

Contract Research Consigned by Ministry of Environment (Year 2003)

Research on Clean Development Mechanisms Responding to Climate Change

**Feasibility study on a CDM project of
alternatives-to-chlorofluorocarbons discharged from
semiconductor plants in China**

1. Objectives

The industry in China has been growing at a large scale in recent years, therefore semiconductor plants have been built one after another and increasing emissions of alternatives-to-chlorofluorocarbons, which are used in the process of producing semiconductors have been concerned.

In terms of reduction of Greenhouse Gas emissions, it has been advocated world-wide that emissions of alternatives-to-chlorofluorocarbons should be reduced, and while voluntary restraints have been innovated in the industrial sector, the five semiconductor trade associations - Japan, United States, Europe, Korea and Taiwan - traced out a policy at WSC(World Semiconductor Council) in 1999 which is "to reduce emissions of alternatives-to-chlorofluorocarbons by at least 10% by 2010".

Abatement equipment is effective for reduction of emissions of alternatives-to-chlorofluorocarbons attendant on increase of new semiconductor manufacturing in China, and technical transfer from Japan including effect measurement for reduction is necessary.

This feasibility study is aimed at verifying possibility of CDM using abatement equipment and estimating the amount of emissions of alternatives-to-chlorofluorocarbons at semiconductor plants in China.

2. Research Outlines

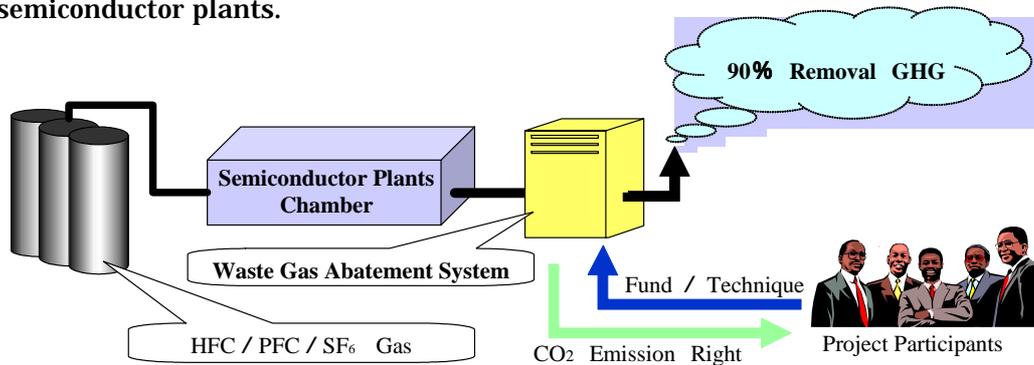
2-1 Project outline

This project is that Japanese project participants install abatement equipment, which decomposes and abates alternatives-to-chlorofluorocarbons in semiconductor plants, then they acquire CER.

2-2 Fundamental study relevant to CDM in China

In addition to the research in China on countermeasures against global warming, the actual conditions of a legal system relevant to CDM and necessity of Capacity Building, we verified a framework for accepting CDM in China and the needs of reduction of emissions of alternatives-to-chlorofluorocarbons, then extracted requirements and

issues to implement a reducing emissions of alternatives-to-chlorofluorocarbons project in semiconductor plants.



2-3 Data analysis on CDM

We grasped the volume of emissions on the basis of present consumption of alternatives-to-chlorofluorocarbons at semiconductor plants in order to set up a baseline.

In regard to the abatement rate in case abatement equipment making alternatives-to-chlorofluorocarbons innocuous is installed, we estimated it on the basis of open data published by manufacturers of abatement equipment.

In regard to methodology of calculating emissions, the one from “Technical research report of PFC emission reduction 2002” compiled by Japan Electronics and Information Technology Industries Association (June 2003) was applied.

2-4 Research on business profitability

We classified the parameters concerning profitability analysis and investigated the process of CDM Certification and international trend on emission trading, then analyzed project risk.

On the basis of those results, we considered and evaluated GHG emission reduction effects, cost benefit ratio, implementation system and project sustainability.

3. Research Outcome

3-1 Project design

Chinese government stated at COP3 that they could not make any promises to reduce GHG emissions until China becomes a Newly Industrialized Economy. Though they have promoted policies that aim for harmony of resources, the environment and the economy thereafter, nether any policy nor statement relevant to reduction of GHG emissions has not been seen so far.

However, Chinese government said that according to Kyoto Protocol, they do not have

an obligation to reduce GHG emissions but they would like to keep its increasing rate under their economic growth while Japanese Minister of Environment visited China in January 2002.

Improvement of energy efficiency and introduction of clean energy to power and gas plants are important issues in China because the supply of electricity and gas is inadequate. Feasibility studies and case studies have been implemented in the fields of chemistry, cement manufacturing, iron manufacturing, power plant and transport as CDM in China, but it has not been developed yet that which field is the first priority.

In regard to emissions of alternatives-to-chlorofluorocarbons, on the other hand, semiconductor trade associations of Japan, Korea, Taiwan, Europe and US promised at WSC in 2002 to reduce it by 10% from 1995-1998 levels in 2010.

It is possible that emissions of alternatives-to-chlorofluorocarbons restraint will be brought into China since CSIA (China Semiconductor Industry Association) has been considering whether they will join WSC.

In consequence of taking hold of those situations, it seems that the implementation of CDM for semiconductor plants in China remains in a tough situation, though it can be expected to carry it out by governmental decision at an early stage.

3-2 Issues for the implementation in the future

As regards installing abatement equipment at foreign affiliated semiconductor plants, we consider it can be understood in the mass, but Chinese government determined only domestic companies, not foreign affiliated companies, can participate in CDM projects.

Not foreign affiliated semiconductor plants often use secondhand semiconductor manufacturing equipment, which used to be worked in other countries such as Japan. Therefore, it is difficult to grasp real consumption of alternatives-to-chlorofluorocarbons and total output of products.

It is necessary to grasp types and consumption of gases discharged from each plant as well as the actual conditions of companies in China which discharge large amount of GHG, including semiconductor plants.

Those issues should be clarified;

- The actual condition of importing secondhand semiconductor manufacturing equipment into China
- The spread of abatement equipment for alternatives-to-chlorofluorocarbons
- The implementation of Capacity Building
- Technical transfer of abatement equipment and measurement know-how