China

# Assistance for Environmental Improvement (Air/Water Quality)

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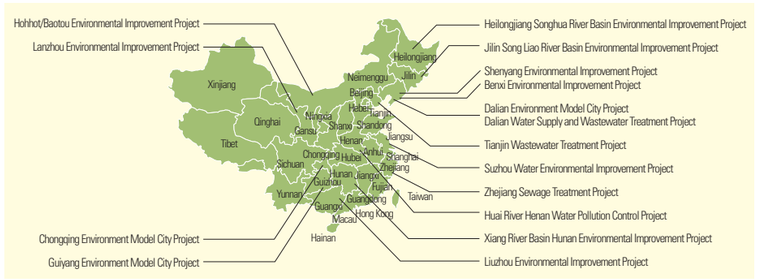
Field Survey: January-November 2005

## Outline and Objectives

Rapid economic development in China has led to exposed various environmental problems, including air and water pollution. It has thus become necessary to extend environmental cooperation in the form of pollution abatement measures, the installation of sewerage treatment equipment, etc. JBIC has supported numerous environmental improvement projects in China. Although many of these projects are currently in progress, based on heightened levels of domestic and international interest in the effectiveness of and necessity for ODA loans to China, there is now a pressing need to evaluate how effective such projects have been in improving the environment and what contribution they have made, if any, to enhancing/reforming environmental policies. This evaluation is designed to analyze the effectiveness of ODA loans to assist environmental improvement in China and their role in enhancing environmental policies and systems with a view to determining the effects of these projects and considering future challenges, and, based on quantitative analysis, to estimate the effects on improvement of the environment through the policy reform of the Chinese government.

**The 16 projects targeted for evaluation**




## Evaluation Results

### (1)The Effectiveness of ODA Loans

Of the loans pledged to China during the fourth multi-year ODA loan period (1996-2000), 16 projects targeting air and water pollution control in key regions were evaluated (approximately 160 billion yen). This evaluation revealed a 190,000-ton reduction in emissions of atmospheric pollutants ($SO_2$) and a 340,000-ton decrease in water pollutants (COD*) (2003). In addition, the number of beneficiaries of the projects (estimated) is as follows: 3.95 million in the 10 cities covered by urban gas projects, 0.9 million in the 6 cities covered by regional heat supply projects, and 13 million in the 28 cities covered by sewerage projects.

* Chemical Oxygen Demand. An indicator of the amount of organic compounds in water; the larger the COD the greater the pollution by organic compounds.

**Atmospheric changes in Guiyang pre- and post project implementation**

2000

2004

Japanese expert team of the JICA China-Japan Friendship Center for Environmental Protection Project

### (2)The Effectiveness of ODA Loans in Enhancing/Reforming Environmental Policies

**(i) Funding support to environmental investment planning promoted environmental pollutant control projects and supported the introduction of total emission regulation in key regions**

In formulating its ninth five-year development plan (1996-2000; the 9.5 plan hereunder), the Chinese government set three targets: (i) the introduction of total emission regulation for pollutants, (ii) pollution controls in key regions, and (iii) increase in environmental investment (RMB450 billion, of which US$4 billion was to be procured as foreign capital). To procure these funds, the government worked out the China Trans-Century Green Project Plan, which lists environmental pollutant control projects in key regions. The Japanese government, meanwhile, informed the government of China that it would emphasize environmental protection in its cooperation with China and pledged ODA loans to projects listed in the Green Project Plan. These loans provided the underlying support, with the Chinese government investing RMB360 billion in the environment and introducing total emission regulation.



(The total amount of environmental ODA loan is equivalent to approximately 30% of the foreign capital, and also equivalent to some 7% of Chinese government investment).

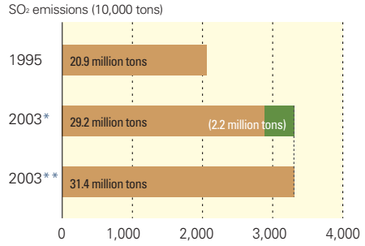
**(ii) Providing the foundations for the enhancement of environmental policy promoting the shift to an energy-saving/resource-saving economic structure**

Through ODA loan-funded factory pollution control projects, the Chinese government has confirmed the effectiveness of energy-saving/resource-saving production technologies (cleaner production technologies) in curbing environmental pollution without loss of corporate profits. In Benxi, Liaoning, for example, an environmental ODA loan was extended to support investment in cleaner production technologies that served to increase corporate incentives to invest in environmental preservation and to adopt environmental conservation measures. A survey team was dispatched to Japan from Guiyang in conjunction with the implementation of an environmental model city project in that city to learn about advanced systems. This contributed to the development of a recycling-oriented economic policy promoting efficient use of by-products and waste recycling in Guiyang. The decision was subsequently made to disseminate this policy on a nationwide basis.

**(iii) Promoting the diffusion of systems and technologies relating to urban environmental infrastructure development**

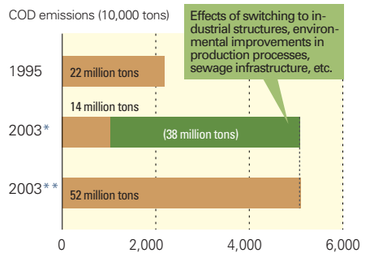
The development of sewage systems and other urban environmental infrastructure was supported by ODA loans. This helped the Chinese government engage in eco-conscious urban development and diffuse sewage disposal technologies. For example, the Gaobeidian sewage treatment plant in Beijing has introduced state-of-the-art technologies and can boast the highest disposal capacity in China. Those staff who took part in Japan-based training programs have been active in China's sewage industry. This sewage treatment works has also established its own training center for sewage treatment technologies.

**Effect of environmental improvements due to enhanced environmental policies and systems ($SO_2$)**




*Actual case
**Estimate without environmental policy improvements

**Effect of environmental improvements due to enhanced environmental policies and systems (COD)**




*Actual case
**Estimate without environmental policy improvements

**Gaobeidian Sewage treatment plant, Beijing**

### (3)Quantitative Analysis to Estimate the Effect of Policy Enhancement/Reform

Results from a quantitative analysis of the effects of environmental policy enhancement/reform revealed a sharp increase in $SO_2$ emissions from 20.9 million tons in 1995 to 29.2 million tons in 2003; without the improvements to environmental policy, however, the projection for 2003 was 31.4 million tons. In the result, desulfurization and coal substation effects were calculated to be 2.2 million tons. While COD emissions (industrial and residential) have declined from 22 million tons in 1995 to 14 million tons in 2003, the estimate for the same year is 52 million tons; assuming that there is no improvement to environmental policy as it turned out, the effects of the reform in the structure of industry, of environmental load reductions in production processes, and of sewage treatment infrastructure are estimated to be 38 million tons.
Based on existing model research, controls on sulfur oxide emissions in China are expected to make a contribution to curbing the amount of deposition in Japan (see column).

## Recommendations

(1) In order to achieve drastic reductions in environmental loads, it is necessary to develop environmental statistics that will enable an accurate diagnosis of environmental problems and set environmental targets from a preventive perspective.
(2) It is critical to consider policies that will give companies incentives to adopt environment measures based on the Chinese policy of promoting market economy. Moreover, it is important to strengthen incentives for environmental policy and to boost the enforcement system through company development of central and regional governments.
(3) In order to address the rapid progress of urbanization, it is necessary to analyze issues and countermeasures toward realization of sustainable development of urban areas; such as considering the consistency of urban growth/environmental management plans with development of the urban environmental infrastructure.

**COLUMN** Estimated $SO_2$ deposition stemming from Japan

| | |
|---|---|
| 1. Huang, et al. (1995): | Japan + volcanoes: 94%; China: 4% |
| 2. Ikeda, Higashino (1997): | Japan: 37%; volcanoes: 28%; China: 25% |
| 3. Arndt, et al (1998): | (Tokai and Kanto regions) Japan: 85%; China: 8%; Korean Peninsula: 6%; (Kansai and Chugoku regions) China: 55%; Korean Peninsula: 28%; Japan: 17% |
| 4. Katayama, et al. (2004): | (July) volcanoes: 36%; Japan: 28%; China: 18%; (December) China: 58%; Korean Peninsula: 17%; Japan; 13% |