

Kitakyushu Initiative for a Clean Environment: Successful and Transferable Practices

**Guiyang (China): Coalescence of Self-effort and Environmental Cooperation:
Strategies for air pollution control**

Policy Research Center for Environment and Economy¹

Target Area: Air pollution

Time Period:

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1. Brief description of Guiyang City

Guiyang City, the capital of Guizhou Province, is located in the west of Yungui Plateau, with an area of 8034 km² and a population of 3.215 million (in 1999). The city is rich in diversified mineral and energy resources; there are more than 20 kinds of mines such as aluminum, phosphorus, coal and iron, other. Twenty percent of the aluminum of the country is processed in Guiyang and one of the three largest phosphorus mines is located in the city. Hence Guiyang City is an important industrial base in China, with pillar industries including electric power, ferric, steel, phosphorus and rubber.

In 2000, the GDP of Guiyang City grew 10.6%, with the growth rates of agriculture, industry and service 2.3%, 10.8% and 12%, respectively. The components of the Guiyang economy consist of 9.1% of agriculture, 50.9% of industry, and 40% of service, in terms of valued-added. The GNP per capita is approximately 906 U.S. dollars, slightly higher than the Chinese average.

2. Air quality and pressing problems in Guiyang City

Table 1 Air Quality of Guiyang City in 2000

Pollutants	Concentrations (annual average)
NO _x	0.027mg/m ³ ---at Grade I of the National Air Quality Standards
TSP	0.180mg/m ³ --at Grade II of the National Air Quality Standards
SO ₂	0.132mg/m ³ ---1.2 times higher than the Grade II.

From Table 1, SO₂ it can be seen that air pollution constitutes a pressing problem in Guiyang, which is caused by coal-fueled industries. The pillar industries in Guiyang are the processing of raw materials because of the richness in diversified mineral resources. On the other hand, coal is the main energy consumed by the most of the pillar industries. Moreover, local coal has an extremely high content of sulfur (4%). The QingZhen Power Plant, the GuiYang Power Plant and Guizhou Crystal Organic Chemical Industry Co. Ltd., for example, discharge more than 77.79% of the total SO₂ emission in the City.

3. Strategic choice for air pollution control: Coalescence of self-efforts and environmental cooperation

In air pollution control, Guiyang City has developed an approach combining self-efforts and international cooperation. In other words, Guiyang City has made its own effort to implement integrated measures and programs for overall control of air pollution, as well as actively explored various opportunities and resources to promote environmental cooperation for tackling difficulties in its local anti-pollution actions.

3.1 Prevention and abatement of air pollution

Guiyang City has applied integrated measures to prevent and abate air pollution, including local environmental legislation, industrial structural adjustment, energy structural adjustment, and enhancement of abatement capacities at end-of-pipe. Experiences in the last several years show that local efforts in air pollution control have obtained evident achievements.

(1) Local environmental legislation

In order to lay the legal foundation of local anti-pollution actions, Guiyang People's Congress and Municipal Government have successively enacted several relevant local laws or regulations (Table 2). In addition to national and local laws/regulations and national policies and programs for air pollution control, several local plans and programs, such as Guiyang Environment Protection Program, and Announcement of phase-out Coal-fueled Stoves are also in place.

Table 2 Local Environmental Laws and the Regulations in Guiyang

The names of laws and regulations	Date of Issuance
Enforcement Procedures for Levy on Pollution Fee	1991.12
Regulation for Prohibitions of Firecrackers and Fireworks in Guiyang	1994.4
Interim Managerial Procedures for Permission Licenses of Pollution Discharge	1994.8
Ordinance of Air Pollution Prevention and Abatement	1995.12
Regulation for Using Gas-fueled Boilers	1997.7
Enforcement Procedures for the Regulation concerning Air Pollution Prevention and Abatement	1997.10

(2) Industrial Structural Adjustment

Guiyang City has restructured its industries through the following three measures.

- Shut down small-sized mills and mines as well as workshops with heavy pollution and economically unreasonable abatement; merging of small-sized polluting enterprises with larger ones with good capacities of pollution control; and transferring of polluting production processes and their products to cleaner ones. For example, Guizhou Cement Plant was moved from the downtown of Guiyang City in 1996. Hngyan Chemical Plant was shut down in 1998. Guiyang Glassworks began to produce new products with less pollution in 2001. After Guiyang Power Plant stopped two sets of 50 thousand KWh generator units, the average SO₂ concentration around the Plant decreased by 49.6%, from 0.143 mg/m³ to 0.072 mg/m³.
- Relocate heavy polluting industries from downtown to suburbs, with installation of pollution control facilities.

- Transform industrial production processes and technologies.

(3) Enhancement of abatement capacities at the end-of-pipe

Guiyang City invested 520.115 million Yuan in installation of industrial pollutant abatement facilities from 1999 to 2000. Increments of abatement capacities were 70,907.11million m³ per hour of exhaust gas, 67 thousand tons per day of industrial wastewater, and 2.469 million tons per year of solid wastes.

(4) Energy structural adjustment

Guiyang City has made great efforts in energy structural adjustment. In the past several years, the production of coal rich in sulfur was reduced by 3.112 million tons through shutting down the pits, forbidding installation of coal-fueled stoves for business use and installation of coal-fueled boilers in new buildings, as well as phasing out coal-fueled boilers with capacity under 1 tons. Now Guiyang is implementing a program for promotion of coal gas, and transforming boilers from coal-fueled into other clean fuels such gas and electricity. At present, 92.89% of the city residents have enjoyed the convenience brought by natural gas.

(5) Achievements of self-efforts in Guiyang City

Through hard efforts for several years, in particular in the period of the Ninth Five-year Plan (1996-2000), Guiyang has made a great progress in air pollution control. By 2000, the total discharge volumes of SO₂, dust, and COD were reduced by 88 thousand tons, 30 thousand tons and 21 thousand tons, respectively, compared to 1996. In other words, industrial pollutant emissions and discharges dropped significantly while industry grew at nearly 10%. The average TSP concentration per year decreased by 29%, from 0.253 mg/m³ in 1996 to 0.180 mg/m³ in 2000. The SO₂ concentration per year dramatically roared down by half, from 0.3 mg /m³ in 1996 to 0.132 mg/m³ in 2000. NOx has leveled at Grade I of the National Air Quality Standards.

3.2 Tackling difficulties in air pollution control through international cooperation

(1) The Sino-Japan Demonstration City Program on Environmental Cooperation

It is difficult to fully resolve the problem of severe air pollution by the City itself due to shortages in environmental funds and technologies as well as managerial capacity, which constitute difficulties of local environmental management. In this sense, external aid becomes of crucial importance to the City. Fortunately, Guiyang was selected as one of three Sino-Japan demonstration cities on environmental cooperation program in 1998. It provided an unprecedented opportunity for Guiyang to tackle the difficulties in air pollution control making use of international funds and technologies.

According to the Demonstration City Program, the Japanese Government would provide a loan of USD 100 million to Guiyang for seven demonstration projects (table 3). The total investments in these seven projects are 2,084,130,300 RMB, including Chinese investments. To date, the Chinese Government has invested 1,043,204,100RMB and 13,466,056,900 Japanese Yen from Japanese loans were in place. Of the seven projects, five are on air environment improvement and the remaining two are in relation to industrial mercury treatment and capacity building for environmental management. All projects will be completed in 2004. Of the five projects on air environment improvement, two are concerned with SO₂ control at key emission resources (Guiyang Power Plant and Guiyang Steelworks) and the other two aim at improving energy quality and structure. Indubitably, it is impossible for Guiyang to carry out such costly projects with its own financial resources at present. Therefore, international cooperation is critical for less-developed regions like Guiyang to resolve local pollution.

The main tasks of all Japanese-yen-loan projects are to renovate industrial processes and introduce cleaner and advanced production technology, so that the consumption of energy and materials, pollution discharge, and production costs could be reduced. The increase of abatement facilities is also included in the targets of the projects. Finally, the projects aim at achieving the win-win results of controlling pollution while promoting business profits.

In the implementation of Japanese-yen-loan projects, the Chinese central government and Guizhou Provincial Government have provided considerable support to Guiyang City. First, the largest area of support is that Guiyang City can share such an unprecedented access to Japanese-yen loans. Second, investments from the Chinese central government and Guizhou Provincial Government as well as Guiyang City on the projects account for more than 50 percent of the total. The financial assistance Guiyang received for the projects from the central government also partly attribute to the Great West Development Strategy which Chinese central government implemented few years ago.

(2) The environment benefit of the Japanese-yen-loan projects

According to targets set in the Japanese-yen-loan projects, SO₂ discharge will be reduced by 164.25 thousand tons—80% of the designed-base-year discharges of 1996, and soot and dust, by 62.88 thousand tons—65% of the designed-base-year discharge of 1996, after completion of all projects (Table 3). The problem of mercury pollution caused by Guiyang Organic Chemical Complex will also be fully resolved. In total, five key sources of air pollution in Guiyang would meet the relevant national standards.

Table 3 Environmental Benefit of Japanese-yen-loan projects in Guiyang

	Projects	Reduction of wastewater (10,000t/year)	Reduction of solid wastes (10,000t/year)	Exhaust gases	
				Reduction of SO ₂ (10,000t/year)	Reduction of soot/dust(10,000t/year)
1	The transformation project on smoke and dust control techniques of Guiyang Power Plant	-	-	10.4	3.15
2	The project on air pollution of Guiyang Steel Plant	-	-3.48	0.8559	0.7505
3	The integrative control project on dust of Guizhou Cement Plant	0.1	0	0.3939	0.9484
4	The project on enlargement of the transmission and distribution of gas	-	4.45	1.82	0.91
5	The on-line system of air quality and pollution source monitoring	-	-	-	-
6	The project on technique transformation of mercury pollution control in Guizhou Crystal Organic Chemical Industry Co. Ltd.	228.2	-11.04	0.3752	0.5289
7	Lindong coal-cleaning project	-	-	2.58	-
	Total	228.3	-10.07	16.425	6.288

Resource: Guiyang Environmental Protection Bureau

4. Strategic implications of Guiyang strategy for air pollution control

Self-efforts and local initiatives are prerequisite and ultimately decisive factors for a city to resolve local environment problems. But for developing countries and their less-developed regions, resolving problems by their own resources may take a long time due to lack of funds and technology as well as managerial capacity. Within this long period, local problems may worsen and develop into regional environmental problems. For example, the pollution of SO₂ in Guiyang has made Guiyang an acid rain source spreading to and exerting an influence on other southwestern cities. Therefore, external assistance and cooperation become more and more important. This is one of reasons and objectives of development of international environment cooperation. In this respect, developed countries and international organizations can play an important role. Certainly, both the central and local governments of receiving countries shall be core actors to ensure good implementation of the international cooperation, and their active initiatives and self-efforts shall first be in place.

In addition, developing countries can also formulate proper policies to attract overseas private financial initiatives in some fields of environmental protection, such as sewage treatment, municipal garbage disposal, and other urban environmental infrastructural facilities.