

## Ex-ante Evaluation

### 1. Name of the Project

Country: The People's Republic of China

Project: Gansu Province Lanzhou City Atmospheric Environmental Improvement Project

(Loan Agreement: December 21, 2007; Loan Amount: 7,400 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 energy consumption (2005), air pollution caused by sulfur oxide (SO<sub>x</sub>), soot, dust and other particles has become a serious problem. Given this situation, in the 11th Five-Year Plan (2006–2010), the government of China has set the goal of reducing the emission of principal pollutants 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 heating supply facilities.

Since energy consumption has increased sharply accompanying the rapid economic growth of the region and about 70% of its energy source comes from coal, Gansu Province is regarded as one of the districts where pollution is particularly serious. Lanzhou City, the provincial capital, uses more than 2,000 units of small coal-burning boilers for heating during the winter. However, since these boilers do not have dust collectors or desulfurizers, they have become a main source of air pollution in the region. Moreover, as the city is located along the Yellow River in a valley surrounded by mountains, it is difficult for polluted air to disperse. As a result, Lanzhou City is ranked 20th among the 113 cities across China that have been designated by the government in 2005 as cities where environmental protection against air pollution is a priority issue. Furthermore, as the city is expanding rapidly, there are concerns over more extensive air pollution caused by additional installation of small coal-burning boilers.

Under these circumstances, the Lanzhou Municipal People's Government formulated the 11th Five-Year Plan for Environmental Protection in Lanzhou City (2006–2010) and set the goal of reducing the emission of principal pollutants by 10% from the level recorded in 2005,<sup>1</sup> with the view to reducing the total amount of pollutant emissions. Toward this end, in both the 11th Five-Year Plan for Environmental Protection in Lanzhou City and the Lanzhou Municipal Air Pollution Control Ordinance, the municipal government is endeavoring to improve air quality by promoting the use of centralized heating supply facilities, prohibiting the installation of small coal-burning boilers, and promoting the dismantling of existing small coal-burning boilers.

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.

<sup>1</sup> The actual value and target value of SO<sub>2</sub> and TSP emission in 2005 are as follows:  
SO<sub>2</sub>: 71,100 tons/year (target 59,800 million tons/year), TSP: 24,800 tons/year (target 39,300 tons/year)

### **3. Project Objectives**

The project aims to mitigate the air pollution burden in Lanzhou City, Gansu Province, by restraining emission sources such as small coal-burning boilers by providing centralized heating supply facilities, and thereby improve the living conditions in the city.

### **4. Project Description**

#### (1) Target Area

Lanzhou City, Gansu Province

#### (2) Project Outline

The project involves the followings to provide heating supply to urban areas of Lanzhou City:

- (a) Centralized heating supply facilities: Installation of heating supply pipes, construction of heat exchange stations, construction of pump stations, etc.
- (b) Training: Training in Japan concerning heating supply facilities and air quality improvement

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

15,160 million yen (Yen Loan Amount: 7,400 million yen)

#### (4) Schedule

June 2008–October 2015 (89 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: Gansu Provincial People’s Government
- (c) Operation and Maintenance System: Lanzhou Thermal Power Company

#### (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 sectors 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 was approved by the Environmental Protection Bureau of Gansu Province in January 2007.

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

With regard to air quality and wastewater, after the project is launched, the project is expected to meet the domestic environmental standards of China by installing dust collectors and desulfurizers, implementing measures for wastewater treatment, etc., as well as by

dismantling small coal-burning boilers and replacing them with centralized heating supply facilities.

(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 13 ha, part of which has already been achieved. Land acquisition is being carried out in accordance with the domestic procedures of China. The project does not involve resident relocation.

(vii) Other/Monitoring

In the project, the Environmental Protection Bureau of Lanzhou City will monitor air quality, wastewater, etc.

(b) Promotion of Poverty Reduction

There are measures for reducing heating supply charges 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.)

None

(7) Other Important Issues

With the completion of the project, reduction in CO<sub>2</sub> emission equivalent to approximately 900,000 tons/year can be expected.

**5. Outcome Targets**

(1) Evaluation Indicators (Operation and Effect Indicator)

Indicator	Baseline (2006)	Target (2015, at project completion)
SO <sub>2</sub> emission reduction volume (tons/year)	–	9,000
NO <sub>2</sub> emission reduction volume (tons/year)	–	7,800
TSP emission reduction volume (tons/year)	–	5,000

(2) Number of beneficiaries

Approximately 780,000

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

Based on the following conditions, the financial internal rate of return (FIRR) of the project is 8.4%.

[FIRR]

- (a) Cost: Project cost, operation and maintenance expenses
- (b) Benefit: Income from fees
- (c) Project Life: 30 years

**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.
- Risk of fluctuation in the price of coal, the fuel used for centralized heating supply facilities.

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

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

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

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

- SO<sub>2</sub> emission reduction volume (tons/year)
- NO<sub>2</sub> emission reduction volume (tons/year)
- TSP emission reduction volume (tons/year)
- Financial internal rate of return (FIRR) (%)

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

At project completion