

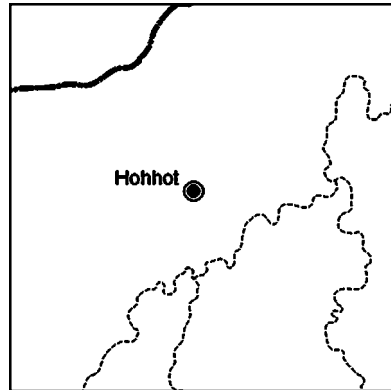
SOLID WASTE MANAGEMENT

HOHHOT MUNICIPAL GOVERNMENT

Hohhot is the capital and political, economic, and cultural center of the Inner Mongolia Autonomous Region. It is also a national historical and cultural city and an important transportation hub of the northern border of the People's Republic of China.

Hohhot covers four districts and five counties with a total population of 2.044 million and a total area of 17,224 km². The urban area is 85 km² (including Ruyi Development Zone, Jinchuan Development Zone, and the Petrochemical Zone) and home to about 710,000 people of 35 nationalities, including Mongolian, Han, Hui, and Manchu.

Hohhot's major industries are electric power, textiles, petrochemicals, machinery, food processing, transportation, communications, and tourism. Its gross domestic product (GDP) was Y14.3 billion in 1998. It generated Y1.73 billion in municipal revenue. Its GDP per capita is Y6,875. Its links with the international community are expanding; it hosts 714 small and medium-sized foreign and joint ventures and foreign investments worth \$102 million. Hohhot is also strengthening its links with inland developed areas, with 2,071 cooperation projects and Y2,530 million in investments.



Continuous economic progress and reform have restructured the job market. At end-1998, 559,000 people were employed in the urban area, 351,000 of them in State-owned enterprises. In that year, 68,000 employees in the State-owned enterprises were laid off, but 43,000 (63.2 percent) were re-employed.

URBAN DEVELOPMENT

After the City Planning Act was passed in 1990, Hohhot issued its own City Planning Regulations in 1993 and prepared its city and township system plans, district plans, and detailed structure plans. The State Council approved Hohhot's revised master plan (1996-2010) in 1999.

The administrative departments for planning, environment, landscape, sanitation, drainage, utilities, civil engineering, and urban management coordinate with each other under the municipal government.

At end-1998, urban land area was 86.2 km², including 23.6 km² for residences, 16.6 km² for industries, 16.3 km² for public facilities, 6.3 km² for squares and roads, 5.9 km² for warehouses, 3.7 km² for external transport, 3.7 km² for utilities, 4.6 km² for parks, and 5.6 km² for special use.

Hohhot suffers from severe air pollution, especially from December to February, when buildings have to be heated. The daily average amount of general suspended particulates and sulfur dioxide was 423/461 gamma/m³ and 102/63 gamma/m³, making the municipality a major sulfur dioxide control area. Air pollution is caused mainly by the burning of coal, which is the major source of energy. Within the 80-km² built-up area, there are more than 2,000 boilers that consume more than 40,000 tons of coal per km².

The Dahei, Xiaohei, and Xi rivers are the main bodies of surface water in Hohhot. Because Hohhot is located in a semi-arid mid-temperate zone, precipitation and surface run-off are too low to dilute, purify, and conduct pollutants. Along with urban socioeconomic development, the volume of domestic and industrial sew-

age has been increasing year after year. The lack of treatment facilities, however, has resulted in surface water pollution, which urgently needs to be controlled. Although the deep groundwater is still pure, it risks contamination from polluted wells and shallow groundwater.

Urban infrastructure has made notable progress. By end-1998, seven water supply plants and 372 km of service pipes had been constructed, with a daily supply capacity of 242,000 tons and serving about 90 percent of the population; 402 km of drainpipes and a sewage treatment plant with a capacity of 100,000 tons/day had been built, bringing the treatment rate up to 27.7 percent. Housing floor space had reached 14.33 million m², with 7.63 million m² of actual living space (8.46 m² per capita); 114.4 km of heating pipelines had been built to combine centralized and associated heating systems, raising the centralized-heating rate to 44.12 percent. Daily coal gas productivity reached 164,000 m³ and daily gas storage capacity grew to 150,000 m³, with 308 km of pipelines and 250,000 consumers. LPG supply reached 6,006 tons, with 149,000 consumers; total gas consumption rate was 58.31 percent.

Hohhot sits on the edge of the alluvial area at the southern foot of the Daqing Mountains. Flooding due to surface runoff from the mountains is a serious problem. Flood control is guided by three principles: store floodwater when possible, and, when necessary, let it flow or discharge it. The municipal government therefore combines engineering and non-engineering measures to integrate antiflood planning, dredging the watercourses, building embankments and reservoirs, preparing flooding emergency schemes, organizing emergency squads, and reserving emergency materials.

Hohhot is fairly well linked up with highways, railroads, and airlines. It has 389 km of urban roads and 3,114 km of highways. By end-1998, it had 68,000 motor vehicles, including 301 public buses with 288 km of service lines. Jingbao Railroad, a national railroad crossing the urban area, carried 2.79 million passengers and 2.23 million tons of cargo. The Baita airport has 11 airlines flying to 12 cities, and its annual throughput is 351,804 person-hours.

SOLID WASTE MANAGEMENT

Hohhot's solid waste is mainly made up of industrial solid waste, urban domestic waste, excrement, and medical waste.

Industrial Solid Waste

Hohhot has more than 800 factories. A 1993 survey of 149 enterprises shows the following:

- The major solid waste polluters are the electric power and metallurgy industries. They generate 50.3 percent of total solid waste, which takes up 99.1 percent of storage space.
- The major pollutants are coal ash, smelter residue, and slag, mainly from the boilers used in manufacturing and heating. Slag is produced mainly by the Hohhot Ironworks, while coal ash comes mainly from the Hohhot Thermoelectricity Plant. Both are extremely expensive to control. Coal ash does not undergo integrated utilization, resulting in the problem of long-term stacking, made worse by the fact that it occupies a great deal of space and is a possible source of water and air pollution. Most (95 percent) of the smelter residue, however, undergoes integrated utilization, and is therefore less of a threat to the environment.
- Most industrial solid waste in Hohhot is nontoxic and non-radioactive, but the problem is how to reduce the amount so that it occupies less space. Accumulated industrial solid waste is now 700,000 tons, occupying 690,000 m² of land. The integrated utilization rate is 46.88 percent. Agencies managing industrial solid waste are guided by the principle that polluting enterprises are responsible for controlling their own pollution.

Domestic Waste

Along with urban population growth, the amount of domestic waste has been increasing continuously. In 1998, 477,000 tons of domestic waste were generated (1,300-1,400 tons/day). Waste construction materials accounted for an additional 800-1,000 tons/day. Night soil production was 62,000 tons for the year. A 200,000-m² integrated waste disposal plant located 7.5 km away from the urban area performs six tasks: hygienic stacking and filling; high-temperature composting; night soil anaerobic fermenting; incineration; integrated utilization; and logistics. It has a stacking and filling capacity of 750 tons/day, a night soil anaerobic fermenting capacity of 200 tons/day, and an incineration capacity of 6 tons/day. However, composting, anaerobic fermenting of night soil, and incineration are insufficient due to a shortage of funds. A large amount of urban refuse is still simply stacked in suburban low-lying ground, severely threatening air and water quality.

Facilities for urban waste collection and transportation are inadequate. Waste is collected through containers, ground collection stations, and clearing stations. There are 967 collection stations, 96 containers, 400 garbage boxes, 28 obturated clearing stations, and 142 sanitation vehicles in the city. But classified collection is not yet well developed and the technology for collecting and transporting waste is relatively primitive.

Medical Waste

Hohhot has over 500 medical facilities, of which 32 are at or above the district level. Each year, approximately 11,000 tons of hazardous hospital waste must be disposed of. However, only a few large hospitals have normal or simple incinerators, and of limited capacity. Most medical waste is discharged along with domestic waste, contaminating the environment and seriously threatening people's health.

The major problems of solid waste management are the following:

- Due to lack of funds, urban infrastructure is weak, resulting in more solid waste accumulation year after year.
- Industrial solid waste and medical waste have not been integrated into urban management.

STRATEGIES FOR SOLID WASTE MANAGEMENT

Development Strategy

DEVELOPMENT OBJECTIVES

By 2010, Hohhot is expected to become a modern, economically vibrant city, with a rational industrial structure, advanced technology and education, a complete social security system, much improved infrastructure, a well-thought-out layout, convenient and safe transportation, a pleasant environment, and a culture and tradition that the people treasure.

ECONOMIC TARGETS

By 2010, it is expected that Hohhot will have a modern, open economy with a strong agricultural base, high technology, and flourishing industry. It should have an improved market system supported by the pillar industries of commerce and trade, finance, insurance, real estate, transportation, communications, and tourism. The leading industries—electricity, wool spinning, electronics, machinery, petrochemicals, and food—will be reformed. The production of grain and crops will be stabilized. Vegetable, marine, and animal production will be increased.

DEVELOPMENT TARGETS

By 2010, living standards will be much higher, with a greatly improved environment and quality of life. Urban land use will be rationalized to enable coordinated development. Better services will foster a pleasant and much more open investment atmosphere. A

modern and multilayered public facility system will serve Hohhot's residents.

Solid Waste Management Development Plan

The international trend is toward urban solid waste disposal that is environment friendly and resource oriented. Research methods and disposal technology are improving constantly. Solid waste control and a reorientation toward resource management have become the key objectives of urban pollution control. However, Hohhot is plagued by problems related to finance, technology, and control measures. The annual rate of increase in urban solid waste is 5 percent. The municipal government has prepared a plan to control and solve the problems of solid waste contamination, and has installed or approved some pollution control facilities.

INDUSTRIAL SOLID WASTE

Industrial solid waste management is still guided by the principle that the polluting enterprises are responsible for controlling their own pollution under government supervision. Although some waste undergoes integrated utilization, most of it is disposed of by stacking. It has been found that coal ash and smelter residue can be used for building and road construction; slag can be used as an insulation material. The municipal government should issue regulations and lay down policies that will promote the integrated utilization of these materials, which make up most of industrial solid waste.

URBAN REFUSE

Waste disposal in the PRC focuses on hygienic stacking and filling, high-temperature composting, incineration, and integrated utilization. The municipal government should focus on promoting integrated utilization technology. Classified collection, transportation, and disposal will be gradually adopted.

WASTE FROM COAL BURNING

The amount of solid waste generated may be reduced by 30 to 50 percent by shifting to centralized or electric heating and gas for home use. The second phase of the urban centralized heating project, gas project, and electric network reform project is underway. The natural gas project is awaiting approval. The Hohhot Thermoelectricity Plant is expanding its 2 x 200,000-kilowatt electric generator set. The associated urban pipeline project is also listed in the municipality's plan.

CLASSIFIED COLLECTION

Classified collection is a common waste management method in developed countries, allowing a recycling rate of 80-90 percent. However, environment consciousness among Hohhot residents is relatively low. The municipal government has issued regulations such as the Citizens' Pact and uses the mass media to raise citizens' consciousness and to promote the garbage-in-bag policy in some residential areas.

CLEAN VEGETABLES AND DEVELOPMENT OF THE PROCESSING INDUSTRY

Waste vegetable matter accounts for 10 percent of the total amount of urban refuse; 20-30 percent of vegetables are thrown out during the harvest season. Selling only clean vegetables in the cities and developing the processing industry will reduce vegetable waste by 50 percent.

FUNDING OF WASTE COLLECTION, TRANSPORTATION, AND DISPOSAL

Allotting more money to waste management will permanently solve the problem of urban waste, as it will expedite infrastructure development. Funds can be raised from the municipal budget, the central Government, autonomous region agencies, and foreign investment.

An integrated waste disposal plant in the western suburbs funded jointly by the central Government, autonomous region authorities, and the municipal government has been operating successfully since 1995. In the eastern suburbs, another integrated waste disposal plant costing Y94 million has passed the feasibility-study stage. It is designed to handle 750 tons of domestic waste per day, 1,000 tons of building waste material, and 40 tons of medical waste. Funding comes from the central Government, local finance, a development bank, and the Asian Development Bank. When the plant starts operating, all the urban domestic waste and medical waste in Hohhot will be rendered harmless.

Hohhot lags far behind developed cities in terms of integrated disposal technologies and control measures. We welcome any expert criticism and instruction. We also welcome investors to participate in infrastructure development.

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