In 1999, the World Bank launched the Prototype Carbon Fund (PCF), a closed U.S. $180 m mutual fund with private and public participants aimed at purchasing project-based greenhouse gases (GHG) emission reductions (ERs) under the Joint Implementation (JI) and Clean Development Mechanism (CDM) of the Kyoto Protocol. The objectives of the PCF were to pioneer these mechanisms—the rules of which were still to be developed at the time—and to disseminate the lessons learned, so as to demonstrate that JI and CDM could constitute credible and cost-effective ways of mitigating GHG emissions while contributing to sustainable development, and so as to foster the development of the carbon market.

The first part of this program is now well under way. As of the end of 2002, the PCF has indeed signed terms sheets for fifteen projects likely to be validated under JI and the CDM, representing purchases of 10.7 million tons of CO2e of ERs for $38.6 m. The aim of the present note is to examine how the PCF has performed on the second part of its mandate, by systematically reviewing the impact of the knowledge these projects have generated. We first detail the role of the PCF in demonstrating that CDM and JI transactions can be beneficial to both the buyer and the seller of ERs and can remain environmentally secure at the same time. Next, we examine how the PCF has contributed to the development of the carbon market. We then discuss the PCF role in powering developing countries and economies in transitions for future climate negotiations. In conclusion, we come back to the rationale for the World Bank to host this instrument.

Demonstrating How JI and CDM Transactions Can Be Win-Win-Win

The idea that a northern entity could finance “clean” projects in economies in transition or in developing countries and gain emission credits in exchange dates back at least from the early 1990s. The premise was that these transactions would benefit both the buyer, which would find supposedly lower abatement costs in developing countries, and the seller, which would gain additional revenues for its project. Some feared, however, that transactions costs might prove too high. In addition, the environmental credibility of these transactions remained highly controversial: How could one be confident that a project reduced emissions, compared with what would have happened otherwise, if buyer and seller both had an incentive to inflate the volume of ERs they were claiming?

Projects under the Activity Implemented Jointly pilot program, launched in 1995, failed to provide definitive answers to these concerns. In fact, in the absence of third-party validation, the environmental integrity of most of them remained questionable (Michaelowa). In addition, they were driven more by foreign policy considerations than by private sector incentives (Larson and Breustedt), hence considerably limiting the lessons that could be drawn out of them.

The PCF experience sheds light on these issues. First, independent third parties have provided positive validation opinions on the environmental integrity of thirteen PCF projects. The validators have done so, knowing that they run a strong reputation and business risk if their opinion is contradicted by the CDM power.
Executive Board (EB), which, under the Kyoto rules, will certify the environmental credibility of all CDM projects. These counterfactual analyses have also withstood severe scrutiny from various stakeholders during mandatory public consultation periods. These elements suggest that the ERs the PCF claims to have produced in these thirteen projects are very credible.

Second, PCF experience suggests that at the prices it pays, that is, from $3 to $4 per tCO₂e, the attractiveness of carbon finance for sellers varies from sector to sector. Because methane is a GHG twenty-three times as potent as carbon dioxide, and thus priced 23 times as much, projects involving methane ERs benefit greatly. In landfill-gas-based power generation, for example, carbon finance can contribute up to 1.5 cents per kWh to the project and can boost the IRR by five or more percentage points. In this price range, additional revenues from the sale of ERs in traditional renewable energy projects are more modest, usually ranging from 0.25 to 0.50 cents per kWh. They depend, of course, on the carbon intensity of the power generation source that is displaced. For example, they are usually high if coal-based power or diesel generators are displaced but are much lower in grids with a lot of hydroelectric capacity.

In addition, there is often a tension between the project sponsor’s need for upfront money to pay for capital costs and the buyer’s willingness to pay only on delivery to limit risk exposure. In some instances, the fact that carbon finance provides revenues in hard currency (U.S. dollars in the case of the PCF), backed by unconditional promissory notes, has provided a way to bridge this gap, as the project sponsor was able to use the carbon purchase agreement as a collateral to leverage financing that otherwise would not have been available. However, extensive outreach to banks and financial institutions is necessary if this model is to be generalized.

On the buyer side, PCF projects show that it is possible to find high-quality ERs in both economies in transition and in developing countries at prices around $3 to $4 per tCO₂e. They also suggest that the transactions costs associated with the creation and validation of ERs usually remain below $300,000 and thus have limited impact on large-scale projects (less than 10% for a $3 m carbon purchase, or 1 MtCO₂e at current prices). Overall, these costs are substantially lower than the domestic abatement costs expected, and, increasingly observed, within OECD (e.g., domestic allowances on the U.K. market currently trade at about $17/tCO₂e, and EU-wide allowances are expected to trade around $10–$12/tCO₂e).

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In short, PCF projects strongly support the idea that it is possible to find win-win situations—where carbon is provided at prices attractive both for a buyer and a seller, and the environmental integrity of the transaction is preserved—in a wide range of countries and for a wide range of technologies. While doing so, the PCF also provides other players in the market with tools and best practices on how to achieve this goal. As confidence in JI and CDM increases among stakeholders, these nuts and bolts contributions (e.g., on baselines, monitoring and validation protocols, financing structures, or legal issues) probably become the single most valuable output of the PCF, as they help reduce the costs for new entrants.

Developing the Carbon Market

As noted above, the stated purpose of the PCF is broader than “merely” increasing confidence in CDM and JI. As its second annual report puts it, the PCF in fact intends to use the knowledge it draws from its transactions to help “catalyze the carbon market.” This implies contributing to the definition of the regulations governing JI and CDM, and stimulating both demand and supply so as to progressively create liquidity in the market.

PCF’s key contribution to this endeavor was, and still obviously is, to do its core job—that is, to demonstrate through project implementation that such transactions are not only possible but also attractive for both buyers and sellers, with environmentally very secure assets. But this is not sufficient. To inform negotiators, lessons learned must be distilled, formatted, and actively disseminated. Similarly, to stimulate demand and supply, the PCF must reach out to private and public decision makers in the South and in the North.

This is a task on its own, which only partly overlaps with normal business operations. To
do so, the PCF has developed three dedicated vehicles. First, it has built a website, where more than 450 documents are now posted. This site has received an average of 173 connections a day over the past twelve months, with more than 5,000 users connecting more than once. Second, the PCF has set up PCFplus, a $1 m/year facility to provide capacity building, outreach, and research around PCF projects. Interestingly, PCFplus is funded by the interests on the contributions to the PCF that three public participants and one private participant have put upfront. Last, the PCF team is present in person at various conferences and workshops, including Conferences of the Parties to the U.N. Framework Convention on Climate Change (UNFCCC). And on top of these specific instruments, 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. We come back to this point in the following section.

What has been the impact of this outreach effort? In terms of regulations, the PCF has extensively shared knowledge with Parties to the UNFCCC and with the EB. The impact on the rules themselves is difficult to assess, but PCF was certainly influential by helping Parties to think through the practical implications of the rules and regulations they were drafting. In addition, under the case law approach of the CDM EB, decisions on PCF projects will be precedent that will guide future projects. Last, the PCF is increasingly engaged in discussions with other market players, such as intermediaries or brokers.

In terms of supply of project-based ERs, PCF’s influence is clear. It has been the first player to actively seek emission reduction projects on a wide scale in transition economies and in the developing world. The number of project ideas received by the PCF has grown steadily, with an increasingly large set of sectors and countries represented. Interest in carbon finance has also been raised by numerous workshops organized by PCFplus, with 516 different attendees from developing countries or economies in transition as of October 2002. The resulting supply is not captive to the PCF, as project sponsors contact the other emerging sources of carbon finance as well.

On the demand side, the impact of the PCF is more difficult to assess. Some of the participants in the PCF have used the experience they have gained through the instrument to set up their own carbon operations. For example, the Government of the Netherlands consulted extensively with the PCF regarding carbon purchases and have established a facility with the unit managing the PCF to purchase ERs on their behalf, and Mitsubishi Corporation has invested in carbon broker Natsource Japan. But the bulk of the demand for ERs in the near term is likely to come from regional, national, and subnational grassroot regulations setting caps on domestic entities emissions and allowing for project-based ERs (e.g., in the U.K., Norway, the EU or in some U.S. and Canadian states). The impact of the PCF pioneering activities on these regimes is unclear.

A sobering fact, however, is that despite low prices, perceived country and business risks remain strong barriers to investment by private entities in JI and CDM transactions, especially in less-than-middle-income countries (on average, at current prices, noncarbon revenues still represent 80% of project total revenues). Unless a company has substantial direct core business investment that can carry carbon assets, it is unlikely that it would invest in a project in developing countries or in economies in transition to buy ERs. Lecocq and Capoor show that, from January 2001 to mid 2002, only 13% of the ERs purchased by the private sector were coming from developing countries, quasi-exclusively from middle-income ones, and none from economies in transition. This suggests that there is a continued role for the World Bank and other development institutions to keep acting as brokers and help manage these risks, especially in low-income countries or in rural regions of richer ones.

Facilitating Further Negotiations on Climate Change

Beyond raising confidence in JI/CDM and stimulating the early carbon market, the PCF facilitates future negotiations on climate change by providing two key assets. First, the fact that the PCF publicly discloses prices provides, indirectly, a rare insight to the abatement costs in developing countries. This is all

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3 The number of project ideas received by the PCF was 43 on 1 September 2000, 125 on 1 September 2001 and 238 on 1 September 2002.

4 Precisely, prices paid by the PCF provide a higher bound for abatement costs.
the more valuable, given that private players undertaking transactions have no incentive to make prices public. Quite the contrary is true, as they run the risk of revealing their willingness to pay and thus harm their negotiating position, should they enter in subsequent carbon deals or negotiate climate policies with government.

This is important because climate change is characterized by tremendous uncertainties surrounding both the impacts of global warming and the costs of abatement. In a quantity-based regime, as Weitzmann has noted, all the uncertainty falls on mitigation costs. This is one of the key reasons why key constituencies such as the United States are reluctant to commit to targets. Better information on abatement costs would reduce uncertainty on the costs of a given target and would limit the risks of strategic use of uncertainty, therefore helping the negotiation. However, the contribution of the PCF in this regard cannot but be limited, compared with the size of the task.

The PCF also contributes to future negotiations by reinforcing climate-related institutions in developing countries. Under the Kyoto Protocol, these countries are indeed exempt from binding GHG targets. However, their emissions, too, will ultimately have to be cut down if we are to achieve the UNFCCC’s ultimate objective to “stabilize GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.” Given the potentially large economic consequences of accepting binding commitments, it is important for countries in the developing world to build strong teams to negotiate to the best of their interests. However, the size of the delegations at previous Conferences of Parties, a good proxy for negotiating power, still too often reflected the countries’ level on the per capita GDP scale.

The process of preparing, negotiating with, and agreeing on a project with the PCF helps the host country think through the implications of CDM and JI, and thus climate policies in general, and also helps it set up the minimal institutional requirements to effectively process deals. This includes, among others, making a decision on whether or not to ratify the Kyoto Protocol, designating a national authority to ensure that CDM projects are indeed in line with national sustainable development goals, and going through the legal issues involved in the transfer of the (sovereign) emission reduction credits. This institutional learning-by-doing leaves countries better equipped to understand what JI and CDM mean for them and therefore helps them defend their interests in climate negotiations. However, PCF experience also suggests that for that learning to be sustainable, some form of follow-up after the deal is completed is required.

Conclusion

Overall, the PCF expects to purchase at least 30 MtCO$_2$e, and the projects that it will support may generate about three times that volume.$^5$ Although significant compared with the current carbon market (157 MtCO$_2$e transacted from 1996 to mid 2002, according to Lecocq and Capoor), this is nowhere near the efforts OECD countries will have to make to meet their Kyoto targets. PCF’s key contribution to the climate change issue is thus not so much the amount of ERs it produces but, rather, the learning-by-doing it provides, which we have argued has raised confidence in JI and CDM, helped develop the carbon market, and, hopefully, contributed to the empowering of developing countries and economies in transition for future negotiations. In short, the PCF is for early climate regimes what Kyoto should be for long-term global climate policies: A learning-by-doing instrument.

By investing in the PCF at its outset, PCF participants took a huge risk by going ahead without knowing whether Kyoto or another scheme would come into force, and without knowing whether their ERs would be eligible under any of these regimes. Although they clearly had other motivations, it is likely that a fund like the PCF would not have emerged as early in the process had the World Bank not stepped in. Unique expertise in financing all types of projects across developing countries and economies in transition, strong working relationships with governments in these countries, and the capacity to attract both private and public partners, among others, have played a significant role in convincing potential participants.

And in retrospect, the World Bank’s investment seems to have paid off. First, in exchange for a limited quantity of seed money, a large share of which has been repaid, the World Bank has channeled $180 m of additional resources—without a private to public

$^5$ The PCF usually buys only part of the ERs stemming from its projects.
sector ratio of two to one—that have helped to leverage significant investment in clean energy, waste management, or land-use change projects in its client countries while contributing to climate change mitigation. But more important, if confidence in JI and CDM can be raised and conditions for the market to develop can be met, a potentially much larger volume of carbon finance could flow to developing countries and economies in transition.\footnote{Beyond 2012, the carbon market could reach at least several billion dollars per year. Although the Kyoto rules do not allow Parties to purchase ERs with ODA, nothing prevents them, over time, from shifting resources from ODA to carbon budgets. Still, in a context of declining ODA, carbon finance constitutes a bonus. In addition, it is expected that a part of Parties’ commitments under the Kyoto Protocol will be passed on to the private sector through taxes, allowances, or other schemes. As a result, carbon finance is likely to come for a large part from private sources.}

We have argued that though much work remains, the PCF appears on track to meet this objective.

**References**


