

## **RURAL POWER COMPANY LIMITED**

### **REQUEST FOR EXPRESSION OF INTEREST (EOI)**

#### **FOR**

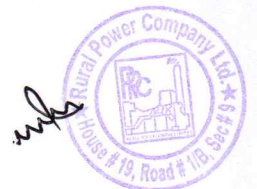
**Appointment of Consulting Firm for Detailed Feasibility Study (DFS), Initial Environmental Examination (IEE), Environmental and Social Impact Assessment Study (ESIA) of Patuakhali 100 MW Solar PV Power Plant Project including Route Survey (RS), Land Acquisition Plan (LAP) and Resettlement Action Plan (RAP) of Power Evacuation Transmission Line to the nearest Grid Sub-Station of the Project located at Kalapara, Patuakhali, Bangladesh.**

**Selection Method: Quality and Cost Based Selection (QCBS)**

**Ref. No.: PUR-014(FS/Patuakhali/EOI/QCBS)/2023-2024, Date: 12.05.2024**

**May, 2024**

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## INSTRUCTION TO THE APPLICANTS

### 1. Application of the interested firms must include:

- a. Name of the Principal Firm with complete address, Fax, Telephone Nos. and E-mail address etc.
- b. Name of the Associated Firm (if any) with complete address, Fax, Telephone Nos. and E-mail address etc.
- c. Notarized Joint Venture/Consortium/Association Agreement (JVCA) on Non-Judicial Stamp of the firms (in case of Joint Venture/Association with another firm) for the said consulting services. The value of Non-Judicial Stamp should be Tk. 300.00 (Three hundred Taka).
- d. The name of the employees/owner(s) of the firms and corporate profile of the firms.
- e. The name and qualification of the Management/Administrative Personnel of the firms.
- f. List and qualification of the key-personnel likely to be involved in the proposed consulting services.

The proposed fields of expertise for the said consulting services would be the following:

Sl. No.	Position	Input (Staff-month)
1	Team Leader (Solar PV Specialist)	3.00
2	Substation Expert	1.00
3	Transmission Line Expert	1.00
4	Structural Expert	1.00
5	Environmental Expert	1.00
6	Social Expert	1.00
7	Economist/ Financial Analyst Expert	1.00
8	Disaster Management Specialist	0.50
9	Agricultural Specialist	0.50
10	Biodiversity Specialist/ Ecologist	0.50
11	Water Resources Specialist	0.50
12	GIS Specialist	0.50
13	Route Survey Specialist	0.50
14	Resettlement Specialist	1.00
15	Land Acquisition Plan (LAP) Specialist	1.00
16	Survey Specialist	0.50
17	AutoCAD Specialist	1.00
	<b>Total</b>	<b>15.50</b>

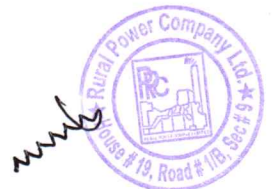


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- g. Identity, Structure, Organogram of the firm(s) including copies of the documents defining the constitution or legal status, place of registration and principal places of business and/or principal offices of the firm(s).
  - h. Details of vehicles, instruments & office equipment of the firm own.
  - i. Audited Financial Statements of the firm for the last five fiscal years.
  - j. Experience of the firms along with a list of similar work at hand or carried out during last 10 years. The Consultant must submit the end user certificate in support of experience.
  - k. The Consultant should submit the signed CV of the proposed professional staff. The CV must contain a photography of the experts.
2. Applicant must submit information using the attached table/format [Section-1 to 6] properly with the document. The submitted document must be sealed and signed by a person duly authorized by the consulting firm.

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## Section 1: Curriculum Vitae (CV)

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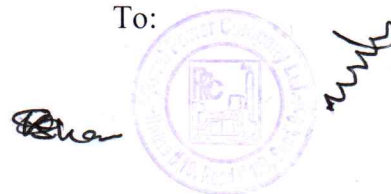
**Curriculum Vitae (CV) for Each Proposed Professional Staff (CV will be maximum within five (05) pages (Short Biography) & the Consulting Firm shall have to be Submitted a soft copy of Section 1 along with EOI document.)**

1. Proposed Position for this Project : *[From the Terms of Reference, state the position which the consultant will be engaged. Only one candidate shall be nominated for each position]*
2. Name of Person : *[State full name]*
3. Date of Birth :
4. Nationality :
5. Mobile No. and E-mail Address :
6. Membership of Professional Associations : *[State rank and name of society and year of attaining that rank]*
7. Education : *[list all the colleges/universities which the consultant attended, stating degrees obtained, and dates, and list any other specialized education of the consultant]*
8. Other Training : *[Indicate significant training since degrees under Education were obtained, which is pertinent to the proposed tasks of the consultant]*
9. Languages & Degree of Proficiency :

Language	Speaking	Reading	Writing
e.g. English	Fluent	Excellent	Excellent
10. Countries of Work Experience :
11. Employment Record : *[The Consultant should clearly distinguish whether as an "employee" of the firm or as a "Consultant" or Advisor" of the firm]*  
*[The Consultant should clearly indicate the position held and give a brief description of the duties in which the Consultant was involved]*

Employer 1	:	From:	To:
		[e.g. January 2019]	[e.g. December 2024]

Employer 2 : From: To:





Employer 3 : From: To:

Employer 4 : From: To:

12. Work Undertaken that Best Illustrates Your Capability to Handle this Assignment : *[Give and outline of experience and training most pertinent to tasks on this assignment, with degree of responsibility held. Use about half of a page A4].*

Certification *[Do not amend this certification]:*

I, the undersigned, certify that (i) I was not a former employee of the Client immediately before the submission of this proposal, and (ii) to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications, and my experience. I understand that any wilful miss-statement described herein may lead to my disqualification or dismissal, if engaged.

Signature

Date:

Day/Month/Year

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## Section 2: Name and Qualification of Management/Administrative Personnel

Serial No	Name of the Personnel	Position at the Firm	Temporary/ Permanent	Educational Qualification (Name of the Exam-----, Passing year-----, University-----)	Experience in Years

**Note:** The applicant shall have to be submitted a soft copy of Section 2 along with EOI document.

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## Section 3: Financial Statement

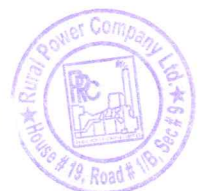
### Summary of Assets & Liabilities:

Serial No	Year	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
1.	Liquid Assets					
2.	Total Assets					
3.	Net Worth					
4.	Total Liabilities					
5.	Profit after Taxes					
6.	Turnover					

**Note: In support for the above documents, Audited Financial Statement must be provided. Otherwise application will not consider for evaluation. The applicant shall have to be submitted a soft copy of Section 3 along with EOI document.**

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### Section 4: Details of Vehicles, Instrument and Office Equipment

Serial No	Name, Brand of the Vehicles/Equipment, Year of Manufacture	Model No., Serial No./Registration No.	Present Condition

**Note: The applicant shall have to be submitted a soft copy of Section 4 along with EOI document.**



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## Section 5: Similar Experience of the Firm

The following format should be used to indicate the similar experience of the firm in projects.

Project Name		
Project Location	Start Date (M / Y)	Completion Date (M / Y)
Name of the Client with address and Contact Number		
Contract Amount in USD/EURO/BDT		
Name of the Associated Firm (if any)		
Narrative description of actual service provided by the firm for the project:		

Name of the Firm:-----

Signature of the authorized signatory:-----

- Note: 1. Experience must be supported by a certificate issued by respective Client. Otherwise application will not consider for evaluation.**
- 2. The applicant shall have to be submitted a soft copy of Section 5 along with EOI document.**



## Section 6: Experience of the Firm in other Works

Serial No	Name of Services	Name of Client with address and Contact number	Contract Amount	Start Date	Completion Date

- Note:**
1. Experience must be supported by a certificate issued by respective Client. Otherwise application will not consider for evaluation.
  2. The applicant shall have to be submitted a soft copy of Section 6 along with EOI document.





## Section 7: Terms of Reference (ToR)

For

**Consultancy Services for Detailed Feasibility Study (DFS), Initial Environmental Examination (IEE), Environmental and Social Impact Assessment Study (ESIA) of Patuakhali 100 MW Solar PV Power Plant Project including Route Survey (RS), Land Acquisition Plan (LAP) and Resettlement Action Plan (RAP) of Power Evacuation Transmission Line to the nearest Grid Sub-Station of the Project located at Kalapara, Patuakhali, Bangladesh.**

### 1.0 Background

Rural Power Company Limited (RPCL) is one of the Government owned Power Generation Companies of Bangladesh. It was registered as a Public Limited Company from the Register of Joint Stock Companies & Firms on 31st December 1994 to alleviate severe power crisis of the country. The company is presently generating 392 MW of electricity from its 4 (Four) Power Stations. RPCL has over the years gained experience in project implementation and operation & maintenance of Power Plants. This has given the company an edge over others in becoming the leading Bangladeshi company with four operating plants of its own.

Power Division has set a target for RPCL of a total of 2730 MW new power generation capacity at different locations which will be implemented within 2030 out of which 10% shall be from renewable sources. Government also has an aspiration to generate upto 40% (24000MW) of its total electricity generating from clean sources of energy by 2041. RPCL likes to implement 300 MW renewable energy based Power Plants at different location of Bangladesh. Presently, RPCL is implementing a 100 MW Solar PV Power Plant (Indian Soft Loan: LoC-III, approved by ECNEC) at Madarganj, Jamalpur and decided to implement 50 MW Solar PV Power Plant Project at Gazaria, Munshiganj and 100 MW Solar PV Power Plant at Kalapara, Patuakhali respectively.

**The Proposed Project Site:** RPCL has acquired 921.74 acres of land at Nishanbaria, Londa and Dhankhali Mouza of Dhankhali Union at Kalapara Upazila of Patuakhali District for the implementation of  $1320 \times 2 = 2640$  MW Coal Fired Thermal Power Plant. Out of which 1320 (2x600) MW Coal Fired Thermal Power Plant is under construction on 500 acres of land. Due to the cancellation of the 2nd phase 1320 MW Coal Fired Power Plant Project by the Government, a policy decision has been taken to build 100 MW Solar Power Plant on the remaining land. Geographic position of the site is  $22^{\circ}1'31.48''N$  and  $90^{\circ}18'3.07''E$ . Embankment and Earth Protection work have been completed. A 33/11kV, 10/14 MVA substation has been constructed for construction power to build new Power Plant. The generated power will be evacuated to the nearest Grid Sub-Station of PGCB.

### 2.0 Objective

Bangladesh has less experience of implementation of high Capacity Solar PV Project. RPCL need to assess the potentiality of the site for implementing mega solar Power Project and implement the Project by selecting Turn Key EPC Contractor within shortest possible time. A bankable Detailed Feasibility Study, IEE, ESIA Study including Route Survey (RS), Land Acquisition Plan

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(LAP) and Resettlement Action Plan (RAP) of Power Evacuation Transmission Line to the nearest Grid Sub-Station need to be conducted before taking decision for investment.

All conditions of this ToR are aimed to select a suitable consulting firm to carry out the consulting services for the Project. The consulting services assignment requires a team of consultants; they have extensive experience in designing of Solar PV Power Plant including Route Survey, LAP and RAP of transmission line, preparation and implementation of necessary social and environmental safeguards measures.

### 3.0 Scope of Services

The overall objective of these studies is to conduct the detailed Feasibility Study of the Project by envisaging financial viability, environmental sustainability and social acceptability.

#### **3.1 Scope of Services for Feasibility Study of the 100MW Solar PV Power Plant and Transmission Line**

The scope of services under this assignment includes the following but not limited to:

1. Preparation of a detailed and a Bankable Feasibility Study;
2. The study should follow the prescribed format of Planning Commission, Government of Bangladesh (Annexure-1);
3. Brief description of the selected site and justification of Site Selection;
4. Assess the technological alternatives/options and best suitable technology considering the site location and grid system;
5. Civil construction requirement as per BNBC -2020 standard;
6. Major equipment required for installation of the solar PV system;
7. Analyze the solar radiation data of the location by the latest version software;
8. Yield calculation using Meteonorm latest version simulation software (It includes month wise energy generation, Loss diagram over the whole year, Specific energy yield, Month wise performance ratio etc.);
9. Description and requirement of power evacuation system. PGCB has given consent that the produced energy will be evacuated through 230/132 kV Grid Sub-Station of PGCB (Geographical co-ordination 22°00'02.7"N and 90°17'31.5"E);
10. Forecast power demand of concerned grid;
11. Analyze the load flow with short circuit current analysis;
12. Detailed technical specification of each equipment of Power Plant (from PV panel up to transmission line);
13. Detailed technical specifications of the mandatory spare parts;
14. As per PPA, power factor should be 0.85 lagging at the delivery point. Required capacity of reactive support equipment to be determined;
15. Preparation of Bill of Quantity (BOQ) with Cost estimation;
16. Preparing Financial Model (BCR, IRR, NPV etc.) for the project according to the financial arrangement of RPCL;

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17. Preparing Economic Model considering Carbon Credit benefit as per SRO of GoB for the project in Economic Appraisal and External Cost and benefit in Economic Appraisal of the Project;
18. Estimated Cost of the Project;
19. Calculation of Levelized Tariff for the Power Purchase Agreement Tenure;
20. Preparation of operating budget;
21. Risk and risk mitigation plan for the project as per the given format of the Feasibility Report;
22. Complete Plant Layout including all equipment dimensions;
23. Complete single line diagram and detailed design description of Power Plant including all protection and metering system;
24. Detailed design of the Solar PV panel mounting structure and
25. Analysis of Geo-Technical and Topographical Survey Reports.

### **3.2 Scope of Services for IEE and ESIA Study**

The scope of services under this assignment includes the following but not limited to:

1. Initial Environmental Examination (IEE) as per DoE Guidelines;
2. Review of relevant literatures and existing documents of the proposed Project;
3. Review of legal and policy documents for defining legislative and regulatory considerations of environmental and social aspects;
4. Seismicity analysis based on secondary information;
5. Identify sources of water for fulfilling the requirements of the Project;
6. Site accessibility and transportation of raw materials for the Power Plant and Transmission Line;
7. Prepare an initial level of environmental and socio-economic baseline of the study area covering all project and project facilities in respect to water resources, environmental quality, land and agricultural resources, biological resources including ecosystems and fisheries point of view and socio-economic condition;
8. Identify the important environmental and social components (IESCs) which would be impacted by the project;
9. Conduct a preliminary environmental and social impact assessment against the project interventions and activities;
10. Identify potential project related hazards and natural events;
11. Conduct informal Public Consultation Meetings;
12. Prepare a Preliminary Environmental and Social Management Plan (ESMP);
13. Prepare a Terms of Reference (ToR) for the ESIA Study to be appended with the IEE report for the approval of DoE;
14. Prepare an IEE Report which shall form the basis of obtaining location/ site clearance certificate from the DoE. In this regard, necessary document and presentation to be performed as per requirement of the DoE;
15. Elaborate Project description and design details including phase- wise project activities;
16. Detail out and firm up the environmental and social baseline information delineated in the IEE level;

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17. Assess the requirements of water and its sources in different phases of the Project; In case of ground water, carry out an empirical analysis of GW availability;
18. Carry out a comprehensive environmental and social impact assessment emphasizing beneficial impacts of the Project;
19. Analyze project induced Risk and Hazard along with the natural events;
20. Prepare an Environmental and Social Management Plan (ESMP) in details with applicable measures and a tentative EMP implementation budget;
21. Prepare Disaster Impact Assessment (DIA) Report.
22. Prepare a Monitoring Plan including the budget;
23. Prepare a Demolition Plan for the end of project life span;
24. ESIA study should be conducted as per DoE/World Bank Guidelines and
25. Assist the Client for obtaining the Environmental Clearance from DoE.

### **3.3 Scope of Services for Route Survey of Transmission Line**

The scope of services under this assignment includes the following but not limited to:

1. Latest high resolution satellite image will be used to grossly delineate the alignment of the proposed line segment and visualized in map. These maps will be printed in adjustable scale which may be used by Client's Layout Planner for delineating a gross alignment for the proposed line;
2. After delineation of the final route, a detailed ground survey using DGPS/ GPS/RTK and/or Total Station will be conducted to prepare an elevation profile of the route. This profile will be used to fine tune the alignment. The final route will be printed on Mouza sheet with plots;
3. The detail survey will be conducted for an area of 50 m buffer on either side from the central Line along the route alignment;
4. Compensation Assessment Report of all Building, House, Structure, Tree, Crop etc.

### **3.4 Scope of Services for Land Acquisition Plan (LAP) for Transmission Line throughout the Route**

The scope of services under this assignment includes the following but not limited to:

1. Collection of the latest published mouza maps including relevant sheets of mouzas covering the proposed project alignment;
2. Scanning of mouza maps and digitizing all plots of the sheets;
3. Conversion of mouza map with plots into GIS format;
4. Collection of high-resolution satellite images;
5. Geo-referencing images through collecting GCP by conducting RTK survey at proposed project alignment and prepare database;
6. Geo-reference mouza plot map according to RTK GCP ortho corrected high resolution satellite images;
7. Collection of both Khatian records Upazila/Union Land Office (Tahsil Office);
8. Prepare land ownership database and linking with mouzas plot GIS database and
9. Super impose acquisition boundaries and preparation of acquisition mouza plot maps.

### **3.5 Scope of Services for Resettlement Action Plan (RAP) for Transmission Line**





The scope of services under this assignment includes the following but not limited to:

1. Project Conceptualization;
2. Identifying scope of land acquisition and resettlement;
3. Relevant Legal and Policy Framework;
4. Entitlements of compensation;
5. Resettlement budget (Payment of compensation, resettlement, rehabilitation, project management, project administration);
6. Detail survey data (in soft copy) of affected people with appropriate quality of standing trees/crops/lands;
7. Institutional arrangements and
8. Monitoring and evaluation.

#### **4.0 Study Schedule**

The study is proposed to be commenced immediately and is scheduled for completion in maximum 4 (Four) months. The study team is expected to mobilize immediately after the sign of contract.

#### **5.0 Reporting Requirements**

The following Reports in connection with the Detailed Feasibility Study are to be delivered by the consultant to the Client. The assignment is to be completed

- a. An Inception Report is to be prepared and submitted within 15 days from the date of commencement of the study;
- b. Draft Route Survey Report is to be prepared and submitted within 45 days from the date of commencement of the study;
- c. Final Route Survey Report is to be prepared and submitted within 75 days from the date of commencement of the study;
- d. Draft Detailed Feasibility Study Report including Detailed technical specification of each equipment of the Power Plant (from PV panel up to transmission line), Bill of Quantities (BoQ) with cost estimation, benefits, annual income, Net Present Value (NPV), Internal Rate of Return (IRR), Benefit Cost Ratio (BCR), Complete Plant layout are to be prepared and submitted at the end of 75 days from the date of commencement of the study;
- e. Final Detailed Feasibility Study Report including Detailed technical specification of each equipment of the power plant (from PV panel up to transmission line), BoQ with cost estimation, benefits, annual income, NPV, IRR, BCR, Complete Plant layout are to be prepared and submitted at the end of 120 days from the date of commencement of the study;
- f. Draft Land Acquisition Plan (LAP) and Draft Resettlement Action Plan (RAP) are to be submitted at the end of 75 days from the date of the commencement of the study;
- g. Final Land Acquisition Plan (LAP) and Final Resettlement Action Plan (RAP) are to be submitted at the end of 100 days from the date of the commencement of the study;
- h. Draft Initial Environmental Examination (IEE) Study Report is to be submitted at the end of 45 days from the date of commencement of the study;

- i. Final IEE Study Report is to be submitted at the end of 75 days from the date of commencement of the study;
- j. Draft Environmental and Social Impact Assessment (ESIA) Study Report is to be submitted at the end of 75 days from the date of commencement of the study;
- k. Final ESIA Study Report is to be submitted at the end of 120 days from the date of the commencement of the study;
- l. All draft Reports and Final Reports are to be submitted in 2 (two) and 5 (five) sets respectively in original with a soft copy;
- m. All reports must be prepared as per Bangladesh and the World Bank standards and acceptable to the Client.
- n. All reports shall be submitted to the following schedule as per contract:

SL No.	Report Submission Schedule (Days will count from the Contract Signing Date)			
		Inception	Draft Final	Final
	Name of Report	Days	Days	Days
1	Detailed Feasibility Study (DFS) of Power Plant	15	75	120
2	Detailed Feasibility Study (DFS) of Transmission Line	15	75	120
3	Initial Environmental Examination (IEE)	15	45	75
4	Environmental and Social Impact Assessment (ESIA)	15	75	120
5	Route Survey (RS)	15	45	75
6	Land Acquisition Plan (LAP)	15	75	100
7	Resettlement Action Plan (RAP)	15	75	100

## 6.0 Responsibilities of the Client (RPCL)

The consultant shall work under the direct supervision of the Chief Engineer (P &D), RPCL. The concerned offices of Rural Power Company Ltd. shall assist the study team as required. In case of any unforeseen events, be it in terms of physical or social obstacles at field levels; the concerned field offices of the Rural Power Company Ltd, will take initiatives to solve it and ensure good working environment.

## 7.0 Responsibilities of the Consultant

The consultants shall carry out the study as detailed in the “Scope of Services” and “Responsibilities” in the best interest of the Company for the successful realization of the project with all reasonable care, skill sound engineering, administrative and financial practices and shall be responsible to the company (Rural Power Company Ltd.) for discharge of responsibilities.

## 8.0 Team Composition, Qualification Requirement and Services

The person-months and field of expertise of the professional for the detail-feasibility study



should include the following:

### 8.1 Staffing requirement:

Sl. No.	Position	Input (Staff-month)
1	Team Leader (Solar PV Specialist)	3.00
2	Substation Expert	1.00
3	Transmission Line Expert	1.00
4	Structural Expert	1.00
5	Environmental Expert	1.00
6	Social Expert	1.00
7	Economist/ Financial Expert	1.00
8	Disaster Management Specialist	0.50
9	Agricultural Specialist	0.50
10	Biodiversity Specialist/ Ecologist	0.50
11	Water Resources Specialist	0.50
12	GIS Specialist	0.50
13	Route Survey Specialist	0.50
14	Resettlement Specialist	1.00
15	Land Acquisition Plan (LAP) Specialist	1.00
16	Survey Specialist	0.50
17	AutoCAD Specialist	1.00
	<b>Total</b>	<b>15.50</b>

### 8.2 Qualification and Experience:

#### 8.2.1 Team Leader (Solar PV Specialist)

##### Qualification:

- 1) He/she should have at least Bachelor in Mechanical /Electrical Engineering. Higher degree in Solar System will be an advantage.
- 2) He/she should have working experience of over 15 years in Solar mini Grid. 20 years' experience will carry maximum credit.
- 3) Working experience at least one 25 MW Solar PV Power Plant as Team Leader.
- 4) Experience of working in more than 1 (one) developing countries.

##### Responsibilities:

His/her tasks and responsibilities shall include but not limited to: He/she will

- 1) Oversee the assignment and the consultant team and act as the team's point of contact with RPCL.



- 2) Review all scope of services; manage the project including administration procedures for the implementation of the project.
- 3) Prepare the technical specifications; choose the best technology options considering the site location and grid system; Prepare the Project implementation schedules, and drawings for bidding of the Power Plant on a turn-key basis.
- 4) Advice and assist RPCL to develop and maintain a project quality assurance plan.
- 5) Prepare the sample of Testing Procedures for plant Major Equipment.
- 6) Review of hazard evaluation of Power Plant.
- 7) Prepare the detailed description of Major equipment required for installation of the solar PV system.
- 8) Analysis of the solar radiation data of the location.
- 9) Yield calculation using Meteonorm latest version simulation software (It includes month wise energy generation, Loss diagram over the whole year, Specific energy yield, Month wise performance ratio etc.).
- 10) Prepare the detailed technical specifications of the mandatory spare parts.
- 11) Prepare the Solar PV panel mountain structure design.
- 12) Conduct other duties and responsibilities as required by the ToR.
- 13) Attend meetings with the client as and when required.
- 14) Preparation of the reports at different stages of the study.
- 15) Others as necessary.

### **8.2.2 Substation Expert**

#### **Qualification:**

- 1) He/she shall be at least B.Sc. in Electrical Engineering; Masters in Electrical Engineering will carry maximum credit.
- 2) He/she shall have experience in similar nature of work for minimum 8 years. 10 years of experience in similar nature of works will carry maximum credit.
- 3) He/she must have through knowledge and working experience in power plant. He/she should have fair idea about the power plant set up. He/she must have proven records of leading and working with multi-disciplinary and multi-cultural teams.

#### **Responsibilities:**

His/her tasks and responsibilities shall include but not limited to: He/she will

- 1) Review the Power System Network Analysis Report.
- 2) Preparing and study technical drawings and specifications of electrical systems.
- 3) Prepare SLD and Layout of Bay extension facilities.
- 4) Installation and operations conform to standards and customer requirements.
- 5) Providing technical advice on the study.
- 6) All activities regarding protection and automation.
- 7) Assist team leader to prepare cost estimation.
- 8) Liaising with relevant professional staff.
- 9) Attend meeting with team leader as and when required by the client.
- 10) Assist the Team Leader in preparation of the reports at different stages of the study.





- 11) Others as necessary.

### 8.2.3 Transmission Line Expert

#### Qualification:

- 1) He/she shall be at least B.Sc. in Electrical Engineering; Masters in Electrical Engineering will carry maximum credit.
- 2) He/she shall have experience in similar nature of work for minimum 8 years. 10 years of experience in similar nature of works will carry maximum credit.
- 3) He/she must have through knowledge and working experience in power plant. He/she should have fair idea about the power plant set up. He/she must have proven records of leading and working with multi-disciplinary and multi-cultural teams.

#### Responsibilities:

His/her tasks and responsibilities shall include but not limited to: He/she will

- 1) Review the Power System Network Analysis Report.
- 2) Preparing and study technical drawings and specifications of transmission line towers.
- 3) Providing technical advice on the study.
- 4) Assist team leader to prepare cost estimation
- 5) Write transmission line feasibility portion
- 6) Liaising with relevant professional staff.
- 7) Attending meeting.

### 8.2.4 Structural Expert

#### Qualification:

- 1) He/she shall have at least a B.Sc. in Civil Engineering. Higher degrees in Structural Engineering will carry maximum credit.
- 2) He/she shall have experience in similar nature of work for minimum 8 years. 10 years of experience in similar nature of works will carry maximum credit.

#### Responsibilities:

His/her tasks and responsibilities shall include but not limited to:

- 1) Preparing the Design and Layout of the Plant.
- 2) Shall carry out all Civil and Geotechnical activities.
- 3) Interpret the environmental consequences of Solar PV Power Plant.
- 4) Determine the availability of land for the ultimate capacity of the power stations.
- 5) Find out the land quality and carry out the Geotechnical and Topographic survey.
- 6) Identify all technical requirements/parameters to be specified by RPCL required as part of the development of the Solar PV Power plant.
- 7) Preliminary idea of structural design of different components of the power plant.
- 8) Preparation of specification and cost of estimate (if required).
- 9) Assist the Team Leader in preparation of the reports at different stages of the study.
- 10) Suggest foundation for Tower and Bay Infrastructure.
- 11) Attending to the meeting and when required by the client.





- 12) Others as necessary.

### **8.2.5 Environmental Expert**

#### **Qualification:**

- 1) At least B.Sc. in Environmental Engineering or Environmental Science. Higher degree in the same field will carry the maximum limit.
- 2) He/she shall have experience of 10 years in environmental and social safeguard. 15 years of experience in similar nature of works will carry maximum credit.
- 3) Experience as safeguard specialist of at least one 15 MW of Solar PV Power Plant Projects.
- 4) Experience of working in more than 1 (one) developing countries.

#### **Responsibilities:**

His/her tasks and responsibilities shall include but not limited to:

- 1) Interpret the environmental consequences of Solar Power Plant.
- 2) Assess environmental impacts and mitigation measures.
- 3) Attend meetings with the client as and when required.
- 4) Preparation of the report at different stages of the study.
- 5) Contribute in developing environmental management plan including mitigation plan.
- 6) Other as necessary.

### **8.2.6 Social Expert**

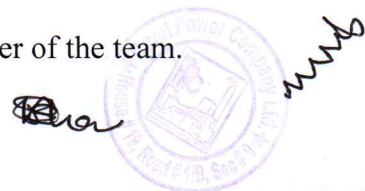
#### **Qualification:**

- 1) He/she should have a B.S.S (Hons) in Sociology or Social Welfare. Higher degree in the same field will carry the maximum limit.
- 2) Working experience at least 5 years in the field of Environmental and Social Impact Assessment Study. 8 years of experience in similar nature of works will carry maximum credit.
- 3) Experience as safeguard specialist of at least one 10 MW of Solar PV Power Plant Projects.

#### **Responsibilities:**

His/her tasks and responsibilities shall include but not limited to:

- 1) Designing and developing methodology along with collection, completion and analysis of data related to social activities in and around the Project site and along the transmission line route.
- 2) Identifying and assessing the possible positive and negative impacts in settlements and homesteads due to installation of the power plant.
- 3) Recommending measures to offset negative Impacts and will assist team leader in preparing the IEE report.
- 4) Coordinate with the team leader and others member of the team.





## 8.2.7 Economist/ Financial Expert

### Qualification:

- 1) He/she should have a Master degree in Economics / Finance. Higher Professional degree will carry the maximum limit.
- 2) He/she shall have experience of 10 years in similar of works nature. 15 years of experience in similar nature of works will carry maximum credit.
- 3) He/she should have experience in Financial and Economic study related to Solar PV Power Plant / Power transmission infrastructure and on macro and micro economics, regional planning, assessment of economic potentials of regional development plan, formulation of sectorial polices and strategies for Bangladesh.

### Responsibilities:

His/her tasks and responsibilities shall include but not limited to:

- 1) Perform detail-feasibility level economic and financial analysis (IRR & EIRR).
- 2) Examine and evaluate the available data related to the socio-economic condition of the study, magnitude and extents of the people sufferings from the proposed power plant.
- 3) Assist the Team Leader in preparation of the reports at different stages of the study.
- 4) He/she shall have to calculate the project benefit, annual income, Internal Rate of Return, benefit cost ratio.
- 5) Attending in the meetings with the team leader and
- 6) Other as necessary.

## 8.2.8 Disaster Management Specialist

### Qualification:

- 1) He/she should have B.Com (Hons) in Management/Bachelor in any Engineering degree /Disaster Science and Climate Resilience. Masters in Disaster Management will carry the maximum limit.
- 2) He/she shall have experience of 5 years in similar of works nature. 8 years of experience in similar nature of works will carry maximum credit.

### Responsibilities:

His/her tasks and responsibilities shall include but not limited to:

- 1) Natural Hazard Analysis.
- 2) Risk Identification and suggesting necessary Measures against the natural hazard.
- 3) Assessing the threat from project hazard.
- 4) Risk analysis of any accidents or if any leakage takes place.
- 5) Hazard and risk assessment.
- 6) Risk Modeling.
- 7) Preparing risk management plan.
- 8) Anticipate, identify and evaluate hazardous condition and practices.
- 9) Perform /review hazard assessment/accident investigations and develop corrective actions/measures to mitigate and control job hazards.





- 10) Review and analyze injury frequency records, causation trends, mitigation options for reducing injury frequency.
- 11) Perform hazard assessment and define job safety requirement in work permits.
- 12) Review and audit the safety and health programs for adequacy, compliance and effectiveness.
- 13) Serve as a member of the emergency response team.
- 14) Contributing in report preparation.
- 15) Providing information about technical activities and other technical things to the team members.
- 16) Coordinating with the Team Leader as well as other team members.
- 17) Other related works as directed by the Team Leader.

### 8.2.9 Agricultural Specialists

#### **Qualification:**

- 1) He/she should have B.Sc. in Agriculture/ Agricultural Engg. Higher degree in the same field will be carried the maximum limit.
- 2) Working Experience of related field at least 8 years. 10 years of experience in similar nature of works will carry maximum credit.

#### **Responsibilities:**

His/her tasks and responsibilities shall include but not limited to:

- 1) Crop Area Identification.
- 2) Cropping pattern and Crop yield assessment.
- 3) Identifying potential impacts and crop loss (if any).
- 4) Give necessary measures against the potential impacts.
- 5) Collecting historical data on Fisheries for generating the future without project (FWOP) condition and compare the same with the future with Project (FWIP).
- 6) Monitoring the impact of fish production and its diversity during the project implementation and suggest possible mitigation measures.
- 7) Suggesting Environmental Management Plan. Asses the environmental impact and mitigation measures and prepare IEE Reports.
- 8) Contributing in report preparation.
- 9) Providing information about technical activities and other technical things to the team members.
- 10) Coordinating with the team leader as well as other team members.
- 11) Other related works as directed by the team leader.

### 8.2.10 Biodiversity Specialist/ Ecologist

#### **Qualification:**

- 1) He/she should have a 4-years B.Sc. (Hons) in Botany. Higher degree will carry the maximum limit.
- 2) Working Experience of related field at least 5 years. 8 years of experience in similar nature of works will carry maximum credit.

### **Responsibilities:**

His/her tasks and responsibilities shall include but not limited to:

- 1) Designing and developing methodology along with collection, completion and analysis of data related to biological resources.
- 2) Establishing baseline condition for ecosystem resources.
- 3) Identifying and assess the possible positive and negative impacts on flora and fauna due to the proposed project.
- 4) Recommending measures to offset negative impacts and will assist team leader interpretation of data.
- 5) Greenbelt planning and design.
- 6) Miscellaneous task as and when required.
- 7) Contributing in report preparation.
- 8) Providing information about technical activities and other technical things to the team members.
- 9) Coordinating with the team leader as well as other team members.

### **8.2.11 Water Resources Specialist**

#### **Qualification:**

- 1) He/she should have B.Sc. in Civil Engineering/ Water Resources Engineering. Higher degree in the same field will carry the maximum limit.
- 2) Working Experience of related field at least 5 years. 8 years of experience in similar nature of works will carry maximum credit.

#### **Responsibilities:**

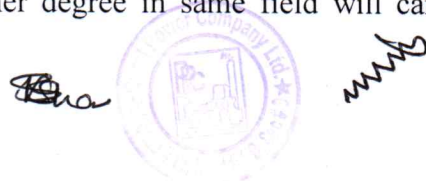
His/her tasks and responsibilities shall include but not limited to:

- 1) Contribute in preparing the report of the study.
- 2) Establish baseline hydrological condition in the project area.
- 3) Identify hydrological factors that may influence the hydrology and hydraulics in the project area.
- 4) Hydrological investigation.
- 5) Maintain close liaison and monitor the overall progress of hydrological study.
- 6) Liaison with all relevant stakeholder to collect secondary hydro-morphological data of the study rivers.
- 7) Any other responsibilities assigned by the authority.

### **8.2.12 GIS Specialist**

#### **Qualification:**

- 1) He/she shall have at least a 4-years B.Sc. (Hons) in Geography /Environmental Sciences or Bachelor degree in Civil Engineering. Higher degree in same field will carry the maximum limit.





- 2) Engineering with minimum 5 years working experience in the field of GIS. 8 years of experience in similar nature of works will carry maximum credit.

**Responsibilities:**

His/her tasks and responsibilities shall include but not limited to:

- 1) Support study team by preparing maps and providing spatial information on demand.
- 2) Identifying special topographical features.
- 3) Prepare all types of maps and drawings required for the study
- 4) Extracting land use information from satellite image.
- 5) Conducting spatial analysis using collected field and environmental data.
- 6) Geo-referencing of the Mouzas through field survey of Ground Control Points (CCPs).
- 7) Ensuring the accuracy of Mouza maps through geometric correction.
- 8) Processing of high-resolution images to get the accurate area for the land acquisition and
- 9) Preparation of Land Acquisition Plan (LAP) Map showing affected area, part or full plots, class of land and ownership of land in the proposed acquisition area.

### **8.2.13 Route Survey Specialist**

**Qualification:**

- 1) He/she should have B.Sc. Engineering (Civil). Higher degree in the same field will be carried the maximum limit.
- 2) Working Experience of related field at least 5 years. 8 years of experience in similar nature of works will carry maximum credit.

**Responsibilities:**

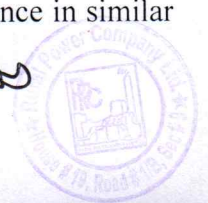
His/her tasks and responsibilities shall include but not limited to:

- 1) Understanding the project data need and formulate/ plan field data collection program with proper equipment and techniques.
- 2) Lead/guide and advice research assistant/surveyors and the survey team in the field in order to set up equipment, measuring different instruments requires etc.
- 3) Preliminary Route Identification and finalize with the consent of the Client.
- 4) Select the Route for the 8km overhead Transmission Line based on the presence of less settlement, less vegetation coverage, less river or canal crossing etc.

### **8.2.14 Resettlement Specialist**

**Qualification:**

- 1) He/she should have a B.Sc. in Statistics or Civil Engineering. Higher degree in the same field will be carried the maximum limit.
- 2) Working experience at least 5 years in relevant field. 8 years of experience in similar nature of works will carry maximum credit.





**Responsibilities:**

His/her tasks and responsibilities shall include but not limited to:

- 1) Review of Land Acquisition Plan (LAP) and relevant documents of the project.
- 2) Collect necessary preliminary data and information using Inventory of Losses (IOL) Survey, Socio-Economic Survey (SES), and Property Valuation Survey (PVS) for analyzing the impacts.
- 3) Conduct necessary consultation meeting with the stakeholders and documentation of records and feedbacks.
- 4) Prepare entitlement policy and eligibility criteria for the affected households/ persons in consultation with the Client.
- 5) Prepare RAP for the affected households/units.

**8.2.15 Land Acquisition Plan (LAP) Specialist**

**Qualification:**

- 1) He/she should have a B.S.S (Hons) in Sociology or Social Welfare. Higher degree will be carried the maximum limit.
- 2) Working experience at least 5 years in relevant field. 8 years of experience in similar nature of works will carry maximum credit.

**Responsibilities:**

His/her tasks and responsibilities shall include but not limited to:

- 1) Review project interventions designed in the project preparatory documents to get the study context.
- 2) Collection of latest Mouza maps in hardcopy format from Upazilla Land Office/ Union Land Office (Tehsil Office) and /or from other possible sources.
- 3) Scanning the hardcopy Mouza sheets maintaining technical quality.
- 4) Collection of latest Khatian information available to the Union Land officers and preparation of Khatian Database.
- 5) Processing of high resolution images to get the accurate area of the land.
- 6) Design, arrange and conduct necessary public consultation meetings and field workshops as required and find out the problems, needs and expectation.
- 7) Obtain people's opinion to resolve problems considering needs and expectation.
- 8) Preparation of Land Acquisition Plan (LAP) Map and Plot Indexes.

**8.2.16 Survey Specialist**

**Qualification:**

- 1) He/she should have a Diploma Engineering (Civil) or Survey. Higher degree will be carry the maximum limit.
- 2) Working Experience of related field at least 5 years. 8 years of experience in similar nature of works will carry maximum credit.



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**Responsibilities:**

His/her tasks and responsibilities shall include but not limited to:

- 1) Establish Bench Mark Point.
- 2) Ensure vertical accuracy.
- 3) Assist Digital Survey Expert in field as well as in data processing.
- 4) Digital survey by using total station.
- 5) Data management and processing.
- 6) Quality control and accuracy assessment.
- 7) Carrying out survey works.

**8.2.17 Auto CAD Specialist**

**Qualification:**

- 1) He/she shall have at least a 4-years Diploma in Civil/Mechanical/Electrical Engineering. Higher degree in same field will be carried the maximum limit.
- 2) Engineering with minimum 5 years working experience in the field of Auto-CAD. Extensive experience is required with Auto-CAD, ARC/INFO, and Arc View Software. He/she must have proven records of leading and working with multi-disciplinary team. 8 years of experience in similar nature of works will carry maximum credit.

**Responsibilities:**

His/her tasks and responsibilities shall include but not limited to:

- 1) Prepare all types of maps and drawings required for the study.
- 2) Shall have close co-ordination with all other members of the team for preparation of the maps and drawings of the study.
- 3) Others as necessary.



**Annexure 1: Planning Commission Form**



**Ministry of-----  
Government of the People's Republic of Bangladesh**

**Feasibility Study for -- (Name of the Project/Projects)**

**----- (Month) 20---**





# Executive Summary

Summaries the key findings of the Feasibility Study and Recommendations.

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# Project Feasibility Study Report

## Section 1: Basic Information

1.	Name of the Project	:	
2.	(a) Sponsoring Ministry/Division (b) Implementing Agency	:	
3.	Project Objectives (Project to be taken based on the study)	:	
4.	Estimated Project Cost (Taka in Crore)	:	
5.	Sector & Sub-Sector	:	
6.	Project Category (Based on Environment Conservation Rules 1997)	:	
7.	Project Geographic Location (a) Countrywide (b) Division (c) District (d) Upazila (e) Others (City Corporation/ Pourashva)	:	
8.	Project Duration	:	

## Section 2: Introduction

### Describe the following:

- Project Background: Rationale and genesis (Mention the sources of information through reviewing the relevant documents);
- Objectives of the feasibility study;
- Approach and methodology of the feasibility study; and
- Organization of the feasibility study.

## Section 3: Market/Demand Analysis

This section assesses the need for public investments and involves the elements listed below:

- Problem Statement:** Provide an explicit definition of the problem to be addressed, identify the likely causes (both direct and indirect) of the problem and give a brief insight of the likely consequences if no intervention in public sector is made.
- Relevance of the Project Idea:** Justify the need for the proposed project by linking the project(s) goals, outcomes and outputs to Global/National Development Plans/Policies and Sector Strategic objectives.
- Proposed Project Interventions:** Describe the interventions (project inputs & outputs) that need to be undertaken by the government through the proposed project to address the problem, describe the interventions undertaken earlier to solve this problem by this organization or other organizations (if any).





- (d) **Stakeholders:** Identify the key stakeholders that are likely to be associated with the project interventions.
- (e) **Demand Analysis:** Identify the need for public investments by assessing:
- I. Current demand (based on statistics provided by service providers/regulators/ministries/national & regional statistical offices for the various types of users);
  - II. Future demand (based on reliable demand forecasting models) in both the scenarios with and without the project; and
  - III. Various constraints and means to meet the demand including government regulations, technological developments etc.
- (f) **SWOT Analysis:** Identify the Strengths, Weaknesses, Opportunities and Threats to the project.

#### Section 4: Technical/Technological & Engineering analysis

A summary of the proposed project shall be presented with the following headings:

- i. **Location:** description of the location of the project including a geographical illustration (map and/or geo-coordinates) with justification. Availability of land is a key aspect; evidence should be provided that the land is owned (or can be accessed) by the organization, which has the full title to use it, or has to be purchased (or rented) through acquisition/requisition process. Besides, it should address if any kind of utility shifting is required. Identify the issues of disaster risks (existing and future) in the proposed location along with project site on hazard map.
- ii. **Technical design:** description of the main components, technology adopted, design, standards and specifications. Key output indicators should be defined as the key physical quantities produced (e.g. meters, sq. meters, kilometers, numbers, man months, etc.). If the project is in disaster prone areas and has the probability of climate change impact, disaster and climate change risks related information should be integrated in technical design in order to address the impact of hazards on the project.
- iii. **Output plan:** description of the output and the expected utilization rate. These elements describe the service provision from the supply side in the context of the forecasted demand.
- iv. **Costs estimates:** estimation of the financial needs for project design, implementation and operations, component wise cost estimates should be provided based on evidence.
- v. **Implementation timeline:** considering the volume of works, capacity of implementing agency, budget flow (MTBF ceiling), project priority etc. a realistic project timeline along with the implementation schedule should be provided (for example, a Gantt chart with the work plan).

#### Section 5: Environmental Sustainability, Climate Resilience and Disaster Risk Analysis

##### 5.1 Environmental, Climate Change and Disaster Risk Analysis

Specify and describe the economic effects/impacts of environmental, disaster and climate change

and possible compensations for ecological damages. Key issues to be addressed:

- (a) What are the likely environmental, disaster and climate change impacts or risks from the project (any impact of project to increase the existing disaster and climate change related risks and/or contribute to create new risks)?
- (b) What counter measures should be taken to reduce these impacts?
- (c) What is the cost for reducing/mitigating the negative impacts?
- (d) Are there alternative ways of delivering the required services or goods without incurring these environmental costs? What are the costs of these alternatives?
- (e) What types of assessments are required for the project (e.g. EIA/DIA)?
- (f) Is there any resettlements issue to be addressed? If yes, provide resettlement modality in details.

## 5.2 Assessment of Disaster Resilience of the Project

This section assesses the resilience and address about uncertainties. Key indicators need to be discussed:

- (a) Contingency Plan for Emergency Disaster Management: Describe the evacuation plan if required, institutional arrangement for shutting down of utility services, and general procedures to be followed by individuals during disasters (Fire, Earthquake, Flood, Cyclone etc.);
- (b) Business Continuity Plan: Outline the key response and recovery priorities. This plan will detail out how different utility services will be rendered to support the overall Emergency Management Plan;
- (c) Time of Recovery: Required time for rehabilitation after a disaster; and
- (d) Reporting of residual risks: Reporting of remaining risks after recognition and put in place adequate risk reduction measures.

## Section 6: Cost-Benefit Analysis

### 6.1 Financial Analysis

Describe the components of costs and benefits at market prices including option analysis.

- (a) Identify the components of cost & benefit;
- (b) Transfer them in monetary value;
- (c) Construct cash flow;
- (d) Identify the Key Assumptions considered in exercises; then
- (e) Compute the following indicators and interpret the results:
  - I. Financial Net Present Value (FNPV)
  - II. Financial Benefit Cost Ratio (FBCR)
  - III. Financial Internal Rate of Return (FIRR)

### 6.2 Economic Analysis

Economic adjustments from financial data using standard conversion factor; after that costs and benefits are appraised from the point of view of the entire economy.

- (a) Identify the direct, indirect and associated cost and benefit components;
- (b) Adjust them where necessary;



- (c) Convert the value of cost and benefit components into economic price by using Standard Conversion Factor (SCF) determined by the Government;
- (d) Construct the cash flow;
- (e) Mention the Assumption;
- (f) Compute the following indicators and interpret the results:
  - I. Economic Net Present Value (ENPV)
  - II. Economic Benefit Cost Ratio (EBCR)
  - III. Economic Internal Rate of Return (EIRR)

**Section 7: Human Resources and Administrative Support Analysis  
(During Implementation and Post Implementation of the project)**

Point out the functional structure and institutional capacity of the Agency (in terms of both Technical & Financial) required for implementation and operational stages of the project(s), sources of the workforce & financing are needed to be identified. Key issues to be addressed:

- (a) What types of managerial and skilled workforces are needed during implementation and operational phases of the project?
- (b) Does the project entity have ability to provide the managerial and skilled workforces needed for implementation of the project? If not, provide suggestions specifically.
- (c) Does the implementing agency have institutional capacity (financial & technical) to retain the project output functional? If not, provide specific suggestions.
- (d) Is the project entity equipped with skilled & experienced workforces to operate the project output? If not, provide specific suggestions.
- (e) Does the entity have adequate fund under its recurring budget to incur the operational expenditure of the project output? If not, provide specific suggestions.
- (f) Is timing of project consistent with organizational capacity (in terms of quantity and other)? A comparative statement should be provided in light of experience of the entity in project implementation.

**Section 8: Institutional and Legal Analysis**

Illustrate the legal restrictions (if any) that may obstruct or impede the project during its implementation and functional stage of the project outputs, key issues are:

- (a) Does the project match with the legal boundary (allocation of business or mandate) of the project entity?
- (b) Are the capabilities and physical facilities of the agency being properly utilized?
- (c) Is there any need for adjustment (reforms) in the policy and/or institutional setup?
- (d) What adjustments may be required before the project is implemented?
- (e) Do the institutions have suitable skills and capacity in line with the project requirements?
- (f) Are there any incentives or penalties in place to ensure the project delivery on time and within the budget?
- (g) Are there any critical governance issues that may affect implementation? If yes, state briefly.
- (h) Are there any challenges related to cross-cutting issues to be addressed? If yes, a mitigation strategy would be suggested.
- (i) Others (if any).

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## **Section 9: Risk (Uncertainty) and Sensitivity Analysis**

Issues regarding uncertainty in flow of costs and benefits through out the project period should be taken into considerations. Guideline has to be formulated to stimulate different scenario and to reduce the risks in light of the relevant contractual clauses. The questions that need to be answered are:

- (a) What are the major risks that may affect project?
- (b) How will the project be affected if the risk event materialized?
- (c) What are the possible mitigation measures needed?
- (d) How sensitive are the assumptions used in the financial and economic models in an environment that differs significantly?
- (e) Are there any risks, legal and regulatory obligations that could increase costs or decrease the benefits? If there any, how much project implementation may be hampered or benefit of the project may be reduced?

## **Section 10: Alternative/Options Analysis**

Option Analysis with recommendations & justifications. Technology and strategy recommended to achieve the goals and objectives of the proposed project should be described along with advantages and disadvantages considering various technologies and strategies applicable.

## **Section 11: Recommendation and Conclusion**

Illustrate the solutions specifically to overcome the critical issues that may hinder the project implementation and that would be supported by different sections of analysis.

## **Section 12: Annexes**

Attach detailed technical and engineering designs, plant prototypes designs etc. Financial & Economic models and any supporting documents.

