



# Technology Transfer for Climate Change

## Scope of the Challenge

Technology transfer is seen as playing a critical role in the global response to the challenges of climate change. Indeed, the transfer of environmentally sound technologies (ESTs) is embodied in the very fabric of the United Nations Framework Convention on Climate Change (UNFCCC). Article 4.5 of the Convention states: "The developed country Parties and other developed Parties included in Annex II shall take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing country Parties, to enable them to implement the provisions of the Convention."

## GEF Response

Since its inception in 1991, the GEF has become the largest public sector funding source supporting the transfer of environmentally sound technologies to developing countries. In its role as the financial mechanism of the UNFCCC, the GEF invests about \$250 million each year in energy efficiency, renewable energy, emerging low-carbon energy-generating technologies, cost-effective short-term response measures, and sustainable urban transport.

## KEY FACTS

- During its 18 years of existence, the GEF has allocated \$2.5 billion to support more than 30 climate-friendly technologies in more than 50 developing countries, generating an estimated \$15 billion in cofinancing.
- The GEF has provided funding for technology needs assessments (TNAs) and other enabling and capacity-building activities in more than 100 countries throughout the world.

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The GEF also manages two special funds under the UNFCCC, the Special Climate Change Fund (SCCF) and the Least Developed Countries Fund (LDCF), that both help countries adapt to climate change. The SCCF has as one of its primary aims the transfer of environmentally sound technologies to developing countries, while significant technology transfer also occurs under the LDCF.



## Activities

While the GEF supports the transfer of technologies to help countries mitigate and adapt to climate change, of equal importance is the GEF's work with countries beforehand in helping establish "enabling policy environments," or legal and regulatory landscapes, that encourage the adoption of climate-friendly technologies and practices. Another critical element in the success of transferring technologies is the ongoing relationships and a commitment by the GEF and other partners to help countries integrate newly demonstrated technologies into both their national policies and their wider economies.

### CLIMATE CHANGE MITIGATION

The GEF's current approach to mitigating climate change is grounded in six strategic programs that promote: (1) energy efficiency in buildings and appliances; (2) industrial energy efficiency; (3) market-based approaches for renewable energy; (4) sustainable energy production from biomass; (5) sustainable innovative systems for urban transport; and (6) management of land use, land-use change, and forestry (LULUCF) as a means to protect carbon stocks and reduce GHG emissions. A description of several of these programs follows.

### ENERGY EFFICIENCY

Among the more than 30 ESTs that the GEF has supported over the years, more than one-third are energy efficiency technologies, ranging from efficient lighting and appliances to chillers, boilers, motors, and brick kilns; from building design and construction materials to district heating systems; and from power generation and distribution to combined heat and power ("co-generation") and industrial energy efficien-

cy technologies. Total GEF funding to support the transfer of energy efficiency technologies is close to \$1 billion, which in turn has leveraged an additional \$6 billion in cofinancing, a significant portion of which has come from the private sector in developing countries.

### RENEWABLE ENERGY

From 1991 to 2007, the GEF approved grants totaling more than \$800 million for approximately 150 projects promoting the transfer of renewable energy technologies to developing countries and countries with economies in transition. Renewable energy technologies supported include solar energy (photovoltaics or PVs), solar homes, and solar water heaters), wind turbines, geothermal, small hydro, methane, and biomass for heat and electricity generation.

### NEW LOW-GHG-EMITTING ENERGY GENERATING TECHNOLOGIES

The GEF has also supported new energy technologies with lower greenhouse gas emissions in order to reduce start-up costs and to develop markets. The GEF, for instance, has pioneered support for such new technologies as the pairing of concentrating solar power (CSP) with a natural gas turbine, biomass-integrated gasification combined-cycle generation, on-grid PV power production, building-integrated photovoltaic power production, and stationary fuel-cell power generation. Providing developing countries early experience with new low-carbon energy technologies creates demand, which increases supply, thereby lowering costs. These reduced costs help developing countries adopt new technologies earlier and on a wider basis than they could without outside assistance.

#### SHORT-TERM RESPONSE MEASURES

In contrast to some of the more costly long-term technologies and programs that the GEF has supported to encourage widespread shifts in behavior, the GEF early on recognized that certain opportunities to reduce greenhouse gas emissions in the short run, e.g., those costing less than \$10/ton of carbon avoided, are so cost-effective as to be "too good to refuse." In this category, virtually all of the technologies that the GEF has supported relate to methane reduction and use, including projects to capture and use methane escaping from coal beds and coal mines; landfill gas utilization; coal-to-gas conversion; natural gas system leakage repair; and liquid propane gas (LPG) substitution.

#### SUSTAINABLE URBAN TRANSPORT

Since 2000, when its transportation program first began, the GEF has supported technologies and practices that promote a long-term shift toward low-emission and sustainable forms of transportation, including public transit, traffic management, nonmotorized transport, and land-use planning. Transportation technologies supported include hydrogen fuel-cell buses, hybrid gas-electric buses, electric three-wheelers, bus rapid transit systems, dedicated bus lanes, traffic demand management, and bicycle paths. The GEF has funded more than 40 projects in over 70 cities throughout Asia, Latin America, Africa, the Middle East, and Eastern Europe. The total GEF allocation to sustainable transport stands at about \$200 million, which has leveraged an additional \$2.5 billion in investment.

#### CLIMATE CHANGE ADAPTATION

The GEF supports climate change vulnerability and adaptation assessments and pilot adaptation projects to increase the resilience of vul-

nerable countries, sectors, and communities to the adverse impacts of climate change. GEF funding for adaptation has totaled about \$130 million, and has targeted six areas: ecosystem management, agriculture, water management, disaster risk management, coastal zone management, and health. Both "soft" and "hard" adaptation technologies the GEF has supported include: wetland and mangrove restoration, beach nourishment, aid to decision makers for integrating adaptation into development planning, drip irrigation systems, drought-resistant crops, installation and reinforcement of infrastructure (e.g., seawalls, groundwater protection systems), and transfer of high-tech electronics for data logging and early warning systems.

#### POZNAN STRATEGIC PROGRAM ON TECHNOLOGY TRANSFER

The Conference of the Parties (COP) to the UNFCCC at its 13th session (COP13) requested the GEF to elaborate a strategic program to scale up the level of investment in the transfer of environmentally sound technologies. In response, the GEF formulated a strategic program, submitting it to COP14 at Poznań, Poland. COP14 welcomed the GEF's program and asked the GEF to consider the long-term implementation of its program, which the COP renamed the Poznań Strategic Program on Technology Transfer. Under this program, the GEF will help developing countries to conduct or update their technology needs assessments and will finance pilot projects for technology transfer. In keeping with the COP14 decision, the GEF has identified technology transfer as a long-term priority of its climate change focal area and has included it as one of the key objectives for the proposed climate change strategy for GEF-5 (2010-14).

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