

## Ex-ante Evaluation

### **1. Name of the Project**

Country: The People's Republic of China

Project: Hunan Municipal Solid Waste Treatment Project

(Loan Agreement: December 21, 2007; Loan Amount: 10,500 million yen; Borrower: The Government of the People's Republic of China)

### **2. Necessity and Relevance of JBIC's Assistance**

Accompanying economic growth and urbanization in China, municipal solid waste has increased. However, since the rate of harmless treatment of municipal solid waste<sup>1</sup> is low at 51.7% (2005), there is concern over the deterioration of water resources and public health. Given this situation, the government of China is promoting reduction of solid waste in its 11th Five-Year Plan and has decided to boost the rate of harmless treatment of municipal solid waste to more than 60% by 2010.

In the local cities of Hunan Province (population: 67 million), development of infrastructure for harmless treatment of municipal solid waste is lagging far behind (in 2005, Hunan Province's rate of harmless treatment was 39.7%), and meanwhile the population is expected to increase as urbanization progresses henceforth. There are currently 8 sanitary landfills, but in the majority of Hunan Province, solid waste is placed in simple landfills that do not meet national standards or is piled and burned in fields. The amount of municipal solid waste is increasing concurrent with rapid economic development, and there is concern about the impact of seepage of polluted water on the soil and the impact of pollution in rivers and groundwater as well as air pollution on health and the natural environment. Thus, the building of sanitary landfills is an urgent issue.

Given this situation, the Three-Year Plan for Environmental Protection in Hunan Province (2005–2007) places emphasis on construction of solid waste treatment facilities, boosting of the collection rate of solid waste, and reduction of the volume of solid waste through appropriate treatment and usage of waste as a resource. The plan aims to raise the rate of harmless treatment in urban areas by increasing the treatment capacity from the current 5,790 tons/day by adding an additional capacity of 8,800 tons/day through constructing municipal solid waste harmless treatment facilities and development of collection networks. Moreover, the 11th Five-Year Program for Social and Economic Development in Hunan Province mandates that the rate of harmless treatment of municipal solid waste be 60% or more by 2010.

This project addresses environmental conservation, one of the priority areas designated in the Economic Cooperation Program for China prepared by the government of Japan and JBIC's Medium-Term Strategy for Overseas Economic Cooperation Operations. Thus, JBIC's support for this project is highly necessary and relevant.

### **3. Project Objectives**

The project aims to promote appropriate treatment of solid waste in local cities of Hunan Province by developing solid waste treatment systems and thereby aims to contribute to improvement of residents' living environment and sanitation environment and to environmental conservation in that

<sup>1</sup> The percentage of solid waste that undergoes harmless treatment out of the total amount of solid waste collected. In China, "harmless treatment" refers to sanitary landfill, composting, and incineration.

region.

#### **4. Project Description**

##### (1) Target Area

16 local cities in Hunan Province

##### (2) Project Outline

The project involves procurement of materials and equipment, civil works, and training related to construction of municipal solid waste treatment facilities in 16 local cities in Hunan Province.

- (a) Municipal solid waste treatment facilities: Sanitary landfill, garbage separation and integrative utilization, transfer station, transfer trucks and street bins, etc.
- (b) Training: Training in Japan and China concerning solid waste treatment (basic policy, sanitary landfill, garbage collection and transfer, information management, environmental monitoring, etc.)

##### (3) Total Project Cost / Loan Amount

22,169 million yen (Yen Loan Amount: 10,500 million yen)

##### (4) Schedule

April 2008–December 2010 (33 months). Project completion is defined as the end of warranty period.

##### (5) Implementation Structure

- (a) Borrower: The Government of the People's Republic of China
- (b) Executing Agency: Hunan Provincial People's Government
- (c) Operation and Maintenance System: Municipal Bureau of City Comprehensive Administration, Environment Protection Bureau, state-owned companies, etc.

##### (6) Environmental and Social Consideration

###### (a) Environmental Effects / Land Acquisition and Resident Relocation

###### (i) Category: B

###### (ii) Reason for Categorization

This project is classified as Category B according to the "Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations" (dated April 2002), as this project does not correspond to sector or regions described in the said guidelines as being sensitive to negative impact, and as it is not deemed to have a significant harmful impact on the environment.

###### (iii) Environmental Permit

The Environmental Impact Assessment (EIA) report related to the project will be approved by the Environmental Protection Bureau of Hunan Province in January 2008.

###### (iv) Anti-Pollution Measures

At the sanitary landfills, no particular negative impact is anticipated because offensive odors will be prevented by covering the site with earth and seeping water will be properly collected

and treated.

(v) Natural Environment

The project site is not located in or around sensitive areas, such as national parks, and so adverse impact on the natural environment is assumed to be minimal.

(vi) Social Environment

The project involves land acquisition of about 239 ha, and acquisition will be carried out in accordance with the domestic procedures of China. The project does not involve resident relocation.

(vii) Other/Monitoring

The Environmental Protection Bureau of each local city will monitor the quality of the groundwater and the air, etc., surrounding the final disposal sites.

(b) Promotion of Poverty Reduction

There are measures for reducing payment of solid waste treatment fees for the poor. These measures will be applied to the project as well.

(c) Promotion of Social Development (e.g. Gender Perspective, Measure for Infectious Diseases including AIDS, Participatory Development, Consideration for the Handicapped, etc.)

It is expected that safety and sanitation education, etc., will be provided for area residents who collect garbage at the final disposal sites.

(7) Other Important Issues

With the completion of the project, reduction in CO<sub>2</sub> emission equivalent to approximately 920,000 tons/year can be expected.<sup>2</sup>

## 5. Outcome Targets

### (1) Evaluation Indicators (Operation and Effect Indicator)

Indicator	Baseline (2005 actual)	Target (2012, 2 years after completion)
Amount of waste disposed at sanitary landfills (tons/year)	1,126,000	2,684,800
BOD concentration of seeping water after treatment (mg/l)	–	30–600
COD concentration of seeping water after treatment (mg/l)	–	100–1,000
Amount of garbage reduction due to sorting facilities (m <sup>3</sup> /year)	–	470,000

### (2) Number of Beneficiaries

Approximately 6.1 million

### (3) Internal Rate of Return (Financial Internal Rate of Return)

In solid waste treatment projects, assistance from the government budget is necessary, and thereby the financial internal rate of return (FIRR) is not calculated. Each year, the necessary amount, as

<sup>2</sup> The amount of annual reduction in gas emission (reduction of greenhouse gases) varies depending on the number of years elapsed since the waste was buried in the landfill. Here, for the sake of expedience, the simple average of the annual reduction was calculated by dividing the total reduction amount at the landfills concerned by the number of years of emission.

determined by the budget office of each local city, is financed.

#### **6. External Risk Factors**

- Delays in construction due to site changes caused by changes in road maintenance areas, development areas, etc. in urban planning.
- Impact on operation and maintenance due to limitation of domestic funds or shortages in collected fees due to changes in the policies relating to the fee sharing principle.

#### **7. Lessons Learned from Findings of Similar Projects Undertaken in the Past**

From the ex-post evaluation of the Beijing Sewage Treatment Plant Construction Project, it has been learned that it is important to set an appropriate fee system that considers operation and maintenance costs, investment cost, payment ability of beneficiary residents, and financial ability of local governments in order to ensure the sustainability of the project's effects. Based on this lesson, establishment of appropriate fee system and technical standards will be confirmed in the project through interim monitoring and supervision, etc.

#### **8. Plans for Future Evaluation**

##### (1) Indicators for Future Evaluation

- (a) Amount of waste disposed at sanitary landfills (tons/year)
- (b) BOD concentration of seeping water after treatment (mg/l)
- (c) COD concentration of seeping water after treatment (mg/l)
- (d) Amount of garbage reduction due to sorting facilities (m<sup>3</sup>/year)

##### (2) Timing of Future Evaluation

2 years after project completion