

Industrial Relocation and Transformation in Dalian

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Dalian is an old and heavily industrial city. The unreasonable city layout, industrial structure and the mixture of plant, residential and commercial area caused a tough problem of environmental pollution in the past. Since 1995, Dalian municipal government has decided to remove, relocate and transform all the industrial enterprises of serious pollution, high energy consumption and low benefit in order to solve the pollution thoroughly. Through the rational city layout and industrial structure adjustment, all industrial enterprises have been removed out of the central area and transformed so that environment quality has been obviously improved. Therefore, Dalian has step into the line of top city in terms of 10 indexes examination of the nationally environmentally comprehensive rectification and control, the model city of national environment protection and the garden city. In 2001, Dalian is honored as “Global 500” by UNEP.

1. The general information of Dalian City

Dalian city is located in the most southern tip of Liaodong peninsula in the Northeastern part of China with one side by mountains and three other sides circled by sea. It is separated by Bohai sea and with the remote neighbor of Huabei plain to the west, by Huanghai sea and face far to Korean peninsula to the east, by Bohai strait and opposite Shandong Peninsula to the south, and near three provinces of Northeastern and the vast hinterland in the eastern part of the Inner Mongolia Autonomous Region to the north. It has the geographic distribution of the east longitude 120°58'~123°31' and north latitude 38°43'~40°12'. The land area is 12573.85 square kilometers including urban area of 2414.96 km² occupying 6 districts, 3 satellite cities and 1 county with the total population of 5.90 million including non-peasant population of 2.7535 million and average density of 468 persons/square kilometer and natural rate of 1.08 %. It has mild weather and four obvious seasons belonging to semi-humid continental monsoon climate of warm temperature zone with annual average temperature of 8-10°C, highest 35.3°C and lowest -21.1°C ,and non-frost period of 170-190 days. In summer, it features south to southeast wind, north to northwest in winter with the average speed of 5.3 meters/second. The most water precipitation occurs from July to September with the annual precipitation of 590-800 mm. The land utilization ratio is 92.8 % including 13.8 % of non-farming land. It has vast marine space with the total coastline of 1906 km including bank shoreline of 1288 km, island shoreline of 618 km and beach area of 646.7 km². There are 226 islands totally.

Dalian, one of heavy industry cities, is port, trade and tourism base in China. It is one of the most open to outside world, the most vigor and the most developed city in northern part of China. In 2002, GDP of RMB 123.56 billion has been realized totally with the increasing rate of 11.8 % and per capita GDP of RMB 22,340, including RMB 11.14 billion of increased value from the primary, RMB 57.42 billion from the secondary and RMB 55 billion from the tertiary. The composition ratio of the increased value from three industries is 9: 46.5: 44.5. The total investment in relate to environment protection is RMB 2.538 billion accounting for 2.05% of GDP including RMB 1.405 billion of environmental infrastructure construction and RMB 1.13 billion of industry pollution control composed of RMB 27.15 million of waste water treatment, RMB 65.42 million of air pollution control, RMB 4.56 million of solid waste and sludge and RMB 2.62 million of noise control and RMB 13.25 billion of personnel, management and equipment. Besides those, there was RMB 0.6 billion spent in the industrial relocation accounting for 0.48 % of GDP so that total RMB 3.5 billion has been invested in it.

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In Dalian, there are 40 Agencies or Bureaus or Commissions of local government and having respective responsibility. Dalian Economic Committee, Planning and Development Committee, Financial Bureau and Environment Protection Agency are involved in the industrial relocation and transformation. Dalian EC is the organizer, manager and coordinator. Dalian PDC and FB provide financial and policy support. Dalian EPA is in charge of environmental protection management and pollution control etc.

2. The general situation of Dalian environment quality

Right now, the air pollution is still the combined type of coal smoke and automobile tail gas and the main pollutant is PM¹⁰ in Dalian. In 2001, the days of first class of API is 89 days, 262 days of the second class, respectively accounting for 24.4 % and 71.8 % of the whole year. The air pollution is lighter in summer, but heavier in spring and winter. The annual average of dust in urban area is 17.4 t / (square km • month) exceeding 1.2 times of Liaoning provincial standard but keeping with last year in urban area, PM¹⁰ 0.079 mg / m³, NO₂ 0.024 mg / m³, CO 0.59 mg / m³, SO₂ 0.031 mg / m³, Dust 17.4. All the main indexes of air quality comply with the second class of national air quality standard. In the whole city, there are 113.2 thousand tons of SO₂ emitted with 14.2 % decrease as compared with 2000, smoke 74.5 thousand tons, 13.8 %; dust 20.4 thousand tons, 5.1 %.

In 2001, there are 7 times sand storm happened in Dalian area, mainly occurring in the winter and spring with the duration time of 10 –20 hr per time and average PM¹⁰ concentration of 0.24 to 0.80 mg / m³. But non acid rain fell.

The main pollutants of industry waste gas are SO₂ of 70 thousand tons with 18.6 % decrease as compared with 2000; smoke 35 thousand tons, 35.2 % and dust 20 thousand tons, 5.1 %. The main emission zone of industry waste gas is Ganjingzi district with SO₂ emission of 31 thousand tons accounting for 45 % of the whole city; smoke 8 thousand tons, 23 %; dust 4 thousand tons, 20%. The firepower generation is the main industry emitting SO₂ with emission volume of 37 thousand tons accounting for 54 %; non-metal mineral for smoke of 11 thousand tons for 31 %; non-metal mineral for dust of 15 thousand tons for 75 %, mainly from cement about 11 thousand tons.

In Dalian, there are more than 0.35 million automobiles and 30 main traffic road. From 1998 to 2002, there are RMB 0.699 billion invested by the public communication and transportation system to renew 4948 old ones so as to effectively enhance the grade and quality of automobiles run in Dalian with the purpose of reducing the emission of NO_x and CO greatly.

In 2001, there are only 2 times of small scale of red tide happened in the offshore waters in Dalian. The main pollutants are inorganic nitrogen and petroleum in the maritime space. Except Dalian gulf, each monitoring index for all maritime space meets the national standard of second class. All the rivers' waters satisfy the third class of national groundwater standard. But the Fuzhou and Dengshahe rivers are seriously polluted, which run in the rural area.

3. The general introduction of industrial relocation and transformation in Dalian

Dalian is historically one of heavy industrial cities in long-term. In 1995, Dalian municipal government has brought the adjustment of industrial structure and relocation into the overall planning of the city development. The relocation and transformation of key pollution enterprises become the main point for government to implement "the sustainable development strategy". Meanwhile, Dalian government set up a leadership group of Dalian industry structure adjustment and relocation led by city mayor composed of relevant committee, agency, bureau and office. There is a working office belonging to the group to take charge of the planning of the preceding stage, project selection, examination and approval, and policy coordination which is belonging to Dalian economic committee. The government has issued some documents such as "the relative regulation for urban enterprises's relocation and transformation in Dalian" and "the implementation scheme for the relocation and transformation with the feature of development and entirety for the urban enterprises".

Through the rational planning, Dalian government has implemented the overall industrial relocation and transformation to control pollution from those enterprises.

Until now, more than 130 enterprises have been removed out of central area of more than 3.7 million square kilometers so as to gain total contract fund of 4 billion Chinese yuans including land selling of 1.3 billion and relocation compensation of 1.2 billion. Therefore more than 21.69 million tons of industrial waste water is decreased each year, which accounts for 6.7 % of total in 2002; 39.7 thousand tons of COD, 68 %; 92.6 tons of petroleum, 20.4 %; 4.74 billion m³ of industrial waste gas, 4 %; 9747.4 tons of SO₂, 13.5 %; 2385.3 tons of smoke, 6.7 %; 1148 tons of dust, 5.3 %; 19.5 tons of industrial solid waste, 7.6 %.

4. The measures and methods taken for the industrial relocation and transformation

In order to successfully realize the industrial relocation and transformation, Dalian government has taken the 5 following measures on the basis of the overall city planning:

- ◆ Making transformation in the new address: The promising enterprise or product with good profit establishes a factory with new techniques in the new address.
- ◆ Shutting down: The unpromising enterprise with bad profit is eliminated following the legal course.
- ◆ Incorporation: Several similar enterprises of small scale are removed out into one new place to leave the land to be developed.
- ◆ Shrinking the large scale enterprise: In relation to the large enterprise occupying much more land, some parts of production systems are removed out or closed to make room for developing new industry.
- ◆ Selling the whole enterprise:

5. The key enterprises of relocation and transformation are with following features:

- ◆ The product of noncompetitive ability; obsolete equipment; low profit; non-exist and non-development without transformation; lack of funding for transformation; very difficult condition of production and operation.
- ◆ The enterprise seriously pollutes environment, harms the resident life and affects the ecosystem.
- ◆ The enterprise locating in good business area makes it useless so that it does not bring the land superiority and resource into full play.

6. The relevant policies and regulations

In order to make the industrial relocation and transformation go on well, Dalian government gives all the enterprises a lot of favorable policies. The document of “the relative regulation for urban enterprises’ removal and transformation in Dalian” proposes that all the departments involved in the industrial relocation and transformation examine the projects on the basis of respective obligation, simplify the procedure of examination and approval, and speed up the removal and transformation. 40%-70 % of all removal fee and the land sale fund are given to the removed enterprise according to the distance to destination. Based on the prerequisite of conforming to the city overall planning, the removed enterprises may enjoy a series of preferential policies of local revenue exemption in a limited period under certain condition, which greatly mobilizes the positivity and the initiative of the removed enterprise. Those provide strong support for the industrial relocation and transformation.

7. The industrial relocation and transformation bring obviously the environmental, economic and social benefit

■ *Environmental benefit*

By the way of relocation and transformation, the products of noncompetitive ability have been cancelled, the clean production has been adopted so that the total pollutant volume has been reduced greatly and the urban environment quality has been effectively improved.

In 5 years, 17lime factories and 4 cement factories have been closed down, 11charcoal plants of small scale have been cleaned out, 150 charcoal kilns of small scale have been demolished. We concentrate our strength on treating and controlling the smoke and dust so that 2415 sets of coal burning boilers of less than 1 ton and 227 boilers from 1 to 4 tons have been dismantled or shut down or sealed, more than 2000 pieces of chimneys have been eliminated. Meanwhile, the production systems of 35 enterprises of casting and forging have been closed down.

At present, the chemical and pharmaceutical plants causing serious pollution have been removed out of the urban area. The main pollution sources of mechanical, textile and metallurgical industries causing waste water, noise, smoke and dust have been thoroughly treated and controlled.

After the industrial relocation and transformation, the urban environment quality has been evidently improved. The comprehensive air pollution index (CAPI) has drop down from 7.88 of 1990 to 4.4 of 2000. Especially in the “95 period”, it become much better. Among 47 key cities nationwide in 2000, the Dalian CAPI rank 12th. The air quality ranks 9th among 42 key cities, ranks the first among 18 key northern cities. The seawater quality in maritime space has been obviously improved. Especially the main pollutants of the coastal waters have declined evidently.

■ *Economic benefit*

Following the industrial relocation, several projects of urban construction, business and residential building have been established on the principle of “Removing it Modifying it; Controlling it Benefiting it”. By the way of enhancing the environment quality and completing the urban function, the whole city value has been increased. In 1992, the usable fund of Dalian finance was RMB 2.1 billion, 2001 up to 9 billion. The land sale price per square meter in 1992 was RMB 40, up to 800 on 1995, up to 4000 in 2000, therefore in 5 years, the land sale price in the urban has increased 5 times. In 8 years, Dalian GDP has raised from RMB 27 billion in 1992 to 111 billion in 2000 with 14.2 % of annual average rate of increment. The material object asset has increased from RMB 75.8 billion to 261 billion with 16.7 % of the progressive rate of annual average. The proportion of the tertiary industry in GDP rises from 32 % to 44 %. The total foreign investment is up to RMB 9.28 billion.

■ *Social benefit*

The industrial relocation makes a earth-shaking change on the environment in Dalian. The nice environment quality and perfect city function becomes a famous name card for inviting foreign investment so as to result in the relative industry development. In 2000, the state-owned commerce realized that the benefit ranked first among other metropolises in the northeastern and round-bohai-sea in 5 years, the tourism income exceeded RMB 9 billion, the number of foreign visitors and the foreign exchange earnings of tourism all increased 30 % than last year. And 52 exhibition fairs happened with the trade volume of more than RMB 30 billion. Until 2000, the composition proportion of increment value of the tertiary industry had been changed from 12 : 56 : 32 to 9.8 : 46.2 : 44, so that it becomes the main force in promoting the economic development. Now more than 23 million square meters residential building has been constructed. More than 1 million people have moved into new apartments. The average living space per capita is raised from 9.2 square meters to 14 , the covering rate of green up to 40.5 % in the constructed area, and the public green land per capita up to 9 square meters.

7. Some unsuccessful experiences

- ◆ The relocation addresses of several enterprises are unreasonable to cause some pollution problems in the residential areas.
- ◆ The some left lands where new apartment buildings have been set up contain the potential pollution problems.
- ◆ Some new products met sale problems in the market.
- ◆ The adoption of high technology has caused workers to lose their jobs.

8. General conclusion

Through the industrial relocation and transformation, we have broken down the barriers of profession, industry and ownership so as to realize the asset increment, industry transfer, function change and worker employment, and enhance the whole industry level. Meanwhile, some serious pollution problems have been resolved so that the air and waters quality has been greatly improved. Therefore, we have stepped on to the sustainable development road.