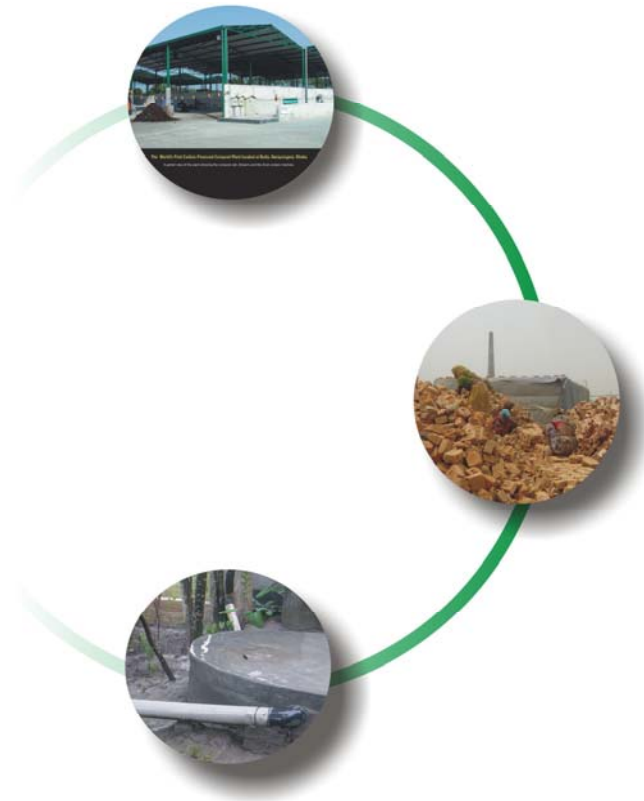


# ASSESSMENT OF GREEN JOBS in RENEWABLE ENERGY SECTOR



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**DRAFT**

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## Executive Summary

Unlike the construction and waste sector, occupational health and safety (OHS) dimension of green jobs is not yet a big concern in the renewable energy sector. More reassuring is this sector by the GHG reduction dimension of green jobs. Thus, the renewable energy sector is ideally suitable for ensuring green jobs from both dimensions of the concept. Thus, quality of the renewable sector jobs is not an issue but the quantity if. This sector (setting aside the traditional biomass) is still a small sub sector of the overall energy sector. The challenge is to replicate, multiply and commercialize the innovative practices and successful projects.

This study identified a large number of policy, institutional, technological, market, economic & financial, information and human resource barriers that need to be overcome for the renewable energy sector to deliver its built-in advantage in generating green jobs (section 4.4) public policy and action programs have also been identified in this study (section 4.5) for addressing these barriers. Given the variety and numerousness of those barriers and necessary public policy and actions, some intervention points are specified below that are expected to set in motion mutually reinforcing positive forces and outcomes.

### Barriers to Expansion of Green Jobs in the Renewable Energy Sector

Although GHG emission reduction dimension of green jobs is very much in-built in the renewable energy sector projects, many barriers were identified by this study that impede the potential of replication and institutionalization of the results from successful pilot projects. As a result, the numbers of jobs created by the renewable energy sector are very limited. During the field work, no obvious gap in the OHS dimension of green jobs was observed. This is partly because of number of workers associated with any project are still few. However, with expected expansion of the renewable energy sector in the days ahead, OHS issues are likely to surface. Presently, the barriers to green jobs in RE are more about impediments in the expansion of this important sector. The identified barriers that emerged from field level investigation and subsequent focus group discussions are presented below by grouping the barriers into policy, institutional, technical, market, economic and financial and information barrier.

#### Policy Barrier

- Lack of legal, regulatory and policy framework for market-oriented renewable energy programs. Most of the present renewable energy programs are limited to technological innovations or at R&D stage. Commercialization by private sector is limited, if not absent.
- Unfavorable utility regulations to renewable energy development e.g., lack of standardized power purchase agreement.

#### Institutional Barrier

- Different ministries, agencies and institutions are involved in renewable energy based service provisioning that creates coordination problem.
- Lengthy and difficult process to get permission for establishment of commercial-scale power plants.
- Dependency on the national budget for implementation of project creates uncertainties in allocation of funds as well as delays in decision-makings.
- Limited spatial distribution of suppliers limits access to renewable energy technologies in most part of the country.

#### Technical Barrier

- Lack of standards and quality control for renewable energy equipment
- Lack of domestic manufacturing of the required equipment.
- Difficulties of firms to dispatch utility grid operations.
- Bulk procurement of renewable energy technologies is limited due to the current small market for renewable energy based modern energy services. Hence the (technical) infrastructure to support renewable energy development does not exist.

- Local manufacturing and/or assembly of renewable energy technology components are currently very limited; although the knowledge, skills, expertise and facilities are available in the country.
- Limited technical capacity to design, install, operate, manage and maintain renewable energy based modern energy services. This is mainly a result of lack of previous experience in this new field.

#### **Market Barrier**

- Doubt about renewable energy market potential.
- The high upfront cost at the end user level (e.g., for solar panels). This is a major barrier to increasing renewable energy sources as an alternative to traditional energy services.
- Government budgets for subsidizing renewable energy projects are limited as the need for financing other national priority areas is more compelling, e.g., health, education, disaster management etc.
- Small size and dispersed location of the renewable energy market presently available does not facilitate benefiting from economy scale.
- Available renewable energy resources are very much site-specific that requires detailed analysis of each location-specific condition.

#### **Economic and Financial Barrier**

- High initial capital costs
- Higher perceived risks of the renewable energy technology
- Financial institutions, unfamiliarity with renewable energy projects
- Lack of access to credit
- Lack of appropriate financing mechanism for renewable energy

#### **Information Barrier**

- Lack of information about renewable energy resources, technical/economic information about renewable energy technologies, equipment suppliers, and potential financiers.
- Lack of awareness about renewable energy among public, industries, utilities, financial institutions and policymakers.
- Limited availability and access to renewable energy resource information. No central information source exists. Information is scattered among the public sector agencies, development assistance organizations, donors, R & D centers and academia.
- Public awareness on renewable energy technologies is largely limited to their mere existence. Knowledge such as that the life cycle costs of most renewable energy technologies are often competitive or even lowest among the cost options is mostly absent, among potential users of renewable energy.

#### **Human Resource Barrier**

- Limited expertise in renewable energy technology related business management and marketing skills.
- Limited in-country capacity for renewable energy data collection and analysis.
- Lack of expertise and services in system design, installation, operation and maintenance of renewable energy technologies.
- Limited in-country capacity for renewable energy project development.

#### **Public Policy for Expansion of Green Jobs**

Unlike the construction or waste sector, OHS issues are not yet of much concern in the renewable energy sector. More reassuring is the fact that renewable energy sector is not of concern from GHG emissions perspective. Thus, renewable energy sector is ideally suitable for green jobs from both dimensions of the concept. The problem here thus is not the job quality, it is more a quantity issue in that the renewable energy is still a small sub sector of the overall energy sector. For example, the solar home systems with about 350,000 units provide 15 MW of electricity. Wind as a source of energy is yet to be a notable

practice. Improved cooking stoves (ICS), number stand at about 150,000 which is too small compared to the potential ICS users estimated at 24 million. Similarly, biogas systems stand at about 35,000 which is also a small number compared to an estimated potential of four million. As has been reported in this study, most of the renewable energy activities are still of R&D kind or small project-based. Technological innovations need to be developed for commercialization by involving the private sector. This is crucial for making a breakthrough in the renewable energy sector. This recommendation also emerged strongly from expert views in the focus group discussions. With this in view, the policy interventions necessary for expansion of green jobs in the renewable energy sector emerged as follows:

- **Attracting Private Sector Investment:** For attracting the private sector investment in renewable energy, technological innovations already in place need to be demonstrated and disseminated through exhibitions-cum workshops. Such dissemination through exhibition and workshops should also include end user level interest and demand for renewable energy. Relevant government agencies and social entrepreneurs need to organize such programs. It is to be noted that the nature of involvement and size of an investment in the renewable energy sector is still of kind that only small social entrepreneurs do. They have played the necessary vanguard role. But now is the time for the classical role of the private sector business entrepreneurs to step in for commercialization and large-scale operation of renewable energy generation and distribution.
- **Financing:** A widely recognized constraint in solar energy use is the inhibiting initial capital cost of solar panels. Subsidization of solar panel production, therefore, deserves public policy action. For overcoming the high initial capital cost a suitable financial arrangement needs to be established for easing access to credit by the investors in the renewable energy sector. Strengthening IDCOL and establishing the proposed SEDA bears potential to serve as the focal points of Renewable Energy activities in the country respectively for financing investment and coordination of work related agencies.
- **Information Dissemination:** In view of the fact that awareness about renewable energy is still limited to the enlightened environmentalists and social entrepreneurs, a massive campaign needs to be launched for overcoming the information barrier on renewable energy among public, industries and financial institutions. Print & electronic media and educational institutions should also be used for this purpose.
- **Technological:** Specific technical and institutional barriers identified by this study (see Section 4.4) are other areas of action for public policy for expanding the renewable energy sector and thereby making it a major source of green jobs.

## Intervention Points

**Financing:** Because of expensive technology, innovations in renewable energy cannot be commercialized. Developing financing mechanisms ought to be the highest priority. Currently only 10 percent of IDCOL, the public-private partnership agency for financing infrastructure in rural and urban areas of Bangladesh, funds flow to the Renewable Energy sector. This share needs to rise. Also, bank financing for the Renewable Energy sector need to be developed for which Ministry of Finance and Bangladesh Bank need to work with the commercial banks.

**Pricing for cost recovery:** Price structure need to be rationalized for ensuring cost recovery. Investment flow is heavily dependent on the scope of cost recovery. Thus, price structure of energy services need to reflect cost for investment in Operation & Maintenance (O & M) and fixed capital. Government and politicians need to discard the fear that any price hike will create trouble. They should be reminded that service users are more concerned about smooth supply of a service. In a growing economy affordability rises. Thus, price is a secondary concern.

**Trouble shooting services:** Since much of the Renewable Energy services are used in rural areas, any technical disruption or disorder in transmission line or equipment (e.g., Improved Cooking Stove or Solar Home System) cannot be tackled by the users easily. Trouble shooting services by trained technical staff need to be available conveniently for consumers to call as required. In this regard, Grameen Technology Center's of Grameen Shakti (GS) facilities can be used for providing the necessary training. Unemployed young men and women should be used for such training.

**Biomass surplus for power generation:** Currently biomass is used for 150,000 improved cooking stoves (ICS). The potential is to use available biomass for 24 million ICS units. Since ICS usage is of cottage nature, the surplus biomass should be directed to power generation for meeting varied purpose and need of power.

## ABBREVIATIONS

ADB	Asian Development Bank
BACE	Bangladesh Association of Community Education
BAEC	Bangladesh Atomic Energy Commission
BBS	Bangladesh Bureau of Statistics
BCAS	Bangladesh Center for Advanced Studies
BCSIR	Bangladesh Council of Scientific & Industrial Research
BPDB	Bangladesh Power Development Board
BRAC	Bangladesh Rural Advancement Committee
BUET	Bangladesh University of Engineering and Technology
CDM	Clean Development Mechanism
CES	Center for Energy Studies
CFL	Compact Fluorescent Lamp
CHT	Chittagong Hill Tracts
CNG	Compressed Natural Gas
CPO	Construction Partner Organization
ESAs	External Support Agencies
FGD	Focus Group Discussion
GCWE	Grid Connected Wind Energy
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	Green House Gas
GIS	Geographic Information System
GoB	Government of Bangladesh
gtz	German Technical Cooperation
GS	Grameen Shakti
GTC	Grameen Technology Center
IAT	Institute of Appropriate Technology
ICS	Improved Cooking Stove
ICT	Information and Communication Technology
IDA	International Development Association
IDB	Islamic Development Bank
IDCOL	Infrastructure Development Company Ltd.
IFRD	Institute of Fuel Research and Development
ILO	International Labor Organization
ITUC	International Trade Union Confederation
KOICA	Korea International Co-operation Agency
LED	Light-Emitting-Diode
LGED	Local Government and Engineering Department
MFI	Micro-finance Institutions
MPEMR	Ministry of Power, Energy and Mineral Resources
NDBMP	National Domestic Biogas and Manure Program
NGO	Non-Governmental Organization
OHS	Occupational Health & Safety
PBS	Palli Biddut Samity
Pos	Partner Organizations
PV	Photo Voltaic
R & D	Research & Development

RE	Renewable Energy
REB	Rural Electrification Board
RET	Renewable Energy Technologies
RERC	Renewable Energy Research Center
REREDP	Rural Electrification and Renewable Energy Development Project)
ROAP	Regional Office for Asia and the Pacific
RRE	Rahimafrooz Renewable Energy Ltd.
RSF	Rural Services Foundation
SHS	Solar Home System
SEDA	Sustainable Energy Development Agency
SEMP	Sustainable Environmental Management Program
SPV	Solar Photovoltaic
SRE	Sustainable Rural Energy
TMSS	Thengamara Mohila Sabuj Sangha
UN	United Nations
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
VDP	Village Defense Parties
VERC	Village Education Resource Center
WBHPP	Wind Battery Hybrid Power Project
WCC	Waste Concern Consultants
WRAS	Wind Resource Assessment Station



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