

## Ex-ante Evaluation

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

Country: The People's Republic of China

Project: Xinjiang Environmental Improvement Project II

(Loan Agreement: December 21, 2007; Loan Amount: 3,802 million yen; Borrower: The Government of the People's Republic of China)

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

In China, the sewage treatment rate in urban areas has remained at 56% (2006), while in rural areas sewerage facilities have not spread very much. Consequently, the water pollution of rivers and freshwater lakes has become a serious problem. Additionally, since clean water sources are concentrated in the southwestern part of China, there are regional factors that cause water shortages. Also, there are many cities beset with the problem of having their water supplied from deteriorating sources and leaking water pipe networks. Furthermore, since China relies on coal for around 69% of its domestic energy consumption (2005), acid rain caused by sulfur oxide (SO<sub>x</sub>), soot, dust and other particles are having a serious impact on the health of local residents and the ecosystem. Given this situation, in the 11th Five-Year Plan (2006–2010), the government of China is promoting measures to prevent water pollution, measures to protect sources of drinking water in cities with priority, and measures to abate air pollution.

The Xinjiang Uygur Autonomous Region, located in China's western border region, is regarded as a pivotal region for the development of the western part of China. Altay and Atushi, two cities in Xinjiang where the project is to be implemented, hold a special position for the development of the Autonomous Region. In these urban areas, urbanization and sizable population growth have boosted demand for water and heating. However, development of water supply and sewerage systems and centralized heat supply system is far from adequate. Thus, there is an urgent need to address the environmental problems such as water and air pollution.

Given this situation the Xinjiang Uygur Autonomous Regional Government formulated the 11th Five-Year Plan for People's Lives and Social Development in the Xinjiang Uygur Autonomous Region (2006–2010), and is committed to improving the water quality and atmospheric environment. Additionally, in FY2006, the Xinjiang Environmental Improvement Project I was authorized, thus paving the way for the development of sewerage and water supply systems and centralized heat supply system in the four regional cities (Hami, Turpan, Wusu and Kuitun) in the Xinjiang Uygur Autonomous Region.

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 increase sewage treatment and water supply capacities and reduce the amount of water and air pollutants by developing sewerage and water supply systems and installing centralized heat supply facilities in Altay and Atushi in the Xinjiang Uygur Autonomous Region, and thereby help improve the environment of the cities as well as the living conditions of the populations.

#### 4. Project Description

##### (1) Target Area

Altay City and Atushi City in the Xinjiang Uygur Autonomous Region

##### (2) Project Outline

The project involves the construction and renovation of sewerage and water supply facilities and heat supply facilities in the aforesaid two cities, as well as the procurement of related materials and equipment. It also involves the construction of urban gas supply facilities in Altay City and the procurement of related materials and equipment. In addition, a training program will be conducted in Japan as part of the project.

- (a) Development of sewage treatment facilities (Altay City and Atushi City): New construction of a sewage treatment plant, new construction and renovation of sewage pipes and drains, new construction of a treated water lake, expansion of an existing sewage treatment plant
- (b) Development of water supply facilities (Altay City and Atushi City): New construction of intake facilities, construction of water supply aqueducts, new construction of a purification plant, new construction and renovation of distribution pipes and drains
- (c) Development of centralized heat supply facilities (Altay City): Construction of heat supply facilities, installation of heat supply pipes, construction of heat-exchange stations
- (d) Development of natural gas heat supply facilities (Atushi City): Construction of heat supply facilities, installation of heat supply pipes, installation of medium pressure natural gas pipes
- (e) Development of urban gas supply facilities (Altay City): Construction of LNG gasification facilities, installation of gas supply pipes
- (f) Training: Training in Japan concerning water supply and sewerage systems as well as heat supply and urban gas supply systems

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

6,158 million yen (Yen Loan Amount: 3,802 million yen)

##### (4) Schedule

January 2008–June 2013 (66 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: Xinjiang Uygur Autonomous Regional People's Government
- (c) Operation and Maintenance System:

Name of city	Subproject	Operation and maintenance system
Altay City	Development of sewage treatment facilities	Sewage Disposal Plant of Altay City
	Development of water supply facilities	Altay Water Supply Company
	Development of centralized heat supply facilities	Altay Industry Central Heating Limited Company
	Development of urban gas supply	Huali Fuel Gas Investment Limited

	facilities	Company
Atushi City	Development of sewage treatment facilities and water supply facilities	Atushi Water Supply and Drainage Company
	Development of natural gas heat supply facilities	Atushi Heating 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) reports related to the project was approved by the Environmental Protection Bureau of Xinjiang Uygur Autonomous Region between December 2006 and August 2007.

(iv) Anti-Pollution Measures

Wastewater from sewerage facilities will be treated and released into rivers, wastelands and the like in a state and manner that meets the wastewater standards established in China, with some wastewater planned to be used as irrigation in afforestation programs. Thus, no significant adverse impact is foreseen. Additionally, although some of the sludge generated in sewage treatment plants will be used as fertilizer for afforestation, highly contaminated sludge will be appropriately disposed of in existing disposal areas. Furthermore, regarding air pollution, wastewater and other issues that may come up after the start of the heat supply project, domestic environmental standards are expected to be met by implementing measures such as the installation of dust collectors, desulfurizers and wastewater treatment equipment.

(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

In the project, the right to use about 148 ha of state-owned land has already been acquired in accordance with the domestic procedures of China. The project does not involve resident relocation.

(vii) Other/Monitoring

In the project, the environmental observation stations set up in each city will monitor the noise, water quality, air pollution, wastewater, and so on.

(b) Promotion of Poverty Reduction

The poor make up 14.6% of the population in Altay City and 15.1% in Atushi City. The poverty rate in both cities exceeds the national average of 2.8%. To help the poor, both cities

introduced a lower fee for heat supply, water supply and sewerage, and it will continue to be applied to this 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 110,000 tons/year can be expected.

## 5. Outcome Targets

(1) Evaluation Indicators (Operation and Effect Indicator)

(a) Development of sewage treatment facilities

Indicator	Baseline (2006 actual)	Target (2013, at project completion)
Population treated (10,000 persons)	9.7	19
Amount of wastewater treated (10,000 m <sup>3</sup> /day)	2.3	5.5
Percentage of wastewater treatment (%)	70	98
Effluent quality (BOD concentration: mg/L)	70–90	40–80
Effluent quality (COD concentration: mg/L)	80–150	80–150

(b) Development of water supply facilities

Indicator	Baseline (2006 actual)	Target (2013, at project completion)
Percentage of population served (%)	85	100
Population served (10,000 persons)	6.7	10.7
Amount of water supply (10,000 m <sup>3</sup> /day)	2.1	4.1

(c) Development of heat supply facilities and urban gas supply facilities

Indicator	Baseline (2006 actual)	Target (2013, at project completion)
SO <sub>2</sub> emission reduction volume (tons/year)	–	480
NO <sub>x</sub> emission reduction volume (tons/year)	–	845
TSP emission reduction volume (tons/year)	–	3,530
Coal use reduction volume (tons/year)	–	49,050

(2) Number of Beneficiaries

(a) Development of sewage treatment facilities: Approximately 92,000

(b) Development of water supply facilities: Approximately 40,000

(c) Development of centralized heat supply facilities: Approximately 92,000

(d) Development of urban gas supply facilities: Approximately 55,000

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

Based on the following conditions, the financial internal rates of return (FIRR) of the project are as follows:

Name of city	Subproject	Internal rate of return
Altay City	Sewage treatment facilities	4.5%
	Water supply facilities	6.1%
	Centralized heat supply facilities	6.2%
	Urban gas supply facilities	4.4%
Atushi City	Sewage treatment facilities	10.4%
	Water supply facilities	9.4%
	Natural gas heat supply facilities	8.9%

[FIRR]

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

(b) Benefit: Income from fees

(c) Project Life: 20 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 for centralized heat supply facilities.
- Risk of fluctuation in the price of natural gas, the fuel for heat supply and urban gas 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 learnt that it is important to set an appropriate fee system that considers operation and maintenance costs, investment costs, payment ability of beneficiaries, and the outlook for budgetary supplements in order to ensure the sustainability of the project's effects. Based on this lesson, appropriate fee system and technical standards will be confirmed to be established through interim monitoring and supervision, etc.

## 8. Plans for Future Evaluation

### (1) Indicators for Future Evaluation

(a) Development of sewage treatment facilities: Population treated (10,000 persons), amount of wastewater treated (10,000 m<sup>3</sup>/day), percentage of wastewater treatment (%), effluent quality (BOD concentration: mg/L), effluent quality (COD concentration: mg/L), financial internal rate of return (%)

(b) Development of water supply facilities: Percentage of population served (%), population served (10,000 persons), amount of water supply (10,000 m<sup>3</sup>/day), financial internal rate of

return (%)

(c) Development of heat supply facilities and urban gas supply facilities: SO<sub>2</sub> emission reduction volume (tons/year), NO<sub>x</sub> emission reduction volume (tons/year), TSP emission reduction volume (tons/year), financial internal rate of return (%)

(2) Timing of Future Evaluation

At project completion