

# Measurement of the Distribution and Effect of Urban Infrastructure in Liaoning

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**Abstract.** Through effective measurement and evaluation of the distribution and effect of urban infrastructure, the key tasks of urban work in our province can be effectively implemented, weak links are improved, urban functions are optimized and urban comprehensive carrying capacity and radiation ability can be improved. In particular, specific proposals for infrastructure projects in basic cities are put forward. For example, the construction and renovation of urban roads, urban rail transit and urban underground pipeline corridors should be intensified. Strengthen the construction of municipal public facilities, build safe, efficient and convenient life services and municipal utilities network system.

## 1. Introduction

Urbanization is the only way of modernization. It is the carrier and platform for the synchronous development of industrialization, information and agricultural modernization. It plays an irreplaceable role in the integration. Urbanization is a strong support for resolving the contradiction between urban and rural dual structure, narrowing the income gap between urban and rural areas, and promoting the coordinated development of our province. Urban work is a systematic project. Urban work must be well coordinated planning, construction and management, and efforts should be made to improve the sustainability and livability of urban development.

### 1.1 The Measurement of the Distribution and Effect of Urban Infrastructure.

We have designed a model to evaluate the distribution and effect of urban infrastructure. After a lot of data analysis, we found that there are many problems to be solved in urban road traffic infrastructure, such as the centralized city gas and water pipe network facilities, and the related data are as follows:

#### 1.1.1 The Measurement of the Distribution and Effect of Urban Road Traffic Infrastructure.

Table 1. Statistics of large capacity public transport construction of urban areas in recent 3 years

Prefecture	Dispatch center	Parking lot	Maintenance field	First terminal station	Stop station
Shenyang	1	33	17	79	3358
Dalian	11	1		30	610
Anshan	0	3	0	2	90
Fushun	2	2	1	27	10
Benxi		7	1	6	134
Fuxin	2	6	1	1	249
Liaoyang	2	6	1	1	249
Gingko	2	3	2	55	779
Jinzhou	0	1	1	9	58
Chatoyant	0	1	0	0	80
Hulu Dao	1	1	1	2	158
Tiling	1	4	1	32	344
Panning	1	0	0	0	150
Dandong	1	8	1	14	167

Table 2. Statistics on the construction of public transport supporting service facilities of urban areas in recent 3 years

(Because some cities does not provide effective data, the individual places are blank)

Prefecture	Transfer hub	Charging pile	Charging station	Public Parking
Shenyang	9	40	3	
Dalian	2	330	13	2
Anshan	1	18	0	15
Fushun	0	80	0	0
Benxi	1			45
Fuxin	2			
Liaoyang	7	36	4	4
Yingkou	4	3	1	0
Jinzhou				78
Chaoyang	0	0	0	0
Huludao				15
Tieling	0	0	0	15
Panjin	0	0	0	9
Dandong				5

### 1.1.2 Construction of Urban Pipe Network.

Table 3. Statistical table of gas construction in the city

(Because some cities does not provide effective data, the individual places are blank)

Prefecture	Gas transformation		Reconstruction of old heating network for central heating		Gas popularity rate
	Kilometer number	Remolding ratio	Kilometer number	Remolding ratio	
Shenyang	61	100%	107	100%	99%
Dalian					
Anshan	41.98	17.4%	45	12.5%	94%
Fushun	2.8	1%	10.3	1.8%	98%
Benxi	20	57%	89.2	19%	93.6%
Fuxin					80%
Liaoyang			162.85	42.94%	98.36%
Gingko	2	30	18	85%	80%
Jinzhou	2.6	100%	150	30%	91.61%
Chatoyant	78	62%	94.5	17.2%	90%
Hulu Dao	8.6	47%			64%
Tiling	37.55	35.76%	42.11	20%	97.52%
Panning	20.05	93%	63	9.4%	80%
Dandong	28	14%	98.54	25%	89.97%

Table 4. Situation of urban water supply facilities

Prefecture	Average public water supply rate in cities (%)	Water quality standard rate (%)
Shenyang	92.19	100
Dalian	98.63	99.95
Anshan	96.33	99.67
Fushun	53.33	98.33
Benxi	98	100
Fuxin	95	100
Liaoyang	90.53	99.33
Yingkou	100	100
Jinzhou	100	100
Chaoyang	98.4	99.9
Huludao	98	100
Tieling	97.57	99
Panjin	100	100
Dandong	99.5	99.37

Table 5. Statistics on the construction of public transport supporting service facilities of urban areas in recent 3 years

(Because some cities does not provide effective data, the individual places are blank)

Prefecture	Wastewater treatment rate	Sewer network(km)	Innocuous disposal rate of sludge	Regenerated water utilization rate of sewage treatment facilities
Shenyang	95%	4238	100%	
Dalian	95%	71	100%	42%
Anshan	90%	891.58	100%	0%
Fushun	85%	295	0	0
Benxi	88%	5.5	100%	100%
Fuxin	98%	256		
Liaoyang	90%	569.47	100%	18.5%
Gingko		73.3	100%	11.42
Jinzhou	85%	63.6	100%	5.8%
Chatoyant		17.4		
Hulu Dao	85.5%	73		25%
Tiling	98%	74.8	100%	24%
Panning	87%	65	100%	0
Dandong	80.75	155	100	50

## 2. Influence Factor

### 2.1 Uneven Construction of Urban Public Infrastructure in Our Province.

There are a certain gap in the construction of urban road traffic infrastructure, the construction and reconstruction of the pipe network, the construction of sewage and garbage disposal facilities and the construction of ecological garden. Especially in large capacity ground public transportation and its supporting service facilities, bridge safety detection and reinforcement, the ratio of old and old pipe networks that need to be reformed, gas popularization rate, regenerated water use rate of sewage treatment facilities, and coverage rate of park green space service radius, the gap between other cities and Shenyang and Dalian is larger.

### 2.2 A Short Board in the Construction of Urban Public Infrastructure in Our Province.

It is mainly embodied in the aspects of gas popularization, sewage treatment, urban park construction, upgrading of urban green space functions, reinforcement and reconstruction of dangerous bridges and so on. By 2015, only five cities can meet the national standards for gas penetration, and 29% of the city and County Park green space service radius coverage reached the national standard. Nearly 50% of the city and county did not realize the "full collection and whole treatment" of the sewage, and did not complete the reinforcement and transformation of the dangerous bridges, and did not build a comprehensive and functional disaster prevention and risk park with a certain scale, water, gas, electricity and other facilities.

### 2.3 The Construction of Urban Public Infrastructure in Our Province Lacks Planning and Management.

Nearly 70% of the cities and counties in the province did not set up a reserve bank for urban infrastructure projects, and nearly 50% of the cities and counties did not establish a quality evaluation system for urban infrastructure construction, and nearly 60% of the cities and counties did not carry out public satisfaction survey on infrastructure construction.

## 3. Strengthening Measures

### 3.1 Strengthening the Construction of Urban Road Traffic Infrastructure.

We will promote the construction of intercity rail transit facilities and give full play to the role of the subway as a backbone of public transport to drive the development of urban public transport and related industries. Speed up the construction of subway and light rail in Shenyang and Dalian. By 2020, the total mileage of the city's urban rail transit operation will reach 300 km. We should actively develop large capacity public transport on the ground, and speed up the construction of dispatching

centers, parking lots, maintenance sites, first and last stops and stops. Promote the construction of transfer hub, charging pile, charging station, public parking lot and other supporting services, and put it into the urban old city reconstruction and new town construction planning. To speed up the construction of green transportation, a more complete vehicle filling station and vehicle charging station will be built in 2019. The number of public transport vehicles has been greatly increased, the technology level of vehicle equipment has been significantly improved, and the riding environment is more comfortable.

### **3.2 Construction and Reconstruction of Urban Pipe Network.**

We should strengthen the construction, renovation and renovation of all kinds of underground pipelines, such as urban water supply, sewage, rainwater, electricity, gas, heating and communication. Priority should be given to retrofit old pipelines, which are backward in materials, serious in leakage and affect safety, so as to ensure that the leakage rate of the pipe network is lower than the national standard. We will speed up the census of underground pipelines and build an integrated information system. We will accelerate the completion of the urban underground space utilization plan and scientifically compile the urban underground pipe gallery construction plan. The first step is to build underground comprehensive pipe corridors in the new urban area, and gradually build underground comprehensive pipe corridors in the process of transformation of old urban areas.

### **3.3 Construction of Sewage and Waste Disposal Facilities.**

We will continue to promote the construction of sewage treatment and recycling facilities, fully implement the construction of sewage pipe network, and improve the sewage collection rate. We will promote upgrading of urban sewage treatment facilities, build sludge treatment and disposal facilities, reuse facilities for reclaimed water, and promote reclaimed water reuse. We will promote the pollution and emission reduction work in our city. By 2020, the utilization rate of urban sewage treatment facilities for reclaimed water reached over 20%. Industrial production, road cleaning, vehicle washing, greening and irrigation, ecological landscape and other production and ecological water use priority should be given to reclaimed water. Setting up the concept of garbage is an important resource and mineral resources, establishing the coordination mechanism of government, community, enterprise and residents, through the classification and collection, comprehensive recycling, to promote the reduction of waste, resources and harmless. By 2020, we will strive to raise the utilization rate of garbage to over 35%. Using new technology and equipment, we will promote the household smashing of kitchen waste and establish the system of kitchen waste and construction waste recycling and recycling.

## **4. Conclusion**

The purpose of this project is to improve the level of urban planning, construction and management in an all-round way through the establishment and implementation of a scientific assessment of urban infrastructure, to improve the quality of urban development and to build a harmonious, livable, green, dynamic and distinctive modern city. To promote scientific and coordinated urban layout, perfect urban functions, complete infrastructure and public service facilities, improved management efficiency, clean and elegant environment, comfortable and convenient human settlements, urban competitiveness and sustainable development ability.

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