

**OPERATIONAL PROGRAM NUMBER 6**  
**PROMOTING THE ADOPTION OF RENEWABLE ENERGY**  
**BY REMOVING BARRIERS AND REDUCING IMPLEMENTATION COSTS**

6.1 The United Nations Framework Convention on Climate Change (UNFCCC) seeks to stabilize atmospheric greenhouse gas (GHG) concentrations at levels that would prevent dangerous anthropogenic interference with global climate. Clearly, this stabilization will require greatly increased utilization of renewable energy technologies (RETs). In fact, widespread application of RETs offers some of the best prospects for achieving deep reductions in greenhouse gas emissions at the global level over the next century, while satisfying some of the increased demand for commercial energy. The Operational Strategy of the GEF puts initial emphasis, among others, on three Operational Programs that address long-term program priorities of the Convention to mitigate climate change. This, the second of these three Operational Programs, seeks to reduce GHG emissions associated with energy consumption and production through increased use of already commercially viable RETs.

**GUIDANCE**

6.2 At its first meeting, the Conference of the Parties (CoP) of the UNFCCC asked the GEF, as the interim operating entity of the financial mechanism...

...to adopt a mixed strategy wherein projects will be selected with a double set of program priorities as described in paragraph 9(c) of the [GEF] report, that is, if they meet either one of the long-term program priorities or one of the short-term program priorities.

6.3 The CoP also provided the following initial guidance that the GEF, as the interim operating entity of the financial mechanism of the Convention, should support agreed activities in Parties not included in Annex I to the Convention<sup>1</sup> that:

- (a) are country driven and in conformity with, and supportive of, national development priorities;
- (b) are consistent with and supportive of internationally agreed programs of action for sustainable development;

---

<sup>1</sup> When the GEF provides assistance outside the Convention's financial mechanism, it will ensure that such assistance is also fully consistent with the guidance provided by the CoP.

- (c) transfer technology that is environmentally sound and adapted to suit local conditions;
- (d) are sustainable and lead to wider application;
- (e) are cost-effective;
- (f) strive to leverage other funds; and
- (g) mitigate climate change.

## **PROGRAM OBJECTIVES**

6.4 The objectives of this Operational Program are to:

- (a) remove the barriers to the use of commercial or near-commercial RETs; and
- (b) reduce any additional implementation costs for RETs that result from a lack of practical experience, initial low volume markets, or from the dispersed nature of applications, such that economically profitable “win-win” transactions and activities increase the deployment of RETs.

6.5 Many applications of RETs already have become lower-cost options than fossil-fuel alternatives, or would be if implementation costs could be lowered by technology transfer or sharing of practical experience and by market development. This means that these renewable energy options can be deployed profitably today in a wide-range of applications, particularly those in remote and rural areas where demand densities do not justify electrical grid extension.

6.6 To date, the adoption of these technologies in commercially viable applications has been slower than desirable from the perspective of mitigating climate change. It also has been considerably slower than might be expected based upon technology development and a *prima facie* evaluation of relative costs. This lag in the adoption of RETs is frequently attributed to the existence of barriers of many types -- all of which can prevent seemingly profitable market transactions from taking place.

6.7 This Operational Program shares with Operational Program Number 5 its design and the programmatic objective of removing barriers to market-oriented transactions. Both of these programs are intended to lay the foundation for increased

public and private sector investments that also result in mitigating potential climate change.

6.8 In some applications and resource conditions, RETs are not yet cost-competitive with conventional energy supplies. These cases are the objective of GEF Operational Program 7, “Reducing the Long-Term Costs of Low Greenhouse Gas-emitting Energy Technologies.”

6.9 The programmatic global benefits will result from the combined effects of the continuous and sustainable deployment of RETs in a specific market following the removal of barriers. These benefits can be estimated by the reductions in greenhouse gas emissions that were averted as a result of this deployment. Programmatic benefits also can result from structured learning. The effectiveness of this learning is estimated by more qualitative performance indicators. Meeting the overall programmatic objectives depends however on two key assumptions, which concern **scope** and **replication**.

### **Scope**

6.10 The first assumption is that successful outcomes will be achieved in many of the various major market applications for RETs. A market application is defined by both the economic sector (for example, households, agriculture, commercial buildings, industries, etc.) and a specific RET. Some RETs will be more appropriately applied in certain economic sectors rather than others. Initially, the following seven market applications of RETs in specified economic sectors will offer opportunities for cost-competitive renewable energy and GHG emissions reduction, as identified both by scientific studies and by practical experience:

- (a) wind pumps for mechanical water pumping for agriculture and domestic water supply;
- (b) low-temperature solar thermal heat for household and agricultural sectors;
- (c) biomass and geothermal heat, including combined heat and power, and use of urban and industrial wastes for process heat and district heating;
- (d) wind, biomass, photovoltaics, small-scale hydro, and other renewable energy for rural electricity supply;
- (e) renewable energy for grid-connected electricity (e.g., wind farms);
- (f) storage systems (e.g., batteries) for cost-effective but intermittent renewable energy supplies; and

- (g) biogas digesters for lighting and water pumping (family-size digesters for home lighting and cooking; community-size digesters coupled with engines and electric generators for water pumping, lighting, and village power needs).

6.11 This program, however, will maintain flexibility to consider new applications, as the commercial range will increase over time as technology costs fall further.

## **Replication**

6.12 The second key assumption is that a successful market application in one country will be replicated widely in other countries where the same RET market applications have significant GHG-reduction potential. Therefore, to the degree possible, the designs of the mechanisms chosen to remove barriers should be replicable to other markets.

## **EXPECTED OUTCOMES**

6.13 A successful outcome is one where particular least-cost, win-win renewable technologies have become financially sustainable in a recipient country market.

6.14 The indicators of overall financial sustainability of renewable energy technologies will depend on the sub-sector and the barrier-removal measure. One indicator could be “market share for a renewable energy technology in a specified application” and it may therefore be possible to estimate the programmatic cost-effectiveness of GEF measures by the *increase* in market share resulting from each unit of GEF resources expended.

6.15 One key assumption for getting the desired outcome is that the sum of the outputs of the various GEF projects and other specific activities will be sufficient to open and sustain the market for particular renewable energy technology application. In any given market, all the major barriers must be removed for RETs to be available on a sustainable basis. The associated risks to cost-effectiveness of GEF operations are the following:

- (a) identified barriers are not removed but only surmounted temporarily. To address this risk, the project proposal would attest the sustainability of “win-win” projects after GEF support has ended, including demonstrations that appropriate cost recovery mechanisms would be established and mainstream financing facilitated. Moreover, projects

should take an approach that stresses continuity of institutional capacities developed;

- (b) only some barriers are removed. Achieving program objectives requires removal of several interrelated key barriers. Development assistance experience clearly shows that technology demonstrations by themselves are not sustainable. Provision of hardware alone, while useful for reducing perceived or real uncertainties, will not create the necessary incentives or cost-recovery mechanisms. Hardware should only be provided where technology demonstrations can achieve clear benefits, such as reduced uncertainties over costs, performance, and market acceptance. Demonstrations can help in resolution of institutional issues associated with a new technology, and with the development of a maintenance and service infrastructure. Production capability, access to financing, stakeholder partnerships, information channels, marketing and distribution systems, and institutional capacities are all parts of a properly functioning market;
- (c) some of the measures identified as barrier removal activities may not in fact be barrier-removal activities. Minimizing the third risk would require more careful scrutiny of the project proposals by the technical reviewers, STAP, and the GEF Secretariat; and
- (d) when a demonstration project is executed for a specific business enterprise, conditions for competition may be distorted between this particular enterprise and other enterprises in the same industry. This risk can be minimized by a sufficiently broad specification of the technology and an open bidding process for procurement.

6.16 A major risk to sustaining outcomes, one that is inherent in all of the GEF's long-term Operational Programs in climate change, is a fall in international prices of fossil fuels that reduces the economic potential for the supported measures.

## **PROJECT OUTPUTS**

6.17 The output of a GEF-supported project in this Operational Program will be the removal of a barrier to a particular renewable energy application, possibly a barrier resulting from high implementation costs. Not all barriers will be equally important in a given setting nor will the removal of all of them incur the incremental cost financing that the GEF provides.

6.18 The indicators of barrier removal are at the project level and depend on the barrier being removed. For example, a survey may be needed to show that the requisite skills have been transferred, movement in prices relative to economic costs may need to be tracked, or information on measures of credit availability may need to be collected.

## **GEF ACTIVITIES**

6.19 GEF activities in this Operational Program will remove identified barriers to and reduce implementation costs of renewable energy technologies in a specific market. There are many mechanisms that can be implemented to remove specific barriers or clusters of barriers to renewable energy, depending upon the market and the specific identified barriers in the local context. Often these mechanisms work in tandem such that a combination of factors ultimately leads to real investments. Mechanisms will vary greatly depending upon the technology in question and also must be tailored to the specific social, political, economic, and institutional contexts in each country or region.

6.20 In order to increase the cost-effectiveness of GEF operations, country-driven opportunities in each of the RET applications listed in paragraph 9 will be initially emphasized where:

- (a) national communications and or other sources provide information about country priorities and about opportunities in, and barriers to, renewable energy;
- (b) conducive sectoral policies increase the likelihood of sustainability of win-win projects and the wider replicability of barrier removal activities; and
- (c) most significant potential for cost-effective RET applications exists.

6.21 GEF assistance will provide more sustainable benefits in those markets where severe energy price and other distortions do not tilt the playing field against RETs. A macroeconomic and policy environment that allows and encourages fair competition is desirable for removing barriers to renewable energy. Renewable energy technologies should not be penalized by special taxes or by subsidies provided to competing fossil technologies. Regulations allowing for independent power producers are also helpful.

6.22 GEF activities would be coordinated with past, ongoing, and prospective work of the Implementing Agencies (in both their GEF and non-GEF capacities) and others to avoid duplication and ensure cost-effectiveness. Project designs and activities should:

- (a) build upon GEF experience and projects;
- (b) be consistent and mainstreamed with existing implementing agency programs; and
- (c) build upon other bilateral and multilateral technical assistance and investment activities.

6.23 In preparing projects, implementing agencies can draw upon existing GEF experience, as well as implementing agency research studies and project preparation activities. In particular, UNDP/World Bank ESMAP studies are relevant to understanding markets for renewable energy in a large array of countries. The generic barriers to the adoption of renewable energy are similar to the barriers to energy efficiency and conservation that are listed in Table 1 of Operational Program number 5. Each barrier removal measure would require a different mix of the following standard GEF modalities:

- (a) targeted research (resource endowment, adaptation to suit local conditions);
- (b) capacity building (e.g., in financial evaluations);
- (c) institutional strengthening (e.g., in establishing a regulatory framework);
- (d) investments (demonstration projects); and
- (e) training (to operate and maintain demonstration sites).

6.24 Each project proposal in this Operational Program would show how activities of the Implementing Agencies would be coordinated and:

- (a) assess the economic scope in specified markets for “win-win” renewable energy projects on the basis of renewable energy resource data and cost data for the RET and the alternatives;
- (b) estimate the contribution that fulfilling the full scope of the project would make to mitigating greenhouse gases;
- (c) identify all key barriers, including high implementation costs and energy price distortions;

- (d) estimate the extent to which barriers hamper cost-effective implementation;
- (e) propose specific measures to remove barriers, specify priorities for those barriers that will be removed with GEF financing and estimate their costs;
- (f) demonstrate appropriate cost recovery and hence sustainability after GEF support for removing barriers and reducing implementation costs has ended; and
- (g) determine how the programmatic benefits will be monitored and evaluated.

6.25 The effectiveness of particular activities in capacity building, institutional strengthening, information dissemination, etc., would be monitored by performance indicators appropriate to that activity (project completion reports, use of best practices, and of efficient use of resources).

6.26 Another key assumption is that money can effectively be spent to remove barriers. Despite some experience gained by the Implementing Agencies from barrier removal activities in the pilot phase, assistance for barrier removal is a newly emphasized endeavor for the GEF and comes with the risk associated with any new endeavor. This risk will be minimized through structured learning from experience.

## **PUBLIC INVOLVEMENT**

6.27 It is one of ten basic operational principles for the GEF that its projects will provide for consultation with, and participation as appropriate of, the beneficiaries and affected groups of people. For instance, the development of micro-grids, whatever their primary source of energy, requires a significant level of community consensus and support regarding such factors as billing, service, and organization. Local participation is a key ingredient in the design of such isolated systems, in their implementation, and in their day-to-day operation. The forms and degree of participation will vary; some technologies may require communities to act in concert, as with small-scale community energy systems, while other technologies require participation of electric utility companies, large industrial enterprises or agricultural interests, or professionals like architects. The GEF Council approved a paper on *Public Involvement in GEF-financed Projects* that defines the procedures for information dissemination, consultation, and stakeholder participation in projects funded by the GEF.



## **RESOURCES**

6.28 A barrier removal project typically takes three or more years to implement, and its resource requirements will depend mainly on the technology but also on the market and the particular barriers to be removed. In this Operational Program, initial activities are expected to be financed over a period of 10 years or more, with outcomes monitored for up to 20 years. The GEF's role is in removing barriers to the widespread dissemination of least-cost renewable energy technologies. While the GEF is available to meet the incremental costs of removing these barriers, other financiers are expected to meet the costs of renewable energy programs once the barriers have been removed and the markets for RETs are open. The required GEF resources for this Operational Program are estimated to be in the range of US \$ 100 to 150 million per year for the next 5 to 10 years, but further work will be undertaken on the longer term resource requirements.