

## **The World Bank's Prototype Carbon Fund and China**

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# The World Bank's Prototype Carbon Fund and China

## Summary

As the first global carbon fund, the World Bank's Prototype Carbon Fund (PCF) aims to catalyze the market for project-based greenhouse gas emission reductions while promoting sustainable development and offering a learning-by-doing opportunity to its stakeholders. Since the inception in 2000, the PCF has engaged in a dialogue with China to get it to sign up as a host country, because the World Bank and other international and bilateral donors expect great potential of the clean development mechanism (CDM) in China and feel the significant need for building CDM capacity in China to enable it to gain more insight into the CDM and increase its capacity to initiate and undertake CDM projects. This paper first discusses why China had hesitated to sign up as a host country of PCF projects until September 2003. Then the paper explains what has led China to endorse the PCF projects. The paper ends with discussions on the implications of the PCF's offering prices for the emerging global carbon market.

**Keywords:** Carbon prices, Carbon market, China, Prototype Carbon Fund, The World Bank

**JEL Classification:** Q54, Q58, Q52, Q48

*This paper has benefited from useful discussions with the colleagues at the National Development and Reform Commission, Beijing, China and the Ministry of Science and Technology, Beijing, China. That said, the views expressed here are those of the author. The author bears sole responsibility for any errors and omissions that may remain.*

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## 1. Introduction

Recognizing that climate change will have the potential impact on its borrowing client countries, the World Bank has been participating in the climate change process since its beginning. The Prototype Carbon Fund, whose establishment was approved on 20 July 1999 by the Executive Directors, establishes the Bank as one of the pioneers in promoting the flexible mechanisms. The PCF aimed to:

- demonstrate how project-based transactions in greenhouse gas emission reductions can contribute to the sustainable development of developing countries and countries with economies in transition;
- share the knowledge gained in the course of the PCF's operations with all interested parties; and
- demonstrate how the World Bank can work in partnership with the public and private sectors to mobilize new resources for its borrowing member countries while addressing global environmental concerns.<sup>2</sup>

The PCF operates like a mutual fund, pooling the collective resources from 23 investors (6 governments and 17 companies) and investing these funds in projects that reduce greenhouse gas emissions or remove these emissions from the atmosphere. The PCF is not legally able to own these carbon credits generated from the PCF projects. These credits have to go back to those investors pro rata according to their level of investment in the Fund. Participants in the Fund agreed on a set of project selection and portfolio development criteria designed to serve the “learning-by-doing” objective of the PCF

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<sup>2</sup> See the PCF web site at: <http://carbonfinance.org>.

while reducing project risk through portfolio diversity. In practice, these objectives are achieved by balancing the Fund's portfolio between: CDM and JI (joint implementation); geographic regions; and eligible sectors and technologies and/or fuel switching in projects that create emissions reductions additional to a credible baseline of what would have happened without the CDM/JI project.

The World Bank and other international and bilateral donors are keen to support CDM capacity building in China because they expect great potential of the CDM in China and feel the significant need for China to gain more insight into the CDM and to increase its capacity to initiate and undertake CDM projects. Thus, since the inception, the PCF has engaged in a dialogue with China to get the country to sign up as a host country. This paper first discusses why China had hesitated to sign up as a host country of PCF projects until late 2003. Then the paper explains what has led China to endorse the PCF projects in the end. The paper ends with discussions on implications of the PCF's offering prices.

## **2. Why had China hesitated to sign up as a host country?**

With the already huge and growing amount of greenhouse gas emissions and a great deal of low-cost abatement options available, China is widely regarded as the world's number one host country of CDM projects (Zhang, 1999, 2000, 2001). But, making this potential a reality represents a significant challenge for China, because there has been a general lack of awareness by both the Chinese government and business community, institutional structure, and implementation strategy. This has raised great concern about China's

ability to compete for CDM projects and fully exploit the potential. The World Bank and other international and bilateral donors feel the significant need for CDM capacity building in China to enable the country to gain more insight into the CDM and to increase its capacity to initiate and undertake CDM projects. For this, since the inception, the PCF has engaged in a dialogue with China to get it to sign up as a host country. The PCF experience suggests that completing the first carbon deal in a host country is a powerful capacity building tool, with tremendous impact on supply on its own (Lecocq, 2003). But China has hesitated to sign up the PCF until late 2003. There are several reasons. First, rules governing the CDM is not agreed on among parties to the Kyoto Protocol until the seventh Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC), and as a very important player, China does not want to see that its involvement in the PCF leads the rules operating the PCF to have any impacts on overall rule-setting for the Kyoto mechanisms. Second, China finds the PCF's targeted price levels of about US\$ 3.3 per ton of CO<sub>2</sub>-equivalent too low,<sup>3</sup> relative to its expectation of US\$ 10 per ton of CO<sub>2</sub>-equivalent.<sup>4</sup> Understandably, the investors in the PCF demand a low price. The current host countries of the PCF projects have no serious demand to increase the PCF's price levels. China is the only country that seriously regards the PCF's price levels as too low, and views that the low price levels will affect the sustainability and expansion of the PCF over the long run.<sup>5</sup> Third, the PCF establishes a practice where the host country takes the risk in case a project does not

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<sup>3</sup> Minimum requirements for PCF projects specify that estimated cost of emission reductions should preferably be less than US\$ 10 per ton of carbon, which is equivalent to about US\$ 3 per ton of CO<sub>2</sub>-equivalent (see the PCF web site at <http://carbonfinance.org>).

<sup>4</sup> Author' interviews in Beijing, January 2004.

<sup>5</sup> Author' interviews in Beijing, January 2004.

perform as planned, and China does not accept that the PCF projects do not bear some risks in implementation and crediting, although the PCF guarantees payment on delivery of the certified emissions reductions (CERs).<sup>6</sup> Fourth, there are some concerns about the formal status of PCF projects regarding whether they can be recognized as CDM projects.

### **3. What led China to endorse the PCF projects?**

Despite the difference in opinion, negotiations between the PCF and China have never stopped. Two sides have made important progress in negotiations recently, and China has determined to be a host country of the PCF. At the moment, two PCF projects are in the final stages of discussion between China and the PCF: one on run-of-river hydropower in Gansu Province, and another on coal bed methane capture and power generation in Shanxi Province. The PCF will invest US\$ 8.5 million in the hydropower project that will lead to the emissions reduction of 2 million tons of CO<sub>2</sub>-equivalent. Although the PCF has informally promised to offer the most favourable price, no agreement has been made on the purchasing prices of emissions reductions for the PCF project. For the coal bed methane project, the PCF as one of the investors will contribute US\$ 12.75 million in return of 3 million tons of CO<sub>2</sub>-equivalent of the total project's emissions reduction of 29 million tons of CO<sub>2</sub>-equivalent.<sup>7</sup>

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<sup>6</sup> The risk of non-delivery for a carbon buyer can be mitigated by purchasing CERs on delivery rather than upfront. Although a project developer is able to use this carbon purchase agreement as a collateral to leverage financing that would otherwise not have been available, the host country and business's risks associated with the underlying project remain, unless the carbon buyer is able to share these risks with the project developer (Lecocq, 2003).

<sup>7</sup> The data for the two PCF projects in China are taken from the following news: PCF Announces New Projects, *Joint Implementation Quarterly*, Vol. 9, No. 4, December 2003, p. 13.

What led China to endorse the PCF projects? First, it is related to the time table set for the funds reserved for projects in China. At the creation of the PCF, its Participants Committee has decided to reserve some funds for potential projects in China. But these funds are only able to be reserved by the end of 2003. While China still views that the PCF projects do bear some risks in implementation and crediting, such perceived risks are at reasonable levels because the PCF guarantees payment on delivery of the CERs.

Another reason is related to weak demand for CERs, which makes it much hard for China to negotiate with the PCF on the price. It is conceivable that China's side is keen to ensure that the carbon credits from China have a high value. However, as shown in Table 1 indicating the current price levels for CDM projects at less than US\$ 6 per ton of CO<sub>2</sub>-equivalent, the current development of the carbon market just turns the price of carbon credits the other way around, and leaves China a very little space to influence the market.<sup>8</sup>

**Table 1 Prices of carbon credits under the selected programs**

Programs	Price of carbon credits (US\$ per ton of CO <sub>2</sub> -equivalent)
World Bank's Prototype Carbon Fund	3 - 4
Dutch CERUPT program	4.4 - 5.5*
Dutch-IFC CDM Facility	~ 4
Dutch-IBRD CDM Facility	~ 4

\* €4-5 per ton of CO<sub>2</sub>-equivalent.

Source: Zhang (2004).

<sup>8</sup> On the other hand, China is fully aware of its role as a dominated supplier of CERs. Whatever prices are set for China projects will have impacts on the world prices. Thus, China is not to give up the price issue so easily.

Third, China hopes to use those projects on the margin to gain much-needed, real learning. Recognising that it is hard to change the situation in weak demand in the short run, China thought that it is worthwhile undertaking some PCF projects, in particular those PCF projects that fall into the priority area under the CDM in China and whose local project developers are determined to undertake these projects and need the funding on the margin. In this case, the funding from the PCF is considered additional.

Undertaking these projects will provide much-needed, real learning about baseline setting, project boundaries, monitoring and verification at project levels, these aspects that are most relevant to all prospective projects under the CDM but in which China has gained little experience in the AIJ (Activities Implemented Jointly) pilot phase.<sup>9</sup>

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<sup>9</sup> The different attitudes towards the AIJ pilot phase among the Chinese ministries concerned at the beginning put China at the slow starter of AIJ projects. As a result, China has only hosted 5 AIJ projects, with 4 projects registered with the UNFCCC Secretariat (see Table 2). For all these projects, there have been quite tough bilateral negotiations between China and the investor countries. The unit costs of abatement for these registered projects are very high.



**Table 2 The registered AIJ projects in China**

Project	Type <sup>a</sup>	Parties involved (host/investor)	Lifetime (years)	Emissions reductions per year (tons of CO <sub>2</sub> -equivalent)	Unit abatement cost (US\$ per avoided ton of CO <sub>2</sub> -equivalent)
A. Installation of a coke dry-quenching facility	Energy efficiency	China/Japan	20	68265	19.6
B. Model project for energy conservation in electric furnace used for ferro-alloy refining	Energy efficiency	China/Japan	20	29050	22.6
C. CFBC & CHP project in Shangqiu thermal power plant in Henan Province of China	Energy efficiency	China/Norway	20	87480	15.0
D. Model project for utilization of waste heat from incineration of refuse in Harbin of China	Fugitive gas capture	China/Japan	20	62896	31.1

<sup>a</sup> The Intergovernmental Panel on Climate Change has classified type of AIJ project as energy efficiency; renewable energy; fuel switching; forest preservation, restoration or reforestation; afforestation; fugitive gas capture; industrial process; solvents; agriculture; waste disposal; or bunker fuels.

*Source:* Zhang (2004).

#### **4. Implications of the PCF's offering prices**

When applauding this positive development in the PCF, we have to realize that host countries are very concerned about the price issue. The World Bank and the Dutch government are the two most active players on the buyer side in project-based transactions. In volume terms, they represent 30% and 26% of the carbon market in 2002-

2003, respectively, as shown in Figure 1.<sup>10</sup> Currently, the PCF pays between US\$ 3.5 and US\$ 4.0 per ton of CO<sub>2</sub>-equivalent, and this price range was set in 1999 at the creation of the PCF.<sup>11</sup> The Dutch CERUPT (Certified Emission Reduction Unit Procurement Tender) program is aiming at price levels of about US\$ 5 per ton of CO<sub>2</sub>-equivalent. The offering price of the PCF is not intended to serve as the market price. Given its dominated role on the buyer side, however, it will largely in practice set the standard for the carbon market. Private investors are unlikely to accept projects with a higher cost.<sup>12</sup> This raises a very important question of striking the balance between encouraging investors to engage CDM projects (thus increasing the volume of CERs of CDM projects) and ensuring the quality of CERs. If the unit cost of abatement is so high, potential investors are scared away. Without CDM investment, there is no delivery of CERs. On the other hand, government and multinational actors have so far totally dominated on the demand side for CDM projects. If they are just interested in getting cheap CERs, there will be no strong incentives to encourage potential investors to develop CDM projects, in particular those sustainable projects like renewable energy projects. After all, the PCF experience shows that, at the carbon price of US\$ 3 per ton of CO<sub>2</sub>-equivalent, carbon finance can hardly

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<sup>10</sup> As shown in Figure 1, the share of Japan in the carbon market increased from 6% in 2001-2002 to 23% in 2002-2003. Unlike the Netherlands, the Japan's purchases are mainly from private entities.

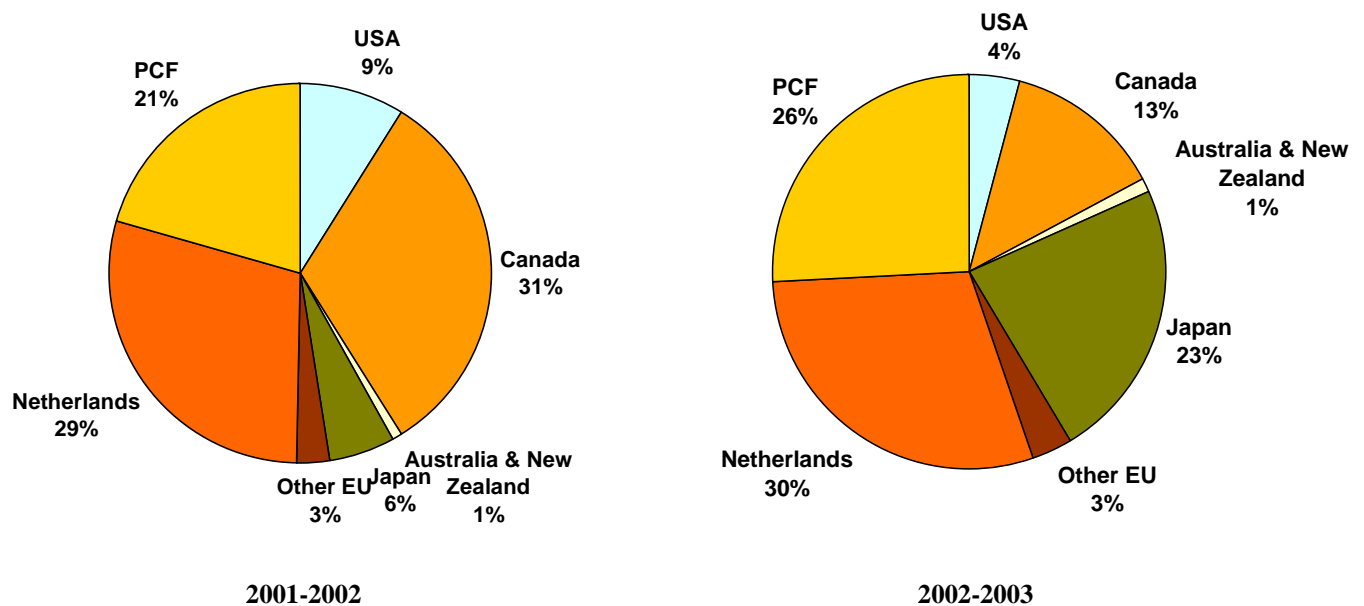
<sup>11</sup> Cited in the *Report of the Asia Meeting on Efficient Clean Development Mechanism Operations*, organised by the UNDP and the World Bank, 1-3 April 2003, Kuala Lumpur, Malaysia.

<sup>12</sup> To avoid harming their negotiation positions either in subsequent deals or in negotiating with the government on the emissions target and policy, private players often keep key elements of their deals such as prices or contract features confidential. However, given the fact that the publicly disclosed offering prices of PCF projects provide information on abatement costs in both economies in transition and in developing countries, it is conceivable that private players are unwilling to go beyond this price bound.

increase the internal rate of return of many project types by more than 5%, except for landfill gas (LFG) capture project<sup>13</sup> (See Table 3). Thus, the corresponding CERs stream is rarely the decisive factor that makes the most significant difference and renders these projects viable.

**Figure 1 Market buyers (share of volume of emissions reductions purchased)**

Source: PCF (2003).



<sup>13</sup> The 100-year global warming potential of methane is 23 times that of CO<sub>2</sub>, implying that abating one ton of methane emissions is equivalent to 23 tons of CO<sub>2</sub> emissions abated. Thus, projects involving a reduction in methane emissions are much more cost-effective than projects aimed at reducing CO<sub>2</sub> emissions. For LFG to power generation projects, carbon finance can contribute up to 1.5 cents per kWh to the project and can boost the project internal rate of return by 5% or more. But at the carbon price of US\$ 3 per ton of CO<sub>2</sub>-equivalent, carbon finance can only contribute to 0.15-0.50 cents per kWh for conventional renewable energy projects (PCF, 2002). This explains why LFG capture project takes the lead among all project types. As shown in Figure 2, this type of project accounts for 30% of the total volume of project-based emission reductions transacted in 2002-2003.

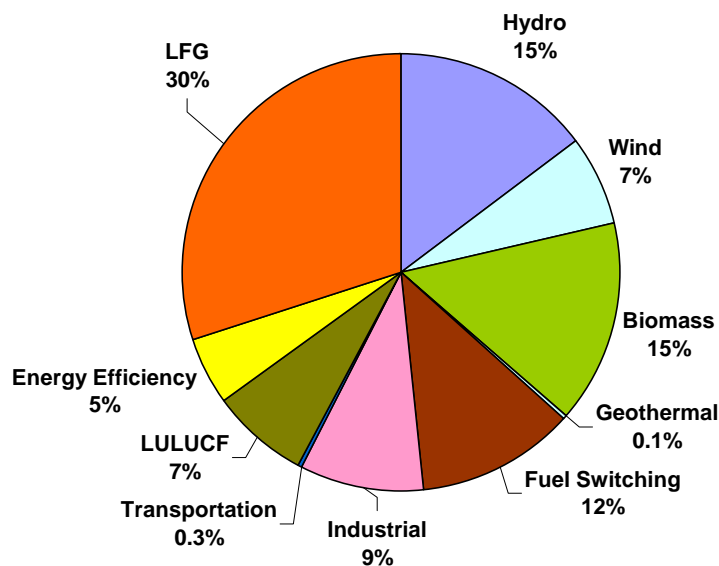
**Table 3 Impact of carbon finance on project financing**

Technology	Increases in project internal rate of return with carbon credits priced at US\$ 3 per ton of CO <sub>2</sub> -equivalent (%)
Hydro	0.8-2.6
Wind	1.0-1.3
Bagasse	0.4-3.6
Energy efficiency/district heating	~ 2.0
Gas flare reduction	2.0-4.0
Biomass	2.0-7.0
Municipal solid waste	> 5

Source: PCF (2002).

**Figure 2 Technology share of emission reduction projects 2002-2003 (in percentage of total volume contracted)**

Source: PCF (2003).



**Table 4 The maximum offering prices of CERs under the Dutch CERUPT program**

CDM project type	Maximum offering prices of CERs under the Dutch CERUPT program (€per ton of CO <sub>2</sub> -equivalent)
Renewable energy (excluding biomass)	5.5
Biomass energy (excluding waste)	4.4
Energy efficiency improvement	4.4
Fossil fuel switch and methane recovery	3.3

*Source:* Senter Internationaal (2001).

From the preceding discussion, it thus follows that, to promote the sustainability and expansion of the PCF over the long run, China and the World Bank should work together on the price issue. The World Bank is there to promote and demonstrate how the market can work and to help catalyze the carbon market. The Bank has an obligation to react to the concerns of its borrowing clients as well as its lending clients. In the meantime, joining the Host Country Committee of the PCF,<sup>14</sup> China is now able to play a more proactive role in either pushing for PCF projects at a more favourable price or demanding that the offering prices are differentiated according to technology types.<sup>15</sup> This will broaden project types that carbon finance renders viable. After all, the PCF transactions, although they are significant in comparison with the current carbon market, account for only few percentages of the total projected emissions reductions required of Annex I countries. Much work remains ahead to stimulate both demand and supply so as to

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<sup>14</sup> A host country of the PCF projects is entitled to be a member of the Host Country Committee if it has signed a memorandum of understanding or a letter of endorsement with the PCF.

<sup>15</sup> As shown in Table 4, the offering prices of CERs under the Dutch CERUPT program are differentiated according to technology types. Renewable energy projects in general have been assigned with a premium price.

progressively scale up project-based carbon transactions and create liquidity in the carbon market.

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