

# WASTE MANAGEMENT

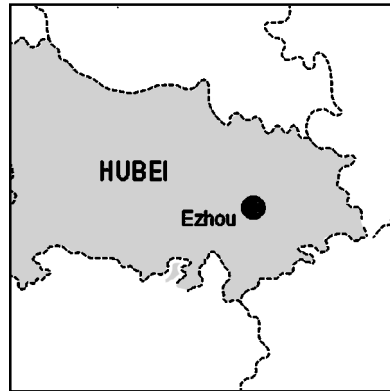
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## EZHOU MUNICIPAL GOVERNMENT

**E**zhou is one link in a chain of cities situated along the Yangtze River in eastern Hubei province. It is surrounded by Huangshi on the east, Xianyang on the south, Wuhan on the west, and Huanggang on the north, across the river. The built-up area is 58 km from Wuhan and 31 km from Huangshi.

Ezhou has four administrative districts, which together have a land area of 1,504 km<sup>2</sup>, including 23 km<sup>2</sup> of built-up area. It has a population of 1.03 million, including 260,000 urban residents. It has a resort area, adequate roads, well-designed buildings, fully functioning utilities, and a clean environment. Known as the City of a Hundred Lakes, it boasts famous scenic spots such as Lake Yanglan in the city center.

Since 1990, the municipal government has been making efforts to improve the urban environment and raise living standards. It has made great strides in domestic waste management. The city has won the provincial award for hygiene three times in a row and has been commended by the central Government for improving its health services.



### DOMESTIC WASTE MANAGEMENT

Ezhou has had a waste disposal system since the 1980s, but before 1990 only less than 30 percent of domestic waste was treated. However, the 1990s witnessed continuous improvement in waste disposal, and by 1997 the city was capable of treating and disposing of its 135,300 tons of annual domestic waste.

While Ezhou's achievements are considerable, its waste disposal capacity and investment remain low. For the period 1990-1997, capacity increased by 45,000 tons. Investment during the same period was Y1.6 million, or only 20 percent of the total environmental sanitation investment of Y8 million (in fixed assets and renewal). For the same period, the total amount of domestic waste treated was 900,000 tons at the average cost of Y1.78 per ton, which was low. However, potential risks to the environment still exist.

In recent years, the municipal authority has paid much attention to environmental protection and has implemented a number of measures to deal with waste management. It has conducted special studies on domestic waste since 1990. Specialists from the city and elsewhere were invited to prepare the Special Plan on Environmental Sanitation for the built-up area. Urban domestic waste management and treatment are included in the master plan of the city. A number of local regulations have been issued to ensure orderly and lawful domestic waste management.

In accordance with the Temporary Provisions for Urban Domestic Waste Investigation issued by the Ministry of Construction, the municipal authorities conducted a sampling survey and laboratory test on urban domestic waste. The analysis showed that the waste generated and its physical and chemical character have changed along with the growth of urban population, and rise in consumption levels. Waste quantity, organic ingredients, and recyclable materials have increased.

In 1997, the city applied to the provincial Planning Committee to build a garbage disposal site. The project was approved and given funds totaling Y19.93 million. It was to be implemented in phases. In the first phase, the city spent Y2 million to build a refuse

storage site on a 13.5-ha suburban tract of land. The site has a storage capacity of 400 tons/day and is approaching its maximum. The city has yet to solve the problem of leaking liquids and gases, which are a potential threat to the environment. The municipal budget allots ¥200,000 annually to maintain the storage site, but the low utilization rate of waste material makes the site a heavy burden for the municipal government. The city's scientists are researching ways to tap the rural compost and fertilizer market, classify collection, eliminate inorganic substances through filtration, and compost organic substances. The research concludes that the expensive method of incineration is inappropriate to conditions in Ezhou and that waste disposal should gradually shift from stacking and filling to industrialized composting.

#### **PROBLEMS IN URBAN DOMESTIC WASTE MANAGEMENT**

Ezhou's urban population produces 400 tons of waste per day. In 2005, the population may reach 340,000, which is expected to produce 500 tons/day. In 2015, a possible urban population of 460,000 will produce 700 tons/day. Overall, it is expected that domestic waste will contain more organic content.

There are two major kinds of waste:

- Domestic waste is composed of materials discarded in the course of daily life, including paper, plastic, food, iron, glass, etc. It is the major source of the city's solid waste, which grows as the economy progresses and consumption levels rise. Ezhou's domestic waste nearly doubled in 11 years, from 73,600 tons in 1987 to 138,600 tons in 1998. At this rate, Ezhou will soon be submerged in an ocean of garbage.
- Industrial waste comes mainly from the chemical, electronic, and mechanical industries. For example, producing 10 tons of iron creates 3 tons of waste residue, sometimes 10 tons when a blast furnace is used. In 1997, 300,000 tons of industrial residue was generated, accounting for 68 percent of total waste. The residue not only contaminates the ur-

ban environment but also occupies precious space and increases the proportion of industrial waste, as the recycling rate is less than 30 percent.

Contamination caused by various kinds of waste has seriously endangered Ezhou's urban environment.

- Waste occupies large areas of land. The storage of great amounts of domestic waste has worsened urban land shortage. In 1987-1997, waste storage took up 10 ha.
- Wastes contaminate the soil, water, and air; 98 percent of stored refuse is untreated and contains a large quantity of pernicious substances. For example, ferroalloys and non-ferrous metals in industrial residues are highly toxic. Calcium carbide residues discharged by organic synthesizing chemical plants are highly alkaline and contaminate soil and water.
- Wastes contain much that can be recycled and reused, but these resources are dissipated due to management and technology problems.

#### **SOLUTIONS TO WASTE DISPOSAL PROBLEMS**

The composition of urban refuse depends on a city's level of economic growth. Most domestic waste in developed countries consists of food, paper, clothing, metals, glass, plastic products, used cars, and household appliances. The US, which produces the most refuse in the world, produces 30 million to 40 million tons of scrap paper every year, exceeding the total output of the world's three biggest paper producers—the Netherlands, Switzerland, and Norway. More than 50 billion metal cans and tins are thrown away every year in the US—an average of more than 200 per year per person. The US generates 250 million tons of refuse every year, or 28 percent of the world's total.

Today, a new scientific field is on the rise: waste management. The waste disposal problem can be solved in three ways:

*Reclamation or recycling.* More and more people are realizing that garbage is actually a second, reusable resource. Developed countries especially encourage waste utilization. Many European countries, for example, are starting to use garbage as fuel. They classify and separate waste into paper, glass, ordinary garbage, used clothes, large furniture, and special waste (containing toxic chemical ingredients). Some developed countries also set aside days for disposing of large pieces of furniture. During the “used furniture festivals,” as they are called, people place their unwanted dressers, beds, cushions, tables and chairs, refrigerators, TV sets, chests, and so on outside their houses for others to go through, cutting off the cords of useless appliances to guide the “scavengers.” Garbage trucks collect the leftovers.

*Cut and fill.* Many countries have adopted these methods for their simplicity. However, the methods tend to contaminate the groundwater and even leak toxic gas underground, and thus require high-tech methods to control their negative effects. Countries such as Japan and the US are investigating ways of converting waste areas into parks, playing fields, and amusement grounds. Most of Hong Kong, China’s waste is used in landfills to create building space.

*Incineration.* The method has a bright future and can be used to generate electricity. It requires highly efficient high-tech furnaces. Countries, however, must be alert to the danger of new kinds of pollution that this method can create.

The best method is recycling or comprehensive utilization. Ezhou should be guided by the same principles that Western developed countries follow:

- Recycle as much as possible.
- Compost biodegradable organic substances as much as possible.
- Incinerate combustibles as much as possible.

- Stack and fill waste that cannot be disposed of by any other means.

### WASTE MANAGEMENT MEASURES

The following measures are proposed to solve the waste problem:

*Promote government and public awareness of the urban domestic waste problem.* Proper waste disposal is part of the mayor's duty. Relevant departments should prepare urban sanitation development and waste disposal facility plans, integrate them into the municipal and central Government plans, and allot land for disposal facilities. The public should be encouraged to protect the environment.

*Enhance urban waste management.* The sanitation department should be professionally managed and improve service quality. Agencies that treat and dispose of urban waste should be placed under a single management. Municipal departments should collaborate closely to curb waste, keeping in mind that most urban waste is a result of people's daily activities.

*Increase waste reclamation and recycling.* Paper, plastic, fabric, glass, metal, and animal bone are important recyclable resources. The relevant departments should encourage recycling. The Agricultural Department, for example, can produce organic fertilizer by subjecting domestic waste to high-temperature composting.

*Seek financing for the installation and operation of environment-friendly disposal facilities.* The municipal government should do the following:

- Continue to support proper waste disposal with government funds and, at the same time, apply for subsidies and preferential loans from the central and provincial governments and from the ministries.

- Apply for loans inside and outside the country; import advanced technology and equipment to upgrade waste treatment.
- Collect fees for waste clearing, collection, transportation, and disposal from enterprises and residents, and use the funds to establish and maintain urban waste disposal facilities.

*Support research on urban waste disposal and technology.* Existing research institutes, universities, and colleges, as well as research staff in relevant city departments should be supported and encouraged to cooperate. Waste disposal research and development should be part of the city's science development plan. The city should cooperate with international agencies and import the appropriate technology and equipment, especially for hygienic stacking and filling.

*Expedite development of sanitation facilities.* The municipal authority should give priority to financing sanitation establishments, facility renewal, and technical reform. It should encourage scientific management, technological progress, research projects on environment-friendly waste disposal, and the use of new waste disposal products and technology.

*Build a composting plant.* Setting up a stacking and filling field would cost over Y200,000 for the land acquisition, antisepsis, ground filling, and grinding. However, a 1998 feasibility study for a high-temperature composting plant (with a capacity of 400 tons/day) estimated that it would cost Y4.86 million to construct and Y200,000 to operate. It would bring in an annual sales revenue of Y576,000, at the current market price of Y8 per ton, generating Y376,000 in profit, thereby not only lightening the municipal government's financial burden, but also stimulating the economy and creating tax benefits for the government.

Ezhou has a large agricultural sector. It has 40,850 ha of arable land (22,750 ha irrigated, 18,100 ha nonirrigated) and there-

fore a great demand for fertilizer. Since it is near the agricultural regions of Huanggang, Xianning, Huangshi, and Daye, organic fertilizer production could be highly profitable. A waste-composting plant would not only turn waste material into a treasure, but it would also reduce the amount of waste (and thus the amount of land needed to store it) and create jobs.

President Jiang Zeming pointed out at the 15th Communist Party Congress that we should develop and apply technology to promote productivity. We are determined to pursue a sustainable development strategy and to reach a new development phase for waste disposal in Ezhou.