Chapter 4 An Option of Financing CDM Projects in China

Summary

Ueta *et.al*. (2004) finds out large potential of CDM projects between China and Japan, and shows a CDM project that can give environmental benefit to both China and Japan even if the price of CER is US$5 per ton of CO_2 equivalent, when counting on the reduction of adverse impact of acid rain to Japan. However, any CDM projects will not be materialized unless financially viable. This issue is critically important in China, for both domestic and foreign private financing cannot be expected in near future due to high project risks as well as underdevelopment of financial institutions in China. This chapter tries to find out feasible options of financing CDM projects in China. Export credit of Japanese government can be a financing option, but it can be provided only when Japanese firms join in the project. The other option is indirect involvement of external public fund. The effectiveness of this option hinges crucially on the capacity of fund management, though it has gone through the degradation of its capital base. Last option is combination of direct ODA involvement and the ERPA provision. To gain win-win solution for both China and Japan, this option can be accepted only for projects that aim for poverty reduction through rural electrification and can be developed as CDM projects.

4-1 Introduction

Ueta *et.al*. (2004) points out four constraints in promoting Clean Development Mechanism (CDM) projects between Japan and China: higher risk for investors, no legally binding targets for greenhouse gas (GHGs) reduction to Japanese firms, little consideration of the co-benefits of CDM projects despite of its large potential local and regional environmental improvement, and China's strong attitude toward carrying out their priorities in selecting CDM projects.

In 2004, some difficulties were mitigated or eliminated. First of all, some risks that is specific to CDM projects were mitigated as Kyoto Protocol would come into effect in February 2005. Second, Japanese firms have much more concern on CDM projects. As the Kyoto Protocol comes into effect, Japan can no more make an excuse for non-compliance of the Kyoto Protocol. In the situation when emission of GHGs from transport and household sector continues to increase, Japanese firms are strongly required to attain their own GHG reduction target even though it is not legally binding. They have paid more attention to CDM projects as a cost-effective way to attain their targets. Third, China's attitude toward CDM has slightly been changed. The Government of China has gained confidence of the potential benefits from CDM projects and has developed capacity to manage them, partly due to technical assistance from aid donors[1]. It published officially China's CDM Rules in

June 2004 and held international seminars to attract foreign investors and purchasers of the Certified Emission Reductions (CERs).

However, the relative newness of the CDM increases the risk profile for undertaking CDM projects in comparison to other types of projects, which makes it difficult to obtain financing from investors and financial institutions. The World Bank's Prototype Carbon Fund (PCF) and the Netherlands government's fund titled Certified Emission Reduction Unit Procurement Tender (CERUPT) may mitigate the risks that are specific to CDM projects. In order to have the same function, Japan also established the Japan GHG Reduction Fund (JGRF), in December 2004, just before the Kyoto Protocol would come into effect.

Even so, CDM projects will still suffer from insufficient financing as domestic financial system has not been developed well, and is not credible enough to provide long-term project-based loans. Several researches have examined mitigation measures of risk profile, but only few have yet conducted how to secure financing CDM projects.

In this chapter, we will examine various options for financing CDM projects in power sector in China, and show one prospective option under the shortage of debt financing in China.

4-2 The Role of Finance and Insurance in CDM Projects

CDM projects require initial costs for developers, and even low cost activities may not be paid back within a year. It is because CERs may be issued only after emission reduction has actually occurred and has been verified and certified in Joint Implementation and CDM projects that adopt baseline-and-credit or post-verification emission trading systems (Janssen, 2000). Due to this time lag between cash outflow and inflow, it is necessary to finance GHG reduction activities from sources other than receipts from emission reduction. Activities with investment on latest technology (that satisfies technological additonality) often generate less cash inflow than outflow for several years, thus requires long-term financing.

There are several options of financing CDM projects, ranging from self-financing (either retained earnings or a fresh share issue), corporate finance to project finance. Ultimately, the way in which CDM projects are structured depends on the nature of the project, the regulatory environment in the host country, the number and types of project participants involved, and the role of the CERs are to play in attracting finance, investment or revenue to the CDM projects.

Traditionally, established firms finances major part of the project from retained earnings, followed by corporate finance, while firms in developing countries rely mostly on external financing from commercial bank loans (Janssen, 2002). Recently, project finance becomes popular, for it enables project developer to finance large-scale projects with smaller amount of investment requirements and project risks

by:

- financing project that is legally and economically independent of them (off balance sheet financing);
- limiting the source of repayment only to cash inflow from the projects (cash flow related lending);
- offering limited or no recourse to lenders (limited or no recourse financing); and
- helping developer to transfer many of the risks away to those better able to manage them.

Thus larger leverage can be expected for implementing CDM projects if lenders, especially banks become more active in project financing. However lenders may perceive CDM projects, especially those of small-scale projects to have higher risks and require very stringent security arrangements unless developers and/or lenders can find more similar projects.

To finance CDM projects from the sources other than retained earnings, the financial structure should be arranged in such a way that downward risks are minimized. According to UMEP Riso Center on Energy, Climate and Sustainable Development (2004), major risks which CDM projects presents for stakeholders can be categorized as follows:

(1) general project risks which are common to all projects in developing and industrialized countries;
(2) special risks due to the fact that a revenue stream from CDM project relies upon a new and developing international legal framework (Kyoto Protocol risks); and
(3) risks due to the fact that the project is incorporated in a developing country with certain political and regulatory uncertainties

General project risks including force majeure, risk of underperformance, market risk with regard to materials and fuels, and risk of cost overrun. These types of risks can be mitigated as long as project and its contractual clauses among stakeholders is efficiently managed.

Kyoto Protocol risks include:

(a) Kyoto Protocol regulatory risks, such as the risk that the Kyoto Protocol does not enter into force, and that CDM projects may be rejected by the CDM Executive Board on the basis that the project baseline does not comply with the Kyoto Protocol rules;
(b) Community or NGO opposition risk that is based on differing perspectives on fluid concepts of “additionality” and “sustainable development”;
(c) Risk that derived from inaccurate carbon accounting that will result in

generation of less CERs than expected;

(d) Legal title risk that the parties may not be able to establish legal title to the emission reduction on which CERs are based;

(e) CER market risk that makes contracts entered into to sell or purchase them no more economically beneficial;

Both the World Bank's PCF and Netherlands' CERUPT offer measures that mitigate some of these risks. They take Kyoto Protocol regulatory risks, and offer a fixed unit price for emission reduction that is stable for life of the emission reduction purchase agreement (ERPA) to mitigate CER market risk, though purchasing price is different between them[2]. Also, they have an option to make advance payment to develop CDM baseline and monitoring plan, to prepare project design document and undertake validation of the project. On the other hand project developers cannot receive these benefits without cost. Both the PCF and the CERUPT assign stringent penalties if project developer fails to deliver CERs for any reason other than force majeure. This prevents project developers to breach the ERPA when the market price for CERs becomes much higher than the price under the existing contract.

In China, three projects are developed or under preparation under the PCF and CERUPT by May 2004. The Inner Mongolia Huitengxile Wind Farm Development Project is awarded a CDM project contract by Netherlands. The Coal-bed Methane project and the Xiaogushan Run-of-river Hydropower Project are under preparation with investment by the PCF (Zhang, 2004).

The JGRF will perform the same function as the PCF and the CERUPT: it will help developers of CDM projects to mitigate CER market risk, though the purpose is to purchase CERs for the JGRF sponsors that are mainly consisted of Japanese firms. Together with the Ministry of Environment, it will provide advance payment. In addition, the Japan Bank for International Cooperation (JBIC) will provide long-term loan to developers that Japanese firms join into.

Besides these two categories of risks, CDM projects will face host country political and sovereign risks when they are financed through foreign direct investment and/or other foreign sources. These risks include: change in laws and regulation of the host country; failure to approve a CDM project, lengthy administrative procedures, and currency fluctuation and strict controls over the use of foreign currency.

4-3 Potentials for Financing of CDM Projects in China

Assumed that the Kyoto Protocol risks are guaranteed, it is expected that CDM projects are financed by and from private sector. Infrastructure projects, including power projects, have high initial investment costs and returns that depend on profitability over the long run. Accordingly, most private infrastructure projects are financed by equity and a significant share of debt. Debt accounts for 60-70% of financing in average (Bellier and Zhou, 2002).

On the other hand, the Government of China wants to hold strong control over CDM projects, though it does not allow unilateral model: projects carried out by Chinese actors without any direct involvement from Annex 1 partners. The China's CDM Rules requires that project developer shall be wholly China-owned or China-controlled enterprises. Foreign entity is expected to join in CDM projects as a minor partner of project developer so that they would transfer environmentally sound technology, bring up-front investment cost to overcome credit constraints in China, and purchase CERs to secure returns from the investment. Thus, financing will come from both domestic and foreign sources.

For the time being, however, it is not expected that CDM projects in power sector will obtain long-term financing from private sources in near future, regardless of domestic or foreign.

4-3-1 Potentials of domestic financing

In China, most of the power plants had traditionally been financed by the government, state-owned banks, or by themselves. Before 1980, the Ministry of Electric Power financed investment to power generation by government subsidy, and recovered only operational cost by tariff. The share of central government expenditure was the biggest (55%), followed by state-owned banks (25%) and self-finance (10%). The share of central government expenditure was dropped and that of self-finance rose in the 1980s when the government replaced subsidy to loans (Murray, Reinhardt and Vietor, 1998). The share of state-owned banks was unchanged, partly because of the state intervention in the allocation of capital[3].

Since the 1980s, industrial structure of the power sector and financial system has been changed along with institutional transformation. After the Ministry of Electric Power had been disbanded and the State Power Corporation (SPC) had been established, the SPC owned the national transmission and distribution system as well as nearly half of generation capacity. At the same time, thousands of decentralized power companies had invested on small coal or micro-hydropower generation plants, because private investment has been allowed. But the SPC commanded a favorable position to obtain long-term loans from the state-owned commercial banks and the China Development Bank (CDB), as long as the government accepted the necessity for capacity expansion to satisfy the growing demand[4]. The CDB, as a policy bank, provides two-thirds of the total domestic financing for such sectors as power, road construction, railways, petrochemicals and telecommunication. Power sector has obtained the largest (30%) in its RMB 1,139 billion of outstanding loan, followed by road transportation (21%), and hydropower, environmental and public facility management[5] (16%) (China Development Bank, 2004).

To abolish monopolistic power supply and to enhance efficiency through competition, however, generation was separated from transmission and distribution,

and splitting generation assets into a number of market players in 2002. Power generators will bid for dispatch into a mandatory energy pool, from which the State Transmission Corporation, monopoly provider of transmission and distribution services, purchases electricity. Competition will be stated bidding for wholesale market as well as retail market. It seems that conditions are developed for independent power generators, including those companies that generate renewable energy and develop CDM projects, to enter into the market. Power generators are also allowed to raise tariff when they change fuels into clean coal and install fuel-gas desulfurization (FGD) technology, thus recover investment for the environment.

Under this competition policy, it is not so clear whether the government, the CDB and the state-owned commercial banks continue policy loans for investments of the state-owned power generators, including ones that can be developed as CDM projects.

However, it is highly unlikely that the state-owned commercial banks and policy banks provide loans to small and medium scale power generators and small-scale CDM projects such as renewable energy and energy efficiency in the industrial sector. They tend to be unwilling to provide loans to SMEs and small-scale projects which tend to require frequent and small loans, thus the cost of providing loans is high, and the benefits are limited (Chen and Shih, 2004).

Generally, state-owned commercial banks' low efficiency in converting savings into loans and non-decreasing non-performing loans have prevented many companies with considerable potential from securing access to financing. Recently, three out of four were recapitalized by injection of the public fund so that they can prepare for the coming competition with foreign commercial banks that is followed by accession on the World Trade Organization[6] (WTO). It is expected that this may increase loans to the potential profitable investors, but it is quite uncertain whether it will increase financing for potential CDM projects.

Share-type commercial banks are the other potential for financing CDM projects. They do not provide loans to state-owned enterprises, major source of non-performing loans though still small compared with state-owned banks. Local governments supported some share-type commercial banks as a means of providing funding for the Special Economic Zones and promoting local economic development. As a result, they have increased the share of total assets, though still tiny when compared with the one of state-owned banks.

However, their branches and business tend to be concentrated in the coastal regions and the big cities, and their business scope is limited to traditional deposit, loan and settlement, which make them difficult to achieve economy of scale. Further, they also suffer from serious weakness in the area of corporate governance, which increase the rate of non-performing loans (Chen and Shih, 2004).

Domestic bond issue is another possibility. However, it has been limited to

government projects such as the Three Gorges Dams in the power sector.

So far, banks and financial institutions have not developed procedures for efficient financing of CDM projects. Though several bilateral and multilateral donors provide technical assistances for CDM capacity building with government as well as financial institutions, it takes time for financial institutions in China to be accustomed to project finance, contractual arrangements and risk management in related to CDM projects. Set aside foreign public funds private power projects are mostly self-financed. This financial structure results in a higher weighted average cost of capital that will ultimately lead to higher tariffs. Limited debt financing also prevents developers and sponsors from leveraging their capital and hinders their ability to invest in more projects.

4-3-2 Potential of foreign financing

In the 1990s, China opened up power generation to foreign direct investment (FDI) to reduce chronic electricity shortages, to enhance productivity of Chinese power plants, and to complement the required financial resources. It has developed 77 projects worth US$27 billion in power sector during 1990-2000 (Bellier and Zhou, 2002). The projects are concentrated mostly in Guandong, Jiangsu and Anhui, but are implemented in regions other than Northeast and Southwest.

Most of China's power projects involving private participation have been carried out through joint ventures between foreign investors and power companies owned by local governments. Recently, some of the largest projects have been implemented using the Build-Own-Transfer (BOT) model, with the project company being either a joint venture or wholly foreign-owned enterprise.

There are two reasons foreign investors have preferred joint ventures to other types of investment. First, joint ventures enable the government to retain significant control over the project. For fear of foreign exchange outflow and inflation, the Chinese government had not approved any foreign direct investments that foreign share exceeds 50% in power sector by 1995. Second, foreign investors expect their Chinese partners to help build consensus on projects among local and state organizations, reducing legal and regulatory risks. The local partner is often seen as safeguard against unfavorable price reviews, dispatch risk, or both. Foreign investors generally facilitate intangible but critical political alliances as well as more secure access to scarce inputs like fuel, foreign exchange and expertise. Foreign firms undertaking cooperative JVs usually do so with local power bureaus or other local governmental authorities. It enables them to obtain favorable contract terms but limits legal recourse in case of contract breach such as purchase contracts and fuel supply contracts with Chinese counterparts(Blackman and Wu, 1999).

Foreign lenders, on the other hand, perceive excessive credit risk among their Chinese counterparts. Many of Chinese counterparts are quasi-government entities

or recent corporate spin-offs of government entities, and there is almost no information on their financial viability. As a substitute, support letters have been sought from governments to ensure that the counterparts will meet their contract obligations. These support letters are not legally enforceable and have become of little value with the fallout from the International Trust and Investment Corporations (ITICs), which the government refused to bail out upon request from international lenders. With the lack of creditworthy counterparts, foreign lenders will place more stringent requests for security on the project, including securities on project assets and contract rights. However, creating and enforcing securities is not easy for lenders (Bellier and Zhou, 2002).

Furthermore, foreign lenders have no way to compensate for their perceived higher credit risks. The government has not articulated well-defined policy towards foreign investments. Approval process was complicated and not transparent, and it took long time and increase project risks for investors to negotiate with various levels and sectors of the government. The State Planning Commission stopped approving projects with rate of return in excess of 12% in 1993 and later 15% so that foreign investors would not make what the government saw unwarranted on China's need for energy (Murray *et.al*., 1998). Foreign lenders, especially those that provide loans by project finance, thought the ceiling unmatched with their perceived higher risks, and lost interest. Instead they had incentive to invest on small-scale projects that do not need government approval, even though they are less energy efficient (Blackman and Wu, 1999).

As a result, even joint ventures had to finance power projects by equity or by less favorable private commercial loans. Recently, there is growing number of investors that employ BOT model with project finance. However, most of them have heavily relied either on international public debt financing or on export credits. Number of the projects that have obtained export credits is quite limited, for export credit is accessible only foreign firms that were involved in joint ventures and their origin were the same as export credit agency.

To standardize the approach to international project finance, the Project Finance Measures was issued in 1997. However, the approval process was not still transparent, reflected by the government concerns about the important issues typically involved in a large-scale infrastructure project, including large capital investments, foreign exchange obligations, potential impact on domestic inflation, and possible exposure of state entities to risks through foreign debt, guarantees.

Accession on the WTO may develop well-defined foreign investment policy framework. To attract foreign investments in urban infrastructure projects, several municipalities published bylaw regarding framework, way of participation, selection process and cost burden rules for foreign investors of infrastructure projects. It is said that Beijing municipality has successfully attracted RMB 5 billion of private

investment for 10 projects, and is planning to attract investments for tollways and gas pipeline projects. To gain this benefit, the central government admits private participation to all the infrastructure projects in all regions, and simplifies the procedure (Ishi, 2004).

In according with the agreements reached and the WTO member nations, China should open up banking industry. Foreign banks will be allowed to RMB services to Chinese enterprises by the end of 2004, and will be allowed to conduct RMB retail business by the end of 2007. The restriction on foreign banks in terms of geographical region of operation and of type of customers will be abolished by the end of 2007. These provisions imply that foreign banks will be able to collect deposit and provide loan in RMB in near future, thus run the business with little consideration to foreign exchange fluctuation risk. Foreign banks may appear as a lender of CDM projects that are invested by joint ventures in near future.

Japanese banks recently increased total assets and outstanding loans in China. But they perceive higher risks, and still limit their range of operation to syndicate loans to and corporate debt purchasing of Japanese affiliates[7].

4-4 ODA Involvement in CDM Projects

Recently, the Ministry of Environment of Japan decided to provide subsidy to the investment cost of CDM projects in exchange for CERs generated from them[8]. This option is a financing that can ensure financial additionality to the existing public funding. However, the Ministry provides subsidy only for Japanese affiliates or joint ventures between Japanese firms and host country counterparts. This constraint may reduce the number of application from potential CDM developers, for China requires project developer to be wholly China-owned or China-controlled enterprises.

At the same time, the Government of Japan has frequently requested to finance CDM projects through ODA, for it has provided significant amount of ODA for GHG emission mitigation[9]. ODA is advantageous to MoEJ's subsidy in that it can finance projects in which no Japanese firms are involved. Hot arguments has been made over this issue, for it may reduce total amount of ODA to developing countries, and decrease its allocation to such important development and environmental challenges as poverty reduction and local water pollution.

Here, we'll examine to what extent Japan can use ODA as an option for financing both CDM projects and sustainable development in China.

4-4-1 Discussion over the ODA involvement in CDM projects

Dutschke and Michaelowa (2003) points out the advantage of direct ODA involvement in CDM projects. It may increase the chance to attract private sector investment in neglected regions and in specific types and modalities with a high contribution to sustainable development, but which would not be profitable enough for private investment alone. This advantage comes from high transaction costs

associated with CDM projects, lack of institutional capacity, small project size, large number of stakeholders, or the fact that the options favored by the host country are not the most profitable ones in terms of CO_2 reduction.

On the other hand, the Conference of the parties to the UNFCCC agreed in 2001 that public funding for CDM projects from Parties in Annex 1 is not to result in the diversion of ODA and is to be separated from and not counted towards the financial obligations of Parties included in Annex 1.

But there is still a debate over the definition of "diversion." Asuka-Zhang (2000; 2003) gives the most rigorous interpretation. He claims that three conditions should be satisfied to use public funds. First condition is that there will be no reduction in the overall ODA flow from developed to developing countries. This signifies that the excess amount of ODA can be used to finance CDM projects if individual donor country complies with the UN 0.7% target for ODA in relation to its GDP. Second one is that in the overall aid projects portfolio of a donor there is no crowding out of regular ODA projects by global warming mitigation activities. Third condition is that CDM projects that are financed by ODA should have environmental additionality, because climate change mitigation projects might already be the business-as-usual case for ODA. Dutschke and Michaelowa (2003) doubts the feasibility of the application of these conditions. If the compliance with the UN target of 0.7 % ODA is a prerequisite for ODA involvement in CDM projects, this would limit CDM investment eligibility to four Nordic countries. Regional diversion cannot be avoided even if the less stringent approach is taken that ODA budget are at least maintained at the level of forgone periods. Also, it is almost impossible to monitor whether ODA financing to CDM projects crowd out of regular ODA projects, because donor can adjust sectoral distribution in the ODA portfolio even if they do not have any incentive to obtain CERs. Further, it is difficult to qualify GHG effects of business-as-usual ODA projects.

Based on these discussions, Development Assistance Committee (DAC) of the Organization of Economic Cooperation and Development published two recommendations with regard to ODA eligibility (Development Assistance Committee, 2004). The one is that the DAC should agree that the value of any CERs received in connection with an ODA-financed CDM project should lead to a deduction of the equivalent value from ODA. The DAC should also rule out the possibility of counting as ODA funds used to purchase CERs. The other one is that the DAC should agree to the principle of reporting as a receipt against ODA the value of the CERs received, irrespective of whether the CERs are sold or retained by the donor. Donors are allowed to involve ODA in CDM projects as these recommendations obtain a consensus among international community including developing countries.

4-4-2 Past experiences of ODA involvement in CDM projects

Before the DAC published the above recommendation, several bilateral and multilateral donors had provided ODA to projects that are conducted or prepared as CDM projects. Some donors provided ODA indirectly, others directly.

Indirect involvement has been done through environmental funds. This enables investors to promote small-scale CDM projects such as energy efficiency, renewable energy, and methane recovery from agricultural waste. Canada established new ODA funding named Canada Climate Change Development Fund to help developing countries to address climate change through the Global Environmental Facility and the PCF (Gonzales, 2001). West Nile Electrification Project in Uganda is partly financed by the new Ugandan Rural Energy Fund (REF), which is established by the contribution of the World Bank (IDA) and bilateral donors (Table 4-1). This project is developed as a CDM project under the support of the PCF.

Direct involvement has been done by both grant and concessional loans. Danish government granted US$ 0.9 million to promote the financial packaging of the Decin District Heating Project in Czech Republic (Table 4-2). The Asian Development Bank (ADB) provides US$35 million of concessional loan to the Xiaogushan Run-of-river Hydropower Project that is conducted in Gansu, China and is being prepared as a CDM project under the PCF[10] (Table 4-3).

It should be noted that these donors do not intend to obtain nor purchase CERs in exchange for the grant/ concessional loans. The main purpose of the West Nile Electrification and the Xiaogushan Run-of-river Hydropower projects are to help developing countries promote rural electrification by developing clean energy, thus to help them gain benefits of both poverty reduction and environmental improvement. The one of Decin District Heating Project is to reduce diesel oil combustion, thus improve environment both at local and global level[11]. ODA or concessional loans are justified and accepted not only by the compliance with the Marrakesh Accord, but by the consistency with the Millennium Development Goal that emphasizes sustainable development in developing countries. On the other hand, donors may have no chance to obtain any CERs in the above projects unless they invest on the PCF, because the PCF has contacted the Emission Reduction Purchase Agreement (ERPA) to purchase most potion of CERs generated from the project during the credit periods.

Table 4-1: Financing Structure of Uganda's West Nile Electrification Project

Financing Sources	US$ million
International investor (WNHPP owner and operator)	15.0
Government of Uganda/IDA/bilateral donors: smart subsidy through REF	3.7
Government of Uganda: Construction of regional transmission line	2.1
Total project finance	20.8
Project revenues	
Sale of CO_2 emission reductions (ERs) to the PCF	3.0

Note: ERPA value at US$3 per CO2 equivalent tons.
Source: Prototype Carbon Fund, 2002.

Table 4-2: Financing Structure of Czech Republic's Decin District Heating Project

Financing Sources	US$ million
Danish grant	0.9
Equity	5.4
Commercial Loans	6.8
Total project finance	13.2
Project revenues	
Sale of CO_2 emission reductions (ERs) to the PCF	0.6

Note 1: The project is developed by Termo Decin whose majority shareholder is MVV EPS, a daughter company of Energie AG of Manheim, Germany.
Note 2: ERPA value at US$3 per CO2 equivalent tons.
Source: Prototype Carbon Fund, 2001.

Table 4-3: Financing Structure of China's Xiaogushan Run-of-river Hydropower Project

Financing Sources	US$ million
Equity	14.0
Gansu Heihe Hydropower Development Shareholder Company Ltd.	7.0
Zhangye Water and Power Bureau	4.2
Gansu Silver Dragon Construction Company Ltd. (private)	2.8
Asian Development Bank Loan	35.0
Local Commercial Long-term Loans	36.8
Bank of China Short-term Loan	1.2
Total	87.0
Project revenues	
Sale of CO_2 emission reductions (ERs) to the PCF	11.1

Note 1: ERPA value at US$3 per CO2 equivalent tons for 10 years even though it is estimated to rise at US$6 per CO2 equivalent tons.
Note 2: Terms of conditions of local commercial bank's loan is at 5.76%, with repayment period of 15 years.
Source: Prototype Carbon Fund, 2003; ADB, 2003.

4-5 Indirect ODA Involvement through Environmental Fund

4-5-1 Enhancing Financing from Environmental Fund

For most of the developing countries, GHG mitigation measure is the last priority to choose among policies. They tend to prefer policies for promoting economic growth to the ones for environmental conservation, and prefer measures to cope with local environmental issues to regional and global environmental ones. Therefore, incentive of host country is not always compatible with that of investors of CDM projects and purchasers CERs.

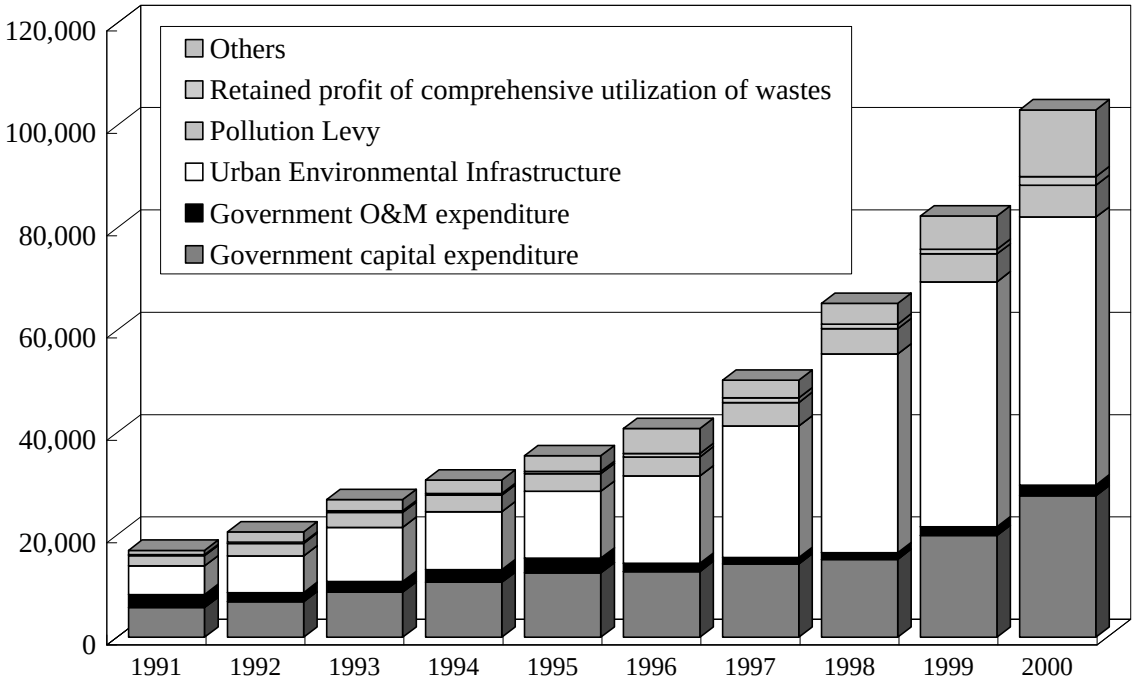
On the other hand, several studies have shown that initiatives for mitigating GHGs often have large co-benefits related to improved local air quality. The most important co-benefits are reduced damage to human health and reduced corrosion rates of materials. Wang and Smith (1999) and Aunan *et.al*. (2004) show that China has large potential to gain co-benefits from GHG mitigation measures.

As long as measures for local air pollution reduction have co-benefit of mitigating GHGs, Official Development Assistance (ODA) for investment on local pollution control will help developing countries to overcome the credit-market constraints. However, donors may find it difficult and time consuming to identify and prioritize the pollution sources, and develop projects that are eligible for ODA disbursement, and disburse ODA one by one. It is cost-effective to set up environmental fund that would provide loans to bankable pollution control investments, with appropriate appraisal, monitoring of the projects, and that would revolve the repayment. Ownership is enhanced if host country government is responsible for financing a portion of the fund and managing it.

In China, environmental fund had been already established as a part of pollution levy system. It seemed rather easy to enhance financing investments for local pollution control from industries: without the fund, donors would face much difficulty in finding out potential investment opportunities one by one, and appraising, financing, and monitoring them. Pollution levy system was introduced in 1978 in order to promote firms to comply with regulations, and 80% of levy revenue was earmarked for environmental fund, and remaining 20% became revenue for environmental protection bureau (EPB) at local level and was spent for enhancing their capacity on monitoring and regulation enforcement. Investments in pollution control totaled RMB 472.4 billion (US$61.5 billion) during 1991-2000, of which 9.4% (RMB 39 billion) came from environmental fund (Figure 4-1).

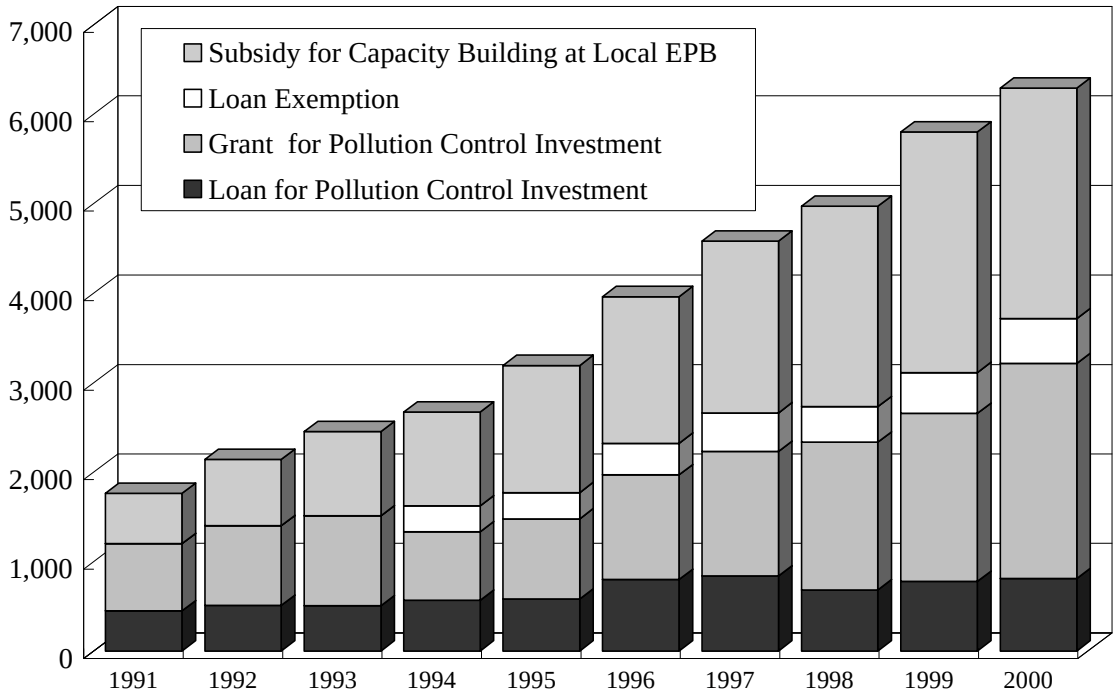
National regulations stipulate that only firms that pay the pollution levy are eligible for obtaining financing, and that the funds can go only to the approved investment projects designed to help the firms comply with the regulations. Then EPBs used to spend the fund just to go back to the firms that paid the levy as grants. But such a grant did not promote pollution control investments.

Figure 4-1 Financing Sources of Industrial Pollution Control in China (RMB million)



Source: author made based on Ge et,al. (2004).

Figure 4-2 Expenditure of the Environmental Fund in Tianjin Municipality (RMB million)



Source: author made based on Gao et,al. (2003).

To enhance the function of pollution control investment, the rules were changed in 1987 to encourage financing by loan. The share of loans in the disbursement for pollution control investment was increasing and exceeded one-third in 1996, but gradually declined later on (Figure 4-2). Few firms have received grants and loans from the fund. There are at least two factors behind the decline. First, fund grants and loans were capped by the firm's levy payments. Many projects await accumulation of sufficient sum in the fund before moving forward. Second, terms of conditions were too strict for potential borrowers. It required borrowers to prepare at least 60% of down payment, and to pay back within three years (Taketoshi, 2004).

To encourage timely project completion and adequate quality, government guidelines allow all or part of the capital amount of the loan to be forgiven for investments meeting those goals. Most EPBs have chosen full forgiveness. For such loans, the fund recovers only the below-market interest on the loan during project construction. As a result, fund does not build their capital base (Lee, 1999).

4-5-2 World Bank experience of enhancing environmental fund

In response to the State Environmental Protection Agency (SEPA)'s request of international concessionary financing, the World Bank supported industrial pollution control through the environmental funds. It provided financial and technical assistance to enhance the environmental fund as a part of the Tianjin Urban Development and Environment Project in 1992, the Southern Jiangsu Environmental Protection Project in 1993, the Liaoning Urban Environmental Project in 1994, the Hubei Urban Environmental Project in 1995, and the Xiaoqing River Basin Sub-loan Facility under the Shandong Environmental Project in 1997.

In Tianjin city, the World Bank committed to provide US$ 1.9 million of subsidized loan and has disbursed RMB 66.17 million (US$ 8.6 million) to the fund during 1993-99, while Tianjin EPB injected RMB 48.48 million (US$ 6.3 million) during the same period. The fund has provided sub-loans to the firms that discharge heavy pollution on a concessional term: about half of the market interest rate. Because of the revolving nature of the fund and the short-term sub-loans, the fund has disbursed loans more than its capital base: it allocated RMB 119.43 million to 41 projects by 2000. The disbursement promoted investments in industrial pollution control, and succeeded in proper treatment of 3.5 million tons of industrial wastewater and 18,000 tons of industrial waste per annum, and in reduction of 16,700 tons of COD, 102,400 tons of sulfur dioxide, and 56,000 tons of soot (Gao *et.al.*, 2003).

However, the range of success was limited: the fund has rarely addressed the trans-boundary pollution that is discharged by large firms. Both firms and EPB managers of the fund gave priority on the pollution that had impacts to county and city, and they tended to pay less attention to the trans-boundary pollution. To disburse as many sub-loans to the firms, the amount of sub-loans are capped to investments less

than US$3 million. The fund has distributed few, if any, sub-loans to power sector, even though they are eligible for obtaining financing, despite of their position as a major source of pollution. Instead, the fund has focused on manufacturing sector or small and medium size enterprises that had attracted both international and local attention.

In addition, the fund tended to support projects that generated sufficient revenue to repay the loan. This was because the EPBs and the central government should repay the loan to the World Bank, which does not allow forgiveness of the capital amount of the loan any more. The Tianjin Urban Development and Environment Project has increased industrial production and profits by RMB 805 million and 1,124 million, respectively (Gao *et.al.*, 2003). The Liaoning Environment Fund has provided 32 sub-loans for focused high environmental impact investments of in-plant clean technology process change (World Bank, 2004). The Hubei Urban Environmental Project has promoted of clean technologies in Hubei industry with the greatest urban environmental impact, through a line of credit for large, pre-identified investments and an Environmental Pollution Control Fund for small and experimental investments (World Bank, 1995).

Furthermore, despite of supports for projects that generated sufficient revenue, the rate of repayment of sub-loans got worse as time went on. All the sub-loans were repaid during 1994-95, but less than 45% have been repaid since 1997 (Gao *et.al.*, 2003). The amount of loan exemption has been increasing since 1996 (Figure 4-2). The fund managers do not have enough capacity and staff to appraise the financial ability of the borrower, as well as to enforce loan contracts stringently. In addition, the allocation of the fund and enforcement of repayment were often influenced by the political concern of the local government. As a result, the fund's capital base is decreasing in Tianjin, and additional capital is required to continue the environmental subsidized loan sustainably.

The degrading capital base of the environmental fund can be seen in other cities and provinces where international concessionary financing is not provided (Ge *et.al*, 2004). Borrowers have often not taken the repayment requirements seriously because of the financial system's long-standing failure to enforce loan contracts through repossession or bankruptcy (Lee, 1999).

To overcome these challenges, the SEPA reformed pollution levy system and environmental fund in 2003. Previously, pollution levy was charged according to the quantities and concentrations of pollutants released in case where the discharge of the pollutants exceeds the emission standard. It was charged only on the "worse case" pollutant even if firm discharges multiple pollutants. But under the new policy, it is charged according to the quantities pollutants released, regardless of the compliance with the standard. It is also charged on each category of pollutants, such as sulfur dioxide, water pollution and noise pollution. The change will increase the amount of

levy collected, thus the capital base of the environmental fund.

However, actual amount of levy collected is estimated to decrease. This is because local EPBs lost the incentive to collect pollution levy. Under the reform 10% of the revenue from the pollution levy will be passed to the national environmental fund, and the remaining to the fiscal department of local governments (Taketoshi, 2004). This enables the SEPA to allocate the sub-loans to trans-boundary pollution as well as large pollution sources including power sector. It also enables the fiscal department to spend that revenue as a general expenditure without earmarking to environmental protection. But the responsibility of levy collection remains to be resided at local EPBs. Local EPBs have no incentive to enforce the revised levy system stringently. Instead, they suggest local firms to manipulate their pollution emission so that local government can keep tax revenue from local firms, for the levy is treated as a production cost and is tax deductible, and their increased burden on levy will be offset by reduction of their tax liability.

Under the reform subsidized loan is replaced by grant for firm's interest payment, and additional penalties are stipulated in case firms spend the financing from the environmental fund for the purpose other than environmental investment. This measure aims to enhance effective use of the fund, though the effectiveness of subsidization of firm's interest payment depends on financial institutions' capacity of appraisal, debt collection, and finding bankable environmental investments. Development of this capacity depends crucially on the credible financial system, which cannot be established unless governments stop intervention to the fund allocation from political reasons.

4-5-3 Feasibility of CDM funds

The above experience signifies that financing CDM projects from the environmental fund cannot be expected in the near future: it is susceptible to political intervention in fund allocation. The amount of fund is too small to finance CDM projects that accompany investments unless large amount of ODA comes from donors.

It is especially true of coal-fired power plant, which is subject to the new regulations on the sulfur dioxide emission. The regulations stipulate that no new installation and expansion of coal-fired power plants will be allowed in the development area of medium and large cities, and that FGD technology must be installed when coal-fired power plants are built or expanded in both acid rain and sulfur dioxide control areas. This raises the investment cost for basic coal-fired power plant by 10-25% and increases the down payment even if a power company can obtain financing from the environmental fund[12]. They should finance this additional investment cost by hiking the tariff, or by self-finance.

In addition, measures for local air pollution reduction may not bring co-benefit of mitigating GHGs (Sakai, 2004). Development of low-efficient but cheaper FGD

technology, along with the above new regulation has made investment on FGD technology more cost-effective for power plants to reduce sulfur dioxide emission than scrap-and-build new, more energy-efficient power plants with integrated gas-combined cycle (IGCC) or semi-critical technology.

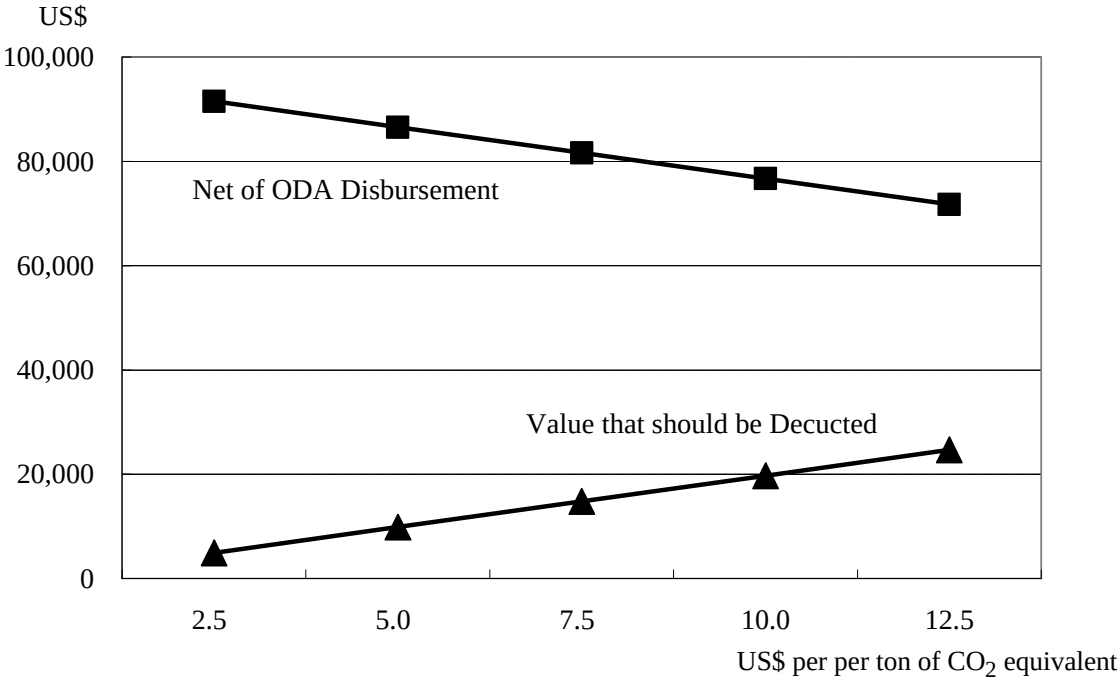
Here, it is safe to say that the environmental fund, even if credit and functions are enhanced by foreign assistance, is unlikely to overcome the credit constraints for CDM projects in China. Now we should examine the last option-direct involvement of ODA in CDM projects.

4-6 Rationale for Direct ODA Involvement in CDM Projects

Japan seeks to obtain CERs in return for direct involvement of ODA in CDM projects. The Government of Japan, through JBIC, seeks registration of an ODA-financed wind power project in Egypt with the CDM Executive Board[13]. The plant will have a capacity of 120MW, and operate in 20 years. The total cost is US$175.89 million of which US$128.54 million is to be financed by Japan's ODA. It will help Egypt to realize sustainable energy development, to alleviate an increase in air pollution and to reduce GHG emissions of 270,000 tons of CO_2 equivalent annually compared to the construction of a thermal power plant with the same generating capacity. The value of CERs obtained, should be deducted from ODA disbursement if Japan complies with the DAC recommendation. If Japan obtains half of CERs generated from the ODA-financed part of project, or 1,973,459 tons of emission reduction for 20 years, US$9.87 million should be deducted from the value of ODA disbursement when the price of CERs is US$5 per ton of CO_2 equivalent. The value will be US$19.74 million and "net" of ODA disbursement will be reduced to US$76.69 million, only 60% of the initial amount of commitment if the price of CERs becomes US$10 per ton of CO_2 equivalent[14]. "Net" of ODA disbursement will be further reduced as the price of CERs get higher (Figure 4-3).

Unless Japan increases the total amount of ODA disbursement, it will be blamed from international community for converting ODA to GHG mitigation projects, and for not being keen in poverty reduction, the major theme of international community after the 9.11 incident and the Monterrey Consensus of the International Conference on Financing for Development. The more CDM projects are ODA directly involved in, the less will be the amount of net ODA disbursement. But Japan is reducing the total amount of ODA, and becomes the last country to attain UN-0.7% target. It has also greatly reduced ODA disbursement to China and has shifted its composition from economic and social sector to environmental sector, and its focus from local to regional pollution mitigation projects that may bring environmental benefit to Japan to some extent.

Figure 4-3 Value that be Deducted and "Net" of ODA Disbursement



Source: author made

An alternative option is that Japan provides ODA to potential CDM projects as a catalyst to complete the financial arrangements, and the JGRF purchase most portions of CERs generated from them. This approach is similar to the one that the IDA, the Danish government, and the ADB took. It assures that ODA is not provided for the purpose of purchasing CERs. Instead it is done as a catalyst of financing CDM projects as well as a financial instrument to help host country to attain sustainable development goal. This way ensures financial additionality, and increases rate of return for developers, and reduces price fluctuation risk of CERs. As ODA carries out catalyst function better, transaction costs will be reduced, and the amount of ODA that is required for each CDM project will be reduced.

However, this option may not acceptable for ethical reason: it looks as if the benefits from CDM projects will mostly accrue to Japan, not host country, because Japan provides ODA to potential CDM projects and purchase CERs from the same projects. As long as ODA is provided by concessional loans, CDM results in the improvement of terms of condition, or in the increase of the grant element. Host country receives this benefit at the cost of sectoral diversion.

In addition, it may cause conflict of interests among power generation companies in China if bilateral or multilateral donors provide ODA just for their capacity expansion to meet the growing demand. After the reorganization, power generation companies are competitive in the market, at least to some extent. Even ODA provision for pollution reduction of power plants may not be justified for changing competitive advantage.

Thus the combination of the direct involvement of ODA and the JGRF's ERPA can be accepted only for the projects that local and foreign financing is negligible, that help China to promote sustainable development, and that gives little influence to competition. Rural electrification in poverty area can be a good candidate in this sense. ODA can be justified as a financial assistance for poverty reduction, and together with the JGRF's ERPA, can work as a catalyst for attracting investors and lenders. China has large potential of this kind of project, as shown in the ADB-supported project. Non-government organizations (NGOs), and private firms may have advantages in finding out and developing potential CDM projects[15]. Though there is a long and hot debate over provision of ODA to NGOs and private firms in Japan, more CDM projects will be financially feasible if Japanese aid institutions can collaborate with them to finance CDM projects.

4-7 Conclusion

This paper shows that local and foreign loans cannot be expected to finance CDM projects for the coming several years in China. Investors will rely heavily on public export credits or private loans at an unfavorable term of conditions. By the time local and foreign banks as well as institutional investors develop capacity to provide long-term financing, foreign public funds, including ODA and government carbon funds, can be justified to make CDM projects financially feasible.

On the other hand, direct ODA involvement in CDM projects is not justified for the purpose of purchasing CERs, according to the Marrakesh Accord. In China, ODA provision to some power companies may be criticized for distorting the market conditions, because competition is started among them.

One possible option of ODA involvement is to create CDM Fund that is financed by ODA and other foreign and domestic source so that the Fund can allocate small-scale CDM projects. However, past experience of the environmental fund shows that this option cannot promote CDM projects efficiently, due to the inefficient resource allocation, to low repayment rate that has been seen in the loans from state-owned banks. The other option is to provide ODA to rural electrification projects and develop them as CDM projects, and purchase CERs by the JGRF, as the ADB, the IDB and the PCF are conducting. This type of projects will bring both local and global benefits, and both economic and environmental benefits, for it will push local economic growth, improve local environmental environment if any, and mitigate GHGs emission.

In January 2005, the Government of Japan states discussion on the termination of ODA provision with China[16]. Once the Government of Japan decides to terminate ODA to China, joint provision of ODA and JGRF's ERPA cannot be realized, thus reduce the financial feasibility of CDM projects in China. To promote CDM projects and sustainable development in China, it is a challenge that Japanese investors, the

JBIC and the JGRF can find out many potential projects that direct ODA involvement can be justified in China as well as international community, and that can be developed as CDM projects at the same time.

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Endnote

1 Four large assistance projects focusing on capacity building for CDM projects were carried out during 2002-2004. World Bank *et.al*. (2004) is one of the outputs of this technical assistance.

2 Traditionally the World Bank has contracted to purchase emission reduction at between US$3-4 per ton of CO_2 equivalent. Netherlands purchases CERs more favorable terms, which differs by the types of GHGs.

3 State-owned commercial banks were reorganized as one central bank (People's Bank of China) and four state-owned commercial banks: the Industrial and Commercial Bank of China, Bank of China, People's Construction Bank of China and Agricultural Bank of China. Even reorganized as commercial banks, the four state-owned commercial banks have been provided significant funding to government-led projects, and participated in only a few private projects (Lardy, 1998; Chen and Shih, 2004). They debited state-owned enterprises over 80% of all the outstanding loans (He, 2002).

4 Policy banks such as the China Development Bank (CDB) was established in 1994 so that state-owned commercial banks can be financially viable as commercial banks.

5 One of its biggest contributions is long-term loan to the Three Gorges Dam project. The total amount of loan is RMB 30 billion, of which RMB 17.9 billion has already been funded. CDB has also assisted in raising and on-lending overseas export loans of approximately $1.1 billion for dredging and construction machinery and equipment.

6 *Nikkei Shinbun, December 30, 2004.*

7 *Nikkei Shinbun, January 28, 2005*

8 The Ministry of Environment of Japan selected the rice husk-fuelled power plant in Thailand as the first project that would be provided subsidy. This project was developed by the joint venture between the Chubu Electric Power Company of Japan and Thai counterpart (AT biopower) (*Yomiuri Shinbun, January 29, 2005*)

9 The Government of Japan announced that it will allocate ODA grant to CDM projects in order to obtain CERs generated from the ODA grant-supported projects (Ministry of Foreign Affairs Japan, February 7, 2005).

10 The terms of condition of the ADB's loan is at floating rate of 2.15% (in accordance with ADB's LIBOR-based loan facility) adding other fees, and 24 years of lending period, 20 years of repayment period.

11 Emission reduction of particulate matters, NOx and SO_2 gives environmental benefit not only to host country, but also donor. This is one of the reasons Danish government provided grant to the project.

12 According to Murray *et.al.*(1998), imported FGD technology costs US$100-250 per kilowatt.

13 It is uncertain that Japan will really obtain CERs from this project, because Egypt does not ratify the Kyoto Protocol at the end of 2004.

14 The amount is calculated to count on the grant element and realistic price of CERs: ODA is provided as a long-term concessional loan and the grant element is 82.69%. The price of CERs was less than US$5 per ton of CO_2 equivalent before September 2004. But after the Russia's ratification to the Kyoto Protocol in October 2004 and the linking of the EU emission trading system with JI and CDM projects in January 2005, the carbon price gets higher in the European carbon market, and is about US$10 in January 2005 (*Nikkei Shinbun, January 14, 2005*).

15 Interview to a non-governmental organization in Beijing on September 29, 2004.

16 *Nikkei Shinbun, January 28, 2005*