

## CATALYZING TECHNOLOGY TRANSFER

Developing countries can leapfrog pollution-producing energy use and apply clean energy solutions, such as renewable energy, when climate-friendly technology is successfully transferred. Through its climate change projects, the Global Environment Facility (GEF) seeks to catalyze this technology transfer, particularly by providing information, creating an enabling environment that strengthens local capacity, and jump-starting the local markets for these technologies.

Since its inception, the GEF has supported projects to develop and transform markets for more than two dozen technologies in over 130 countries. GEF projects have not only helped assess the barriers that prevent local markets from using new climate-friendly technologies and practices—they have also helped formulate and implement strategies to remove these barriers.

GEF interventions are designed to have lasting positive impacts on technology transfer and diffusion. For example, GEF financing helps introduce climate-friendly technologies that are equally or more cost-effective than nonclimate friendly technologies, even in cases where they are not known or available in developing countries.

### SCALING UP

Many GEF projects aim to bring about large-scale technological changes in energy use. In some cases, regional approaches have been adopted to benefit from shared circumstances and economies of scale. For example, the regional program for mini- and micro-hydropower in francophone Africa will help support a regional technology center. The program is designed to strengthen the

South-South transfer of knowledge and technology, and the regionwide build-up of technology capacity, as well as regional access to technology information and best practices.

In addition, the GEF supports activities to promote innovation at the national level and market aggregation at the global level, even for those technologies that are currently too costly but have the potential to become cost effective. The GEF has developed a conceptual framework for technology transfer based on different types of barriers, such as lack of consumer and supplier awareness, initially high up-front costs, policy barriers, lack of business models, and limited delivery capacity. The framework will help countries use future GEF-funded activities to develop local capacity for technology transfer and to disseminate climate-friendly technologies in a manner consistent with the GEF principles of cost-effectiveness, sustainability, replicability, and country ownership.

The following climate change projects highlight GEF support for technology transfer.

### HIGH EFFICIENCY BOILERS IN CHINA

To reduce greenhouse gas emissions, a GEF project, implemented by the World Bank, has provided technology transfer and technical assistance to nine competitively selected boiler manufacturers. The technology will allow them to develop high-efficiency boiler models.

As part of the technology transfer, the project has acquired advanced equipment from abroad to upgrade these firms' designs for new boiler

models. The project has also provided technical assistance to the boiler manufacturers to develop, produce, market, and finance the newer models and to strengthen customer service programs. In addition, the project provides technical assistance and training for industrial enterprises to understand, purchase, and operate high-efficiency boilers, along with support for research institutes and government agencies to disseminate the technologies to other boiler manufacturers.

### **SOLAR WATER HEATERS IN MOROCCO**

The number of solar water heaters in Morocco has dramatically increased from about 20,700 in 1998 to about 111,300 in 2004. The jump can partially be attributed to a GEF project, implemented by the United Nations Development Programme (UNDP), which is helping to install 80,000 square meters of solar water collectors. Because the analysis of the existing market showed that its growth was hindered by the low quality and reliability of previous solar water heaters, the project has been designed to focus on improving product quality and reliability in a number of ways.

The project is training governmental agencies and private firms to promote, evaluate, and install solar hot water systems. It is helping the country to develop norms, standards, and testing procedures to ensure that all solar water heaters sold and installed in the country are built to meet the highest international standards. Moreover, the project is introducing assemblers and manufacturers to improved standards; training architects and engineers to apply the standards and procedures; and developing codes of practices for constructors, installers, and plumbers. All of this is being undertaken to ensure sustained growth in the market for this important renewable technology.

### **WIND ENERGY IN MEXICO**

The GEF is working with the Government of Mexico and all three of its implementing agencies—UNDP,

United Nations Environment Programme (UNEP), and the World Bank—to help lay the foundation for the transfer of wind energy technology and the expanded use of wind and other renewable energy sources in Mexico. This integrated effort is designed to place Mexico in the forefront of renewable energy development worldwide.

Through support for the UNEP Solar and Wind Energy Resource Assessment Project (SWERA), the GEF has helped the Mexican authorities to increase their information about and understanding of Mexico's wind energy resources.

Through support for the UNDP Action Plan for Removing Barriers to the Full-scale Implementation of Wind Power, the GEF is assisting the Mexican Government's efforts to increase capacity to work with and adopt wind energy technology. The project will enable the Instituto de Investigaciones Electricas to establish a wind-turbine research facility, which will increase the understanding of wind technology under Mexican conditions. The institute will also train technicians to install, maintain, and eventually manufacture wind generation equipment in Mexico. Moreover, the Government has begun to establish a favorable business environment for joint ventures with the major wind turbine manufacturers.

Working through the World Bank's Large-Scale Renewable Energy Development Project, the GEF is supporting the Mexican Government's efforts to change its electricity regulatory policy environment to ensure that renewable electricity generation—from all sources—is given reasonable opportunities to sell electricity to the grid and to private electricity consumers. In addition, GEF resources are being used to finance some of the additional costs associated with renewable electricity generation to jump start the market.

GEF support for these three projects is helping Mexico to become a world leader in renewable energy generation and development.

### **FOR MORE INFORMATION**

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