gtz

PRIORITY AREA

energy

Sustainable Energy for Development (SED)

Promoting Renewable Energy and Energy Efficiency

Development needs energy. The reliable and efficient provision of modern energy services is a key to reducing poverty. But Bangladesh is an energy starved country: only 40% of its 145 million people are connected to the electricity grid and, in the rural areas, where 80% of the population lives, only 20% have electricity. A mere 6% of the entire population has access to natural gas, and they are primarily in urban areas. Most people in the rural areas depend on kerosene lamps for light. 90% of all Bangladeshis cook with biomass, such as rice husks, jute sticks, cow dung, or wood. In fact, 50% of Bangladesh's total energy supply is provided by biomass.

Those who do have electricity experience daily blackouts, because reliable electricity supply is so far below demand. Almost all medium and large factories in the country are forced to install captive or standby generation facilities (gas or diesel engines) in order to avoid interruptions. The additional cost to these companies runs into the millions of dollars.

The inefficient burning of biomass deprives of soil essential nutrients, resulting in unsustainably low levels of organic matter in the soil. The smoke and particles from kerosene lamps and conventional stoves cause eye problems and respiratory diseases, which rank among the most serious risks to health in developing countries. A lack of lighting prevents children from studying and parents from home working in the evenings. Small businesses such as market stalls, tea shops, rice mills, saw mills, tailoring shops, and grocery shops cannot stay open past dusk. Social or medical facilities are barely workable without reliable power supplies.

Addressing Bangladesh's energy needs is therefore one of the priority areas of Bangladesh-German Development Cooperation. The Program Sustainable Energy for Development (SED), supported by the Ministry of Power, Energy, and Mineral Resources (MPEMR) and the German Federal Ministry for Economic Cooperation and Development through GTZ, is deeply involved with Bangladesh's effort to provide more and reliable energy to its people through the efficient use of energy and the dissemination of renewable energy technologies. On the one hand, it is working to increase the use of energy-efficient appliances and production processes by industry, government, and private households; on the other hand, the program is actively supporting, among others, the dissemination of biogas digesters, improved cooking stoves, and technologies utilizing solar energy in the rural areas.

Improved cooking stoves use 50% les fuel and protect the health of women and children.

Germany is of course a world leader in the use of renewable energy and the improvement of energy efficiency: Germany produces more electricity from photovoltaic panels than any other country in the world – approximately one billion kilowatt hours of solar electricity in 2005; around one million solar collectors also heat air or water in German homes. Renewable energy now contributes 10.2% of gross electricity consumption, 5.3% of heat allocation, and 3.6% of fuel consumption in Germany. And this is only the beginning. The goal of the German Government is for renewable energy sources to supply at least 10% of primary energy consumption and at least 20% of electrical power by 2020. By 2050 half of the German primary energy consumption is to derive from renewable energy sources.

As for energy efficiency, at the end of 2005 Chancellor Angela Merkel announced a new program designed to bring all pre-1978 homes up to contemporary energy efficiency standards. The aim is to refurbish 5% of such housing each year so that the sector shows dramatic improvements by 2025. The GTZ itself is setting a good example. The electricity at GTZ Head Office is supplied entirely from renewable energy sources and GTZ recently renovated the main Head Office building, with a new façade, state-of-the-art heating and cooling systems, and many other features that not only greatly enhance the building's energy efficiency and reduce operating costs, but also cut harmful CO2 emissions.

Vast Potential for Energy Savings in Bangladesh

The program Sustainable Energy for Development is working to bring about similar energy savings in Bangladesh. An estimated 20–30% of the electricity produced in this country today can be saved and thus made available to customers through the use of efficient appliances and production processes, beginning with system losses in the electricity sector itself. About 21% of net generated electricity is lost in the transmission and distribution system and through theft. A further 14% of generated electricity is simply not paid for. Naturally, this negatively impacts the cash flow of the sector and its ability to invest in order to improve and extend service.

The machinery and production processes used in most industrial subsectors are equally energy inefficient, and

The training of female solar energy system technicians is essential for the success of the program

energy audits have demonstrated an enormous energy savings potential. Bangladeshi rice mills, for example, parboil rice in boilers with only 20% energy efficiency, although there are estimates that efficiency could be raised to 60% or above. Households also have their part to play. Today, for example, compact fluorescent lamps (CFLs) have a market penetration rate of only 2%. Simply replacing conventional light bulbs with CFLs would make available another 300MW of power. Similarly, a great deal of energy could be saved by instituting minimum energy standards for household appliances from toasters to refrigerators; the same applies to the diesel and gas generators used by households and businesses throughout the country.

Awareness of the need for sustainable energy development is just beginning to emerge in Bangladesh. The Ministry of Power, Energy, and Mineral Resources has therefore been working with GTZ and UNDP to rewrite the National Energy Policy and to prepare the framework for the new Sustainable Energy Development Agency, which will oversee and promote energy efficiency and renewable energy activities in the country. This collaborative effort will continue in the preparation of the new Energy Conservation Act, the development of energy efficiency standards and labels for household appliances and industrial

equipment, and the development of informational material, training programs, public information announcements, and demonstration projects promoting energy efficiency and renewable energy. SED follows a multi-level approach, cooperating with a variety of partners. On the policy level, the MPEMR is the program's most important partner. For development and adapation of technologies the program cooperates with research and educational institutions like the Bangladesh University of Engineering and Technology (BUET) and the Bangladesh Rice Research Institution. For the dissemination of technologies, SED works with many local partners, which are mostly consulting firms and NGOs. The most important partner-NGOs are Grameen Shakti, and BRAC. SED is open to new ideas and concepts and willing to work with more organizations.

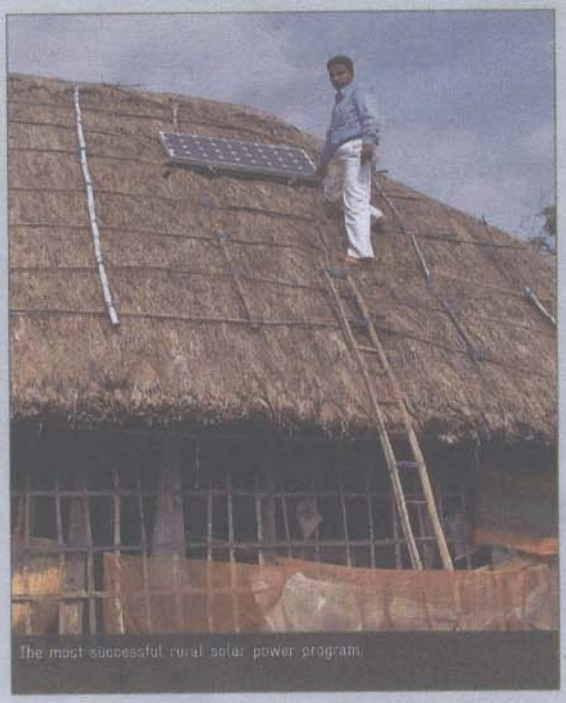
Grameen Shakti – Pathbreaking Innovations

Bangladesh has abundant sunlight for most of the year; however, it was not until 2002 that solar power began to take off, when the Infrastructure Development Company Ltd. (IDCOL), a Bangladesh Government-owned financing company, initiated a project to bring solar home systems (SHSs) to rural Bangladesh. One of IDCOL's most important partners, Grameen Shakti, an organization related to the Nobel Prize-winning Grameen Bank, designed the innovative micro-credit scheme that made solar home systems affordable for ordinary rural families – for example, allowing a customer to make a down payment of 25% and pay the remaining amount within two years in monthly installments. By the end of 2006, 100,000 solar home systems had been installed in 20,000 rural villages of Bangladesh, benefiting over 500,000 people; two-thirds of those systems were financed and installed by Grameen Shakti.

Biogas digesters produce methane gas and germ-free fertilizer

GTZ has been deeply involved in Grameen Shakti's efforts to bring renewable energy to the rural areas of Bangladesh, through the program Sustainable Energy for Development. It has been supporting the expansion of Grameen Shakti's network into the rural areas and is now assisting Grameen Shakti, the Rural Services Foundation, and other private-sector partner organizations to develop and market still smaller and less expensive solar home systems so that even very poor Bangladeshis can afford them. New LED (light-emitting diode) technology now makes it possible to design solar systems of between 10 and 20 watts that provide adequate light and cost only EUR 95–175 as compared to EUR 300 for the 50 watt system (which can power four to six low-energy lights, plus a socket for TV, radio, or battery recharging, and a mobile-phone-charging unit).

Grameen Shakti's rural solar power program has won numerous awards, including the 2003 European Solar Prize and the Ashden 2006 Light Award for "the central roles which Grameen Shakti (and its co-winner Rahimafrooz) have played in delivering the world's most successful solar power program bringing electric light and power to the rural people." In 2006, the European Solar Prize was again awarded to Grameen Shakti, this time to its Managing Director, Dipal Barua, for his role in promoting solar education in Bangladesh and for creating the Grameen Technology Centers, where women engineers train female solar energy system technicians. As Barua explains, "In socially conservative Bangladesh, women do not allow strange men into the house in order to install or service a solar panel. But solar power is crucial to the rural areas and must be widely disseminated. That is why we are training women technicians."



The most successful rural solar power program

Grameen Shakti, with the support of GTZ, is also working to promote the use of improved cooking stoves that require 50% less biomass and draw off the smoke and particles through a chimney, thus preventing the deleterious health effects to women and children near the stove. Dr. Hassan Khan, then at the Bangladesh Center for Science and Industry Research, worked with Bangladeshi rural women to improve the energy efficiency of the mud and clay stoves they routinely build and use – through the simple addition of a grate at the correct depth and a chimney. Dr. Khan and Grameen Shakti are training people to make and market these stoves. As Grameen Shakti's Barua puts it, "Besides saving biomass, these stoves can save my mother's life and the lives of a lot of mothers by significantly reducing indoor air pollution."

Another simple, comparatively inexpensive, but highly effective way to efficiently use biomass is through biogas digesters. Grameen Shakti and GTZ are testing the potential of larger biogas plants in the rural areas. Again, by way of micro-finance, Grameen Shakti initially sold biogas plants to 60 poultry farmers and several slaughterhouses as a demonstration project, which, in the meantime, has led to increasing demand for this biogas application. From the animal wastes, the digesters produce not only methane gas, which can be used for cooking or lighting, but also high-quality, germ-free fertilizer in the form of slurry. Grameen Shakti is experimenting with various ways of collecting and drying this slurry, so that the resulting pellets can be transported, stored, and sold in bulk.

GTZ has over 25 years of practical and conceptual experience in dealing with technological, social, and economic factors in the energy sector. At present, it is implementing or planning 50 energy projects in 35 developing and transition countries. Total German Government support, through GTZ, of the Bangladesh program Sustainable Energy for Development, 2004–2010, is EUR 6 million. The Netherlands Directorate General for International Cooperation (DGIS) is complementing GTZ support with 4 million euros. KfW, the financial cooperation arm of German Development Cooperation, has made available to IDCOL a grant of EUR 16.5 million for the refinancing and subsidy of an additional 100,000 SHSs to be sold and installed between 2007 and 2011 and a grant of 8.6 million euros for the construction of 60,000 smaller household biogas digesters.

Contact: Director General, Power Cell, Ministry of Power, Energy, and Mineral Resources or Mr. Otto Gomm – otto.gomm@gtz.de

gtz | Office Dhaka

Deutsche Gesellschaft für
Technische Zusammenarbeit (GTZ) GmbH

– German Technical Cooperation –

GTZ – Office Dhaka
Road 90, House 10/C
Gulshan 2, Dhaka 1212
Bangladesh
T +88-02-8823 070
F +88-02-8823 099
E gtz-bangladesh@gtz.de
I www.gtz.de/bangladesh

COOPERATION
PEOPLE'S REPUBLIC OF BANGLADESH
FEDERAL REPUBLIC OF GERMANY