

**Alternative Energy Promotion Centre (AEPC)
Renewable Energy for Rural Livelihood (RERL)**

REQUEST FOR PROPOSAL FOR CONSULTING SERVICES

RFP RERL No. 08

Title of Consulting Services

Detailed Feasibility Study of Solar Mini-grid Projects

Cluster#1- Bajhang, Humla, Dolpa, Mustang, Saptary

Cluster#2- Dailekh, Rolpa, Palpa

(Note: Bidder can only apply for either of the two Clusters proposed)

Project Name : Renewable Energy for Rural Livelihood (RERL)

Office Name : Alternative Energy Promotion Centre (AEPC)

Office Address : Khumaltar Height, Lalitpur, Nepal

Financing Agency: RERL

Date of RFP Issue: 14 May 2018

Deadline for Submission of RFP: 27 May 2018

Date.....

Dear Sir/Madam

Subject: Detailed Feasibility Study of Solar Mini-grid Projects

Please study the evaluation criteria and provide the relevant information

To enable you to submit a proposal, attached are:

- i. Instruction to OfferorAnnex I
- ii. General Terms and Conditions of the ContractAnnex II
- iii. Proposal Submission FormAnnex III
- iv. Financial Proposal Submission Form.....Annex IV
- v. Terms of Reference (TOR).....Annex V

Your offer comprising of both a technical proposal and a financial proposal, in a separate sealed envelopes, should reach the following address no later than **27 May 2017**.

A bidder can submit proposal **for one cluster only**. Please mention in cover letter **(Cluster 1 OR Cluster 2)** that the bidder is applying for.

The National Programme Manager
Renewable Energy for Rural Livelihood (RERL)
Khumaltar Height, Lalitpur, Nepal
Phone: 01 5539390, 5539391, Fax: 01 5542397
Website: <http://www.aepc.gov.np/rerl/>
Email: rerl@aepc.gov.np

If you required additional information, we are ready to provide information, but any delay in providing such information will not be considered a reason for extending the submission date of your proposal.

Yours sincerely,

Mr. Satish Gautam
National Programme Manager(NPM)

A. Introduction

1. General

The purpose of this RFP is to invite technical and financial proposals from the potential consulting firms who have skill, knowledge and expertise for " **Detailed Feasibility Study of Solar Mini-grid Projects**".

2. Cost of Proposal

The offeror shall bear all costs incurred during submitting the proposal. The offeror shall bear all costs associated with the preparation and submission of the proposal. RERL will in no case be responsible or liable for those costs, regardless, of the conduct or outcome of the evaluation of this proposal.

B. Solicitation Documents

3. Contents of solicitation documents

Proposals must offer services for total requirement. The Offeror is expected to examine all corresponding instructions; forms, terms and specifications contained in the solicitation Documents. Failure to comply with these documents will be at the offeror's risk and may affect the evaluation of the Proposal.

4. Clarification of solicitation documents

The offerors requiring any clarification of the Solicitation Documents can forward their queries in the following email address

Email: rerl@aepec.gov.np

5. Amendment of solicitation documents

At any time prior to the deadline for submission of proposals, the RERL may, for any reason, whether at its own initiative or in response to a clarification requested by a shortlisted Offeror, modify the Solicitation Documents by amendment.

All offerors that have received the Solicitation Documents will be notified in writing of all amendments to the Solicitation Documents. In order to afford prospective Offerors reasonable time in which to take the amendments into account in preparing their offers, RERL will notify in time.

C. Preparation of Proposals

6. Applying for providing services

The Offerors need to read the RFP including the ToR and prepare proposal accordingly. The proposal must address all the requirements of the proposal including required documents.

7. Language of the proposal

The proposal prepared by the Offeror and all correspondence and documents relating to the proposal exchanged by the Offeror and the RERL shall be written in the English language.

8. Documents comprising the proposal

The proposal shall comprise the following **mandatory documents**:

- a. Proposal submission form
- b. Organizational Profile/Brochure—describing the nature of business, field of experience, licenses, certification and accreditations
- c. Valid registration and renewal certificate
- d. VAT certificate
- e. Tax Clearance Certificate of 2073/74
- f. Track records of Human resource- with list of similar services relevant to objective and scope of works included in this RFP.
- g. CVs of proposed human resources signed by concern individual
- h. The proposal must provide clear methodology to meet the activities proposed for completing this task

9. Proposal form

The Offeror shall structure the operational and technical part of its proposal as follows:

i. Proposed methodology

This section should demonstrate the Offeror's responsiveness to the specification by identifying the specific components proposed, addressing, the requirements, as specified, point by point, providing a detailed description of the essential performance characteristics proposed warranty; and demonstrating how the proposed methodology meets or exceeds the specifications. **This section should explain clearly how the required information as mentioned in the scope of work in the attached ToR will be collected and analyzed.**

Pricing information shall be separated and only contained in the appropriate Price Schedules.

It is mandatory that the Offeror's Proposal numbering system corresponds with the numbering system used in the body of this RFP. All the references to descriptive material and brochures should be included in the appropriate response paragraph, though material/documents themselves may be provided as annexes to the Proposal/response.

Information which the Offeror considers proprietary, if any, should be clearly marked "proprietary" next to the relevant part of the text and it will then be treated as such accordingly.

ii. Summary Sheet

The Offeror is required to prepare a summary sheet (Table 1) with information related to Feasibility Study of Solar PV Mini Grid Projects, Other related large scale solar PV related work.

Table 1 Summary sheet

SN	Name of the program/project	Contract agency	Duration	Amount of contract

Note: Please mention only settlement, infrastructure or urbanization sector program/project

iii. Qualification of the Service Provider

The consulting firm (Offeror) must have at two years of experience in renewable energy projects. Preference will be provided to the consulting firms with prior experience in study, design and installation of solar PV mini grid systems. The consulting firm must be legally registered as per the rule of Government of Nepal and provide the following documents

1. Consulting Firm/Company Registration Certificate
2. VAT Registration Certificate
3. 2073/74 Tax Clearance Certificate

iv. Human Resource Requirement

Team Leader/ Solar Power Expert: The Team Leader must have a minimum of Masters Degree in Renewable Energy/Energy/Engineering or equivalent with 3 years professional experience or bachelor degree with 5 years of experience in Electrical/Electronic/Mechanical Engineering especially in the field of renewable energy (solar PV) system. The candidate shall possess experience desinging large scale solar PV system. The Team Leader/ Solar PV Expert will be responsible for coordinating activities pertaining to the activities mentioned in this ToR. Team Leader should possess excellent interpersonal, technical and communication skills, as well as proficiency in written and spoken English and Nepali language.

Transmission and Distribution (T&D) Line Design Engineer: The T&D line design Engineer must have at least bachelor degree in Electrical/Electronics Engineering with 5 years of experience in the field of T&D line design. S/he should have very good knowledge of voltage drop analysis, desing of components of T&D line, safety requirements etc.

Energy Finance Expert: The Financial Expert should have Bachelor in Engineering /Management/Engineering Economic/Finance with atleast 5 years of experience in financial analysis of RE projects. The candidate having experience in financial analysis of solar PV project will be highly preferred.

10. Proposal prices

The Offeror shall indicate on an appropriate Price Schedules, the price of a service it proposes to supply under the contract. The VAT should be included in the offer, if applicable. The tax will be deducted at source as per prevailing tax rule of the government.

11. Proposal currencies

All prices shall be quoted in the Nepalese Rupees (NRs)

12. Period of validity of proposals

Proposals shall remain valid for One Hundred And twenty (120) days after the date of the Proposal submission prescribed by the RERL, pursuant to the deadline clause. A Proposal valid for a shorter period may be rejected by RERL on the grounds that it is non-responsive.

In exceptional circumstances, the RERL may solicit the Offeror's consent to an extension of the period of validity. The request and the responses there to shall be made in writing. An Offeror granting the request will not be required or permitted to modify its proposal.

13. Format and signing of Proposals

The Offeror shall prepare the Proposal. The Proposal shall be in typed or written in indelible ink and shall be signed by the Offeror or a person or persons duly authorized to bind the Offeror to the contract. The latter authorization shall be indicated by written power-of-attorney accompanying the proposal.

The Proposal shall contain no interlineation, erasures, or overwriting except, as necessary to correct errors made by the Offeror, in which case such corrections shall be initialed by the person of persons signing the proposal.

14. Estimated Completion Date

The desired delivery date for completion of this task is 4 months after signing the contract.

15. Payment

The RERL shall effect payments to the Contractor/Offeror after acceptance by the RERL of the invoices submitted by the Contractor/Offeror. The payments will be made in installment basis based on deliverables.

Amount in percentage

Payment

- | | |
|---------|---|
| i) 30% | Immediately after Signing Contract. |
| ii) 40% | After submission of draft report |
| ii) 30% | After submission of final report and approval from of AEPC/RERL |

D. Submission of Proposals

16. Sealing and marking of Proposals

The Offeror shall seal (lahachhap) the proposal in one outer and two inner envelopes, as detailed below.

- (i) The outer envelope shall be

Addressed to:

The National Project Manager
Renewable Energy for Rural Livelihood (RERL)
Khumaltar Height, Lalitpur, Nepal
Phone: 01 5539390, 5539391, Fax: 01 5542397
Website: <http://www.aepc.gov.np/rerl/>
Email: rerl@aepc.gov.np

And,

Marked with:

" Detailed Feasibility Study of Solar Mini-grid Projects- Cluster"

- (ii) Both inner envelopes shall indicate the name and address of the Offeror. The first inner envelope shall contain the information specified in clause 8 (Proposal Form) above. The second inner envelope shall include the price schedule and price schedule of individual Offeror duly identified as such.

NOTE, if the inner envelopes are not sealed and marked as per the instructions in this clause, the RERL will not assume responsibility for the Proposal's misplacement or premature opening.

17. Deadline for the submission of Proposals

Proposals must be received by the RERL at the address specified under clause *Sealing and Marking of Proposals* no later than **17:00 hrs, 27 May 2018**.

RERL may, at its own discretion extend this deadline for the submission of Proposals by amending the solicitation documents in accordance with clause *Amendments of Solicitation Documents*, in which case all right and obligations of the RERL and Offerors previously subject to the deadline will thereafter be subject to the deadline as extended.

18. Late Proposals

Any Proposals received by RERL after the deadline for the submission of Proposals, pursuant to clause *Deadline for the submission of Proposals*, will be rejected.

19. Modification and withdrawal of the Proposals

The Offeror may withdraw its proposal after the Proposal's submission, provided that written notice of the withdrawal is received by the RERL prior to the deadline prescribed for the submission of the Proposals.

The Offeror's withdrawal notice shall be prepared, sealed, marked, and dispatched in accordance with the provisions of the Clause Deadline for Submission of Proposals. The withdrawal notice may also be sent by telex or fax but followed by a signed confirmation copy.

No proposal may be modified subsequent to the deadline for the submission of the Proposals.

No Proposal may be withdrawn in the interval between the deadline for submission of proposals and the expiration of the period of the Proposal validity specified by the Offeror on the Proposals Submission Form.

E. Opening and evaluation of the Proposals

20. Opening of proposals

The RERL will open the Proposals in the presence of AEPC and UNDP representatives at the Programme Office.

21. Clarification of the proposals

To assist in the evaluation and comparison of Proposals, the Purchaser may at its discretion, ask the Offeror for clarification of its Proposal. The request for clarification and the response shall be written form and no change in price or substance of the Proposals shall be sought, offered or permitted.

22. Preliminary examination

The Procurer will examine the Proposals to determine whether they are complete, whether any computational errors have been made, whether the documents have been properly signed, and whether the Proposals are generally in order.

Arithmetical errors will be rectified on the following basis: If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price errors, its proposal will be rejected. If there is a discrepancy between the words and figures the amount in words will prevail.

Prior to the detailed evaluation, the Procurer will determine the substantial responsiveness of each Proposal to the request for Proposals (RFP). For the purposes of these clauses, a substantially responsive Proposal is one which confirms to all the terms and conditions of RFP without material

deviations. The producer's determination of a proposal's responsiveness is based on the contents of the proposal itself without recourse to extrinsic evidence.

23. Evaluation and comparison

Total Score (100%) = Technical Evaluation (70%) + Financial Evaluation (30%)
Maximum Total Score = 1000

The Financial Proposal carries a total score of 300 points. The points for the financial proposal will be allocated as per the following formula:

$$\frac{\text{Lowest Bid Offered}^*}{\text{Bid of the Firm/Offeror}} \times 300$$

* "Lowest Bid Offered" refers to the lowest aggregate price offered by proposers scoring at least 70% points in Technical Evaluation.
 The Contract will be awarded to the (agency/Organization/Firm) Offeror scoring the highest combined scores (Technical and Financial).

Technical evaluation criteria will be as follows:

Summary of technical proposal evaluation form	Score weight	Point obtainable
Expertise of the firm submitting proposal	20%	200
Methodology, its appropriateness to the ToR, condition and timeliness of the implementation plan	30%	300
Qualification and experience of personnel	50%	500
Total		1000

NOTE: Seventy percent weightage will be given to technical proposal and thirty percent for financial proposal.

Form 1: Criteria for evaluation of expertise of the firm

SN	Criteria	Obtainable points	Company/Firm				
			A	B	C	D	E
1	Minimum of 2 Years of Experience in	40					

	Renewable Energy Projects						
2	Organizational structure (size of the firm, strength of project management, annual turnover)	90					
3	Completed task relevant to this activity	70					
	Sub-total	200					

Form 2 Criteria for evaluation of approach, methodology and appropriateness

SN	Criteria	Obtainable points	Company/Firm				
			A	B	C	D	E
1	Understanding of Existing AEPC's Design Guideline for Solar-Wind Mini Grid	60					
2	Proposed approach and methodology	100					
3	Feasibility Study Outline and Presentation	100					
4	Timeline plan	40					
	Sub-total	300					

Form 3. Criteria for evaluation of proposed human resources

SN	Criteria	Obtainable points	Company/Firm				
			A	B	C	D	E
Solar Power Expert-Team Leader	Masters in Renewable Energy or Energy or Environmental Engineering with 3 Years or Bachelor Degree in Electrical/Electronic/Mechanical Engineering with 5 Years	60					
	Technical Expertise in Design of previous projects (Large scale solar PV projects, mini grid, hybrid projects, etc.)	100					
	Specific experience relevant to the proposed task	50					
T&D line Design Expert	Minimum Bachelors Degree in Electrical/Electronics Engineering	30					
	Minimum of 3 Years experience in designing T&D line	100					
	Experience on understanding of NEA distribution code having experience in calculation of voltage drop analysis, fault analysis, safety requirements.	30					
Energy Finance Expert	Bachelor in Engineering /Management/Engineering Economic/Finance	30					
	Minimum of 5 years of experience in	60					

	financial analysis of RE projects						
	Specific experience related to financial analysis of Solar Mini Grid Projects	20					
	Coherency of Team	20					
Sub-Total		500					

B. Award of contract

24. Award criteria, award of contract

The RERL reserves the right to accept the proposal or reject all proposals at any time prior to award of the contract, without thereby any liability to the affected Offeror or any obligation to inform the affected Offeror or Offerors of the grounds for the Purchaser's action prior to the expiration of the period of proposal validity, the RERL will award the contract to the qualified Offeror whose proposal after being evaluated is considered to be the most responsive to the needs of the organization and activity concerned.

25. Purchaser's right to vary requirements

The purchaser reserves the right at the time of award of the contract to vary the quantity of services and goods specified in the RFP without any change in price or other terms and conditions.

26. Signing of the conditions

After the evaluation of the proposals, **a selected Offeror will be asked to enter into contract.** Within 5 days of the receipt of the contract, the successful Offeror shall sign and date the contract and return it to the purchaser.

General Terms and Conditions of the Contract

1. Independent Relationship

Nothing contained in the contract shall be construed as establishing or creating between Government and the Organization the relationship of a master and a servant or principal and agent, it being understood that the Organization is an independent person vis-à-vis Government.

2. Organization /Expert/Consultant's General Responsibilities

- The organization shall carry out services under this contract with due diligence and efficiency and in conformity with the highest standards of professionals and ethical competence and integrity.
- The Organization shall act at all times so as to protect, and not be in conflict with the interests of Government.
- The organization shall be responsible for the professional and technical services provided by him/her in the implementation of this contract.

3. Workmen's compensation and other insurance

The organization shall make his/her own arrangements regarding insurance for the medical expenses and for an accident, death and permanent disability for the period of this contract. All costs involved will be borne by the Organization.

4. Source of Instruction

The organization shall neither seek nor accept instructions from any authority other than NPC/RERL's authorized agent in connection with the performance of services under this contract.

5. Prohibition on conflicting activities

The Organization shall ensure that he/she will not directly/indirectly engage in any activity that would conflict with those of RERL in respect of this evaluation.

6. Officials no to benefit

The Organization warrants that no RERL has been or will be admitted by him/her to any direct/indirect benefit arising from this contract or award thereof.

7. Assignment

The Organization shall not assign, transfer, pledge or make other disposition of this contract or any other parts thereof rights, claims or obligations under this contract, without prior written approval of RERL.

8. Records, Accounts, Information and Audit

- The organization shall maintain accurate and systematic records and accounts in respect of the services to be performed under this contract.

- The Organization shall furnish, compile or make available at all times to RERL any records or information, oral or written, which RERL may reasonably request for in respect of the services to be performed under this contract.
- The Organization shall allow RERL or its authorized agents to inspect and audit all such records or information upon reasonable notice.

9. Language

Unless otherwise specified in this contract, English language shall be used by the Organization in all written communications to RERL with respect to the services rendered and with respect to all documents procured or prepared pertaining to such services.

10. Equipment of property

Equipment or property furnished to the organization with funds supplied or reimbursed by the RERL or its agent shall be the property of the RERL and such equipment shall be returned to the duly authorized official of RERL upon completion of the services, conclusion of this contract or upon completion of the services, conclusion of this contract or upon termination thereof or when no longer required by the Organization. Such equipment or property when returned to RERL shall be in the same conditions as when delivered to the Organization, subject to the normal wear and tear. The organization shall in any event, be liable to RERL for the loss of or damage to such equipment or property through his/her fault or negligence.

11. Confidential Nature of Documents

All maps, drawings, photographs, mosaics and plans.

12. Amendments

The terms and conditions of this contract may be amended only in writing signed by both parties to this contract or their duly authorized representatives.

13. Obligation to Inform RERL of change in condition

The organization shall promptly and fully notify RERL in writing of any conditions, which interfere, or threatens to interfere, with successful carrying out of the services under this contract. Such notice shall not however relieve the Organization of his/her obligations to continue to provide services under this contract. Upon receipt of such notice, RERL shall take such action as in its sole discretion it considers to be appropriate or necessary under the circumstances.

14. Taxation

The Organization shall be liable for any tax levied on the remuneration and allowances paid as per this contract. Income tax on the remuneration and allowances paid to the organization will be deducted at source.

Proposal Submission Form (Company Letter Head)

The National Programme Manager
Renewable Energy for Rural Livelihood (RERL)
Khumaltar Height, Lalitpur, Nepal
Phone: 01 5539390, 5539391, Fax: 01 5542397
Website: <http://www.aepc.gov.np/rerl/>
Email: rerl@aepc.gov.np

Dear Sir,

Having examined the Solicitation Documents, the receipt of which is hereby duly acknowledged, we, the undersigned, offer to provide services to conduct evaluation of the "**Detailed Feasibility Study for Solar Mini-grid Projects**" for the sum as may be ascertained in accordance with the Price Schedule attached herewith and made part of this proposal.

We undertake, if our proposal is accepted, commence and complete delivery of all services specified in the contract within the time frame stipulated.

We agree to abide by this Proposal for a period of 120 days from the date fixed for opening of Proposals in the invitation for proposal, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

We understand that you are not bound to accept any proposal –whole or part –you may receive.

Dated this day/Month of year

Signature
Name
Position
Stamp

Duly authorized to sign Proposal for and on behalf of

Financial Proposal Submission Form
PRICE SCHEDULE

The Consulting Firm/Contractor is asked to prepare the Price Schedule alongwith the cost breakdown (as provided in this annex IV below) in separate envelop. All prices/rates quoted must be inclusive of all taxes. The Price Schedule must provide a detailed cost breakdown. Provide separate figure for each functional grouping or category. The format shown on the following pages should be used in preparing the Price Schedule. The format includes specific expenditures, which may or may not be required or applicable but are indicated to serve as the examples. Therefore, it should be considered as broad guidelines for Price Schedule (s).

Cost Breakdown by Cost Component [This is only an Example]:

S.N.	Particulars	Quantity	Unit	Rate NRs	Amount NRs.
A	Human Resource				
1	Solar Power Expert-Team Leader		MD		
2	T&D Line Design Expert		MD		
3	Energy Fiancne Expert		MD		
B	Travel cost and DSA				
C	Total (A +B)				
D	VAT (13%) of C				
	Total (C+D)				

Notes:

1. Financial proposals will be selected on the basis of compliance with RERL costing parameters.
2. Payment will be made only for the activities costed in the financial proposal.

(Signature)

[Name and Signature of the Service Provider's Authorized Person]

[Designation]

[Date]

(Office Stamp)

**Terms of Reference
for
Detailed Feasibility Study of Solar Mini-grid Projects**

1. Introduction and Background

Alternative Energy Promotion Centre (AEPC) is the apex Government body under the Ministry of Population and Environment which was established in 1996 with major objective as promotion of Renewable Energy Technologies for enhancement of the socio-economic status of the rural people. Under AEPC, UNDP-GEF-RERL Programme has been under implementation, from 1st July, 2014 upon the successful completion of the Rural Energy Development Program (REDP) and Renewable Energy for Rural Livelihood (RERL), with main focus on enhancing rural livelihood. The objective of the programme is to remove barriers to increased utilization of renewable energy resources in rural Nepal in order to support technical, economic, environmental and social development of people in the rural areas and to reduce GHG emissions.

The GEF-RERL programme is supporting AEPC in newer areas of Renewable Energy Technologies (RETs) where efforts are needed to establish the systems such as in Mini Hydro, Mini Grid and Large Scale Solar System. The programme will also support for creating conducive environment at the community level to take lead on accessing and utilizing renewable energy solutions; to build linkages between community and micro/macro finance institutions, market developments/information and possible partnership opportunities for implementing livelihood enhancement program. The program implementation will ensure complementarities with other RE programmes by fostering partnership with central and local government, institutions, private sector and other development partners.

2. Rationale of the Study

AEPC has received demands to carry out feasibility study of Solar Mini Grid Systems from following locations;

Cluster#1

1. Kada Rural Municipality, Ward no. 3, **Bajhang**- 160 households
2. Tajakot Rural Municipality, Ward no. 4 and 5, **Humla**- Approx 700 households
3. Shey-Phoksundo Rural Municipality, Ward no. 4 of Dhangdar and Namdo Settlement, **Dolpa**
4. Varagung Mukti Chetra Gaupalika (Kagbeni) Rural Municipality, Sangta Gaun, **Mustang**:
5. Bode Barshain Municipality, Rauthat and Malahankya Village, **Saptari**

Cluster#2

1. Mahabu Rural Municipality, Ward no. 3, **Dailekh**, 300HH
2. Tabang Rural Municipality, Ward no. 4 and 6, **Rolpa**
3. Nisadi Rural Municipality, Ward no. 1 and 2, **Palpa**

Upon preliminary interaction with community representatives, AEPC has reached into the decision to conduct feasibility study of these sites. During the interaction, AEPC officials has clearly asked whether there is river or any other water resources or not, availability of national grid etc. This is

basically to determine Best Available Technology (BAT) of that particular place. However during interaction, it has been concluded that it is not necessary to go for detailed BAT assessment as the grid is distant apart from these settlements and there is no possibility of micro/mini hydro. Thus the consultant has to carry out the activities mentioned in the Scope of Work mentioned below.

3. Objectives of the Study

The main objective of this study is to carry out detailed feasibility study and detail engineering design for the above mentioned sites. Specific objectives of the assignment are:

- Detail site assessment and feasibility study (including technical, financial and socio-economic viability)
- Detail Engineering Design and Drawings (of power generation and distribution system)
- Cost estimation of the proposed energy system
- Productive End Use (PEU) Baseline Preparation and inclusion of its demand in the feasibility study

4. Scope of Work (activities)

Under the assignment objectives following are the main Scope of Work.

1. Carryout the demand survey for the proposed location. The survey should be based on AEPC survey form which would be shared by AEPC for successful bidder.
2. Carry out focused group discussion and discussion with sample individual household. Also interact with Ward office/Rural Municipality office and investigate their readiness for the possible solar mini grid project.
3. Propose the feasible solutions based on the survey data carried out. The consultant also has to superficially analyse Best Available Technology of that place. If it comes other than large scale solar, it has to inform AEPC/SASEC/RERL's concerned officials before going for detailed design and estimation.
4. Analyze and confirm the possibility of national grid-connection within the next 5 years through interaction with local community and local Nepal Electricity Authority (NEA) office.
5. Carry out the resource assessment of the proposed area. More specifically, the global horizontal radiation, daily radiation of that particular area can be obtained from either Meteorological or Solargis or measured and validated data if any.
6. Carryout the energy demand and projection of load growth for particular place based on focused group discussion or CBS data.
7. Based on the demand and resource assessment, design major components of solar mini grid system. The component information should include minimum of
 - a. Land availability and assurance from community for land acquisition for power house and solar array placement.
 - b. GPS coordinates of power house
 - c. Solar array sizing
 - d. Battery sizing
 - e. Inverter sizing
 - f. Charge controller sizing
 - g. Mounting structure design and sizing
 - h. DC and AC cables sizing
 - i. Control, protection and monitoring system type and size
 - j. Conductor sizing for transmission and distribution based on voltage drop, line length, current flow etc.

- k. The route of T&D has to be determine through GPS tracking system which could be later seen from Google Earth too. The total T&D lenght should be validated based on both tape measured data and GPS tracker data.
 - l. Carryout the voltage drop analysis of distribution system. It is advisable not to exceed 10% of voltage drop in any section of distribution line.
 - m. Design of electric pole, insulator, cross arm, stay set and other distribution system component. It is highly recommend to refer NEA's practise of distribution system design.
 - n. Complete layout of project including power house and distribution network
 - o. Design of lightning system to ensure safety of personal and equipment from lightning.
8. Prepare Bills of Quantities (BOQ) drawings and Cost Estimate of the Project. The design and cost estimate should be technically and economically optimized. All potential optimized solutions should be presented in the final report.
 9. Financial and economic analysis, sensitivity analysis, risk assessment of the project.
 10. Conduct environmental assessment and risk analysis if any.
 11. Investigate the possibility of end use for solar application and need of that particular area.
 12. Conduct Socio-economic analysis including assessment of general socio economic information of the village or bazaar, socio-economic profile, energy intervention, willingness to accept mini-grid system, willingness and capacity to pay for upfront equity (if any) as well as monthly electricity tariff, interest to own and operate mini-grid system, gender equality and social inclusion (GESI) status, community benefit assessment etc.
 13. Propose a model of operation suitable for local context.

5. Inputs from AEPC/SASEC/RERL

There will be following inputs for completing the assignment:

- a. AEPC/ SASEC/RERL provides relevant documents /materials and information– as well as.
- b. Design Guideline of Solar/Wind Mini Grid
- c. Demand survey forms (both indivisual and focused group-if required)
- d. Details of Focal Persons of the prosposed sites