

Proposal for a Global Environment Facility (GEF) Technology Risk Guarantee Mechanism¹

NAUTILUS INSTITUTE

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1. Introduction

Adoption of new technologies involve taking some degree of risk to project sponsors particularly in the event that the new technology is not tested at commercial scales. Accordingly governments often provide support from public funds to encourage application of new technologies. Allocation of public funds to technology promotion is further justified in case where the application of the new technology is likely to bring some social benefits. For example the governments of the United States and Japan provide substantial support to promoting technologies which result in reducing local, regional and global environmental impacts of energy supply and consumption. The support from these governments has been in recent years extended to adoption of new environmental friendly technologies in emerging economies. In addition to the US and Japanese government, many multilateral institutions are also seeking ways to support the application of environmentally friendly technologies. However, most these efforts concentrate on information dissemination and occasionally compensating the project agency for the higher cost of the new technology as compared with the traditional (default) technological options.

A rather distinct aspect of application of new technologies is the incremental risk of using these technologies. The incremental risk refers to the possibilities that project may have cost over-runs, or may fail to operate at the projected levels of efficiency and availability. These risks, though categorized as “commercial”, are often out of control of project sponsors. Thus, project sponsors do not want to take this type of risk. At the same time most financiers do not wish to engage in projects which are likely to have unmitigated commercial risks.

The present note proposes that the Global Environmental Facility (GEF) can be utilized as a source of risk mitigation for energy technologies, which are likely to reduce the global environmental impact of energy supply. More specifically the paper proposes that for each project the GEF support can be allocated to a guarantee facility which would be drawn upon only if certain aspects of project construction, and performance do not meet the projected standards and only if these shortcomings are due to the unforeseen aspects of the new technology.

2. The Global Environment Facility (GEF)

The Global Environment Facility (GEF) was created to fulfill a unique niche—that of providing financing for programs and projects to achieve global environment benefits in four focal areas: climate change, biodiversity, international waters, and ozone layer depletion; and in land degradation, primarily desertification and deforestation, as they relate to the four focal areas.

The GEF provides grants and concessional funding to recipient countries for projects and programs that protect the global environment and promote sustainable economic growth in the above four focal areas. GEF, originally set up as a pilot program in 1991, was restructured and replenished with over US\$ 2 billion in 1994, to cover the agreed incremental costs of activities related to the four focal areas. Both the Framework Convention on Climate Change and the Convention on Biological Diversity have designated the GEF as their funding mechanism on an interim basis.

GEF projects and programs are managed through three implementing agencies: the UN Development Programme (UNDP), the UN Environment Programme (UNEP), and the World Bank. The GEF Secretariat, which is functionally independent from the three implementing agencies, reports to and services the Council and Assembly of the GEF.

Currently 156 countries are participants in the GEF. Countries may be eligible for GEF funds in one of two ways: (1) if they are eligible for financial assistance through the financial mechanism of either the Climate Change Convention or the Convention on Biological Diversity; or (2) if they are eligible to borrow from the World Bank (IBRD and/or IDA) or receive technical assistance grants from UNDP through a Country Programme. A country must be a party to the Climate Change Convention or the Convention of Biological Diversity to receive funds from the GEF in the relevant focal area. GEF projects must be country driven, incorporate consultation with local communities and, where appropriate, involve non-governmental organizations in project implementation.

Since its inception, the GEF has accumulated substantial experience in grant funding of public sector activity, especially activities that reduce greenhouse gas (GHG) emissions. It is now in the process of investigating and operationalizing non-grant modes of supporting commercial sector activity.

The technology risk guarantee mechanism proposed in this paper is one example of such a non-grant mode of financing. GEF's mandate enables it to take certain commercial risks, particularly those related to technology transfer and demonstration projects. That the technology risk guarantee mechanism described here fits under the GEF mandate is illustrated in the following quote from the World Bank's *Energy and Environment Strategy*, September 1998:

“GEF resources have enabled the Bank to support technologies and techniques that, at their present costs of production or deployment, would not otherwise meet present Bank economic investment criteria. The GEF has also enabled the Bank to overcome real or perceived risks, both internal and existing in client

countries, that have limited the willingness to engage in new forms of energy lending. Finally, and perhaps as important as its dollar resources, the presence of GEF has provided a rationale for doing things that would otherwise not find support in a relatively conservative banking environment.”

In addition, a strong recommendation to pursue non-grant forms to leverage private sector financing comes from the GEF’s “Overall Performance Study” (December 1997):

“GEF should seek to identify techniques for reducing the risk for private investors to participate in GEF projects. For example, instead of using GEF funds to pay part of the principal cost of projects, consideration should be given to using them in the form of loan guarantees. This recommendation does not suggest that a portion of normal GEF funds be set aside for loan guarantees. Instead, the use of GEF funds in the form of loan guarantees should continue to be based on approval by recipient countries.”

There are two major benefits of a technology risk guarantee mechanism. First, the funding of a project related to an environmentally-friendly yet non-commercial technology may lead to future repeating projects. This could reduce the cost and increase the availability of the technology. Second, the money in the guarantee fund may not be disbursed. It would be then returned to the GEF or used in other demonstration projects.

There is a precedent for using the GEF resources in a guarantee mechanism. In 1997, the GEF provided \$5 million to an energy efficiency program in Hungary. The money was used to provide partial credit guarantees to support energy efficiency transactions by other financial intermediaries. The guarantee mechanism is, in this case, managed by the International Finance Corporation (IFC). When a guarantee is made, the program money is reserved dollar-for-dollar to cover the guarantee liabilities. At the end of the program’s life, remaining funds will be returned by the IFC to the GEF unless another approach is warranted and approved by the GEF Secretariat.

3. The Technology Risk Guarantee Mechanism

One of the rationales of the technology risk guarantee mechanism is that incremental costs and incremental risks of a proposed technology, assuming it fits GEF support criteria, could be substantially reduced after implementation of several demonstration projects related to the technology.

In order to provide incentives for implementing a demonstration project, a government and the international aid community need to provide financial support for: (a) dissemination of relevant information; (b) preparation of the project (e.g., commissioning of feasibility studies); and (c) investment in constructing the demonstration project. The GEF technology risk guarantee mechanism applies to the third item—investment in the first demonstration project(s).

The technology risk guarantee mechanism would be established in order to compensate for the additional risks involved in the construction and operation of the new technology. This mechanism would remain as a contingent fund and would not be disbursed if the construction and operation proceed according to the plan. The transaction arrangements of the guarantee mechanism would be designed considering the requirements of the project sponsors and financiers.

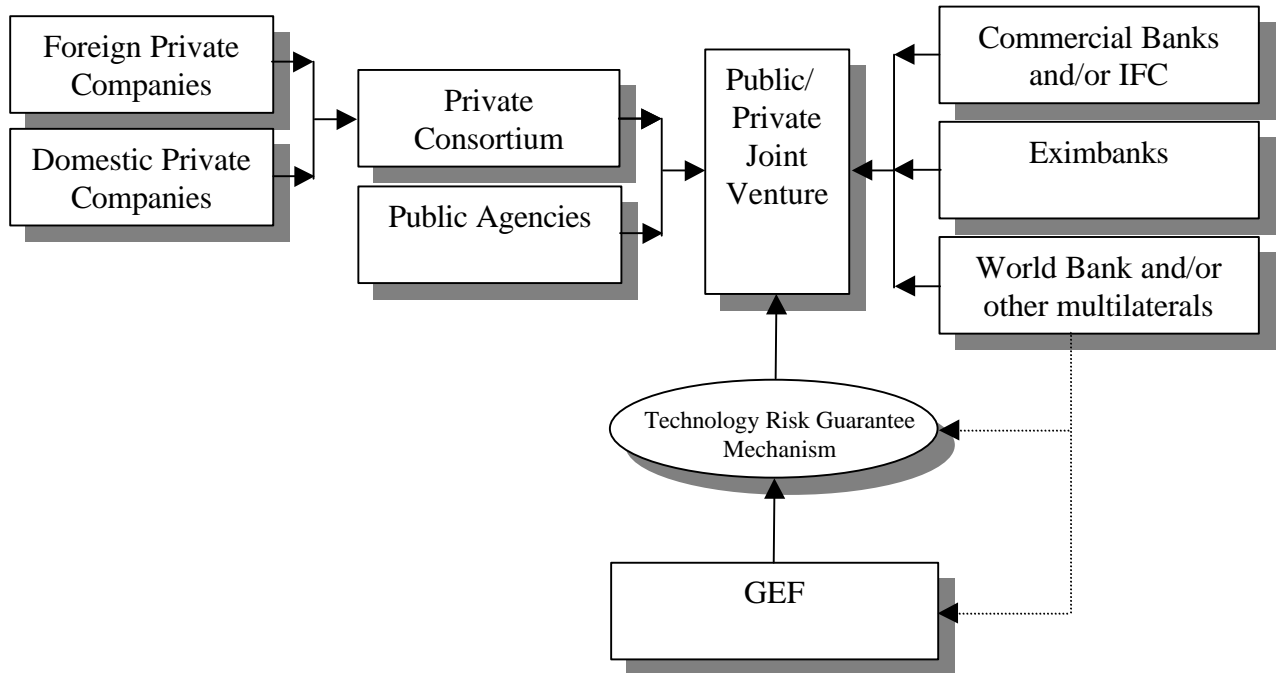
The following are the steps to financing a project utilizing the proposed technology risk guarantee mechanism:

- (a) First, the ownership structure of the demonstration project is determined. In order to identify the potential agencies for direct financial support and the guarantee mechanism, the design of the project ownership structure must first be decided. Project ownership can be wholly public or private, and in the latter case can be wholly domestic or foreign. Each type of ownership brings in certain advantages. Complete public ownership is not viewed as desirable because of potential inefficiencies and the burden on the government budget. However, a certain degree of public participation may facilitate access to bilateral and multilateral support. In contrast, a complete private ownership ensures efficient construction and operation of the plant but would limit the project's access to government support and thereby the assistance from official aid agencies. Thus, a joint venture between public and private sector represents the most suitable ownership structure.
- (b) The technology risk guarantee mechanism is funded by the GEF.
- (c) With the support of the government where the project will be undertaken, the World Bank and/or another multilateral agencies are asked to provide loan(s). The participation of these agencies will provide the required financial support and also facilitate participation of other financiers.
- (d) The World Bank or other multilateral agencies are asked to manage the guarantee mechanism. A general concern would arise regarding the possibility of abusing the mechanism. That is, project participants may revert to the mechanism too easily to bail themselves out of normal financial challenges. The management of the mechanism by the World Bank or another multilateral agency would provide comfort to the project participants and the GEF that the mechanism would not be withdrawn unless under the envisaged contingent conditions.
- (e) Eximbanks are asked to provide the balance of the financial requirements. These banks provide loans for purchase of equipment and services supplied by their own nationals.
- (f) Commercial lenders are asked to fill the remaining financial gap if any. These financiers would come in easily if multilaterals and bilaterals are already participating and a guarantee mechanism is included in the financing scheme. Should the financial gap be

large, project sponsors may approach the IFC to provide financial support from its own resources and to mobilize funds from commercial lenders.

The hypothetical financing scheme outlined above is shown in Figure 1.

Figure 1: Hypothetical Financing Scheme Incorporating the GEF Technology Risk Guarantee Mechanism



4. Specifying Technological Risk

The primary tool guiding GEF funding activity is incremental cost analysis. Incremental cost analysis has evolved through the GEF’s Program for Measuring Incremental Costs for the Environment (PRINCE). PRINCE includes methodology development, case studies, and dissemination of findings. To fully address commercial sector concerns, incremental cost analysis can also include assessment of incremental risks. Incremental risks are those which inhibit commercial actors from undertaking a given project and which cannot be mitigated by mechanisms typically found in conventional project development. Incremental risks are often apparent in the form of “financing gaps” in otherwise environmentally beneficial projects.

One such incremental risk is technological risk, i.e., the risk that an unproven technology may not perform to expectations.

A general concern with regard to a technology risk guarantee instrument is that it may be abused. That is, project participants may revert to the guarantee mechanism too easily to bail themselves out of normal financial challenges. Thus, the institutional arrangement needs to be designed so that the guarantee mechanism remains as the source of last resort and that project participants revert to the mechanism only if there is a clear failure with the new technology. The legal structure of the mechanism should spell out the conditions under which a contingency can be declared and resources withdrawn. It is also important to have the World Bank or another multilateral agency such as the Asian Development Bank (ADB) play a central role in managing the guarantee mechanism. Such an arrangement would provide comfort for project participants, and also for the GEF to provide the financial resources for the guarantee mechanism.

Clearly, construction of a plant in a developing country faces a host of political and commercial risks. The proposed GEF guarantee facility should concentrate only on covering the following risks:

- (i) the construction cost over-run which is not due to the negligence of the involved parties but due to the unforeseen aspects of the new technology.
- (ii) the failure or shortcoming of the constructed plant to meet the standards of thermal efficiency and availability.

In order to design and determine the size of the guarantee facility, one should assess the incremental costs and incremental risks associated with the proposed technology compared with the “base” option. Thus, one should first calculate the per unit cost of output using projected streams of capital and operating costs. Then for each (new and base) technology one would need to estimate the risk margin by introducing the worst case scenarios for each technology.

As an example, we have assessed the incremental cost and incremental risk of constructing a 500 MW IGCC plant versus a conventional coal-fired power plant in China. The calculation shows that*:

- (i) an IGCC project in China would generate power at the cost of $\text{¢}45.8/\text{kwh}$ while a conventional coal-fired power station would supply power at the cost of $\text{¢}4.4/\text{kwh}$. That is, incremental cost of the IGCC is 32%.
- (ii) the IGCC plant would be exposed to a level of commercial risk, which is 23% higher than that of a conventional plant.

These figures when translated into the capital requirements imply that the IGCC plant would cost some \$70-80 million more than the conventional plant. In addition, some \$40-50 million contingent fund would be needed to meet the consequences of the incremental risks of the

* See “Financing Clean Coal Technologies in China,” the Nautilus Institute’s background paper for ESENA Workshop, February 1999

IGCC plant in the event that these risks materialize. Thus in order to promote the IGCC plant, the government of China and the international community should provide some \$70-80 million grant to compensate project sponsors for the incremental cost; and there should be some guarantee facility to provide for failures in construction and operation performance which are due to the transfer of the new technology. In this example the GEF funds would be used to set up such a guarantee facility.

5. Conclusion

The GEF is currently exploring non-grant financing instruments. This paper proposes one such innovative financing mechanism appropriate for the GEF—a technology risk guarantee mechanism. This mechanism will build off of early experimentation by the GEF with loan guarantees.

The Nautilus Institute seeks to investigate the feasibility and viability of the proposed technology risk guarantee mechanism through its application to a specific project that meets GEF support criteria. The usefulness of the mechanism will be tested in the context of developing a financing package for China's first IGCC power plant to be built in the city of Yantai in Shandong province in China.

¹ Information in this briefing paper was drawn from the following sources: “Financing Clean Coal Technologies in China” (1999) by Hossein Razavi and the staff of the Nautilus Institute; a draft report “The Use of Non-Grant Mechanisms as an IC-Financing Modality in GEF-Sponsored World Bank Projects” (29 September 1998) prepared by the GEF; “Operational Strategy” (1996) by the GEF; and interviews with various individuals in the GEF, World Bank, and IFC.