

GHG Emission Reduction Quantitative Assessment of Total Pollutant Control in Panzhihua, China

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Outline

- Basic Information on the Project
- Project Goals
- Project Results
- Lessons Learned

Basic Information on the Project

- Background
 - Statement of Joint Implementation of Co-benefits Projects between MEP, China and MOE, Japan, in December 2007
 - Joint Communique on Cooperation in Energy and Environment between China and Japan, Dec. 2007
 - Joint Statement on Climate Change between China and Japan in 2008
- Project location and timeline
 - Started from April 2008, 3 years
 - First stage, Panzhihua city, Si Chuan Province as a pilot

What is the Panzhihua?

Located in the Southeast of China

Medium city

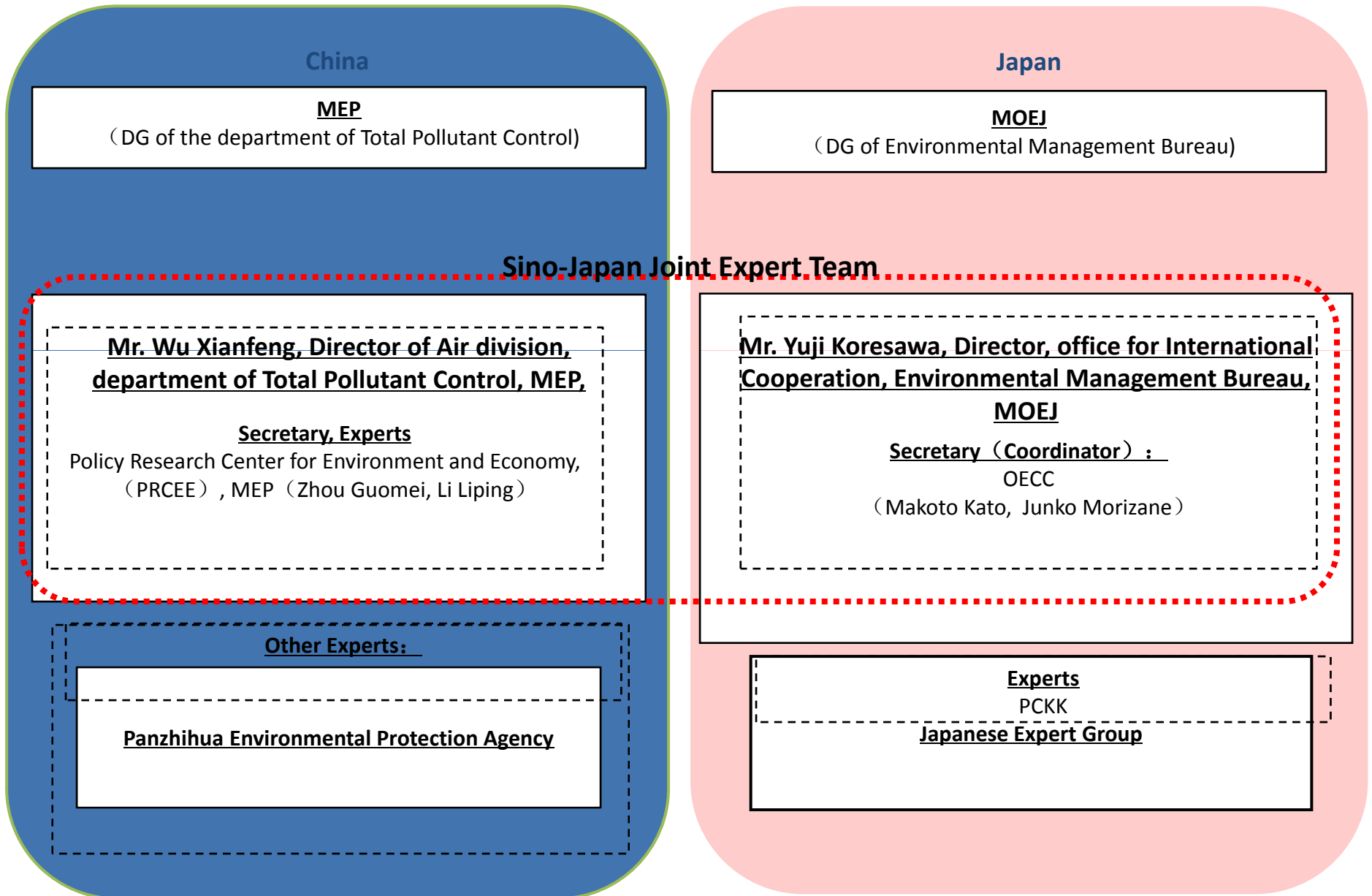
Resources character, and Iron and Steel sector is the pillar industry in Panzhihua

According to “the total control plan of major pollutants emission in Sichuan Province during the 11th five year”, the amount of SO₂ emission should be less than 81 thousand ton by 2010 in Panzhihua.

In order to achieve the goal, Panzhihua city legislated “ Implementation program for the total control of major pollutants emission in Panzhihua”



- Organization Structure Chart



Basic Information on the Project

- Methodology

According to the “business accounting method and guidance for the total emission reduction of major pollutants(SO₂)”, which made by MEP,

sorting out pollutant emission reduction measures in the Panzhihua’s implementation program: structural adjustment, project, and management:

$$R = R_{\text{structural}} + R_{\text{management}} + R_{\text{project}}$$



Identifying methodologies for calculation of pollutant emission reduction measures



Converting to methodologies for GHG emission reduction from methodologies for calculation of pollutant emission reduction

Basic Information on the Project

- Methodology

Case Study1 :

Structural adjustment reduction:

Closure of Power Generation Unit(50MW) Pollutant Emission Reduction

SO₂ Emission Reduction=SO₂ Emission from the facility

$$\begin{aligned} E(\text{SO}_2) &= M \times S \times 1.6 \times 10^2 \\ &= 11.14 \times 0.72 \times 1.6 \times 10^2 \\ &= 1283(\text{t-SO}_2) \end{aligned}$$

E(SO₂): SO₂ emission from the facility

M: Coal consumption for power generation 11,1400t

S: Average sulfur content of coal 0.72%

1.6:coefficient

Basic Information on the Project

- Methodology

Case Study 1: Closure of Power Generation Unit(50MW)

Pollutant Emission Reduction

CO2 Emission Reduction=CO2 Emission from the facility

$$\begin{aligned} E(\text{CO}_2) &= M \times C \times (44/12 \times 0.8) \times 10^2 \\ &= 11.14 \times 50 \times (44/12 \times 0.8) \times 10^2 \\ &= 163281(\text{t-CO}_2) \end{aligned}$$

E(CO₂): CO₂ emission from the facility

M: Coal consumption for power generation

C: Average carbon content of coal 0.72%

44/12: Mass ratio between C and CO₂

0.8: Combustion efficiency of coal 80%

Basic Information on the Project

- Methodology

Case Study 2: *project reduction*

$$R(\text{SO}_2) = M \times S \times \eta \times 1.6 \times 10^{-2}$$

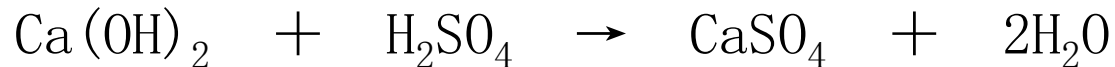
R(SO₂): SO₂ emission reduction from the facility

M: Coal consumption for power generation 11,1400t

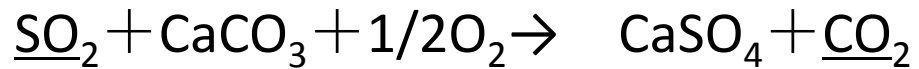
S: Average sulfur content of coal 0.72%

η: Mass desulfurization efficiency

Slaked lime desulfurization technology:



Calcium carbonate desulfurization technology:

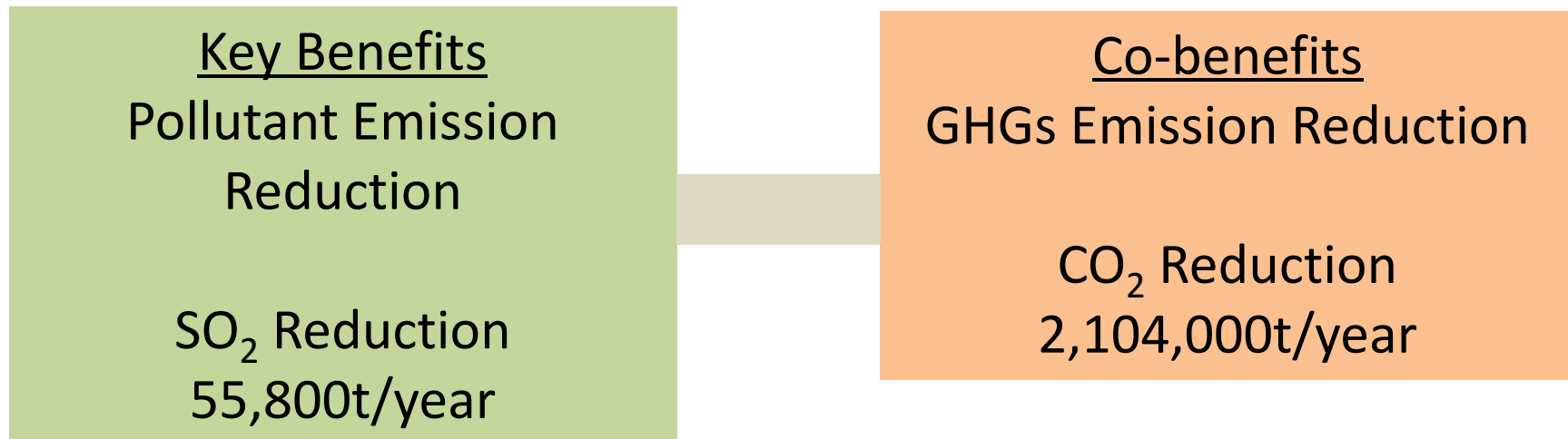


Project Goals

- quantitative assessment of the co-benefits of the Panzhihua Total Pollutant Control during 11th five year
- The way to achieve the goal:
 - Field survey
 - Methodology development
 - Literature review
 - Expert meetings
 - Data collection and analysis

Project Results

- 29 measures in “Implementation program for the total control of major pollutants emission in Panzhihua”
- Calculation of GHGs emission reduction effect
- Only “structural adjustment” and “project”
- Only air quality management



Results of Quantitative Assessment

Sector	Measures	SO ₂ Emission Reduction(t)	CO ₂ Emission Reduction(t)
Power	Closure of No.1 Unit (50MW)	1283	163281
Power	Closure of No.2 Unit (50MW)	1193	151899
Power	Closure of No.5 Unit (50MW)	1805	375990
Power	Closure of No.6 Unit (50MW)	2476	315193
Iron and Steel	Closure of Sintering Machine No.1#2#	129	0
Cement	Closure of Two Wet Rotary Kilns (3×100.94m)	194	63384
Iron and Steel	Closure of Four Coke OvensW-85	104	25510
Cement	Closure of Shaft Kiln	45	34517
Iron and Steel	Closure of Two(2) Coke Ovens	229	56066
Iron and Steel	Waste Gas Settlement utilizing ammonia water	19	12 0

Results of Quantitative Assessment

Sector	Measures	SO ₂ Emission Reduction (t)	CO ₂ Emission Reduction (t)
Power	Closure of Five steam boilers	3080	513333
	Closure of Limekiln	33	7058
	Closure of Limekiln	10	2139
Iron and Steel	Closure of Shaft Furnace 108m ³	40	8470
Iron and Steel	Closure of Coke Oven (2.5m)	859	209978
Iron and Steel	Closure of Coke Oven (2.5m)	462	112933
Cement	Closure of Shaft Kilns No. 1&3	22	66285

Results of Quantitative Assessment

Sector	Measures	SO ₂ Emission Reduction(t)	CO ₂ Emission Reduction(t)
Iron and Steel	Flue gas desulfurization	99	0
Iron and Steel	Sintering Machine No. 6 Flue gas desulfurization	12600	0
Iron and Steel	Installation of New Sintering Machine(360m ²)	11000	0
Iron and Steel	Sintering Machine No.3, 4&5Flue gas desulfurization	7964	0
Iron and Steel	Power Station No.1 Flue gas desulfurization	3060	0
Iron and Steel	Power Station No.1 Flue gas desulfurization	3060	0
Iron and Steel	Power Station No.1 Flue gas desulfurization	3060	0
Iron and Steel	Flue gas desulfurization	1100	-756
Iron and Steel	Flue gas desulfurization	600	-413
Iron and Steel	Flue gas desulfurization	60	-41
Iron and Steel	Flue gas desulfurization	405	-278
Iron and Steel	Flue gas desulfurization	852	-586

Results of Quantitative Assessment

- Conclusions:
 - big co-benefits and huge potential:1:37
 - Minus co-benefits existed
 - Big co-benefits are from power plants, but not in Iron & steel company

Lessons Learned

- Leakage?
- One Panzhihua Case VS the whole country?
- CO₂ VS other GHG?
- Air pollutants VS all pollutants(COD)?

Further consideration:

- Improve the assessment methodology!
- Select another case and extend the assessment
- Co-control technology and policies

Thank you!