

**PROJECT INFORMATION DOCUMENT (PID)  
APPRAISAL STAGE**

Report No.: PIDA520

<b>Project Name</b>	Rural Electrification and Renewable Energy Development II (RERED II) Project (P131263)
<b>Region</b>	SOUTH ASIA
<b>Country</b>	Bangladesh
<b>Sector(s)</b>	Other Renewable Energy (78%), General energy sector (12%), Energy efficiency in Heat and Power (10%)
<b>Lending Instrument</b>	Specific Investment Loan
<b>Project ID</b>	P131263
<b>Borrower(s)</b>	People's Republic of Bangladesh
<b>Implementing Agency</b>	Infrastructure Development Company Limited (IDCOL), Power Cell, Rural Electrification Board
<b>Environmental Category</b>	B-Partial Assessment
<b>Date PID Prepared</b>	24-Jul-2012
<b>Estimated Date of Appraisal Completion</b>	24-Jul-2012
<b>Estimated Date of Board Approval</b>	20-Sep-2012
<b>Decision</b>	

**I. Project Context**

**Country Context**

Bangladesh, with a population of about 150 million and a land area of 147,570 square kilometers, is amongst the most densely-populated countries in the world. The country is vulnerable to natural disasters and extremely sensitive to climate change impacts. Despite the challenges, Bangladesh has managed to graduate to a higher growth trajectory and maintain an average GDP growth around 6 percent in recent years. Poverty has also decreased in recent years, keeping Bangladesh on track to meet the Millennium Development Goal of halving extreme poverty by 2015. Total export of the country increased at a rate of about 14 percent since 2005. However, the infrastructure deficits in a number of areas but especially in energy are emerging as the main threats to maintain its growth in exports and GDP. In the latest Investment Climate Assessment (ICA), the highest number of firms (78%) expressed their concern about the lack of adequate power.

A large segment of the population of Bangladesh has little or no access to electricity or to clean energy sources. Access to electricity in Bangladesh is about 55% and in the rural areas, the access rate is only 43% with about 13 million rural households yet to be electrified. The per capita electricity consumption of about 236 kWh per year is one of the lowest in the world.

Out of the total 30 million households in Bangladesh, about 90% use traditional biomass fuels such as wood, twigs, leaves, agricultural and plant residues, paddy husk, bagasse, jute sticks and dried animal dung for cooking and heating. Traditional biomass fuels are used in low-efficiency stoves (5 to 15 percent fuel efficiency). The incomplete combustion of these fuels in inefficient stoves produces smoke composed of large amount of particulate matter and gaseous pollutants. Indoor air pollution resulting from this smoke is linked with many illnesses including childhood pneumonia and chronic obstructive pulmonary disease representing a significant health hazard. Daily exposure to particulate matter for most Bangladeshis exceeds 200µg/m<sup>3</sup>, well above the daily standard of 25µg/m<sup>3</sup> established by the World Health Organization (WHO). The health impact is particularly acute for women and children who are the most exposed groups to indoor air pollution. According to WHO estimates, about 32,000 children below the age of 5 years and 14,000 adults die every year from pulmonary diseases caused by indoor air pollution in Bangladesh.

**II. Sectoral and Institutional Context**

The peak electricity demand in the country is about 6,500 MW and the available generation capacity is about 4,600 to 5,200 MW, resulting in supply disruptions to those having access to electricity. The rural areas connected to the grid face a disproportionate share of load-shedding. Natural gas is the primary fuel for more than 80% of power generation, which itself is in short supply. Renewable energy currently constitutes less than 1% of total power generation in the country.

The Government of Bangladesh (GOB) has adopted a multi-pronged strategy in the power sector that includes energy conservation, load management, adopting grid and off-grid electrification approaches to extend electricity services, promoting private sector investment in short and longer-term power supply measures, and improving sector governance and efficiency. The GOB articulated a Vision and Policy Statement on Power Sector Reforms in 2002, which includes the objectives of: i) universal access by the year 2020 with improved reliability and quality; ii) stabilizing the sector's financial status and increasing its efficiency; and iii) operating the sector on commercial principles and increasing private sector participation.

The Renewable Energy Policy (2008) of GOB laid out the target of meeting 5% of total power demand from renewable energy sources by 2015 and 10% by 2020. The Remote Area Power Supply Systems (RAPSS) guideline of 2007 allows for private sector participation in development, operation, and maintenance of electricity generation system and distribution networks in remote rural areas including isolated islands to supplement GOB efforts at achieving universal access by 2020. However, there has not been much progress in implementing the RAPSS schemes. GOB is preparing the legislation to establish a Sustainable and Renewable Energy Development Agency (SREDA) as an autonomous body to lead its efforts in promoting renewable energy and energy efficiency in the country.

With all the short and long-term efforts at increasing power generation and demand side management, it will still take years to fully close the demand-supply gap. Consequently, it will not be possible to achieve the government vision of universal access by 2020 relying only on the grid electrification. Furthermore, the dispersed nature of rural settlements and the numerous rivers that crisscross the country make grid electrification in many areas difficult and expensive. Off-grid renewable energy is the only near-to-medium-term option left for millions of people in the remote areas of the country where grid electricity is either not economically viable or cannot reach.

The Solar Home Systems (SHS) program of Bangladesh supported principally by the World Bank with other donors has emerged as a viable and least cost option for electricity for lighting and other basic services in areas where grid is not available.

The SHS program started in 2003 with a target to install 50,000 SHS over the 5-year project period under the on-going World Bank financed Rural Electrification and Renewable Energy Development (RERED) project. This initial target was reached in just 2 years. The World Bank continued to support the program with additional funds. With support from the Bank and other development partners, the program is currently installing 50,000 systems per month making it one of the fastest growing SHS programs in the world. The SHS program is implemented by the Infrastructure Development Company Limited (IDCOL), a government owned infrastructure finance company. The program is a successful public-private partnership model where the Partner Organizations (POs) (mostly Non-government Organizations) procure and install the systems as per technical standards set by IDCOL. Consumers sign SHS purchase contracts under a micro-finance scheme with the POs. After the systems are installed, the POs apply for re-financing from IDCOL for a portion of the microfinance they extended to the households. After technical and other verifications, IDCOL releases the credit and a fixed subsidy (currently \$28 per system) to the POs. This refinancing provides the POs with funds to install more systems and reach even more remote areas.

In addition to the SHS, GOB is also exploring other renewable energy options for providing access to electricity in rural areas. There are pockets of off-grid areas and remote islands in Bangladesh where population concentrations are such that renewable energy based mini-grid is the least-cost option for providing access to electricity. Providing grid-quality electricity from renewable energy sources in these areas will serve the commercial needs of the rural markets and small enterprises, where the potential consumption of electricity is much higher than the basic lighting and electricity needs of a typical rural household that could otherwise be met by SHS. The on-going Bank support has piloted three renewable energy-based mini-grid schemes for providing access to electricity in selected remote areas. Taking lessons learned from these pilots, GOB plans to scale-up these types of schemes under the scope of the RAPSS guidelines. Private operators, selected by IDCOL, would be investing in and generating power from the least-cost technology options (solar photovoltaic, biomass gasifier etc) for providing grid quality electricity in the selected locations on a fee-for-service basis. IDCOL will be managing a RAPSS fund to provide for a mix of credit and grant financing to keep the tariff affordable to the consumers, in addition to equity contribution by the private operators. In September 2011, the Government issued a concept note for supporting private sector investment in 1,000 mini-grid schemes by 2015, requiring 25 MW of renewable energy capacity.

The transition to modern, clean cooking fuels like natural gas, liquefied petroleum gas (LPG), and to some extent electricity, will take a long time, as access to these fuels are limited, and the appliances to use them are not affordable to the poor. Transitory clean cooking options for households include improved cook stoves (ICS), advanced combustion stoves, and biogas. An ICS with a well maintained chimney could: (i) help save up to 50 percent of the traditional biomass fuels used by improving fuel combustion, and (ii) provide moderate reduction in health damaging pollutants by directing smoke through the chimney out of the kitchen. An advanced combustion stove can provide significantly higher fuel efficiency and emission reduction efficiency. Similarly, biogas can provide clean cooking benefits in addition to household lighting and the availability of biogas-slurry for fertilizer. For both advanced combustion stoves and biogas, affordability is an important issue preventing a large scale introduction. The large scale dissemination of clean cooking solutions has the potential to yield co-benefits in household health, local environmental quality, and regional climate.

As part of its efforts to reduce the existing demand-supply gap, GOB has embarked upon the Efficient Lighting Initiatives of Bangladesh (ELIB) program with Bank support to replace incandescent lamps with energy efficient Compact Fluorescent Lamps (CFLs). The Rural Electrification Board (REB) procured the CFLs while the distribution utilities and the rural cooperatives (Palli Bidyut Samities or PBSSs) distributed the CFLs to the households in exchange for incandescent lamps. The first-phase distribution of 10 million CFLs has been completed, though there are problems related to product quality. The second-phase distribution of another about 7 million CFLs is being planned, including actions to overcome the quality issues. The program is registered under the Clean Development Mechanism (CDM) for claiming carbon credits with IDCOL as the Coordination and Managing Entity (CME).

Based on the demonstrated track record of the RERED project, the proposed RERED II Project will continue to support through access to electricity through renewable energy sources. The Project would also support dissemination of clean cooking options for rural households, dissemination of energy efficient CFLs in exchange of incandescent lamps, and support technical assistance for power sector capacity building.

### III. Project Development Objectives

The proposed project development objective is to increase access to clean energy in rural areas through renewable energy, promote more efficient energy consumption, and improve the response capacity of the borrower in case of an emergency.

### IV. Project Description

#### Component Name

Access to Electricity component would support 550,000 SHS and other renewable energy options for providing access to electricity in rural areas where grid is not viable.

Household Energy component would support awareness and social mobilization campaigns for creating demand for improved cookstoves and biogas plants for cooking to improve access to clean energy.

Compact Fluorescent Lamp (CFL) would support dissemination of about 7 million CFLs in exchange of incandescent lamps in an effort to reduce peak demand.

Sector Technical Assistance component would provide support for technical assistance and capacity building in the power sector in general and renewable energy in particular.

A Contingent Emergency Response component with zero allocation is proposed to allow for the flexibility of a rapid response in the event of an emergency in the country.

**V. Financing (in USD Million)**

<b>For Loans/Credits/Others</b>	<b>Amount</b>
BORROWER/RECIPIENT	42.40
International Development Association (IDA)	155.00
US Agency for International Development (USAID)	7.60
Bangladesh MDTF for Climate Change	24.50
GERMANY KREDITANSTALT FUR WIEDERAUFBAU (KFW)	12.90
LOCAL BENEFICIARIES	53.40
Non-Government Organization (NGO) of Borrowing Country	90.20
Total	386.00

**VI. Implementation**

The main components of the Project (Access to electricity and household energy) would be implemented by the Infrastructure Development Company Limited, a government owned infrastructure finance company following the implementation arrangement under the on-going RERED Project. IDCOL is run by professional management under an effective oversight by a competent Board. The household energy component, a separate Project Management Unit (PMU) will be established for day-to-day management of the component. The energy-efficient lighting component will be implemented by REB, which will procure the CFLs and distribute them to the relevant PBSs and other distribution utilities. PBSs and the distribution utilities will be responsible for distributing the CFLs in exchange of incandescent lamps in the respective service territories. REB will be responsible for overall management of the component, including consumer awareness and monitoring and evaluation of the program. Power Cell will be implementing the technical assistance to the sector following the same implementation arrangement of the PSDTA project.

**VII. Safeguard Policies (including public consultation)**

<b>Safeguard Policies Triggered by the Project</b>	<b>Yes</b>	<b>No</b>
Environmental Assessment OP/BP 4.01	<b>X</b>	
Natural Habitats OP/BP 4.04		<b>X</b>
Forests OP/BP 4.36		<b>X</b>
Pest Management OP 4.09		<b>X</b>
Physical Cultural Resources OP/BP 4.11		<b>X</b>
Indigenous Peoples OP/BP 4.10		<b>X</b>
Involuntary Resettlement OP/BP 4.12		<b>X</b>
Safety of Dams OP/BP 4.37		<b>X</b>
Projects on International Waterways OP/BP 7.50		<b>X</b>
Projects in Disputed Areas OP/BP 7.60		<b>X</b>

**VIII. Contact point****World Bank**

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