Terms of Reference (ToR)
for
Feasibility Study for Multipurpose Use of Land for Renewable Energy Project in Bangladesh
(Contract Package: S- 19)

1. *Background*

Bangladesh is near to achieve 100% electrification by 2021. Now Govt. has concentrated on fuel diversification for electricity generation with increasing addition of clean energy. To fulfill the GOB's vision, development of Renewable Energy (RE) resources will play a vital role side by side with the conventional fuel resources. So the government has emphasized generating environment-friendly electricity from RE sources.

Utility-scale RE projects need to be implemented in Bangladesh to achieve the RE generation target but those projects require huge area of land. Bangladesh is predominately an agricultural country. Every year almost 0.20 million people are being added to the total population whereas the estimated annual shrinkage of agricultural land is about 0.08 million hectares due to various non-agricultural activities like constructions of houses, offices, roads, mills, factories etc. (BRRI, 2009). As Bangladesh is a land constrains country with a huge population, occupying land for the sole use of RE based power plant is difficult. Hence, multipurpose use of land for RE projects is necessary. Nowadays scientists are finding ways and means for multiple use of land with RE electricity generation with the advancement of technology. Towards that end, Bangladesh would also like to carry out a feasibility study to find out best options for multiple uses of land in conjunction with RE based power plants.

With this end in view, Power Cell, Power Division, Ministry of Power, Energy and Mineral Resources intends to appoint a Consulting firm to conduct a Feasibility Study for Multipurpose use of Land for Renewable Energy Project in Bangladesh under "TA for Strengthening and Development of Sustainable Power Sector in Bangladesh" project. The cost of the study will be borne from the fund of The World Bank.

2. *Purpose of the Assignment*

The main objectives of this assignment are:

a) Promote multipurpose use of land for RE with agriculture/fisheries/livestock project;
b) Estimate potential for agro-RE and expected benefit/impact on country level;
c) Develop business model for agro-RE based projects;
d) Identify best practices related to agro-RE in home and abroad;

3. *Scope of Services*

The scopes of services for the feasibility include the following. The consultants can propose some modifications in the scope of work to meet the objectives of the assignment.

- ***Identify Suitable Agricultural Lands to co-locate RE***
  Identify suitable lands for implementing renewable energy especially Solar PV along with agricultural projects after analysing the agricultural activities in different areas of Bangladesh. It is required to estimate total potential of agricultural land of various nature to co-locate RE (i. e. solar PV) in national level;

- ***Assess Scope of Multipurpose Use for RE Projects being Implemented***
  Identify suitability of multipurpose use of lands where RE projects are being implemented. Assess the prospect of agriculture/animal husbandry/fish farming or any other appropriate utilization options for ensuring multipurpose utilization of lands;

- ***Select Appropriate RE Technology and Optimum Design for Future RE Projects***
  Review the available renewable energy technologies in the market and recommend the best technology for the project with agriculture/animal husbandry/fish farming or any other appropriate utilization options from land optimization perspective;

- ***Idea on Plant Design***
  Depending on the lands, recommend on technical design and other considerations for various types of RE (i.e. solar PV) project development with agriculture/animal husbandry/fish farming or any other appropriate utilization options. Also recommendation on plant installation, maintenance and operational measures required to ensure safety and security for multitude activities in same land;

- ***Risk Analysis***
  It is also necessary to identify the associated electrical and mechanical damages of RE plants for such kind of multitude activities. Risk factors regarding plant performance degradation, impact of multitude use on plant operation, risks associated with human/animal interventions in plant sites along with required mitigation measures should be addressed;

- ***Method of Implementation of the Project***
  Recommend the method of implementation of the RE project in association with multiple activities considering economic, financial, commercial aspect. It is also required to consider multiple project executors for multiple utilizations besides RE plants. It is necessary to review different documents and suggest new commercial models for RE with multipurpose land utilization based power plants in Bangladesh;

- ***Review Tender Document and PPA***
  Review the existing tender document and will prepare a standard RE tender document with multipurpose land use for generation companies. Also review the existing contract documents (PPA, IA, LLA etc.) for private sector projects and will prepare a standard contract documents (PPA, IA, LLA etc.) for such kind of projects;

- ***Financial & Economic Analysis***
  Carry out cost-benefit analysis for different technological options for RE with multiple activities. The cost estimates for development, construction and operation of the project and predicted revenue, based on the available resource data, as well as indicative quotes or comparison with similar projects. Financial and economic analysis for the technology suitable for commercial utility-scale grid connected RE power plants at each of the selected sites, specifying the investment cost ($/kW), levelized cost of energy ($/kWh) with another options, subsidies, incentives (e.g. applied to the equipment's costs, etc.), energy tariffs, costs and benefits, total cost of ownership/life-cycle costs of plant, payback time, insurances costs, costs recovery, etc. should be taken into account;

- ***Cost Estimation***
  Review all aspects of the project and prepare a detailed breakup of cost estimate of each component of the project;

- ***Recommend Tariff***
  Possible tariff for such kind of projects with agriculture/animal husbandry/fish farming or any other appropriate utilization options;

- ***Environmental, Legal and Institutional Aspects***
  Review the existing environmental laws and regulations and recommend environmental issues that may arise as a result of the implementation of such kind of projects. Analyze legal and institutional aspects of the multiple land utilization, environment and other issues for the proper implementation of the project. Recommendation should be given on measures to be taken from environmental, disaster, social and legal aspects to implement RE plants with multiple land use;

- ***Analyse Similar Projects***
  Review any similar projects implemented in Bangladesh and neighbouring countries with recommendation for Bangladesh based on learnings from those projects;

- ***Stakeholders Engagement and Dissemination***
  Conduct 03 (three) Stakeholder consultation workshops:

  - ✓ **Workshop 1:** After submission of Inception Report to share idea on implementing such projects and sensitize stakeholders;
  - ✓ **Workshop 2:** After submission of Draft Final Report to received comments from relevant stakeholders for finalizing the report;
  - ✓ **Workshop 3:** After submission of Final Report to disseminate the finding to a broad targeted group like government and private sectors;

Each workshop will be arranged for approximate 60 personnel with representation from relevant stakeholder agencies and institutions. The place and duration of each Workshop will be finalized in consultation with the client.

4. ***Duration of Assignment***

The duration of this assignment will be 06 (Six) months.

5. ***Detailed Outputs of the assignment (and applicable quality standards, where applicable)***

5.1 **Qualification Requirements for the Consultant:**

The consultant shall be a firm/company/partnership/proprietorship/any consortium firm. Consulting firms should have experience to perform the consultancy services, experience of performing consultancy services in renewable energy especially utility-scale solar or any other similar RE projects, experience in similar conditions, firm's capability, and availability of appropriate skills among key staff, availability of resources, relevant transactional experience.

5.2 ***Team Composition and Qualification Requirements for the Key Experts***

The Proposer is expected to engage the following categories of key experts for the Project and CVs shall be submitted accordingly:

- **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 from a recognized University with minimum of 15 years of experience in Renewable Energy sector including minimum 5 years of experience in the field of solar/wind technology. S/he will lead the team to successfully accomplish the study. Experience in multipurpose use of land in RE project will be given preference.

- **Agriculture Expert**

The Agriculture Expert must have a Bachelor's degree in Agricultural Science or any other relevant subject from a recognized University with Masters in respective field. The Expert should have minimum of 10 years of experience in similar field. The Agriculture Expert will identify potentiality of the land for various agricultural activities in RE projects.

- **Animal Husbandry Expert**

The Animal Husbandry Expert must have a Bachelor's degree in Animal Husbandry or any other relevant subject from a recognized University with Masters in Animal Husbandry/Veterinary Science in related field. The Animal Husbandry Expert should have minimum of 10 years of experience in similar field. The Animal Husbandry Expert will identify potentiality of the land for various animal husbandry related activities in RE projects.

- **Fisheries Expert**

The Fisheries Expert must have a Bachelor's degree in Agriculture/Fisheries science or any other relevant subject from a recognized University with Masters in Fisheries related field. The Fisheries Expert should minimum of 10 years of experience in similar field. The Fisheries Expert will identify potentiality of the land for various fisheries related activities in RE projects.

- **Environmental Expert**

The Environmental Expert must have a Master's degree in Environmental Science or any relevant subject from a recognized University. The expert must have a minimum of 5 years of experience in the field of environment. S/he will identify environmental, disaster and social related issues of the land in case of multiple uses.

- **Legal & Institutional Expert**

The legal expert must have a Master's degree in Law from a recognized institute or from a recognized University of higher learning. The expert must have a minimum of 5 years of relevant and practical experience. The expert must have a strong background and experience in Bangladesh law and legislation related to land management, power and energy sector, environment and conservation and natural resource management.

- **Financial/Economic Analyst**

The Financial/Economic Analyst must have a Master's in Economics/Business Administration or any relevant subject from a recognized University with a minimum of 5 years of experience in financial/economic analysis. The expert will carry out financial and economic analysis of this study.

5.3 Reporting Requirements and Time Schedule for Deliverables

- Inception Report within 15 (fifteen) days of signing of contract stating their jobs understanding, concept on the requirements of the assignment, readiness and strategy for undertaking the project;
- Stakeholder's meeting after submission of Inception Report;
- Interim Report within 02 (two) months of signing of contract with primary assessment of land utilization options, appropriate technologies, risk analysis etc.;
- Stakeholder's meeting/Workshop 1 after submission of Interim Report;
- Draft Final Report within 04 (four) months of signing of contract with recommendation of land use for multipurpose activities, implementation methodology, possible tariff, standard documents (tender, PPA, IA, LLA etc.);
- Stakeholder's Workshop 2 after submission of Draft Final Report;
- Final Report within 06 (six) months incorporating comments received from stakeholders;
- Stakeholder's Workshop 3 after submission of Final Report.

10(Ten) copies of each report has to be submitted along with a soft copy;

Person to receive the Report: Director General, Power Cell (Client)

The consult will report to Director General, Power Cell for billing and contract management. For work execution purposes, the consultant will work with all the utilities under the Power Division.

6. ***Client's Input and Counterpart Personnel***

(a) Data, Personnel, facilities and local services to be provided by the Client:

The entities of power sector will ensure access to the available pertinent information to this assignment. Consultant will work in close association with Power Division/Power Cell and other relevant entities. A coordination mechanism will be set up to review progress, provide guidance and advice. The designated personnel of the entities will interact with the consultants and provide data, arrange discussions and assistance as required.

(b) Logistics Support

Office accommodation, field visits, secretarial service will have to be arranged by the consulting firm at their own costs.

7. ***Institutional Arrangements***

Power Cell will act as contact administrator of the assignment (client) and consultant will work with Power Division and its other utilities and stakeholders.