**TERMS OF REFERENCE**

**FOR**

**FEASIBILITY STUDY FOR ELECTRIFICATION OF RANGABALI UPOZILA WITHRENEWABLE ENERGY**

1. **Background**

The vision of the Government of Bangladesh is to provide electricity to all by 2021. To fulfill the GOB’s vision and objectives of electrification, development of renewable energy resources will play a vital role side by side with the conventional fuel resources. So the government has taken appropriate measures for generating environment-friendly electricity from renewable energy sources also. The Renewable Energy Policy has already been approved with the target to produce 10% of the total power generation by 2020 from renewable energy sources.

As an initiative to popularize the use of renewable energy in the country, Government of Bangladesh has decided to electrify the whole of Rangabali Upozilla under Patuakhali Districtfrom renewable energy resources. For successful implementation of the project Power Cell has been directed to appoint a consulting firm to carry out a detailed feasibility study and recommend methodology to electrify the Upozilla. Bangladesh Rural Electrification Board has been asked to implement the project.

1. **Objective of the Study**
2. Development of RE projects in the country;
3. Resource assessment at the selected sites;
4. Popularize use of RE in the country.
5. **Scope of Work-**

The following are the scope of services of the consultants who would conduct the study but not limited to:

1. **The consulting firm will collect the following data for the study:**

* Collect the geographical data of Rangabali Upozilla;
* Total number of household, Government offices, Commercial establishments, Charitable Institutions, Educational Institute, Industries etc.;
* Population growth rate
* Land use status and availability;
* Collect the information of existingroad/riveraccess/transport system;
* The life style/social pattern of RangabaliUpozilla people;
* Average earning capacity of people to pay the electricity bill;
* Collect and review previous studies (if any).

1. **The consulting firm will assess the electricity demand of the Upozilla:**

* Detailed description of the present electrical distribution system (loadand sub-station);
* Detail description of present fuel/ electricity uses &cost(if any).
* Existing demand of Electricity(Residential, Agriculture, Commercial, Industries etc.) for the Upozilla;
* Forecast load growth for next 5 to 10 years.

1. **The consulting firm will suggest the best Renewable Energy resources &technology or a combination of technologies:**

* Probable source of Renewable Energy& applicable technology;
* Type &capacity of the plant;
* Identification of site/land areas for the plant;
* Design distribution network withvoltage level, interconnection facilities etc.;
* Necessary 11 kV feeders&distance from solar Plant;
* Required LT line & service cables;
* Required amount of Battery backup withcapacity for night time & cloudy weather;
* Diesel Generator / Alternative Power supply and capacity;
* Future National Grid integration provision;
* Suggest capacity of load of each household;
* Metering System for RE usage;
* Review the MonpuraSurjagram Model& suggest improved model for adoption at Rangabali;
* Recommend innovative & new technology for electrification;
* Suggest distribution of solar lantern or similar RE items for floating people of the area to be brought under electrification;

1. **The consulting firm will formulate project implementationmethodology:**

* DPP preparation;
* Project implementation plan &schedule;
* Specification &design drawing of the plant;
* Power off take;
* Project Ownership;
* O&M mechanism.

1. **Cost Estimation:**

* Land requirement&cost;
* Cost of necessarycivil works;
* Installation cost of Power Plant (solar, wind, Diesel, Hybrid etc.), HT line, LT line, Service line etc.;
* Requirement of manpower for the RE Plant and Operation & Maintenance and its costing;
* Overall per kWh energy production cost;
* Tariff setting /financialmodeling;
* Billing System.

1. **Financial & EconomicAnalysisof the project**
2. **Carry out Environmental Impact Assessment;**
3. **Carry out due diligence of legal &institutional aspect**
4. **Suggest modality for sustainability of plant**
5. **Team Composition and Qualifications of Key experts**

The following are the ley qualifications required for the experts positions:

* **Renewable Energy/Technical Expert (Team Leader):** The team leader must have a Bachelor’s degree in Engineering or Masters in Renewable Energy or any other relevant subject with minimum of 20 years of experience including minimum 5 years of experience in the field of renewable energy technology.
* **Wind Resources Specialist:** The Wind Resources Specialist must have a Bachelor’s degree in Engineering or Masters in Renewable Energy or any other relevant subject with minimum of 15 years of experience including minimum 5 years of experience in the field of renewable energy technology.
* **Power Distribution Expert:** At least bachelor degree in Electrical Engineering with minimum 10 years of working experience in similar job preferably in distribution planning, design and load flow analysis. S/he should have experience in modeling process and distribution software.
* **Environmental Expert:** The environmental expert must have a Masters degree in Environmental Science or any relevant subject. The expert must have a minimum of 5 years of experience in the field of environment.
* **Legal & Institutional Expert:** The legal expert must have a Masters degree in Law from a recognized institute of higher learning. The expert must have a strong background and experience in Bangladesh law and legislation related to land management, environment and conservation and natural resource management. The expert must have a minimum of 5 years of relevant and practical experience.
* **Financial/Economic Analyst:** The analyst must have a Masters in Economics/Business Administration or any relevant subject with a minimum of 5 years of experience in financial/economic analysis.

1. **Evaluation Criteria**

The consulting firm will be selected in accordance with the procedure set out in The World Bank Guidelines. The evaluation of consulting firms will be done according to the categories mentioned below:

* **Age of the firm**
* **Experience of the firm in Bangladesh Power Sector**
* **Qualification of Key Professional**
* **Experience of firm in similar works**
* **Work methodology and Project Plan**

1. **Deliverables and Timeline**

The scope of the services to be provided by the consultant or consortium will include delivery of the following:

1. Inception Report – 2 (two) weeks after signing of the contract
2. Hold two consultations meeting with the local people and other stakeholders in the area– within 2 (two) months after signing of the contract
3. Draft Feasibility Study Report – 3 (three) months after signing of the contract.
4. Hold Stakeholders Consultation Workshop on Draft Feasibility Study Report – 3.5(three & half) months after signing of the contract.
5. Finalization of Feasibility Study Report – 4(four) months after signing of the contract
6. **Location of the feasibility site**

The project site will be in Rangabali Upozilla under Patuakhali District.

1. **Duration of assignment**

The duration of the assignment is 4 (four) months.

1. **Facilitation and Reporting**

The contract will be signed between the Consulting firm and Power Cell. The Consultant firm will work in consultation with Bangladesh Rural Electrification Board (BREB). BREB will assign and supervise work performance and recommend the payment of the Consulting firm along with invoice, log sheets, etc. to the Power Cell.