through the establishment of carbon trading market and carbon emission permits. The complex of information, electronics and computer is the main techniques of the intelligent traffic management system, is the best way to improve urban traffic congestion, traffic efficiency and road safety, which should be accelerated in China' large and medium cities.

### Introduction

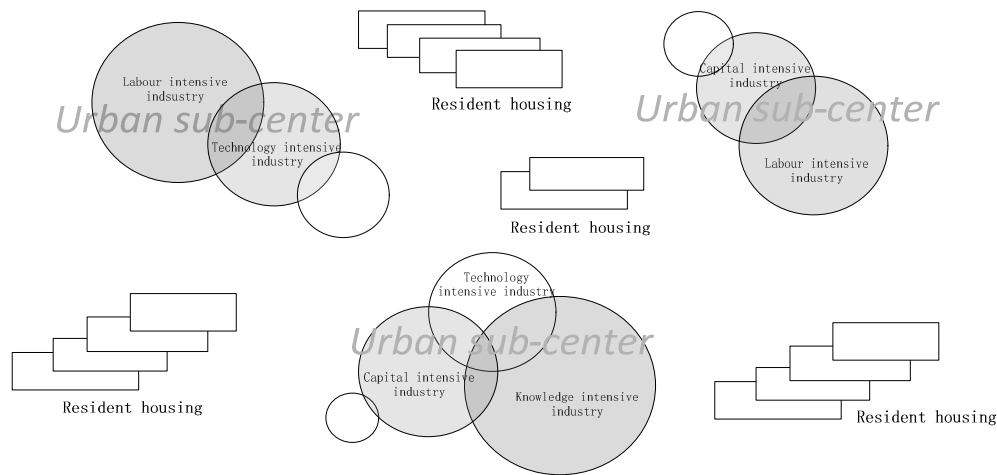
Traffic model guides urban space to expand. Urban space in a certain extent determines the mode of transportation. Urban traffic modes are interacted and complemented with urban space each other. Traffic mode of high efficiency, convenience, low energy consumption, low emissions must be based on the corresponding urban space.

### Distribution of Several Centers

Several centers are foundation of the environmental friendly transport. For megacities of more than 5 million people, the spatial structure of multi-center is the best form after planning as a whole the overall benefit and transportation cost. The spatial structure of multi-center reduces the traffic demand, and balances the traffic distribution. An efficient rail transport may be used among the centers; within a center the public transport is given priority to; also self-drive is taken as the auxiliary pole. In this way, a total traffic demand and traffic congestion will be greatly reduced [1].

In the process of urbanization, city in the transformation of the old urban area or new city have the best conditions for the realization of this plan. Residential distribution is driven by industry development. What the enterprise groups are built is taken as the forerunner to develop the residential area. Distribution of the urban function is driven with the living building, what promotes the construction about consumption, entertainment, Banks, hospitals, schools and other functional supporting facilities of urban. Thus, the employment of the population, residential housing areas, services and public services will be the basis for the development of the city deputy center to absorb a considerable amount of employment and reduce the population liquidity.

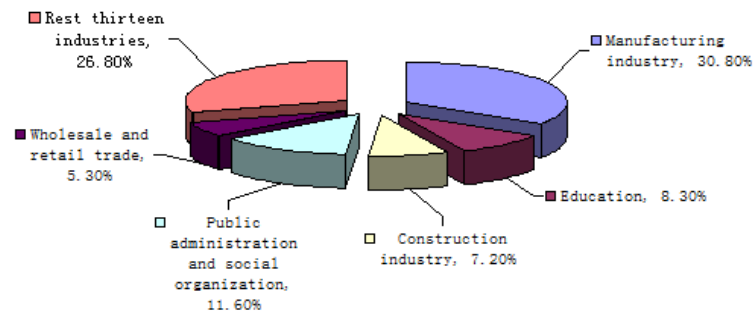
The multi-center layout of the city must pay attention to the compactness and the proportionality. Compactness refers to the use of land and the plan of density reasonable. Proportionality is the balance between the employment and the living. The industrial cluster of each center should be able to absorb more population, and reflects their own characteristics in travel and use of traffic tools as shown in Figure.1. The level of population income or residential housing is highly correlated with the distance of travel. According to this law the street under the each center should also be designed to be suitable for walking and riding space to reduce the use of motor vehicles.



**Fig. 1 Sub-center Layout**

The attainment of a balanced development between the employment and living needs two conditions: government guidance and the resident's choice. First, the diversity level of residential housing areas is built according to the industrial distribution and industry combination. In areas that the manufacturing and commercial industries are relatively concentrated, or in the areas of low and middle-income residents jobs with more concentration ratio, the government should increase the supply of the low-rent and affordable housing; The high quality housings are built in the vicinity of capital intensive, knowledge intensive and technology intensive enterprises. Secondly, business and social services simultaneously follow-up according to the distribution of residential areas. As a result, the market will lead to the relative balance of employment and living condition after people's rational choice and adjustment.

The industries clusters with high intensive population should be set as the sub-center. For example, compared to other industries, the education and manufacturing enterprise are the foundation of the urban population as shown in Figure 2. Their population mobility is relatively small.

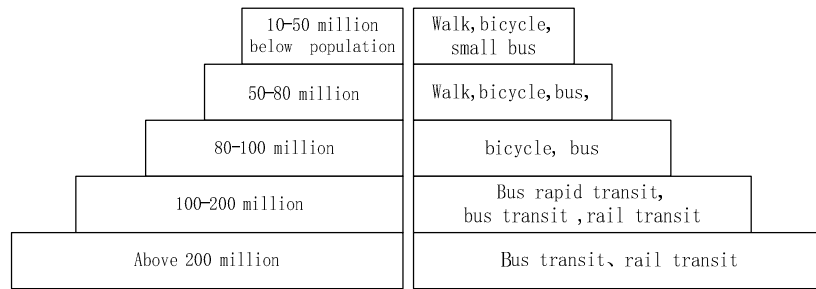


Sources of data: China Statistical Yearbook 2014

**Fig. 2 Proportion of Industry Practitioners**

### Green Traffic System

China should advocate the use of appropriate and effective traffic, based on the characteristics with self population density, urban space and living customs and so on, as shown in Figure 3. Bicycles, new energy bus, subway and light rail will be most widely used in the future China city. Especially the bicycle, no matter how urban size changes, will be the mainstream of returning to nature.



**Fig.3 The corresponding relation between population size and main transit modes**

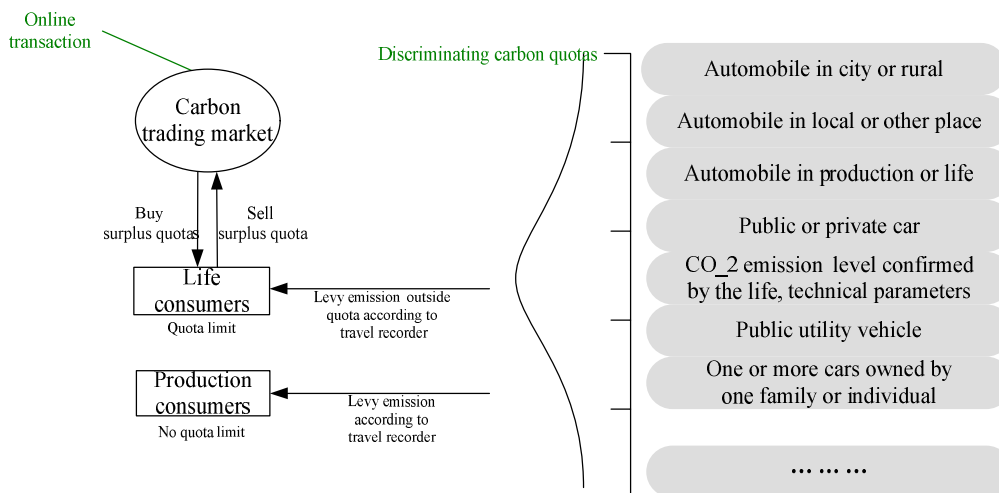
**Public Transport.**

A. China has established rail transit only in one line and two line cities. A few cities have been building, but there is still no one in most cities. So rail transport has great potential. The construction should speed up. According to the actual situation of each city, the proper way of traffic should be chosen.

B. The level of the bus traffic needs to be improved. The buses and operating lines are optimized with the aid of intelligent management, the transfer between public transport and other traffic is perfected as far as possible. The optimized public transportation through market competition instead of private transportation tools such as exploiting a rapid transit line, setting up bus lanes and improving the attraction by the service quality and efficiency of public transit.

**Emission Permit System.** Under the permit system, a carbon emissions quota can be free transaction in the market. The vehicle emission licence with the "one vehicle one card" is issued by the government according to the different uses or different emissions of automobiles and stipulates the quantity standard for fuel consumption to control carbon dioxide emissions.

Vehicle emission license is a proof to distinguish the automobile identity. It is used to identify among all sorts of use nature of the automobile. Such as, the automobile is for the purpose of production or life, city or rural, local or other place, how many level of engine CO<sub>2</sub> emission, one person or one family own a one or more? The above information is used to allocate the number of quota, as shown in Fig. 4.



**Fig.4 Emission quota transfer mechanism**

The license is used in combination with the emission quota. The emission quota of fuel consumption can be bought or sold. For consumers of the insufficient consumption, they can buy surplus quotas held by others people in the market. For productive consumers, they have no fuel quota restrictions, but need to pay tax in accordance with the recording equipment of carbon emissions. In generally, the carbon tax rate of production consumption should be less than the carbon one of life consumption, which makes the overall social benefits better. In this way, total fuel consumption in the life could be controlled. CO<sub>2</sub> emissions will reach the goal of the government [2].

**Bike Travel.** Special-purpose road network should be planning for bicycle. Motor vehicles is forbidden to take up bicycle lanes to ensure that the bicycle storage space and driving safety; bike hire should be taken in downtown to be convenient residents cycling and transfer. The supporting facilities of the pedestrian system are perfected and upgraded to ensure the safety of walking without interference from the vehicle.

If a good walk and ride facilities are connected with the public transport system together, people would be ensured to complete the whole trip and do not need use a car or a motorcycle. At the same time, the above provision of the infrastructure, it is necessary to introduce policies to control the use of private cars [3].

**Traffic Management.** ① **The establishment of low carbon traffic laws and regulations.** Special laws and regulations about low carbon transport are still blank. Therefore, the legislation of low carbon traffic would be quickening up. ② **The development of intelligent traffic management system.** This intelligent system is a comprehensive system of the traffic management combined by advanced information, electronic and computer processing technology, which is the best way to solve the urban road and highway congestion, improve operating efficiency and driving safety. ③ **Emission test of motor vehicle.** Testing technology and management methods for motor vehicle emission are vigorously developed to ensure that all motor vehicles on the road to achieve low carbon standard.

## **Related Problems**

China is in the process of rapid urbanization. Dealing with between the Urbanization progress and low carbon traffic is the need of the sustainable development of urban traffic system. Therefore, there are three main reminders:

(1). The spread of the disorder driving by car should be prevented in the urbanization process. We must draw lessons from the old city and avoid copying the old traffic problems.

(2). Many traffic problems in old city are caused by the road facilities, space layout, building density, distribution of public goods and so on. We need to do that all the elements of the new district are in line with the requirements of low carbon traffic.

(3). The branch and the path in road network are reconstructed, so that meet the demand of urban residents and improve the efficiency of urban traffic [4].

## **Conclusion**

For China's "new urbanization" development concept, the government needs to formulate effective policy and funding support at various levels, including urban planning, transportation planning, demand management, development of public transport, encourage cycling and walking, and to be complemented by a motor vehicle clean technologies and the use of new energy. And the government's effective policy should be based on the full and accurate data.

## **References**

- [1] G.R.Wang: *Forward Position*, 13(2011): 126.
- [2] C.G. Xu and T. S.Gong: *Proceedings of the 2015 International Forum on Energy, Environment Science and Materials*, Published by Atlantis Press, 706-709.
- [3] P.Sophie, P.Kaye and L. Fu: *Traffic construction and management*, Special issue, Beijing, 66-69.
- [4] C.Y.Jun: *Reform and opening*, 4(2016): 76-78.