

## Ex-ante Evaluation

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

Country: The People's Republic of China

Project: Inner Mongolia Huhhot Atmospheric Environmental Improvement Project (II)

(Loan Agreement: March 30, 2007; Loan Amount: 6,300 million yen; Borrower: The Government of the People's Republic of China)

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

Since China relies on coal for around 69% of its domestic energy consumption (2005), air pollution caused by sulfur oxide, soot, dust and other particles has become a serious problem. Particularly harmful is SO<sub>x</sub>, an agent that causes acid rain, which in turn seriously affects the local ecosystem and the health of residents. In light of this situation, in the 11th Five-Year Plan (2006–2010), the Government of China has set the goal of reducing the emission of principal contaminants by 10% from the level recorded in the 10th Five-Year Plan. Toward this end, the government prohibits the building of coal-fired plants in the city, and promotes the construction of co-generation energy facilities and centralized heat supply facilities.

In the Inner Mongolia Autonomous Region, energy consumption is increasing sharply in tandem with rapid economic development. Since around 96% of the region's energy is derived from coal (as of 2005), it is one of the leading areas where air pollution is especially serious. Huhhot, the capital city, with a population of 2.13 million (equivalent to the population of Gifu prefecture) and a land area of 17,000 km<sup>2</sup> (equivalent to the land area of Shikoku), is ranked as the 69th worst city among the 113 cities designated in China as national priority environmental protection air pollution cities (as of 2005). Therefore improvement of air quality has become one of the most pressing issues. Particularly, in the western district of Huhhot (with an area of about 25 km<sup>2</sup>), in the winter most residents and public facilities use for heating the 97 small decrepit coal-burning boilers distributed in the district. However, since these boilers have low energy-efficiency and do not have dust collectors or desulfurizers, they are the principal emission source of air pollutants. Given the ongoing urbanization (annual urban construction exceeds 2.91km<sup>2</sup>), there are concerns over more extensive air pollution caused not only by existing facilities but also by the increasing use of small coal-burning boilers year after year. In light of this situation, the 11th Five-Year Plan of the Inner Mongolia Autonomous Region aims to improve urban air quality by promoting the construction of centralized heat supply facilities. In addition, to achieve the aforesaid goal, in the 11th Five-Year Plan for Environmental Protection in Huhhot as well as in the Management Ordinance for the Prevention of Air Pollution in Huhhot, the spread and improvement of centralized heat supply facilities, the prohibition of the installation of new small coal-burning boilers, and the removal of existing small coal-burning boilers are to be promoted. Centralized heat supply facilities are introduced in the project as alternatives to small coal-burning boilers, so reduction in the emission of air pollutants such as SO<sub>x</sub> can be expected.

The project addresses environmental conservation, one of the priority areas designated in the Economic Cooperation Program for China prepared by the Government of Japan and the Medium-Term Strategy for Overseas Economic Cooperation Operations of JBIC (FY2005–FY2007). Thus, JBIC's support for this project is highly necessary and relevant.

### **3. Project Objectives**

The project aims to decrease small pollution sources and reduce air pollution by constructing cleaner and more energy-efficient centralized heat supply facilities in Huhhot City, Inner Mongolia Autonomous Region. It will thereby help improve the living conditions of its population.

### **4. Project Description**

#### (1) Target Area

Huhhot City, Inner Mongolia Autonomous Region

#### (2) Project Outline

The project involves the construction of centralized heat supply facilities and procurement of equipment and materials in the western district of Huhhot (covering an area of approx.10.07 km<sup>2</sup>), as well as implementation of an overseas training program.

- (a) Centralized heat supply facilities: Construction of heat supply facilities, installation of heat supply ductwork, and construction of heat exchange stations
- (b) Training: Air quality improvement training in Japan

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

10,094 million yen (Yen Loan Amount: 6,300 million yen)

#### (4) Schedule

May 2007–October 2011 (54 months). The definition of project completion is “when the equipment and installation works are finally inspected.”

#### (5) Implementation Structure

- (a) Borrower: The Government of the People’s Republic of China
- (b) Executing Agency: Inner Mongolia Autonomous Region People’s Government
- (c) Operation and Maintenance System: Huhhot Municipal People’s Government

#### (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” (established in April, 2002). This categorization is assigned because this project does not correspond to sectors or regions described in said guidelines as being sensitive to negative impact, and because 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 was approved by the Environmental Protection Bureau of the Inner Mongolia Autonomous Region in March,

2007.

(iv) Anti-Pollution Measures

Regarding air pollution at the time of heat supply, domestic emission standards and environmental standards are expected to be met by implementing measures such as the installation of 100-meter smokestacks, dust collectors and desulfurizers. In addition, since coolant water and the like are expected to be reused after they are recycled and processed, no significant adverse impact on water quality is foreseen.

(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 already owns the right to use the planned site of the project. Thus, it does not involve neither land acquisition nor resident relocation.

(vii) Other/Monitoring

In the project, the Huhhot Environmental Protection Bureau will monitor air quality, water discharge, etc.

(b) Promotion of Poverty Reduction

None

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

None

(7) Other Important Issues

None

**5. Outcome Targets**

(1) Evaluation Indicators (Operation and Effect Indicator)

Indicator	Baseline (2005 actual performance)	Target (2013, 2 years after project completion)
SO <sub>2</sub> emission reduction volume (tons/year)	0	2,860
NO <sub>x</sub> emission reduction volume (tons/year)	0	1,327
TSP emission reduction volume (tons/year)	0	3,410

(2) Number of Beneficiaries

Approx. 400,000

(3) Internal Rate of Return (Financial and Economic Internal Rate of Return)

Based on the conditions given below, the financial internal rate of return (FIRR) is 6.6%.

[FIRR]

(a) Cost: Project cost, operation and maintenance expenses

(b) Benefit: Income from fees, subsidy

(c) Project Life: 30 years

**6. External Risk Factors**

1. Delays in construction due to site changes caused by changes in road maintenance areas, development areas, etc. in urban planning
2. Impact on operation and maintenance due to shortages in financial funds or collected fees due to changes in the policies relating to the fee sharing principle
3. Risk of a fluctuation in the price of coal, the fuel used for centralized heat supply facilities

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

From the ex-post evaluation of ODA loans granted in the past, it has been learned that it is important to secure a budget sufficient for putting in place and ensuring appropriate operation and maintenance of a system for centralized heat supply facilities. Based on this lesson, efforts will be made in the project, through interim monitoring and supervision, etc., to ensure proper operation and maintenance as well as an appropriate fee schedule and fee collection.

**8. Plans for Future Evaluation**

## (1) Indicators for Future Evaluation

- (a) SO<sub>2</sub> emission reduction volume (tons/year)
- (b) NO<sub>x</sub> emission reduction volume (tons/year)
- (c) TSP emission reduction volume (tons/year)
- (d) FIRR (%)

## (2) Timing of Next Evaluation

After project completion