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## Green Financing in The Energy Sector Of Bangladesh

Bangladesh, a low lying country located on the Ganges-Brahmaputra Delta, is highly susceptible to climate change outcomes, such as flood, draught, salinity, cyclone, sea-level rise etc. A country of above 160 million populations with almost 75 percent of its territory having less than 10 meters above the sea level and more than 700 rivers run through its territory is generally a highly vulnerable to climate change risks. Geographical location, climate vulnerability, dense population and riverine landscape are the characteristics that adhere to a strong case for green investments in Bangladesh for its sustainable development. Mainstreaming green finance in climate resilient and renewable energy projects is thus an important policy challenge for the country.

The impressive economic growth of over 6% in the last decade accelerates the demand for electricity in the country. Since 2000, in Bangladesh the per capita energy consumption has almost doubled to 222.22 kg (oil equivalent) due to rapid increase in population, expansion of production in agriculture and industry, fast urbanization and development in road and transportation. Currently about 90% of the population has access to electricity including 12.5% from solar electricity generated mainly from solar homes systems. However, still there remains a substantial unmet demand for electricity as the current electricity generation covers only about 75% of its installed capacities. Industry sector is badly affected by inadequate supply of electricity. The government sets a target to achieve electricity generation of 23000 MW by 2020 with 10 percent of the total power demand from renewable energy sources by then that requires huge investments in the sector. One potential risks is that about 57% (i.e., inclusive of captive power generation) of the country's natural gas production is used in power generation, which has been depleting over time as there is no prospects of new extraction of natural gases. The government thus explores other sources of energy including nuclear power, renewable energy technology etc. At present the primary sources of energy include natural gas (56%) followed by oil, coal, and solar/green energy (1%). Having strong potentials of green energy including solar, hydro and others type, the country yet to reap the full potential of green energy. It is thus important to identify the policy barriers and find a solution towards green financing in enhancing green (renewable) energy technologies for ensuring sustainable and reliable green energy.

The solar home systems (SHS) program in Bangladesh is one of the most successful solar (green) energy programs that provide access to solar electricity to about 20 million people. The program, implemented by a public non-bank financial institution, namely the Infrastructure Development Company Limited (IDCOL), has so far distributed 4.13 million SHS through NGOs with subsidized prices is a nice example of public-private partnership of green financing in Bangladesh. Though the program was considered a very successful one, it is now at the brink of abandonment due to some problems like lack of coordination among various government agencies, weak financial governance, difficulties in commercializing the program, emergence of a private unregulated market etc. Therefore, this chapter takes the IDCOL's solar home system program as an important case study for analysis that might unlock various empirical challenges of green energy projects.

It is to be noted that like other developing countries' cases, IDCOL's SHS program also involves a wide variety of support measures including subsidies, grants, refinancing facilities for

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distributing agencies in order to promote SHS to off-grid area people at an affordable price. These serve as incentives for adopting RETs to promote diffusion of the technologies. However, an assessment of the efficiency of subsidies is necessary from welfare concerns as well as commercialization perspectives. At the outset of the current dwindling situation of the SHS market in Bangladesh, we attempt to make an in-depth analysis of subsidies provided in the SHS program taking the approaches of Barnes and Halpern (2000) that is based on three factors, such as efficacy, sector efficiency and cost-effectiveness of subsidies. These aspects have been analyzed through economic analysis of demand for SHS, willingness to pay and subsequent consumer surplus, and benefit-cost ratio of subsidies.

Apart from the case study of IDCOL's SHS program, this chapter also highlights the current status of green financing including its operational aspects, barriers and possible solutions. Bangladesh has already adopted various green financing strategies by its own and remained very vocal in international forums on climate risks and remedies. Bangladesh bank (the central bank) has formulated modus operandi of green financing for banks and financial institutions, which is now followed by financial institutions. The success of commercialization of green projects depends on appropriate incentives designed for the private/partner institutions and how the operational risks are addressed. Given inadequate supply of green finances, there is a need for the development of green financial instruments, such as green loans, green bonds, green investment trusts and funds.