

**CORRIGENDUM 01 DTD. 19.03.2018**  
**TENDER NO. CEMKTG001 dated 17.03.2018**

## List of documents to be included during submission of offer

Documents to be submitted along with tender/pre-bid tie up/ post PO

- Seal and sign the tender documents including

- a) Pre-qualification requirement (PQR)
- b) Technical specification,
- c) NLC Document
- d) Deed of Joint undertaking
- e) Co-operation agreement for associate (CAA)
- f) Instruction to bidder (ITB)
- g) Special conditions of contract (SCC)
- h) Integrity pact
- i) Unpriced bid (without prices with relevant taxes and duties)
- j) Price bid (with prices with relevant taxes and duties)
- h) Undertaking for exclusivity criteria.

## **PRE-QUALIFICATION REQUIREMENTS (PQR) :**

Bids of Only such Bidders who meet all the following Qualification criteria, shall be evaluated:

**1.1** Bidder should have executed contracts of Design/Engineering, Supply, Erection/Supervised erection, commissioning of Battery Energy storage system with cumulative capacity of 1.0MWhr. or above as on the original scheduled date of tender opening and out of which at least one Battery Energy Storage System shall be of minimum 0.5MWhr. capacity or above and should be in successful operation for at least one year within the last 7 years as on the original scheduled date of tender opening.

**1.2** The Bidder shall have Positive Net Worth as per the latest audited financial statements.

**1.3** Average Annual Turn Over of the Bidder, Average, shall not be less than Rs.25 Cr. in the preceding three (3) consecutive financial years as on the original scheduled date of tender opening.

### **2.0 Other Conditions:**

**2.1** The Bidder shall attach documentary evidence to prove that the qualifying requirements mentioned in Clause 2.1 above are met by him / them, along with the bid in the form of end user certificate together with full contact details for verification. The Bidder shall submit End User Certificate which is subject to verification for qualification. The end user certificates showing the experiences of their own installations or subsidiary or group companies or companies under the same Management is also acceptable. A confirmation from the firm which is having the experience in this regard is to be enclosed along with end user certificate. In case the bidder furnishes the end user certificates of their subsidiary or group companies or companies under the same Management, in addition to End User Confirmation, NLC reserves the right to inspect such installations where such certificates are obtained by the Bidder, only if the Bidder facilitates necessary inspection of such installation by the purchaser. However, cost pertaining to the purchaser's personnel for such inspection shall be borne by the purchaser.

**2.2** In case of participation by the Bidder with Collaborator(s), the bidder shall furnish a copy of valid Collaboration Agreement along with the bid, for the services offered jointly and such agreement shall be valid till completion of all the contractual obligations including O&M Contract. In case of participation by the Bidder as a Consortium, the bidder shall furnish a copy of valid Consortium Agreement and Joint Deed of Undertaking along with the bid, for the services offered jointly and such agreement shall be valid till completion of all the

contractual obligations including O&M Contract. In case of participation by the Bidder as a Joint Venture Company, the bidder shall furnish a copy of valid Joint Venture Agreement along with the bid, for the services offered jointly and such agreement shall be valid till completion of all the contractual obligations including O&M Contract. In all the above cases, the percentage value of the respective portion of the work is to be indicated in the Techno commercial bid.

**2.2(a)** The successful bidder meeting the Qualifying Requirements, shall furnish a Contract Performance Guarantee (CPG) in the form of an on-demand Bank Guarantee for the faithful performance of the contract for a value of 10% of the total contract value after the award of LOA.

**2.2(b)** If the successful bidder is meeting the Qualifying Requirements with Collaborator(s), in addition to the CPG as mentioned in Cl. 3.2(a) above, each Collaborator shall also furnish a back up Bank Guarantee for 5% of their respective portion of the scope of work. In case the respective portion of the scope of work is less than 1% of the total contract value, then back up Bank Guarantee for a minimum of 0.05% of the total contract value shall be furnished.

**2.2(c)** If the successful bidder is the leader of a consortium, in addition to the CPG as mentioned in Cl. 3.2(a) above, each of the consortium partners other than the leader shall furnish a back up Bank Guarantee for 5% of their respective portion of the scope of work. In case the respective portion of the scope of work is less than 1% of the total contract value, then back up Bank Guarantee for a minimum of 0.05% of the total contract value shall be furnished.

**2.2(d)** If the successful bidder is a JV Company meeting the Qualifying Requirement, in addition to the CPG as mentioned in Cl. 4.5.3(a) above, each partner of the JV Company on the basis of whom the JV company gets qualified shall also furnish a back up Bank Guarantee for 5% of their respective portion of the scope of work. In case the respective portion of the scope of work is less than 1% of the total contract value, then back up Bank Guarantee for a minimum of 0.05% of the total contract value shall be furnished.

**2.3** The bidder or the bidder with collaborator(s) or all individual firms in the Consortium or all partners in the Joint Venture Company, as the case may be, shall furnish their audited profit and loss accounts and balance sheets for the preceding three (3) financial years from the original scheduled date of tender opening.

**2.4** NLCIL reserves the right to ask the bidders to furnish the experience certificate authenticated by the Indian Embassy in that country for installation outside India and to furnish the experience certificate attested by a Notary Public for installation within India.

**2.5** NLCIL reserves the right to consider any foreign installations as experience, only if the Bidder facilitates necessary inspection of such installation by NLCIL. However, cost pertaining to the purchaser's personnel for such inspection shall be borne by the purchaser.

**2.6** NLCIL reserves the right to inspect the plant(s) referred to by the bidders as well as the original documents submitted in support of their claim to assess its veracity.

**2.7** The bidder shall furnish major legal cases and their statutory liabilities if any.

### **3.0 OTHER REQUIREMENTS:**

The Bidder shall take note of the following, but not limited to, as per Department of Industrial Policy and Promotion (DIPP), Ministry of Commerce and Industry, Govt. of India, Public Procurement (Preference to Make in India) Order 2017 dated 15.06.2017. The Bidder shall confirm compliance to the requirements indicated below:

#### **3.1 DEFINITIONS:**

i. 'Local content' means the amount of value added in India which shall, be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.

ii. 'Local supplier' means a supplier or service provider whose product or service offered for procurement meets the minimum local content as prescribed.

iii. 'L1' means the lowest tender or lowest bid or the lowest quotation received in a tender, bidding process or other procurement solicitation as adjudged in the evaluation process as per the tender.

iv. 'Margin of purchase preference' means the maximum extent to which the price quoted by a local supplier may be above the L1 for the purpose of purchase preference.

Minimum local content: The minimum local content shall be 50%. Margin of Purchase Preference: The margin of purchase preference shall be 20%.

### **3.2 Verification of local content:**


- i. The local supplier at the time of tender, bidding or solicitation shall be required to provide self-certification that the item offered meets the minimum local content and shall give details of the location(s) at which the local value addition is made.
- ii. The local supplier shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.
- iii. False declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules-2017, Ministry of Finance, Govt. Of India for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules-2017, Ministry of Finance, Govt. Of India along with such other actions as may be permissible under law.
- iv. A supplier who has been debarred by any procuring entity for violation of this Order shall not be eligible for preference under this Order for procurement by any other procuring entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities”.

### **3.3 Establishment and man power criteria:**

The bidder shall be able to provide services to BHEL-EDN as detailed in the specifications within 24 hours of BHEL-EDN asking for the same. It is preferred that the Bidder has a local Indian office for providing services to BHEL-EDN. However Bidders who do not have a local India office may also participate if they are willing to start a local Indian office with at least 10 engineers working on Simulator Software and services within 30 days from the date of receipt of order by BHEL from NLCIL, for which documentary evidence shall be furnished.

### **3.4 Exclusivity criteria:**

The bidder who is selected in this Bid as BHEL's Associate shall preferably not participate in this NLCIL's Bid either directly or as an associate of any other Bidder. Else, the Bidder shall at least mandatorily agree to participate as BHEL's Associate as a preferred partner and provide preferential pricing to BHEL. An undertaking to this effect shall be submitted by Bidder on Company letter head and seal stating the above. If at a later date it is found that Bidder has violated this requirement, then BHEL may ban the Bidder from bidding to BHEL for any product or services in future.

	<b>INSTRUCTION TO BIDDERS (ITB) – PART A</b> <b>BATTERY ENERGY STORAGE SYSTEM</b> <b>FOR</b> <b>INTEGRATING WITH SOLAR PV PLANT</b>	Ref: SCPV/330/NLC/ITB
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**NOTICE INVITING BIDS**

**BID SUBMISSION AND OPENING:**

The proposals are to be submitted in TWO PARTS as follows:

Part-I:: Pre-Qualification Requirement, Letter of Undertaking of Preferential pricing, No-Deviation Certificate, Techno-commercial (with Un-priced Price Schedule) Bid

Part-II: Price Bid

Both Part-I and Part-II shall be submitted together latest by 23.03.2018 upto 13.00 hrs.

Price Bids of only such Bidders who meet the PQR and whose Techno-Commercial Bids are found acceptable, shall be opened.

Soft signed copy of Qualification Requirements, Techno-Commercial Bids and Price Bids in soft copies in .pdf format shall reach the mailbox mentioned below:

spankaj@bhel.in, chendhil@bhel.in

**NO REQUEST FOR EXTENSION SHALL BE ENTERTAINED.**

Signed ORIGINAL Hard copy of the Part-I and Part-II Bids Price Bids shall be sent to:

AGM (SC&PV-MM)  
Attention. Sh Ponnuguru Packiam  
Bharat Heavy Electricals Ltd.  
NEB 5th Floor, Electronics Division  
Mysore Road, Bangalore – 560026.  
Ph. 080-26988669, Cell: +919449869617

**Bid Clarifications:**

Bidders seeking clarifications on the tender specification requirements shall email the same to the following on or before 12:00 hrs IST on 23-03-2018


spankaj@bhel.in, chendhil@bhel.in

Only Clarifications by written Email will be acknowledged and replied by BHEL. Clarifications sought orally or via telephone will not be entertained.

**Preparation of Bids**

The Part-I and Part-II Bids shall consist of following and the same shall be submitted together within the due date as stipulated in the tender specifications.

**Part-I Bid:**

	<b>INSTRUCTION TO BIDDERS (ITB) – PART A</b> <b>BATTERY ENERGY STORAGE SYSTEM</b> <b>FOR</b> <b>INTEGRATING WITH SOLAR PV PLANT</b>	Ref: SCPV/330/NLC/ITB
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1) Pre-Qualification Requirements: Documentary evidences in support of the PQR stipulated in this ITB. Documentary evidence to meet the Financial criteria, Establishment criteria, and Undertaking for Preferred Partner and Preferential Pricing to BHEL. The bidder shall furnish their audited profit and loss accounts and balance sheets for the preceding three (3) financial years from the original scheduled date of tender opening

2) No Deviation Certificate

Bidder shall furnish a signed soft copy of “Unconditional No Deviation Certificate” on BHEL specification requirements as a separate document. Non-furnishing of the same shall risk in rejection of Bids.

3) Power of Attorney:

Bidder shall furnish a Power of Attorney from competent authority of their organisation in the name of the Authorised signatory, authorizing him / her to sign and submit Bids, Provide clarifications if sought by BHEL, participate in negotiations with BHEL, participate in discussions with NLCIL if required. Copy of Delegation of powers for Competent authority to issue Power of attorney shall be enclosed with the Power of Attorney.

4) Techno Commercial Bid

Bidder shall furnish a responsive techno commercial bid containing the Documents, Drawings, Sixing calculations, Energy Generation Guarantees as listed in Part-B, BHEL’s Technical Specifications. Bidders shall note that techno commercial bids shall be considered for evaluation only if the “No Deviation Certificate” submitted by bidder is found to be satisfactory and unconditional.


Part-II Bid:

Bidder shall furnish the signed soft copy of the filled price schedules as per the format enclosed in the specification in .pdf. Bidder shall also be required to furnish signed ORIGINAL HARD COPY of Part-I and Part-II Bids

Bid evaluation:

Bidders who meet the qualification requirements and have submitted documentary evidence in support of the same and who have submitted the signed copy of “No Deviation Certificate” as well as acceptance of Terms & Conditions shall be considered as eligible bidders and the Technical commercial bids of these Bidders shall be evaluated.



	<b>INSTRUCTION TO BIDDERS (ITB) – PART A</b> <b>BATTERY ENERGY STORAGE SYSTEM</b> <b>FOR</b> <b>INTEGRATING WITH SOLAR PV PLANT</b>	Ref: SCPV/330/NLC/ITB
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Clarifications if any shall be sought from Bidders on technical commercial Bid, and these clarifications shall be provided by Bidders within 24 hours upon request from BHEL failing which Bids shall be treated as nonresponsive and summarily rejected.

In case during the evaluation of Technical commercial Bid if any amendment is required to scope of supply and services, then the same shall be informed to eligible Bidders and Supplementary Price Bids shall be requested and the same shall be submitted by Bidders in similar fashion as Part-II Bid submission on date and time specified by BHEL-EDN.

Price Bids may be opened “IN CAMERA” by the committee. Clarifications if any shall be sought and filed for records.

**Bid Evaluation Criteria:**


The Bids shall be evaluated as per the following criteria:

The Total cost to BHEL-EDN shall be calculated to include basic prices for supply including customs clearance & port clearance, port charges, (if any), basic prices for services, Transportation upto Site, Marine and Inland Transit Freight & Insurance , all applicable Taxes & Duties, as Applicable to arrive at the “Lowest Cost to BHEL” Bid (L1). Bidder shall ascertain all applicable Taxes & Duties for inclusion in the Price Bid. Also Applicable taxes and duties as included in the Price shall be declared along with rates applicable. For supplies from abroad, the Customs Duty and other applicable Taxes & Duties on Imports shall be included (on Merit Duty basis) to arrive at the landed cost to BHEL.

No other Taxes & Duties other than those declared by Bidder shall be allowed at a later date except where the Taxes & Duties undergo a change due to statutory reasons.

**Selection of Associate:**

Bidder whose Techno commercial bids are found suitable and whose Price bid is evaluated to be the Lowest (L1) shall be called for negotiations, if required, to be able to obtain the most optimum and best price to ensure that BHEL is successful in bagging the order from NLCIL. Subsequent to this Bidder will be termed as BHEL-EDN’s Associate and will be requested to submit a Bank Guarantee of 1% of the Final negotiated value of Bidder’s price as a security deposit. BHEL-EDN shall then Sign a Co-operation Agreement for Associate (CAA) with the associate as per the Format enclosed with Technical specifications. Subsequent to signing of CAA, the Associate shall also be required to sign a consortium Agreement with BHEL for submission to NLCIL with BHEL’s Bid. In the event of NLCIL placing order / signing contract with BHEL, this CAA will form the basis for placement of order by BHEL shall place order on Associate during project execution on back-to-back basis. Associate shall also sign a Deed of Joint Undertaking as per format enclosed which shall be submitted by BHEL along with composite Bid to NLCIL.

	<b>INSTRUCTION TO BIDDERS (ITB) – PART A</b> <b>BATTERY ENERGY STORAGE SYSTEM</b> <b>FOR</b> <b>INTEGRATING WITH SOLAR PV PLANT</b>	Ref: SCPV/330/NLC/ITB
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The selected associate after Price bid evaluation shall visit BHEL-EDN, Bangalore office within a short notice of ONE DAY for price negotiations, signing of Consortium agreement, CAA, DJU, signing of Attachments along with supporting documents for NLCIL tender.

Subsequent to BHEL becoming successful in bagging this contract if Customer seeks reduction in prices / insists for negotiations then Associate shall agree for the same and resultant reduction in prices if any shall be proportionately be passed on to Associate and shall be unconditionally accepted by Associate.

**REQUIREMENT TO BE FULFILLED BY BIDDER WHO IS SELECTED AS BHEL’S ASSOCIATE**

Bidder who is selected by BHEL as the successful Bidder after Techno-Commercial and Price Evaluation, will be BHEL’s Associate for participating in the Tender floated by NLCIL. The Associate shall enter into a CAA with BHEL and sign a Joint Deed of Undertaking for submission to NLCIL along with the BHEL’s Bid. This agreement and Joint Deed of Undertaking shall be valid till completion of all the contractual obligations of the Associate. The Associate so selected shall also sign an Co-operation Agreement Associate (CAA) with BHEL which shall form the basis for future back-to-back placement of Order on Associate by BHEL in the event of NLCIL placing order / signing a contract with BHEL.

The selected Associate, shall furnish the following Bank Guarantees immediately upon being informed of selection and signing of Co-operation Agreement for Associate (CAA) with BHEL. The Associate shall also be required to sign a consortium agreement with BHEL which shall be submitted by BHEL with BHEL’s Bid to NLCIL.


(a) BHEL as lead Bidder shall be required to submit a Bank Guarantee of Rs.1,63,00,000/- to NLCIL as EMD for participating in the Tender. Associate shall submit a Back-up Bank Guarantee to BHEL for EMD in proportion to Associate’s share of the Estimated Price as per calculation below. This BG shall be valid for 10 months from Date of Bid opening by NLCIL i.e 10 months from 27-03-2018 and shall be extendable by Associate on the request of BHEL .

Associates Price for their share of work x 1,63,00,000/-

Estimated Total Bid Price

(b) Bank Guarantee of 1 % of the Associates Price as Backup Guarantee for the Co-operation Agreement for Associate (CAA)

This BG shall be valid for 12 months from Date of Bid opening by NLCIL i.e 15 months from 27-03-2018 or till the date of placement of back-to-back Order by BHEL (in case NLCIL places order on BHEL) on Associate whichever is later and shall be extendable by Associate on the request of BHEL.


	<b>INSTRUCTION TO BIDDERS (ITB) – PART A</b> <b>BATTERY ENERGY STORAGE SYSTEM</b> <b>FOR</b> <b>INTEGRATING WITH SOLAR PV PLANT</b>	Ref: SCPV/330/NLC/ITB
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Bank Guarantees to BHEL shall be as per the enclosed formats from any of the Banks as per the List of approved Banks in this ITB. No change in format shall be acceptable whatsoever.


c) In case NLCIL places order on BHEL, then BHEL shall place back-to-back order on Associate as per agreed Terms & Conditions. The Associate shall furnish within 10 days of placement of order by BHEL, a Bank Guarantee to BHEL for 10% of the Associates Ordered price as Contract Performance Guarantee (CPG).

d) In addition to the CPG as mentioned above, Associate shall also furnish a back up Bank Guarantee for 5% of their portion of the scope of work to NLCIL as per the Format enclosed. In case their portion of the scope of work is less than 1% of the total contract value, then back up Bank Guarantee for a minimum of 0.05% of the total contract value shall be furnished.

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	<b>SPECIAL CONDITIONS OF CONTRACT(SCC) – PART B BATTERY ENERGY STORAGE SYSTEM FOR INTEGRATING WITH SOLAR PV PLANT</b>	Ref: SCPV/330/NLC/SCC
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**TITLE: SPECIAL CONDITIONS OF CONTRACT (SCC) FOR**  
**BATTERY ENERGY STORAGE SYSTEM**  
**FOR**  
**INTEGRATING WITH SOLAR PV PLANT**

	<b>SPECIAL CONDITIONS OF CONTRACT(SCC) – PART B</b> <b>BATTERY ENERGY STORAGE SYSTEM</b> <b>FOR</b> <b>INTEGRATING WITH SOLAR PV PLANT</b>	Ref: SCPV/330/NLC/SCC
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Terms and Conditions:

1. Bidders shall note that BHEL will be participating as lead bidder in the following Tender of NLCIL:

Tender No. CO CONTS/ 0006G / PV Solar - BESS /ICB/Andaman/e-contrs/ 2018, dt.24.02.2018

1. The scope of work for installation of 2 x 10 MW (AC) Grid interactive Solar PV Power Project integrated with 8 MWhr. Battery Energy Storage System at Attam Pahad and at Dolly Gunj, Port Blair, South Andaman with associated 33 KV Switchyard and grid interconnection at the take off points of Electricity Department of Andaman & Nicobar Administration including Design, Engineering, Manufacture, Inspection at supplier's works, supply, insurance, transport, storage, erection, testing, commissioning.

The scope of work also includes Operation and Maintenance of the entire system for ten years after one year warranty.

2. This Tender floated by BHEL for Competitive Bidding is for sole purpose of Selection of techno-Commercially and Price wise Best Bid among Vendors who are Bidding to be BHEL's Associate for for Submission of Bid to NLCIL in response to above tender of NLCIL by entering into a / Cooperation Agreement for Associate (CAA) with BHEL. In case BHEL's bid is successful and BHEL receives order from NLCIL / NLCIL signs a contract with BHEL, then this CAA will form the basis of back-to-back placement of order on Associate by BHEL as per agreed scope division.

**This tender shall not be understood as Tender for placement of order/ procurement of BESS by BHEL.**


3. BHEL-EDN is not responsible for any delay in receipt of quotation sent by vendor through post/e-Mail/fax.

4. BHEL- EDN does not bind itself to accept the lowest rate quoted, but reserves right to accept whole or part of any quotation at its sole discretion. Bids should remain valid for a minimum period of 240 days from the due date of Bid opening by NLCIL (23<sup>rd</sup> Mar 2018) and shall be further extendable depending upon requirement of BHEL / NLCIL.

5. BHEL-EDN is under no obligation to inform the prices of Lowest quoted vendor or any other vendors to anyone. This is keeping in view the confidentiality required for participation in NLCIL's ICB tender.

4. Lowest quotation is determined on the basis of Total Cost to BHEL- EDN for supply& services including basic value, all taxes and duties, freight, and insurance.

5. It is mandatory that all Bidders agree to sign Deed of Joint Undertaking (DJU) failing which Bids shall be liable for rejection. It is deemed that by submission of Bids to BHEL in response to this Tender, Bidder agrees to be considered for selection as BHEL's Associate for participating in NLCIL Tender and if selected agrees to sign Deed of Joint Undertaking (DJU) if and when called upon by

	<b>SPECIAL CONDITIONS OF CONTRACT(SCC) – PART B</b> <b>BATTERY ENERGY STORAGE SYSTEM</b> <b>FOR</b> <b>INTEGRATING WITH SOLAR PV PLANT</b>	Ref: SCPV/330/NLC/SCC
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BHEL to do so. Techno-Commercial Best and Lowest quoted Bidder shall be selected as BHEL-EDN's Associate for signing Deed of Joint Undertaking (DJU) as per format attached with ITB , on Indian NON-JUDICIAL STAMP PAPER, before submission of Bid by BHEL-EDN to NPTI. This DJU shall be submitted along with the Bid by BHEL to NLCIL and shall remain binding on both the parties till the completion of contract.

6. Submission of Bids, Receipt of bids, opening and Evaluation of Bids shall be as per ITB.

7. Selection of Associate after evaluations and Requirements to be fulfilled by Associate after selection are detailed in ITB.

8. The Terms & Conditions (COMMERCIAL CONDITIONS OF CONTRACT) of NLCIL as included in their Tender No. CO CONTS/ 0006G / PV Solar - BESS /ICB/Andaman/e-conds/ 2018, dt.24.02.2018, shall be applied back-to-back and shall be binding on BHEL's associate during execution of the contract. These terms and conditions are enclosed to this Tender specification. Successful bidder shall submit a signed copy of these terms & conditions along with their Part-I Bid as acceptance of these terms & Conditions.

9. The Bidder is also required to submit Signed copy of the ITB (Part –A), these Special Conditions of Contract (Part-B) as well as the Technical Specifications of this Tender of BHEL, along with their Part-I Bid in acceptance of all terms & conditions and specifications. These shall form part of the future contract, if and when signed with Associate by BHEL.

10. Bidders shall submit NO DEVIATION Bids and shall furnish a “NO DEVIATION” declaration signed by Authorized signatory with company seal along with Part-I of the Bid, failing which the Bids will not be evaluated further. By submitting the NO DEVIATION declaration, Bidder agrees that he will comply to Technical Commercial and Price related requirements specified by BHEL in totality and there shall be no deviations to any of the requirements


11. In case of negotiations/ reduction in price required by NLCIL as a part of post-Bid negotiations with successful Bidder, the same shall be proportionately passed on and acceptable to Associate.

12. Non-Acceptance of conditions at Sl. No. 8,9,10,11 will result in rejection of the Bids.

13. The Co-operation Agreement for Associate (CAA) signed may be converted into back-to-back Purchase order on Associate after BHEL receives order from NLCIL. Validity of CAA shall be at least for 240 days from Date of Bid opening by NLCIL.

14. At the time of award of order, Inspection/Test Reports/Certificates, if any as per specification/ Tender requirement, shall be adhered to. If Preshipment inspection at supplier's works is required either by BHEL and/or by NLCIL, vendor shall provide necessary assistance for inspection.

15. Payment terms: NLCIL payment terms shall apply back-to-back on Associate.

	<b>SPECIAL CONDITIONS OF CONTRACT(SCC) – PART B</b> <b>BATTERY ENERGY STORAGE SYSTEM</b> <b>FOR</b> <b>INTEGRATING WITH SOLAR PV PLANT</b>	Ref: SCPV/330/NLC/SCC
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16. Taxes and duties as indicated in the Price Bid and in the Purchase Order of BHEL- EDN only to be charged. If there is any statutory change such as new GST rates, new Taxes, Cess or levies, etc. these shall be treated in same manner as in NLCIL Tender terms & Conditions.

17. Bidder's GST Registration Number should be mentioned in the-Price Bid.

18. If Liquidated Damages are due to be paid by BHEL to NLCIL, the same shall be passed on to Associate, in case delay is due to reasons attributable to the Associate in proportion to contract value. If the successful Completion of Facilities is not attained within 18 months from the date of Notification of Award by NLCIL on BHEL, for reasons attributable to Associate, then the Liquidated Damages payable at the rate of 0.5% per week of delay or part thereof of supply and services subject to a ceiling of 10% of the total value of contract for supply & services, shall be payable by Associate on whom BHEL has placed order for BESS.

17. BHEL-EDN reserves the right to accept/reject bids of any Bidder and/or annul/ re-float/ call for snap bid the tender, in case outcome is not favorable to BHEL-EDN's participation in the tender. BHEL's decision will be Final and binding on all Bidders.

Enclosed: NLCIL Commercial Terms & Conditions:

**COMMERCIAL CONDITIONS OF CONTRACT (Volume 1 of 2)**

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**DATE :**

**CO-OPERATION AGREEMENT FOR ASSOCIATE (CAA)**  
**BETWEEN**  
**BHARAT HEAVY ELECTRICALS LTD (BHEL) – ELECTRONICS DIVISION**  
**AND M/s. \_\_\_\_\_**

Sub: Co-operation Agreement for Associate for NLC India Limited, Neyveli for installation of 2 x 10 MW (AC) Grid interactive Solar PV Power Project integrated with 8 MWhr. Battery Energy Storage System at Attam Pahad and at Dolly Gunj, Port Blair, South Andaman.

Ref: NLCIL Tender No. CO CONTS/ 0006G / PV Solar - BESS /ICB/Andaman/e-contrs/ 2018, dt.24.02.2018.

- 1) NLCIL has invited International Competitive Bidding for design, engineering, manufacturing, system integration, pre-shipment testing at works, packing, delivery, unloading, storage, installation & commissioning, training and fine-tuning of of 2 x 10 MW (AC) Grid interactive Solar PV Power Plant and integrated with 8 MWhr. Battery Energy Storage System along with Operation & Maintenance for 10 years after 1 Year Warranty period at project site.
- 2) **PRE-QUALIFICATION REQUIREMENTS (PQR) of Tender:**

2.1 Bidder should have executed contracts of Design/Engineering, Supply, Erection/Supervised erection, commissioning of Battery Energy storage system with cumulative capacity of 1.0MWhr. or above as on the original scheduled date of tender opening and out of which at least one Battery Energy Storage System shall be of minimum 0.5MWhr. capacity or above and should be in successful operation for at least one year within the last 7 years as on the original scheduled date of tender opening.

2.2 The Bidder shall have Positive Net Worth as per the latest audited financial statements.

2.3 Average Annual Turn Over of the Bidder, Average, shall not be less than Rs.25 Cr. in the preceding three (3) consecutive financial years as on the original scheduled date of tender opening.

3.0 Other Conditions:

3.1 The Bidder shall attach documentary evidence to prove that the qualifying requirements mentioned in Clause 2.1 above are met by him / them, along with the bid in the form of end user certificate together with full contact details for verification. The Bidder shall submit End User Certificate which is subject to verification for qualification. The end user certificates showing the experiences of their own installations or subsidiary or group companies or companies under the same Management is also acceptable. A confirmation from the firm which is having the experience in this regard is to be enclosed

along with end user certificate. In case the bidder furnishes the end user certificates of their subsidiary or group companies or companies under the same Management, in addition to End User Confirmation, NLC reserves the right to inspect such installations where such certificates are obtained by the Bidder, only if the Bidder facilitates necessary inspection of such installation by the purchaser. However, cost pertaining to the purchaser's personnel for such inspection shall be borne by the purchaser.

3.2 In case of participation by the Bidder with Collaborator(s), the bidder shall furnish a copy of valid Collaboration Agreement along with the bid, for the services offered jointly and such agreement shall be valid till completion of all the contractual obligations including O&M Contract. In case of participation by the Bidder as a Consortium, the bidder shall furnish a copy of valid Consortium Agreement and Joint Deed of Undertaking along with the bid, for the services offered jointly and such agreement shall be valid till completion of all the contractual obligations including O&M Contract. In case of participation by the Bidder as a Joint Venture Company, the bidder shall furnish a copy of valid Joint Venture Agreement along with the bid, for the services offered jointly and such agreement shall be valid till completion of all the contractual obligations including O&M Contract. In all the above cases, the percentage value of the respective portion of the work is to be indicated in the Techno commercial bid.

3.2(a) The successful bidder meeting the Qualifying Requirements, shall furnish a Contract Performance Guarantee (CPG) in the form of an on-demand Bank Guarantee for the faithful performance of the contract for a value of 10% of the total contract value after the award of LOA.

3.2(b) If the successful bidder is meeting the Qualifying Requirements with Collaborator(s), in addition to the CPG as mentioned in Cl. 3.2(a) above, each Collaborator shall also furnish a back up Bank Guarantee for 5% of their respective portion of the scope of work. In case the respective portion of the scope of work is less than 1% of the total contract value, then back up Bank Guarantee for a minimum of 0.05% of the total contract value shall be furnished.

3.2(c) If the successful bidder is the leader of a consortium, in addition to the CPG as mentioned in Cl. 3.2(a) above, each of the consortium partners other than the leader shall furnish a back up Bank Guarantee for 5% of their respective portion of the scope of work. In case the respective portion of the scope of work is less than 1% of the total contract value, then back up Bank Guarantee for a minimum of 0.05% of the total contract value shall be furnished.

3.2(d) If the successful bidder is a JV Company meeting the Qualifying Requirement, in addition to the CPG as mentioned in Cl. 4.5.3(a) above, each partner of the JV Company on the basis of whom the JV company gets qualified shall also furnish a back up Bank Guarantee for 5% of their respective portion of the scope of work. In case the respective portion of the scope of work is less than 1% of the total contract value, then back up Bank Guarantee for a minimum of 0.05% of the total contract value shall be furnished.

3.3 The bidder or the bidder with collaborator(s) or all individual firms in the Consortium or all partners in the Joint Venture Company, as the case may be, shall furnish their audited profit and loss accounts and balance sheets for the preceding three (3) financial years from the original scheduled date of tender opening.

3.4 NLCIL reserves the right to ask the bidders to furnish the experience certificate authenticated by the Indian Embassy in that country for installation outside India and to furnish the experience certificate attested by a Notary Public for installation within India.

3.5 NLCIL reserves the right to consider any foreign installations as experience, only if the Bidder facilitates necessary inspection of such installation by NLCIL. However, cost pertaining to the purchaser's personnel for such inspection shall be borne by the purchaser.

3.6 NLCIL reserves the right to inspect the plant(s) referred to by the bidders as well as the original documents submitted in support of their claim to assess its veracity.

3.7 The bidder shall furnish major legal cases and their statutory liabilities if any.

#### 4.0 OTHER REQUIREMENTS:

The Bidder shall take note of the following, but not limited to, as per Department of Industrial Policy and Promotion (DIPP), Ministry of Commerce and Industry, Govt. of India, Public Procurement (Preference to Make in India) Order 2017 dated 15.06.2017. The Bidder shall confirm compliance to the requirements indicated below:

#### 4.1 DEFINITIONS:

- i. 'Local content' means the amount of value added in India which shall, be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.
  - ii. 'Local supplier' means a supplier or service provider whose product or service offered for procurement meets the minimum local content as prescribed.
  - iii. 'L1' means the lowest tender or lowest bid or the lowest quotation received in a tender, bidding process or other procurement solicitation as adjudged in the evaluation process as per the tender.
  - iv. 'Margin of purchase preference' means the maximum extent to which the price quoted by a local supplier may be above the L1 for the purpose of purchase preference.
- Minimum local content: The minimum local content shall be 50%. Margin of Purchase Preference: The margin of purchase preference shall be 20%.

#### 4.2 Verification of local content:

- i. The local supplier at the time of tender, bidding or solicitation shall be required to provide self-certification that the item offered meets the minimum local content and shall give details of the location(s) at which the local value addition is made.
  - ii. The local supplier shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.
  - iii. False declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules-2017, Ministry of Finance, Govt. Of India for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules-2017, Ministry of Finance, Govt. Of India along with such other actions as may be permissible under law.
  - iv. A supplier who has been debarred by any procuring entity for violation of this Order shall not be eligible for preference under this Order for procurement by any other procuring entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities".
-

Bharat Heavy Electricals Ltd – Electronics Division, Mysore Road, Bangalore-560026 having its head office at BHEL House, Siri Fort, New Delhi – 110049, shall be participating in this ICB tender as per the option 2.3 above of PQR. For this purpose, BHEL will be associating with a Battery Energy storage system supplier who meets the PQR stipulated at Sl. No. 2.2 above.

In order to select the techno-commercially best and price wise lowest party and enter into a pre-bid tie-up, BHEL had called for Techno-commercial and price quotations from approved vendors through an Open tender dated 17th March 2018. As an outcome of the evaluation of proposals received from approved vendors, M/s. \_\_\_\_\_ has been selected as BHEL's Associate for Bidding for referred NLCIL tender and BHEL has entered into a pre-bid tie-up dated \_\_\_\_ March 2018 with M/s \_\_\_\_\_. On the basis of this Agreement, BHEL is now entering into this Project Specific Co-operation Agreement for Associate (CAA) to participate in the Tender for 2 x 10 MW (AC) Grid interactive Solar PV Power Project integrated with 8 MWhr. Battery Energy Storage System at Attam Pahad and at Dolly Gunj, Port Blair, South Andaman.

This Co-operation Agreement for Associate (CAA) is signed between BHEL, hereinafter referred to as Bidder and M/s. \_\_\_\_\_ hereinafter referred to as Associate Bidder in order to bind both the parties to the Terms & Conditions and agreement reached hereupon.

- 1) The following has been understood and agreed upon by both parties :
  - i. BHEL and M/s. \_\_\_\_\_ shall jointly Bid for subject project and it is hereby understood that M/s. \_\_\_\_\_ shall associate with BHEL as their exclusive / preferred partner by way of preferential and lowest pricing, for jointly bidding for this Tender with the intention of bagging this order jointly. As a guarantee to this agreement, \_\_\_\_\_ shall submit to BHEL, a CAA guarantee amounting to 1% of the Associate's share either in the form of a BG (from BHEL approved Bank as per List enclosed) or by way of Demand Draft (DD), which shall be returned to Associate in case of award of contract and receipt of order from NLCIL or NLCIL finally awarding the contract to any other Bidder or NLCIL deciding to shelve the project.
  - ii. The scope of supply, work and services of M/s \_\_\_\_\_ are as submitted by them in response and in full compliance to the Tender specifications and subsequent corrigenda issued from time to time, of NLCIL, and is enclosed as Annexure-\_\_ to this CAA. However, \_\_\_\_\_ agrees that in the view of NLCIL, any additional supplies, works or services that are deemed necessary for complying to Tender specifications , shall be provided by \_\_\_\_\_ without any implications on Price, Delivery or Guarantees, to BHEL and / or NLCIL.
  - iii. BHEL will be submitted an EMD in form of a BG for Rs.1,63,00,000/- to NLCIL as EMD for participating in referred NLCIL tender. M/s \_\_\_\_\_, who has been selected as BHEL's Associate for Bidding for referred NLCIL tender, on their part, agrees to furnish a back-up guarantee to BHEL in the form of a BG (from BHEL approved Bank as per List enclosed) in proportion to their share, for the EMD
  - iv. In case BHEL is selected by NLCIL for award of contract, M/s. \_\_\_\_\_ agrees to furnish an on-demand back-up bank guarantee (from BHEL approved Bank as per List enclosed) for a value equal to 5% (five percent) of their share of work, to NLCIL as a part of the Contract Performance Guarantee.
  - v. As per the requirement of tender, BHEL and M/s \_\_\_\_\_ shall jointly sign and submit a Deed of Joint Undertaking (DJU) as per format enclosed at Annexure-1, which will be a part of the Techno-commercial Bid to NLCIL.

- vi. In case BHEL is awarded the contract by NLCIL, this CAA for pre-bid tie up shall form the basis for working together and shall be a back to back agreement for placement of purchase order by BHEL for Battery Energy Storage System and auxiliaries and associated services as per the Scope of Supply, Works and Services (Enclosed at Annexure-xx) on M/s. \_\_\_\_\_ during project execution.
  - vii. The tender conditions stipulates that the Techno-commercial Bids shall remain valid for 8 months (243 days) from date of (Techno-Commercial) Bid opening and the Price Bids shall remain Valid for 243 days from opening of (Price) Bids. M/s. \_\_\_\_\_ hereby agrees that their proposal shall remain valid till 243 days from date of bid opening by NLCIL and validity shall be further extended by M/s \_\_\_\_\_ as required by NLCIL and BHEL till a confirmed Purchase order is issued by BHEL on \_\_\_\_\_.
  - viii. Subsequent to submission of (Techno-commercial and Price) Bid by BHEL and M/s. \_\_\_\_\_, NLCIL shall evaluate the Bids and later may call Bidders for negotiation of to participate in Reverse Auction. At that stage M/s \_\_\_\_\_ Agrees that the prices shall be negotiated by BHEL with M/s. \_\_\_\_\_, and M/s \_\_\_\_\_ shall again review their prices and furnish most competitive lowest prices at that stage to enable BHEL to bag the order..
  - ix. The terms and conditions stipulated by NLCIL shall apply on back-to-back basis on both BHEL and \_\_\_\_\_ and have been confirmed for compliance by M/s\_\_\_\_\_. There terms & conditions become an integral part of this CAA and are enclosed at Annexure-2. Further any specific Terms & Conditions which may be agreed upon between BHEL and \_\_\_\_\_ shall be signed in the t, which shall also form part of this CAA. The terms & Conditions of this CAA shall form part of the Purchase order that may be placed by BHEL during execution, in case the order is bagged by BHEL .
  - x. The Penalties / Liquidated Damages, if any, levied by NLCIL shall be borne and shared by BHEL and M/s. \_\_\_\_\_ in accordance and in proportion with their respective value of share and scope of work determined under the contract.
  - xi. The Commercial Conditions of Contract, as listed in the tender documents, are enclosed as Annexure-xx to this CAA and shall be adhered to by both Parties as and where applicable for respective scope of work of parties.
  - xii. The Time schedule stipulated by NLCIL is enclosed to this CAA as Annexure-4, and BHEL and M/s. NLCIL shall be jointly responsible for completion of all tasks as per the work schedule.
  - xiii. Payment Terms of NLCIL (Schedule-6) of NLC Tender specifications shall be applicable to both BHEL and \_\_\_\_\_ on back-to-back basis.
  - xiv. The Warranty and Guarantee conditions of contract shall be applicable on back-to-back basis as per the Tender conditions of contract,.
- 2) Limitation of liability: "Subject to any other clause relating to the liability of the parties, in no event parties will be liable for any consequential damages and the aggregate liability of either of the parties under this contract / Joint bid shall in no event exceed 100% of contract value except in cases of criminal neglect or willful misconduct.
- 3) Confidentiality  
Either party shall keep other party's information confidential. The information which needs to be kept confidential shall be marked as "confidential" by the disclosing party while making disclosure. This confidentiality obligation of either party shall remain for a period of 5 years from expiry of the agreement.
- 4) Mutual Arbitration Clause: Shall be as in the prebid tie up between BHEL and M/s \_\_\_\_\_

Any dispute in respect of which amicable settlement has not been reached within thirty days period shall be finally and conclusively settled by arbitration in accordance with The Arbitration and Conciliation Act, 1996 and any other enactment or modification thereof for the time being in force. The following provisions shall apply to any arbitration proceedings:

- a) Each party shall appoint its own Arbitrator and bear the cost of its own Arbitrator, these two shall appoint a mutually acceptable Lead Arbitrator, whose cost shall be borne equally.
- b) The language to be used in the arbitration proceedings shall be English.
- c) The place of arbitration shall be Bangalore.
- d) The arbitration shall be carried out in accordance with the Arbitration laws of India.
- e) The award shall be final and binding.
- f) Each of the Parties shall bear their respective costs.
- g) Notwithstanding the foregoing, either Party may apply to any court of competent jurisdiction at Bangalore for preliminary injunctive relief without breach of this arbitration provision.

In agreement to the above, this CAA has been signed as under by Authorised signatories of both BHEL and M/s \_\_\_\_\_

M/s \_\_\_\_\_ .

BHEL

## BANK GUARANTEE FOR MOU

In consideration of the Bharat Heavy Electricals Limited, having its registered office at BHEL House, Siri Fort, New Delhi – 110 049 the concerned division being Industrial systems group, Bangalore (hereinafter called BHEL)., having agreed to accept the Bid to execute **Battery energy Storage system (BESS) package including Design, engineering, sizing calculations, manufacturing, training to BHEL and NLCIL, pre-shipment testing at supplier’s works, packing, transportation, delivery at site, unloading, storage, installation and commissioning, comprehensive insurance, successful completion of facilities inclusive of supply of mandatory spares, performance and guarantee testing of complete BESS system at AttamPahad and at Dolly Gunj, Port Blair, South Andaman and integration with BHEL’s 2x10MW Solar PV power plant at same location.** submitted by M/s **XXXX**, (hereinafter called “the said Contractor(s)”) the successful L1 vendor for the pre-bid tie-up.

Under terms and conditions of MOU agreement dated ..... made between BHEL and M/s **XXXX** (hereinafter called “the said Agreement”), SUPPLIER has agreed to furnish a Bank Guarantee for Rs. .... (Rupees ..... ), for 1% of the value of the SUPPLIER’S scope as per MOU. This BG shall be valid till a formal Purchase Order is placed on the SUPPLIER.

1. We ..... (hereinafter referred to as “the Bank”) at the request of (indicate the name of Bank) contractor(s) do hereby undertake to pay to BHEL an amount not exceeding Rs. .... against any loss or damage caused to or suffered or would be caused to or suffered by BHEL, by reason of any breach by the said contractor(s) of any of the terms or conditions contained in the said Agreement.
2. We .....(indicate the name of Bank) do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from BHEL stating that the amount claimed is due by way of loss or damage caused to or would to or suffered by BHEL by reason of breach by the said contractor(s) of any of the terms and conditions contained in the said Agreement or by reason of the contractor(s) failure to perform the said Agreement. Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, out liability

under this guarantee shall be restricted to an amount not exceeding Rs.....

3. We .....(indicate the name of Bank) undertake to pay to BHEL any money so demanded notwithstanding any dispute or disputes raised by contractor (s) supplier(s) in any suit or processing pending before any court or tribunal relating thereto our liability under these presents being absolute and unequivocal. The payment so made by under this bond shall be valid discharge of our liability for payment thereunder and the contractor(s) shall have no claim against us for making such payment.
4. We ..... (indicate the name of Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and the it shall continue to be enforceable till all the dues of BHEL under or by virtue of the said Agreement have been fully paid and its Agreement have been fully and properly carried out by the said contractor(s) and accordingly discharge this guarantee unless a demand or claim under this guarantee is made on us in writing on or before ..... we shall be discharged form all liability under this guarantee thereafter.
5. We .....further agree with BHEL that BHEL shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder, to vary any of the terms and conditions of the said Agreement or to extend tim of performance by the said contractor(s) from time to time or to postpone any time or from time to time any of the powers exercisable by the BHEL against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reasons of any such variation, of extension being granted to the said Contractor(s) or for any forbearance, act, or commission on the part of BHEL or any indulgence BHEL to the said Conference(s) or by any such matter or thing whatsoever which under the law relating to sureties would but for its provisions, have effect of so relieving us.

This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s) / Supplier(s)

We .....(indicate the name of Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of BHEL in writing.

The address of BHEL of services, correspondence in respect of matters relating to this guarantee shall be:

ADDRESS OF THE CONCERNED DIVISION OF BHEL.



Address of the Bank in full

Dated the ..... Day of ..... 19.

Pin Code :

Telegraphic Code :

For .....  
(Indicate the name of Bank)

Telex No. :

Fax No. :

Witness :

1.

2.

# **INTEGRITY PACT**

## **Between**

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at “BHEL House”, Siri Fort, New Delhi – 110049 (India) hereinafter referred to as “The Principal”, which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

## **and**

\_\_\_\_\_, (description of the party along with address), hereinafter referred to as “The Bidder/ Contractor” which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

## **Preamble**

The Principal intends to award, under laid-down organizational procedures, contract/s for

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_. The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint Independent External Monitor(s), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

## **Section 1 – Commitments of the Principal**

- 1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-
  - 1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
  - 1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
  - 1.1.3 The Principal will exclude from the process all known prejudiced persons.
- 1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

## **Section 2 – Commitments of the Bidder(s)/ Contractor(s)**

- 2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.
  - 2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he / she is not legally entitled to, in

order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

- 2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
- 2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/ PC Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- 2.1.4 The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- 2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

### **Section 3 – Disqualification from tender process and exclusion from future contracts**

If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidders(s)/ Contractor(s) from the tender process or take action as per the separate “Guidelines for Suspension of Business Dealings with Suppliers/ Contractors” framed by the Principal.

## **Section 4 – Compensation for Damages**

- 4.1 If the Principal has disqualified the Bidder(s) from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.
- 4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/Performance Bank Guarantee, whichever is higher.

## **Section 5 – Previous Transgression**

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- 5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

## **Section 6 – Equal treatment of all Bidders/ Contractors/ Sub-contractors**

- 6.1 The Bidder(s)/ Contractor(s) undertake(s) to demand from his sub-contractors a commitment consistent with this Integrity Pact. This commitment shall be taken only from those sub-contractors whose contract value is more than 20% of Bidder's/ Contractor's contract value with the Principal.
- 6.2 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.
- 6.3 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

## **Section 7 – Criminal Charges against violating Bidders/ Contractors /Sub-contractors**

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

## **Section 8 –Independent External Monitor(s)**

- 8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
- 8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Sub-contractor(s) with confidentiality.
- 8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.
- 8.5 As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or

take corrective action, or heal the situation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

8.6 The Monitor will submit a written report to the CMD, BHEL within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.

8.7 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.

8.8 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant IPC / PC Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8.9 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.

8.10 The word 'Monitor' would include both singular and plural.

## **Section 9 – Pact Duration**

9.1 This Pact begins when both parties have legally signed it. It expires for the Contractor 12 months after the last payment under the respective contract and for all other Bidders 6 months after the contract has been awarded.

9.2 If any claim is made / lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified as above, unless it is discharged/ determined by the CMD, BHEL.

**Section 10 – Other Provisions**

- 10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.
- 10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.
- 10.3 If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.
- 10.4 Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- 10.5 Only those bidders/ contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

-----  
For & On behalf of the Principal  
(Office Seal)

-----  
For & On behalf of the Bidder/ Contractor  
(Office Seal)

Place-----

Date-----

Witness: \_\_\_\_\_  
(Name & Address) \_\_\_\_\_  
\_\_\_\_\_

Witness: \_\_\_\_\_  
(Name & Address) \_\_\_\_\_  
\_\_\_\_\_



# NLC INDIA LIMITED

(FORMERLY NEYVELI LIGNITE CORPORATION LIMITED)

(A "Navratna" - Government of India Enterprise)

Block - 1, NEYVELI - 607 801, Cuddalore Dist. Tamil Nadu, INDIA.

## OFFICE OF THE CHIEF GENERAL MANAGER / CONTRACTS CORPORATE OFFICE



CREATING WEALTH FOR WELL BEING

### Volume-1 of 2 TENDER DOCUMENT FOR

**Installation of 2 x 10 MW (AC) Grid interactive Solar PV Power Project integrated with 8 MWhr. Battery Energy Storage System at Andaman includes Operation and Maintenance of the entire system for ten years after one year warranty period**

**INTERNATIONAL COMPETITIVE BIDDING  
Through e-Tender and e-Reverse auction**

**Tender No. CO CONTS/ 0006G / PV Solar - BESS /ICB/Andaman/e-conts/ 2018, dt.24.02.2018**

**Pre bid conference : 14.03.2018 at 11.00 Hrs.**

**Last Date & Time for submission of Bid : 27.03.2018 at 14.30 Hrs.**

**Date & Time of Opening (Cover-I& II) : 27.03.2018 at 15.00 Hrs. (IST)**

**Phone No:04142/252210,251620**

**Fax No.04142-252026/252645/252646**

**Web site: [WWW.nlcindia.com](http://WWW.nlcindia.com)**

**Email:[gmconts\\_co@nlcindia.com](mailto:gmconts_co@nlcindia.com)**

**Registered Office: First Floor, No.8,Mayor Sathyamurthy Road,  
FSD, Egmore Complex,Chetpet, Chennai-600 031.**

## SCHEDULE OF TENDER (SOT)

NLCIL TENDER No.	CO CONTS/ 0006G / PV Solar-BESS/ICB/ Andaman/e-contrs/ 2018, dt.24.02.2018.
MODE OF TENDER	Physical forms in sealed Cover and e-Tendering System (Online QR, Techno-Commercial Bid & Price Bid and e-Reverse auction)
Date of Tender document available to Bidders for downloading.	02.03.2018 to 26.03.2018
Tender Fee	Rs.30,000/- or USD 463 or Euro 376 <b>Non-refundable</b>
Bid Guarantee Amount	Rs. 1,63,00,000/-or USD 2,51,455 or Euro 2,04,352
Date of Pre Bid Conference & Venue	14.03.2018 at 11.00 Hrs. (IST) at Conference Hall of Corporate Contracts Division, Corporate Office, Block -1, Neyveli 607801.
Date of Starting of e-Tender for submission of on line QR, Techno-Commercial Bid and Price Bid	From 14.03.2018 at 11.00 Hrs. IST
Last date of Remitting Tender fee & Registration	23.03.2018 at 16.00 hrs. IST
Date of closing of online e-tender for submission of QR documents, Integrity pact, Techno-Commercial details and Price schedule	27.03.2018 at 14.30 hrs. IST
Last Date & Time of submission of Physical forms in sealed cover (i.e. Bid Guarantee, Letter of undertaking and Check list for compliance of important Tender Conditions.)	27.03.2018 at 14.30 hrs. IST
Date & Time of opening of Physical forms sealed in sealed Cover.	27.03.2018 at 15.00 hrs. IST
Date & time of opening of e-Bids (Cover – II) (i.e. QR documents ,Integrity pact, Techno-Commercial details and Price schedule)	27.03.2018 at 15.00 hrs. IST
Date of e-Reverse Auction	To be informed later

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## SECTION - A

(Newspaper)

### NLC INDIA LIMITED

(FORMERLY NEYVELI LIGNITE CORPORATION LIMITED)

**OFFICE OF THE CHIEF GENERAL MANAGER / CONTRACTS  
CORPORATE OFFICE, NEYVELI - 607 801  
INTERNATIONAL COMPETITIVE BIDDING**

**Through e-tender and e-reverse auction**

#### NOTICE INVITING BIDS

- 1.0 Online Bids in English are invited by NLC INDIA LIMITED, NEYVELI for the following:

Tender No. CO CONTS/0006G/ PV Solar- BESS/ICB/Andaman /e-contrs/2018, dt.24.02.2018.	
Name of the work	Installation of 2 x 10 MW (AC) Grid interactive Solar PV Power Project integrated with 8 MWhr. Battery Energy Storage System at Attam Pahad and at Dolly Gunj, Port Blair, South Andaman. The scope of work also includes Operation and Maintenance of the entire system for ten years after one year warranty period.
Date of NIB available to parties to download	02.03.2018 to 26.03.2018
Bid Guarantee Amount	₹ 1,63,00,000/- or <b>USD 2,51,455</b> or <b>Euro 2,04,352</b>
Tender Fee	₹ 30,000/- or <b>USD 463</b> or <b>Euro 376</b>
Last date and time for receipt of bids	27.03.2018 upto 14.30 Hrs. (IST)
Date & Time of Bid Opening	27.03.2018 at 15.00 Hrs. (IST)
Date of Pre-Bid Conference	14.03.2018 at 11.00 Hrs. (IST)

- 2.0 For further details such as Qualifying Requirements, Detailed Scope of work etc. and Tender Document please log on to our website: [www.nlcindia.com](http://www.nlcindia.com) or Central Public Procurement Portal (CPPP) of Government of India, web site : [www.eprocure.gov.in](http://www.eprocure.gov.in) or contact the Chief General Manager / Contracts, NLC India Ltd., Corporate Office, Block-1, Neyveli - 607 801, Cuddalore District, Tamil Nadu, India. Phone: 04142-252210, 251620, Fax: 04142-252026 / 252645/ 252646.

CHIEF GENERAL MANAGER /CONTRACTS

(Web)  
(Newspaper)  
**NLC INDIA LIMITED**  
(FORMERLY NEYVELI LIGNITE CORPORATION LIMITED)  
**OFFICE OF THE CHIEF GENERAL MANAGER / CONTRACTS**  
**CORPORATE OFFICE, NEYVELI - 607 801**  
**INTERNATIONAL COMPETITIVE BIDDING**  
**Through e-tender and e-reverse auction**  
**NOTICE INVITING BIDS**

- 1.0 Online Bids in English are invited by NLC INDIA LIMITED, Neyveli for the following:

Tender No. CO CONTS/0006G/ PV Solar- BESS/ICB/Andaman /e-contrs/2018, dt.24.02.2018.	
Name of the work	Installation of 2 x 10 MW (AC) Grid interactive Solar PV Power Project integrated with 8 MWhr. Battery Energy Storage System at Attam Pahad and at Dolly Gunj, Port Blair, South Andaman. The scope of work also includes Operation and Maintenance of the entire system for ten years after one year warranty period.
Date of NIB available to parties to download	02.03.2018 to 26.03.2018
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Last date and time for receipt of bids	27.03.2018 upto 14.30 Hrs. (IST)
Date & Time of Bid Opening	27.03.2018 at 15.00 Hrs. (IST)
Date of Pre-Bid Conference	14.03.2018 at 11.00 Hrs. (IST)

- 1.1.3 The points for discussion during Pre-Bid Conference shall be furnished in advance, at least two days before the scheduled date of pre-bid Conference, both in hard and soft copy (editable copy) to the undersigned and also to the following **E-mail ID: gmconts\_co@nlcindia.com, gmconts@gmail.com, gmconts\_co@rediffmail.com.**

**Note:**

- i. For further details such as Qualifying Requirements, Scope of work, etc. and Tender Document please visit our website: [www.nlcindia.com](http://www.nlcindia.com) or Central Public Procurement Portal (CPPP) of Government of India, website : [www.eprocure.gov.in](http://www.eprocure.gov.in) or contact Chief General Manager / Contracts, Corporate Office, NLC India Ltd., Block-1, Neyveli - 607 801. Phone: 04142 - 252210, 251620, Fax 04142 – 252026 / 252645/ 252646. E-Mail ID: [gmconts\\_co@nlcindia.com](mailto:gmconts_co@nlcindia.com), [gmconts@gmail.com](mailto:gmconts@gmail.com), [gmconts\\_co@rediffmail.com](mailto:gmconts_co@rediffmail.com).

- ii) Amendments /Errata /corrigendum/clarifications, if any issued for the tender shall form part and parcel of the tender document. Amendments/Errata/corrigendum/clarifications will be posted in NLCIL's web site: www.nlcindia.com and Central Public Procurement Portal (CPPP) of Government of India, website: www.eprocure.gov.in. Bidders are requested to visit NLCIL's web site: www.nlcindia.com or Central Public Procurement Portal (CPPP) of Government of India, website: www.eprocure.gov.in and note the amendments before submission of offer. Any ignorance on the part of the firms in not seeing the website will not be an excuse. NLCIL shall not be responsible if any Bidder omits to notice any amendments/Errata / corrigendum / clarification. Amendments /Errata / corrigendum / clarification will be numbered serially. The bidders are requested to sign all the Amendments / Errata / Corrigendum / Clarifications issued for the tender and enclose along with the bid as these form part and parcel of tender document.

## 2.0 **QUALIFYING REQUIREMENTS**

### **PRE-QUALIFICATION REQUIREMENTS (PQR) :**

- 2.1(a) Bidder should have executed contracts of Design/Engineering, Supply, Erection/Supervised erection, commissioning of Solar PV Power Plant(s) with cumulative capacity of 10MWp or above as on the original scheduled date of tender opening and out of which at least one Solar PV Power Plant shall be of minimum 5MWp capacity or above and should be in successful operation for at least one year within the last 7 years as on the original scheduled date of tender opening.

AND

- 2.1(b) Bidder should have executed contracts of Design/Engineering, Supply, Erection/Supervised erection, commissioning of Battery Energy storage system with cumulative capacity of 1.0MWhr. or above as on the original scheduled date of tender opening and out of which at least one Battery Energy Storage System shall be of minimum 0.5MWhr. capacity or above and should be in successful operation for at least one year within the last 7 years as on the original scheduled date of tender opening.

- 2.2 Bidder who doesn't fulfill the qualifying requirements stipulated in clause 2.1 (a) and (b) above by himself can also participate provided the bidder collaborates with not more than two firms and together they fully meet the qualifying requirements stipulated in clause 2.1 (a) and (b) above and the Collaborator (s) should furnish along with the bid valid collaboration agreement to execute this project and a back-up Bank Guarantee as required in the relevant clauses.

OR

Bidder can also be a leader of a consortium consisting of not more than three firms, such that together they meet the Qualifying Requirements stipulated in clause 2.1 (a)

and (b) above and the members of the consortium should furnish back-up Bank Guarantee as required in the relevant clauses. In case of bidding by a Consortium, the consortium partners shall necessarily identify a leader of the Consortium who will furnish the Consortium Agreement and the consortium partners shall execute a Joint Deed of Undertaking in which the partners are jointly and severally liable to the Owner for successful performance of the contract.

OR

Bidder can also be a Joint Venture Company, provided the qualifying requirement in clause 2.1 (a) and (b) above is met by any one or more partners of the Joint Venture (JV) Company. Each partner of the JV Company on the basis of whom the JV Company gets qualified shall have minimum 26% equity in the JV Company and should furnish back-up Bank Guarantee as required in the relevant clauses.

2.3 The Bidder or the Leader of the Consortium or the major partner of JV Company shall have Positive Net Worth as per the latest audited financial statements.

2.4 Average Annual Turn Over of the Bidder, combined Average Annual Turn Over of the Bidder and Collaborator(s), combined Average Annual Turn Over of the Consortium partners and the combined Average Annual Turn Over of all the promoters of the Joint Venture Company, as the case may be, shall not be less than Rs.48.648 Cr. in the preceding three (3) consecutive financial years as on the original scheduled date of tender opening.

3.0 **Other Conditions:**

3.1 The Bidder or the Bidder with Collaborator(s) or the Consortium or the Joint Venture Company, as the case may be shall attach documentary evidence to prove that the qualifying requirements mentioned in Clause 2.1 (a) and (b) above are met by him / them, along with the bid in the form of end user certificate together with full contact details for verification. The Bidder shall submit End User Certificate which is subject to verification for qualification. The end user certificates showing the experiences of their own installations or subsidiary or group companies or companies under the same Management is also acceptable. A confirmation from the firm which is having the experience in this regard is to be enclosed along with end user certificate.

In case the bidder furnishes the end user certificates of their subsidiary or group companies or companies under the same Management, in addition to End User Confirmation, NLC reserves the right to inspect such installations where such certificates are obtained by the Bidder, only if the Bidder facilitates necessary



inspection of such installation by the purchaser. However, cost pertaining to the purchaser's personnel for such inspection shall be borne by the purchaser.

- 3.2 In case of participation by the Bidder with Collaborator(s), the bidder shall furnish a copy of valid Collaboration Agreement along with the bid, for the services offered jointly and such agreement shall be valid till completion of all the contractual obligations including O&M Contract. In case of participation by the Bidder as a Consortium, the bidder shall furnish a copy of valid Consortium Agreement and Joint Deed of Undertaking along with the bid, for the services offered jointly and such agreement shall be valid till completion of all the contractual obligations including O&M Contract. In case of participation by the Bidder as a Joint Venture Company, the bidder shall furnish a copy of valid Joint Venture Agreement along with the bid, for the services offered jointly and such agreement shall be valid till completion of all the contractual obligations including O&M Contract. In all the above cases, the percentage value of the respective portion of the work is to be indicated in the Techno commercial bid.
- 3.2(a) The successful bidder meeting the Qualifying Requirements, shall furnish a Contract Performance Guarantee (CPG) in the form of an on-demand Bank Guarantee for the faithful performance of the contract for a value of 10% of the total contract value after the award of LOA.
- 3.2(b) If the successful bidder is meeting the Qualifying Requirements with Collaborator(s), in addition to the CPG as mentioned in Cl. 3.2(a) above, each Collaborator shall also furnish a back up Bank Guarantee for 5% of their respective portion of the scope of work. In case the respective portion of the scope of work is less than 1% of the total contract value, then back up Bank Guarantee for a minimum of 0.05% of the total contract value shall be furnished.
- 3.2(c) If the successful bidder is the leader of a consortium, in addition to the CPG as mentioned in Cl. 3.2(a) above, each of the consortium partners other than the leader shall furnish a back up Bank Guarantee for 5% of their respective portion of the scope of work. In case the respective portion of the scope of work is less than 1% of the total contract value, then back up Bank Guarantee for a minimum of 0.05% of the total contract value shall be furnished.
- 3.2(d) If the successful bidder is a JV Company meeting the Qualifying Requirement, in addition to the CPG as mentioned in Cl. 4.5.3(a) above, each partner of the JV Company on the basis of whom the JV company gets qualified shall also furnish a back up Bank Guarantee for 5% of their respective portion of the scope of work. In case the respective portion of the scope of work is less than 1% of the total contract value, then back up Bank Guarantee for a minimum of 0.05% of the total contract value shall be furnished.

- 3.3 The bidder or the bidder with collaborator(s) or all individual firms in the Consortium or all partners in the Joint Venture Company, as the case may be, shall furnish their audited profit and loss accounts and balance sheets for the preceding three (3) financial years from the original scheduled date of tender opening.
- 3.4 NLCIL reserves the right to ask the bidders to furnish the experience certificate authenticated by the Indian Embassy in that country for installation outside India and to furnish the experience certificate attested by a Notary Public for installation within India.
- 3.5 NLCIL reserves the right to consider any foreign installations as experience, only if the Bidder facilitates necessary inspection of such installation by NLCIL. However, cost pertaining to the purchaser's personnel for such inspection shall be borne by the purchaser.
- 3.6 NLCIL reserves the right to inspect the plant(s) referred to by the bidders as well as the original documents submitted in support of their claim to assess its veracity.
- 3.7 The bidder shall furnish major legal cases and their statutory liabilities if any.

#### 4.0 OTHER REQUIREMENTS:

The Bidder shall take note of the following, but not limited to, as per Department of Industrial Policy and Promotion (DIPP), Ministry of Commerce and Industry, Govt. of India, Public Procurement (Preference to Make in India) Order 2017 dated 15.06.2017. The Bidder shall confirm compliance to the requirements indicated below:

#### 4.1 DEFINITIONS:

- i. 'Local content' means the amount of value added in India which shall, be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.
- ii. 'Local supplier' means a supplier or service provider whose product or service offered for procurement meets the minimum local content as prescribed.
- iii. 'L1' means the lowest tender or lowest bid or the lowest quotation received in a tender, bidding process or other procurement solicitation as adjudged in the evaluation process as per the tender.
- iv. 'Margin of purchase preference' means the maximum extent to which the price quoted by a local supplier may be above the L1 for the purpose of purchase preference.

Minimum local content: The minimum local content shall be 50%.

Margin of Purchase Preference: The margin of purchase preference shall be 20%.

#### 4.2 Verification of local content:

- i. The local supplier at the time of tender, bidding or solicitation shall be required to provide self-certification that the item offered meets the minimum local content and shall give details of the location(s) at which the local value addition is made.
- ii. The local supplier shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.
- iii. False declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules-2017, Ministry of Finance, Govt. Of India for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules-2017, Ministry of Finance, Govt. Of India along with such other actions as may be permissible under law.
- iv. A supplier who has been debarred by any procuring entity for violation of this Order shall not be eligible for preference under this Order for procurement by any other procuring entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities”.

#### 5.0 SCOPE OF WORK

The scope of work for installation of 2 x 10 MW (AC) Grid interactive Solar PV Power Project integrated with 8 MWhr. Battery Energy Storage System at Attam Pahad and at Dolly Gunj, Port Blair, South Andaman with associated 33 KV Switchyard and grid interconnection at the take off points of Electricity Department of Andaman & Nicobar Administration including Design, Engineering, Manufacture, Inspection at supplier's works, supply, insurance, transport, storage, erection, testing, commissioning.

The scope of work also includes Operation and Maintenance of the entire system for ten years after one year warranty period.

(Detailed scope of work is available in the Vol. II, Technical Specification.).

- 5.1 The detailed scope of work is given in Vol.II, Technical Specification.

## 6.0 TIME SCHEDULE:

The scope of work, covered under this tender shall be performed as per the time schedule given below, reckoning from the date of Letter of Award.

<b>Details</b>	<b>From the date of Letter of Award</b>
The scope of work for installation of 2 x 10 MW (AC) Grid interactive Solar PV Power Project integrated with 8 MWhr. Battery Energy Storage System at Attam Pahad and at Dolly Gunj, Port Blair, South Andaman with associated 33 KV Switchyard and grid interconnection at the take off points of Electricity Department of Andaman & Nicobar Administration including Design, Engineering, Manufacture, Inspection at supplier's works, supply, insurance, transport, storage, erection, testing, commissioning.	18 months

- 7.0 All other terms and conditions along with technical details regarding qualifying requirements, time schedule, bid guarantee, validity of bids and instruction to bidders, etc., are contained in the Tender Documents.
- 8.0 Bids submitted by Tele-fax or E-Mail and the off line bids received shall be rejected.
- 9.0 NLCIL reserves the right to reject any tender or all tenders received at its discretion without assigning any reason whatsoever.
- 10.0 Collaborator / Consortium Partner/JV Partner/ of a Bidder for this tender cannot be a Bidder for this Tender.
- 11.0 The Micro and small scale Units registered under single point registration scheme of the NSIC/covered under MSMED Act,2006/MSME are permitted to participate without Tender fee, provided that the request for the same is received in time with a copy of valid certificate of registration and the product range mentioned in the certificate is the same or similar to our requirements. Copies of necessary certificates duly attested by any Notary public (or) Gazetted Officers (or) practicing Chartered Accountant with seal and date shall only be accepted. They are also are exempted from furnishing Bid Guarantee, provided that such Micro and Small Scale Units are registered under single point registration scheme of NSIC/covered under MSMED Act, 2006/MSME and the same is valid on the scheduled date of tender opening and the product range mentioned in the certificate is the same or similar to our requirements.

CHIEF GENERAL MANAGER / CONTRACTS

## **SECTION - B**

# **QUALIFYING REQUIREMENTS**

## **SECTION - B**

### **QUALIFYING REQUIREMENTS:**

#### **1.0 Qualifying Requirements**

1.1(a) Bidder should have executed contracts of Design/Engineering, Supply, Erection/Supervised erection, commissioning of Solar PV Power Plant(s) with cumulative capacity of 10 MWp or above as on the original scheduled date of tender opening and out of which at least one Solar PV Power Plant shall be of minimum 5 MWp capacity or above and should be in successful operation for at least one year within the last 7 years as on the original scheduled date of tender opening.

AND

1.1(b) Bidder should have executed contracts of Design/Engineering, Supply, Erection/Supervised erection, commissioning of Battery Energy storage system with cumulative capacity of 1.0 MWhr. or above as on the original scheduled date of tender opening and out of which at least one Battery Energy Storage System shall be of minimum 0.5 MWhr. capacity or above and should be in successful operation for at least one year within the last 7 years as on the original scheduled date of tender opening.

1.2(a) Bidder who doesn't fulfill the qualifying requirements stipulated in clause 1.1 (a) and (b) above by himself can also participate provided the bidder collaborates with not more than two firms and together they fully meet the qualifying requirements stipulated in clause 1.1 (a) and (b) above and the Collaborator (s) should furnish along with the bid valid collaboration agreement to execute this project and a back-up Bank Guarantee as required in the relevant clauses.

OR

Bidder can also be a leader of a consortium consisting of not more than three firms, such that together they meet the Qualifying Requirements stipulated in clause 1.1 (a) and (b) above and the members of the consortium should furnish back-up Bank Guarantee as required in the relevant clauses. In case of bidding by a Consortium, the consortium partners shall necessarily identify a leader of the Consortium who will furnish the Consortium Agreement and the consortium partners shall execute a Joint Deed of Undertaking in which the partners are jointly and severally liable to the Owner for successful performance of the contract.

OR

Bidder can also be a Joint Venture Company, provided the qualifying requirement in clause 1.1 (a) and (b) above is met by any one or more partners of the Joint Venture (JV) Company. Each partner of the JV Company on the basis of whom the JV Company gets qualified shall have minimum 26% equity in the JV Company and should furnish back-up Bank Guarantee as required in the relevant clauses.

1.3 The Bidder or the Leader of the Consortium or the major partner of JV Company shall have Positive Net Worth as per the latest audited financial statements.

1.4 Average Annual Turn Over of the Bidder, combined Average Annual Turn Over of the Bidder and Collaborator(s), combined Average Annual Turn Over of the Consortium partners and the combined Average Annual Turn Over of all the promoters of the Joint Venture Company, as the case may be, shall not be less than Rs.48.648 Cr. in the preceding three (3) consecutive financial years as on the original scheduled date of tender opening.

## 1.5 OTHER CONDITIONS:

- 1.5.1 The Bidder or the Bidder with Collaborator(s) or the Consortium or the Joint Venture Company, as the case may be shall attach documentary evidence to prove that the qualifying requirements mentioned in Clause 1.1 (a) and (b) above are met by him / them, along with the bid in the form of end user certificate together with full contact details for verification. The Bidder shall submit End User Certificate which is subject to verification for qualification. The end user certificates showing the experiences of their own installations or subsidiary or group companies or companies under the same Management is also acceptable. A confirmation from the firm which is having the experience in this regard is to be enclosed along with end user certificate.

In case the bidder furnishes the end user certificates of their subsidiary or group companies or companies under the same Management, in addition to End User Confirmation, NLC reserves the right to inspect such installations where such certificates are obtained by the Bidder, only if the Bidder facilitates necessary inspection of such installation by the purchaser. However, cost pertaining to the purchaser's personnel for such inspection shall be borne by the purchaser.

- 1.5.2 In case of participation by the Bidder with Collaborator(s), the bidder shall furnish a copy of valid Collaboration Agreement along with the bid, for the services offered jointly and such agreement shall be valid till completion of all the contractual obligations including O&M Contract. In case of participation by the Bidder as a Consortium, the bidder shall furnish a copy of valid Consortium Agreement and Joint Deed of Undertaking along with the bid, for the services offered jointly and such agreement shall be valid till completion of all the contractual obligations including O&M Contract. In case of participation by the Bidder as a Joint Venture Company, the bidder shall furnish a copy of valid Joint Venture Agreement along with the bid, for the services offered jointly and such agreement shall be valid till completion of all the contractual obligations including O&M Contract. In all the above cases, the percentage value of the respective portion of the work is to be indicated in the Techno commercial bid.

- 1.5.3(a) The successful bidder meeting the Qualifying Requirements, shall furnish a Contract Performance Guarantee (CPG) in the form of an on-demand Bank Guarantee for the faithful performance of the contract for a value of 10% of the total contract value after the award of LOA.

- 1.5.3(b) If the successful bidder is meeting the Qualifying Requirements with Collaborator(s), in addition to the CPG as mentioned in Cl. 1.5.3(a) above, each Collaborator shall also furnish a back up Bank Guarantee for 5% of their respective portion of the scope of work. In case the respective portion of the scope of work is less than 1% of the total contract value, then back up Bank Guarantee for a minimum of 0.05% of the total contract value shall be furnished.

- 1.5.3(c) If the successful bidder is the leader of a consortium, in addition to the CPG as mentioned in Cl. 1.5.3(a) above, each of the consortium partners other than the leader shall furnish a back up Bank Guarantee for 5% of their respective portion of the scope of work. In case the respective portion of the scope of work is less than 1% of the total contract value, then back up Bank Guarantee for a minimum of 0.05% of the total contract value shall be furnished.

- 1.5.3(d) If the successful bidder is a JV Company meeting the Qualifying Requirement, in addition to the CPG as mentioned in Cl. 1.5.3(a) above, each partner of the JV Company on the basis of whom the JV company gets qualified shall also furnish a back up Bank Guarantee for 5% of their respective portion of the scope of work. In case the respective portion of the scope of work is less than 1% of the total contract value, then back up Bank Guarantee for a minimum of 0.05% of the total contract value shall be furnished.
- 1.5.4 The bidder or the bidder with collaborator(s) or all individual firms in the Consortium or all partners in the Joint Venture Company, as the case may be, shall furnish their audited profit and loss accounts and balance sheets for the preceding three (3) financial years from the original scheduled date of tender opening.
- 1.5.5 NLCIL reserves the right to ask the bidders to furnish the experience certificate authenticated by the Indian Embassy in that country for installation outside India and to furnish the experience certificate attested by a Notary Public for installation within India.
- 1.5.6 NLCIL reserves the right to consider any foreign installations as experience, only if the Bidder facilitates necessary inspection of such installation by NLCIL. However, cost pertaining to the purchaser's personnel for such inspection shall be borne by the purchaser.
- 1.5.7 NLCIL reserves the right to inspect the plant(s) referred to by the bidders as well as the original documents submitted in support of their claim to assess its veracity.
- 1.5.8 The bidder shall furnish major legal cases and their statutory liabilities if any.



# **SECTION – C**

## **INSTRUCTIONS TO BIDDERS FOR SUBMISSION OF ONLINE BIDS THROUGH e-TENDER and e-REVERSE AUCTION**

## SECTION – C

### INSTRUCTION TO BIDDERS FOR SUBMISSION OF ONLINE BIDS THROUGH e-TENDER and e-REVERSE AUCTION

Bidders are requested to read the terms & conditions of this tender before submitting their online bids.

#### 1.0 Pre requisites for accessing NLCIL Website

##### **A. Software Requirements**

Refer to NLCIL's portal (econts.nlcindia.com) for System Requirements

- *Operating system: Windows XP-- SP3 & above.*
- *Web browser: Internet Explorer 9/10/11*
- *Java: JRE6/JRE 1.7.45 or above.*
- *PDF reader: Adobe Acrobat Reader 8 or above.*

##### **B. Digital Certificate**

- Bidder should have a legally valid **CLASS III Digital Certificates (i) Digital Signature, non-repudiation certificate (used for Signing) and (ii) Key Encipherment Certificate (used for encrypting Bid Document) with Organisation name** from any of the licensed Certifying Authorities (CA) operating under the Root Certifying Authority of India (RCAI), Controller of Certifying Authorities (CCA) of India.

Ensure that all necessary trust certificates and drivers are installed as per CA's instruction and working properly. For detailed guidance about browser and Java configuration the bidders are advised to go through the guide available in the portal.

#### 2.0 **Registration:**

The process involves Bidder registration with NLCIL website under e-contracts portal. Only after successful registration, the Bidder(s) can submit his/their bids electronically. Bidders are required to make their own arrangement for bidding from a computer connected with Internet. NLCIL shall not be responsible for making such arrangements.

Interested bidders are required to pay the Tender fee and register in the URL and click on "New Bidder" and fill up the registration form with their details like Bidders address, user ID and Password, Tender fee details etc., and attach a scanned copy of Tender fee details with UTR No., Remitted Bank, Amount, Date etc., and submit. Kindly note that Bidder name will be captured from Digital Signature Certificate (DSC). Bidders are advised to keep note of the same. It may be noted that no separate user id and password will be provided by NLCIL. However, the bidders who have already participated in this portal can directly login with their valid user id and password and fill up the registration form with details of Tender fee etc. Acceptance or Rejection of Registration request for the Tender will be intimated by a separate e-mail message.

After the Tender fee payment and successful registration, the bidder can login with their user ID, password & DSC and participate in the e-Tender. Tender fee is non-refundable.

### 3.0 **Payment of Tender Fee**

The payment towards Tender fee is to be remitted in favour of NLC India Limited by NEFT/RTGS or e-payment to NLCIL's bank account as per following detail.

Bank Details : State Bank of India, Branch: Neyveli Main

Account Details :NLCIL Account No.10895129204,

Beneficiary Name : NLC India Limited. Estt.A/c in State Bank of India,  
Branch: Neyveli Main

IFSC Code No. :SBIN0000958

Tender fee will be deemed to have been submitted by the bidder if and only if the same is received (credited) in the above bank account within the stipulated time. Cash payments will not be accepted.

### 4.0 **Bidding Process:**

The entire bidding process is divided into Two Stages i.e. Stage-I and Stage-II. Stage-I bidding will be through e-Tender, in addition to submission of Physical forms in sealed cover as brought out in clause 6.1.1 of Invitation to Bid and Stage-II bidding will be through e-reverse auction.

#### **Stage-I, e-Tender**

- **Preparation of Bid**

The Bidder will be able to prepare his Pre Qualifications Bid, TECHNICAL BID, COMMERCIAL BID and Initial PRICE BID online using the respective forms. For Guidelines please refer to the help in the Portal.

Bidder can edit and save his offer any number of times till closing time of the bid. However, once he submits his bid he will not be able to edit it.

If bidder wants to edit his submitted bid then he has to first delete his submitted offer and then edit his offer and resubmit. Only submitted bids will be considered for evaluation. Any saved bids that are not submitted will be deleted by the system after the due date of opening.

Bidder can attach files containing company profile details, scanned copies of dealership certificate, scanned copies of technical drawings, etc., which are required for the enquiry. The documents attached should be in PDF format.

File Size: 5MB is the maximum size of a single file that can be attached.

#### **e-bid Submission and Signing**

Submission of e-bids online is a two-step process. In the first step, the Techno Commercial bid and Initial Price Bid have to be filled and submitted. In the second step, these bids have to be digitally signed using Bidder's Digital Signature Certificate.

- Bidder cannot submit any offer after the due date and time stipulated in the e-Tender.

All bids submitted by Bidder can be viewed by clicking on the link Submitted bids provided in the left menu of the corresponding Bidder's home page.

All notices and correspondence to the bidder(s) shall be sent by email message during the process till finalization of tender. Hence the bidders are required to ensure that their email address provided at the time of registration is valid and updated. Non receipt of email will not entitle any bidder to lodge any claim and no complaint in this regard shall be entertained. Bidders are also requested to ensure validity of their DSC (Digital Signature Certificate).

Bidders are advised to see the web site regularly to remain updated with latest information to ensure that they do not miss out any corrigendum / addendum uploaded against the said e-tender after downloading the e-tender document. The responsibility of downloading the related corrigendum, if any, will be that of the bidders.

5.0 **Process of e-Tender:**

5.1 On the scheduled date and time of tender opening, Tender Opening Committee will open the Physical forms in sealed coverfirst and shall confirm details of payment towards cost of Tender document (Tender fee), Bid Guarantee as in NIB, compliance of Letter of Undertaking. The bids confirming to all the above is treated as Responsive bids and Cover -II of the responsive bidders only will be opened.

5.2 Cover-II will be opened on the same day. For evaluation purpose, prices quoted in Schedule of Prices alone shall be taken into consideration. Price Bids will be checked by NLCIL for arithmetical accuracy. Errors, if any, will be resolved in the following manner, and it shall not be necessary to make a reference to the concerned Bidder(s) for such purpose:

(i) where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern.

(ii) where there is a discrepancy between figures and in words of an unit rate, the unit rate as quoted in words will govern.

(iii) If there is any discrepancy between the amount quoted in words and figures, the amount quoted in words will be considered.

5.3 If a bidder desires to be present at the time of Tender Opening, he shall depute his representative(s) (not more than two persons) in time with due authorization for participating in the Tender Opening

5.4 **Stage-II : E-Reverse Auction :**The Reverse Auction, if required, will be conducted among the shortlisted bidders with a start price and decremented value. The Reverse auction procedure is detailed under the heading “Reverse auction” (Annexure - B).

6.0 **Bidding in e-Tender & Reverse auction:**

a. In all cases, bidder should use their own ID and Password along with Digital Signature at the time of submission of their bid.

b. The e-tender floor shall remain open from the pre-announced date & time and for as much duration as mentioned above.

c. All electronic bids submitted during the e-tender and e-reverse auction process shall be legally binding on the bidder. Any bid will be considered as the valid bid offered by that bidder and acceptance of the same by the Purchaser will form a binding contract between Purchaser and the Bidder for execution of work.

d. It is mandatory that all the bids are submitted with digital signature certificate otherwise the same will not be accepted by the system.

e. NLCIL reserves the right to cancel or reject or accept or withdraw or extend this bidding process (e-tender and e-reverse auction) in full or part as the case may be without assigning any reason thereof.

- f. The server time shall be treated as final and binding. Bids recorded in the server before the bid closing time will only be treated as valid bid. Bidders are, therefore, advised to submit their bids well before the closing time of e-tender / e-reverse auction. If any bid reaches the server after the bid closing time as per server time, the same will not be recorded and no complaint in this regard shall be entertained.
- g. Bidders are advised to exercise caution in quoting their bids in e-tender and e-reverse auction to avoid any mistake. Bids once submitted can't be recalled.
- h. Any order resulting from this bidding process shall be governed by the terms and conditions mentioned in the NIB.

**SECTION –D**  
**INVITATION TO BID**

## **SECTION –D**

### **INVITATION TO BID**

#### **1.0 INVITATION:**

NLC India Limited, Neyveli a Navratna Government of India Enterprise registered under Indian Companies Act 1956 hereinafter referred to as “PURCHASER” invites Sealed bids in English (one original and six identical copies) for installation of 2 x 10 MW (AC) Grid interactive Solar PV Power Project integrated with 8 MWhr. Battery Energy Storage System at Attam Pahad and at Dolly Gunj, Port Blair, South Andaman with associated 33 KV Switchyard and grid interconnection at the take off points of Electricity Department of Andaman & Nicobar Administration including Design, Engineering, Manufacture, Inspection at supplier’s works, supply, insurance, transport, storage, erection, testing, commissioning.

The scope of work also includes Operation and Maintenance of the entire system for ten years after one year warranty period.

#### **2.0 ABOUT NLCIL:**

2.1 NLC India Limited (NLCIL), a Navratna Government of India Enterprise, functioning under the administrative control of Ministry of Coal is an integrated complex involving in Lignite Mining and Thermal Power Generation. NLCIL operates four lignite mines of total capacity 30.6 Million Tonnes per annum (MTPA) and four Thermal Power Stations of total capacity of 2740 MW including Barsingsar (Rajasthan) Mine Project of capacity 2.1 MTPA linked with Thermal Power Station of capacity 2 X 125 MW and a coal based Thermal Power Project of capacity ( 2 x 500 MW) called NLC Tamil Nadu Power Limited (NTPL) at Tuticorin, Tamil Nadu, as a joint venture between NLC India Limited (NLCIL) and Tamil Nadu Generation and Distribution Company (TANGEDCO). Further NLCIL has also commissioned 51 MW Wind Power Project at Kazhuneerkulam, Tirunelveli District, Tamil Nadu and 10 MW Solar Power Project and 130MW Solar Power Project at Neyveli.

2.2 The Lignite based power project under execution at Neyveli is “New Neyveli Thermal Power Station 2x 500 MW”. NLCIL with its excellent performance, figures among the top profit making Public Sector Undertaking. For more details, Kindly visit NLCIL’s Web site: [www.nlcindia.com](http://www.nlcindia.com)

#### **3.0 SCOPE OF WORK:**

3.1 The scope of work for for installation of 2 x 10 MW (AC) Grid interactive Solar PV Power Project integrated with 8 MWhr. Battery Energy Storage System at Attam Pahad and at Dolly Gunj, Port Blair, South Andaman with associated 33 KV Switchyard and grid interconnection at the take off points of Electricity Department of Andaman & Nicobar Administration including Design, Engineering, Manufacture, Inspection at supplier’s works, supply, insurance, transport, storage, erection, testing, commissioning.

The scope of work also includes Operation and Maintenance of the entire system for ten years after one year warranty period as detailed under Technical Specification (Vol. II).

#### 4.0 **BID GUARANTEE:**

- 4.1 The amount shall be as specified in the Notice Inviting Bid and in the form of Demand Draft or Banker's cheque drawn in favour of NLC India Ltd., on any Bank in Neyveli or payable at par by a Bank in Neyveli or NEFT/RTGS mode to NLCIL's Account No. 10895129204, Beneficiary Name: NLC India Limited, Estt.A/c in State Bank of India, Branch: Neyveli Main (IFS Code No. SBIN0000958) and the remittance details with UTR No./DD/ Banker's cheque shall be enclosed with the bid in Part I failing which the offer is liable for rejection. The Bidder is to note that the Bank Commission charges will be to the account of the bidder and the net amount transferred to NLCIL's account shall be equal to the amount specified in the Notice Inviting Bid.
- 4.2 The Bid Guarantee can also be in the form of an Irrevocable Bank Guarantee from any Nationalised Bank / Scheduled Bank in India except Bank of China.
- 4.3 The Bid Guarantee shall be valid for 10 (ten) months from the date of tender opening Part -I.
- 4.4 The Bid Guarantee deposited in any manner shall not bear any interest.
- 4.5 The Bid Guarantee furnished in the form of Demand draft / Banker's Cheque / Bank Guarantee, the scanned copy shall be uploaded and the original copy of the same shall be furnished as brought out in the Clause 6.1.1.
- 4.6 The firms registered with NSIC/covered under MSMED Act,2006/MSME are exempted from furnishing Bid Guarantee, provided that such Micro and Small Scale Units are registered under single point registration scheme of NSIC/covered under MSMED Act, 2006/MSME and the same is valid on the scheduled date of tender opening and the product range mentioned in the certificate is the same or similar to our requirements. Copies of necessary certificates duly attested by any Notary public (or) Gazetted Officers (or) practicing Chartered Accountant with seal and date shall only be accepted.

#### 5.0 **TENDER DOCUMENTS:**

- 5.1 Tender document Volume-I Consists of
- i SECTION – A : Notice Inviting Bids (NIB)
  - ii SECTION - B : Qualifying Requirements
  - iii SECTION - C : Instructions to Bidders for submission of online Bids in e-tender & e-Reverse Auction.
  - iv SECTION - D : Invitation to Bid
  - v SECTION - E : Specimen Formats
  - vi SECTION - F : Draft Contract Agreement and Commercial Conditions of Contract
  - vii Volume-II : Technical Specification



6.0 **BID SUBMISSION AND OPENING:**

6.1.1 All bids, including all attachments / enclosures shall be prepared in English language only and submit online in the NLCIL web site.

Bidders are requested to furnish the following documents in Original in a sealed cover (**Physical Forms**) within the last date of receipt of Bids.

- (i) Details of payment towards Tender fee
- (ii) Bid Guarantee
- (iii) Letter of undertaking
- (iv) Check list for compliance of important Tender Conditions.

6.1.2 The above sealed cover shall be superscribed as under:

Name of the Bidder:

Tender No.

Opening Date .....Time.....

Proposal for----- and submitted

To

The Chief General Manager / Contracts,

Corporate Office,

NLC India Limited,

Neyveli - 607 801, Cuddalore District,

Tamil Nadu, INDIA.

6.1.3 Submission of a valid bid guarantee or DD for the stipulated sum in full along with the bid and acceptance of the bid guarantee/DD or NEFT/RTGS by NLC India Limited is a condition-precedent for such Bid to be eligible for consideration by NLC India Limited.

6.1.4 An offer without Bid Guarantee, or with bid guarantee for a lesser amount, or bid guarantee in a form other than specified herein above, shall be liable to be rejected without further reference to the Bidder(s) or to the concerned Bank. No interest shall be payable on the Bid Guarantee amount.

6.1.5 The bid guarantee shall

- a. be executed only on behalf of the bidder on whose name the tender documents has been hdownloaded from the website.
- b. be submitted only by the bidder on whose name the tender documents have been downloaded from the website.
- c. be executed only as per the format prescribed by NLCIL.

6.1.6 The bid guarantee shall also have provision for extension by the banker upon request by the bidder. The bidder shall arrange for extension of validity upon request from NLC India Ltd., Neyveli.

### Confirmation of BG under the through “Structured Financial Messaging System (SFMS)”

“The Bank Guarantee issued by the issuing Bank of Behalf of Bidder/ Contractor / Supplier in favour of “Name of Company” shall be in paper form as well as issued under the “Structured Financial Messaging System”. The details of beneficiary for issue of BG under SFMS platform is furnished below:-

Name of Beneficiary & its details	Name	NLCIL
	Unit/ Area/ Division	Contracts branch /Corporate Office
Beneficiary Bank, Branch & Address		State Bank of India
		Block-2, Neyveli – 607801
IFSC Code		SBIN0000958

The above particulars are to be incorporated by the issuing bank properly while issuing BG under SFMS mode to avoid any problem in future.

#### 6.1.7 The Bid Guarantee shall be forfeited if:

- a. the bid is unilaterally revoked /revised / modified / withdrawn before expiry of bid validity period ,by the bidder(s); or
- b. the price(s) have been unilaterally increased or altered after the bid opening and during validity of offer, by the bidder; or
- c. In case, any certificate submitted by the Bidder(s) is found to be not genuine, or forged / bogus; or
- d. on issue of LOA by NLCIL to the bidder, the bidder omits or refuses to accept the said LOA within the stated period and /or execute the Contract agreement; or
- e. the successful bidder, after issue of LOA, omits or fails to submit Contract Performance Guarantee within the specified period.

#### 6.1.8 Without prejudice to any other remedies available at law,

- i. in the event of any of the contingencies mentioned in Clause 6.1.7(a) to (c), NLCIL shall have the right, at their discretion, to reject the bid without notice to the Bidder(s);
- ii. in the event of the contingency mentioned in Clause 6.1.7 (d) & (e),NLCIL shall have the right to cancel the LOA/Contract, without notice to the Bidder
- iii. in addition on (i) and (ii) above, NLCIL shall also have the right to de-bar the defaulting Bidder(s) for a period to be specified, from participating in any of NLCIL tenders and NLCIL reserves the right to inform the matter to other PSUs/statutory Bodies and the decision of NLCIL in this regard shall be final and binding on the Bidder(s).

### 6.1.9 **Return of Bid Guarantee**

(i) **For unsuccessful Bidders:**

For unsuccessful bidders, bid guarantee /EMD shall be returned to such Bidders within 15 days from the date of approval for placement of order on the successful Bidder. If any bidder who does not agree to extend the validity of the bid, bid guarantee shall be returned on request.

(ii) **For successful Bidder:**

For successful bidder whose bid has been accepted and LOA is issued, the bid guarantee / EMD shall be returned within fifteen days from the date of acceptance of Bank Guarantee for Contract Performance.

(iii) In all the above transactions, the documents shall be sent by Registered post /Speed Post.

6.1.10 All Bank Guarantees except Bid Guarantee are to be furnished directly by the Banker to NLCIL either by Reg. Post/Speed Post/Courier.

6.1.11 The Online bid with regard to Technical and Commercial aspects shall contain the full details of the profile of the bidder(s) in addition to the following:

(i) Duly filled in online forms.

(ii) Audited Annual reports for the last 3 years comprising of Audited Balance Sheets and Profit and Loss Accounts, duly certified by the statutory auditors and the documentary evidence with respect to Annual turnover.

(iii) Any amendment / corrigendum / errata for the Tender Document shall also be signed by the Bidder as a token of acceptance of the same and enclosed in Cover-II of the Bid.

(v) Bidders who offer for complete equipment in collaboration/Joint Venture/consortium shall furnish the details of the collaboration agreement, JV agreement, consortium agreement etc.

(vi) Integrity Pact duly signed.

6.1.12 If the Audited Annual Reports are not in English language, certified English translated copies be attached duly signed by the Company Auditor.

6.1.13 To assist in the scrutiny, evaluation and comparison of bids, the Purchaser may, at its discretion, seek from any or all bidders, clarification(s) of his / their Bids, including break-downs of unit rates, technical information, documents and materials after the Tender Opening. No change in the final price or substance of the Bid shall be permissible.

### 6.2. **PRICE**

6.2.1 The 'Schedule of Prices' duly and correctly filled in by the bidder shall be submitted online in the Specified Form.

- 6.2.2 Price given should cover the entire scope of work and should be as per price format. The bidder shall quote his price for entire scope of work on firm price basis only. The bidder quoting a system of prices other than that specified, run the risk of summary rejection of the bid.
- 6.2.3 The Bidder shall quote his price against each item of the schedule as indicated in the price format. The bidder shall quote the prices only once after considering all the pros and cons.
- 6.2.4 All entries shall be in English language only.
- 6.2.5 The price shall be quoted in **Indian Rupees/ USD / Euro** and shall remain valid till the completion of entire work.
- 6.2.6 Price Bids will be checked by Purchaser for arithmetical accuracy. Errors, if any, will be resolved in the following manner, and it shall not be necessary to make a reference to the concerned Bidder(s) for such purpose:
- i) where there is a discrepancy between the amounts in figures and in words, the amount in words will govern; and
  - ii) where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern.
  - iii) where there is a discrepancy between figures and in words of an unit rate, the unit rate as quoted in words will govern.

## 7.0 **GENERAL**

- 7.1 In general, no request for postponement or extension of time shall be permitted for the last date for remitting Tender fee, date of closing of online e-tender, Date of submission of physical forms (Cover-I), Date of opening of physical forms (cover – I), Date of opening of e-bids (Cover- II), etc. However, the Purchaser has the right to decide.
- 7.2 Bids received in incomplete shape shall be liable for rejection.
- 7.3. NLC India Limited takes no responsibility for transmission delays, loss or non-receipt of bid documents or any letters sent by post / courier, either way, and also reserve the right to reject any bid in part or full without assigning any reasons therefore.
- 7.4. Notwithstanding any information and data, which may be contained in these tender documents, the bidder has to make independent inquiries and generally obtain his own information on all matters that may in any way affect prices, risks and obligations of the Contractor under the Contract.
- 7.5. The submission of any bid connected with these documents and specifications shall constitute an agreement that the Bidder shall have no cause of action or claim against the Purchaser for rejection of his Bid. The Purchaser shall always be at liberty to reject or accept any bid or bids or part thereof at his sole discretion and any such action will not be called into question and the bidder shall have no claim in that regard against the Purchaser.
- 7.6. Bids once submitted shall not be returned and shall remain property of the Purchaser.
- 7.7 Unilateral revision or withdrawal of offer by the bidder within the subsistence of the validity period of offer shall not be permitted. Violation of this condition shall result in rejection of the bid without notice, besides forfeiture of EMD/ Bid Guarantee as the case may be. In addition to the above, such bidder shall also be debarred either

permanently or for a fixed period, at the discretion of NLCIL from participating in any of the NLCIL's future tenders.

#### 8.0 **Effect and Validity of Bid**

The bid shall be kept valid for acceptance for 08 (Eight) months from the date of opening of the bid and has to be extended from time to time if situation warrants due to administrative procedures in vogue.

#### 9.0 **Clarifications**

A bidder, who has been issued the tender document may seek clarifications, if found necessary, in respects of any printed portion of the tender documents. But such request in writing should reach the General Manager/ Contracts within two weeks of the date of issuance of the tender document by the Purchaser. In response to such a request or even otherwise, Purchaser shall have the right to provide clarifications as may be considered necessary to all those who have been issued the tender documents. In any case, Purchaser shall not be liable to entertain any request for clarifications received not less than seven days prior to the scheduled tender opening date.

9.1 Requests for clarifications received after the stipulated time as indicated in 10.2 shall not be considered. The NLCIL shall endeavor to render / communicate their clarifications in writing to the bidder without delay. After receipt of such clarifications, the bidder may submit his bid but within the time and date as indicated in the tender. All such clarifications and the relevant exchange of correspondence between the parties in this regard shall form part of the tender specifications and contract documents.

9.2 Address of the Technical department is given below:

The General Manager/PBD Telephone No.04142-252496  
NLC India Limited,  
Corporate Office, Block -1,  
NEYVELI – 607 801.

#### 10.0 **Latest Hour For Receipt of Bids**

10.1 Online / Electronic Bid shall be submitted through NLCIL web site under e-Contracts Portal i.e. [econts.nlcindia.com](http://econts.nlcindia.com)

10.2 Physical sealed cover as brought out in Para6.1.1 must be received / deposited / delivered to any one of the officer at the office mentioned below, not later than 14.30 Hrs. IST on the date fixed for tender opening. The sealed cover deposited / delivered after the time & date fixed for the receipt of the bids shall be rejected.

- a) Shri P. Seshadri, Addl. Chief Manager / Contracts,
- b) Shri S.Gothandaraman, Addl. Chief Manager / Contracts,
- c) Shri C. Venkatraman, Manager / Contracts,

O/o The Chief General Manager / Contracts  
Corporate Office, Block-1,  
NLC India Limited  
Neyveli – 607 801, Cuddalore District.  
Tamil Nadu, India.

11.0 **Single Bidder Responsibility**

The bidder shall specifically indicate in his bid that he assumes full responsibility for the scope of work in accordance with specifications, quality and time schedule of the complete tender and guarantee the satisfactory performance as a whole.

12.0 **No Claim for Compensation for Submission of Bid**

12.1 The submission of any bid connected with these documents and specifications shall constitute an agreement that the Bidder shall have no cause of action or claim against the NLCIL for rejection or non-acceptance of his Bid. The Purchaser shall always be at liberty to reject or accept any bid or bids or part thereof at his sole discretion and any such action will not be called into question and the bidder shall have no claim in that regard against the Purchaser.

12.2 The Bidder whose bid is not accepted shall not be entitled to make any claim on account of costs, charges and expenses incidental to or incurred by such Bidder, as a result of or in connection with his submission of bid or the consideration of the bid by NLCIL, even if NLCIL elects to modify/withdraw/abandon the Invitation to Bid.

13.0 **Policy of bids under consideration**

Bids shall be deemed to be under consideration immediately after they are opened and until such time the NLCIL makes official intimation of award/rejection to the Bidder. While the Bids are under consideration, Bidders and/or their representatives or other interested parties are advised to refrain from contacting, by any means, the NLCIL and/or his employees/representatives on matters related to the Bid under consideration. The NLCIL if necessary will obtain clarifications on the Bids, by requesting for such information from any or all the Bidders either in writing or through official discussions. The Bidder(s) will not be permitted to change the final price or substance of the Bid after the same has been opened. Unilateral revision or withdrawal of bids by the bidder within the subsistence of the validity period of offer shall not be permitted.

14.0 **NLCIL 's Right to Accept Bid**

14.1 PURCHASER shall always be at liberty to reject or accept any bid or bids or part thereof at his sole discretion and any such action will not be called into question and the bidder shall have no claim in that regard against the PURCHASER.

14.2 The Purchaser does not pledge itself to accept the lowest bid, and reserves the right to reject such bids for reasons to be recorded in writing. The other bids will be retained as given. The decision of NLCIL in this regard shall be final and binding on the bidders and the bidders shall not be entitled to any notice in this regard or to any compensation whatever.

15.0 **Deputation of Representatives for Discussion**

After opening of the bid, if NLCIL desires to have discussion, the bidder shall be in a position to depute, at short notice, his representative(s) having full authority for finalizing technical parameters as well as Commercial Terms and Conditions of the Contract.

## 16.0 **Evaluation of Bids**

16.1 The following procedures would be followed for evaluation of bids.

16.2 On the scheduled date and time of tender opening, Tender opening committee will open the Cover -I first and shall confirm, details of payment towards cost of Tender document(Tender fee), EMD/Bid Guarantee as in NIB, compliance of Letter of undertaking. The bids confirming to all the above is treated as Responsive bids and online Cover-II of the responsive bidders will be opened on the same day.

16.2.1 In the Schedule of Prices, the Bidders shall quote against each activity.

16.3 For conversion of FC to INR, the B.C selling rate prevailing on the date of opening of price bid shall be adopted.

The following procedure will be adopted regarding the loading:

- i) For FOB supplies, payments made through Letter of credit, interest loading for the 60% payment for equipment shall be done for evaluation purpose at prime lending rate of SBI together with statutory levies if any as on the date of price bid opening for the duration of 3 months in case of imports from Asia, Africa, Europe, Australia and 4 months in case of America. However if the bidder wants to take FOB payment on receipt of materials at Indian Port, this loading will not be made and the bidder shall indicate it specifically in their bid.
- ii) For FOB supplies L.C opening charges and usance charges incurred in India will be loaded.

The bids will be evaluated based on the total evaluated site cost per MW plus O&M charges per MW for Ten years i.e., evaluated price. The bidders will be ranked starting from the lowest evaluated price in the ascending order after bringing them to the same platform.

iv. The summary price table i.e Schedule-1 to 7 submitted online will be considered for evaluation. Any discrepancies arises between online price submitted and price mentioned in the scan copy uploaded, the online price will be considered.

16.4 From the above ranking, the bidder whose bid becomes H1 with the highest evaluated price shall be eliminated, subject to **ensuring minimum four(4) bidders** participation in the reverse auction i.e., H1 will be eliminated if **five (5)** or more bidders participated in the tender.

In case, participation is less than or equal to **four(4)**, all the bidders will be qualified for the reverse auction.

In case more than one bidder turn out to be H1 bidders (with the same evaluated price), all H1 bidders will be eliminated subject to ensuring **four (4)** bidders participation in the reverse auction. Due to such elimination of H1 bidders, if the available eligible bidders get reduced to less than **four (4)**, all will be included without elimination.

All the short listed bidders for Reverse Auction will be intimated about their eligibility for participation in Reverse Auction. Thereafter Reverse auction will be conducted.

16.4.1 Terms and conditions of Reverse Bidding/Auction is enclosed as Annexure-D. The date and time of Reverse Bidding/Auction will be intimated. At the end of Reverse Auction, the price ranking status of bidders will be ranked as RL1, RL2, RL3..., starting from the lowest offered price in the ascending order.

16.4.1.1 If RL1 is not from a local supplier, the lowest bidder among the local suppliers will be invited to match the RL1 price subject to local supplier's quoted price falling within the margin of purchase preference and the contract shall be awarded to such local supplier subject to matching the RL1 price.

In case such lowest eligible local supplier fails to match the RL1 price, the local supplier with the next higher bid within the margin of purchase preference shall be invited to match the RL1 price and so on and contract shall be awarded accordingly. In case none of the local suppliers within the margin of purchase preference matches the RL1 price, then the contract may be awarded to the RL1 bidder.

After completing the reverse auction, the lowest offered bidder (RL1) will be evaluated for QR& Techno-commercial conditions.

If the lowest offered bidder (RL1) satisfies all QR / Techno-commercial conditions, the bidder will be considered for placement of order.

If the lowest offered bidder (RL1) fails to qualify on QR / Techno-commercial conditions, the next ranked bidder (RL2) will be evaluated for QR& Techno-commercial conditions.

If the bidder RL2 satisfies all QR / Techno-commercial conditions, this bidder will be considered for placement of order. This awarded price will be taken as the lowest offered price.

This process will be repeated in the order of ranking till the eligible bidders are exhausted.

16.4.2 The order value for the successful bidder shall be calculated as follows:

The closing price (CP) in the Reverse Auction is the lowest offered evaluated price per MW of the successful bidder in the Reverse Auction.

The ratio (R), between this closing price and the originally evaluated price per MW of the successful bidder (EP) will be calculated as  $R = CP/EP$ .

The order value for the successful bidder will be calculated in the above ratio(R) of the quoted price of the successful bidder as below:

Order value =  $R * \text{Grand Total (PART-A +PART-B)}$

Correspondingly the individual price schedules will be arrived based on the above ratio (R).

16.4.3 In case, if any of the information / details /declaration furnished by the RL1 bidder is not found to be in order with the tender conditions, the bid shall be rejected and action as mentioned below will be taken on the bidder.



- (i) In case, the RL1 bidder fails to submit requisite documents as per NIT or if any of the information / declaration furnished by RL1 bidder is found to be wrong during evaluation of documents submitted by the bidder, which changes the eligibility status of the bidder (for the first time) consider as defaulted, then his bid shall be rejected and EMD or Rs. 1 Lakh, whichever is lower of RL1 bidder will be forfeited.
- (ii) If the RL1 firm is disqualified in a subsequent tender, then the bids shall be rejected and entire EMD amount will be forfeited.
- 16.4.4 If the bidder fails remit the amount as stipulated above in clause 16.4.3 (i) & (ii) they will be either debarred or banned for a specific period as deemed fit.

#### 17.0 **Local Conditions**

- i) Minimum wages for Contract labour shall be paid as applicable in that region from time to time. Claims and objections due to ignorance of site conditions will not be considered after submission of Bid.
- ii) The Bidder is required to carefully examine the Technical & General Specification, Terms and Conditions, Commercial and Erection conditions of Contract, drawings and other details relating to work given in the Tender Document and fully acquaint himself as to all conditions and matters which may in any way affect the work or the cost thereof. The Bidder shall be deemed to have on his own and independently obtained all necessary information for the purpose of preparing the Bid and his bid as accepted shall be deemed to have taken into account all contingencies as may arise due to such information or lack of the same.
- iii) The Bidder shall be deemed to have exhaustively examined the Tender documents, to have obtained all information and clarifications on all matters whatsoever that might affect the carrying out of the work and to have satisfied himself as to the adequacy of his Bid. He is deemed to have known the scope, nature and magnitude of the work and the requirements of materials and labour involved etc. and as to all work he has to complete in accordance with the Contract whatever be the defects, omissions or errors that may be found in the Tender/Bid Documents.
- iv) The Bidder shall be deemed to have acquainted himself with the Indian Income Tax Act, 1961, Indian Companies Act, 1956, Indian Customs Act, 1962, Indian Electrical Act, Factories Act, Pollution Control Regulation and other related Acts & Laws prevalent in India and as amended from time to time. The Purchaser shall not entertain any request for clarifications from the Bidders regarding such local conditions.
- v) Any neglect or omission or failure on the part of the Bidder in obtaining necessary and reliable information as stated above or on any other matter affecting the Bidder shall not relieve him from any risks or liabilities or the entire responsibility for completion of the work in accordance with the Tender Documents.

#### 18.0 **Signature of Bids**

- 18.1 The Bid must contain the name, residence and place of business of the person or persons making the Bid must be signed and sealed by the Bidder with his full signature. The name of the person/persons signing should be typed or printed below the signature and each page of the bid shall be properly authenticated by appending signatures/initials and seals, if any.

- 18.2 Bid by a Corporation/Company must be signed with the legal corporate name of the Corporation/Company by the President, Managing Director or by the Secretary or any other person or persons authorised to submit bid on behalf of such Corporation/Company and shall contain the Official seal of the Company.
- 18.3 A Bid by a person who affixes to his signature the word 'President', 'Managing Director', 'Secretary', 'Agent', or other designation without disclosing his Principal will be rejected. Satisfactory proof of authority of the person signing on behalf of the Bidder shall be furnished with the Bid.
- 18.4 The Bid/offer shall be submitted only in the real/registered/trading name of the Bidder and anonymous/pseudonymous shall be rejected.
- 18.5 Any corrections or other changes in the bid documents shall be duly authenticated by appending signatures/initials and seals, if any, of the person signing the Bid.
- 18.5.1 Bids not conforming to the above requirements will be disqualified.

19.0 **Award of Criteria**

- 19.1 The Purchaser will award the contract to the bidder who meets the Qualifying Requirements, determined as substantially responsive and lowest evaluated price.
- 19.2 The Purchaser reserves the right to accept or reject any bid and to annul the bidding process and reject all the bids at any time prior to Award of Contract, without thereby incurring any liability to the affected Bidder/Bidders and not obliged to inform the grounds of such action.
- 19.3 The Purchaser will be the sole Judge in this regard.

20.0 **Integrity Pact Programme:**

NLCIL is committed to have most ethical business dealing with the Vendors, Bidders and Contractors of goods and services and deal with them in a transparent manner with equity and fairness.

In order to achieve these goals, NLCIL is implementing the Integrity Pact Programme in co-operation with Central Vigilance Commission (CVC) and renowned International Non-Governmental Organisation, Transparency International India (TII).

The Integrity Pact Programme covers the following aspects:

- i) Commitments and Obligations of NLCIL (Principal).
- ii) Commitments and Obligations of Vendors / Bidders / Contractors (Counterparties).
- iii) Violations and Consequences.
- iv) Independent External Monitors.

As per the Integrity Pact Programme, an "Integrity Pact", which envisages an agreement between the prospective Vendors, Bidders & Contractors and NLCIL, committing the persons / officials of both parties, not to exercise any influence on any aspect of the contract. Only those Vendors / Bidders / Contractors, who have entered into such an "Integrity Pact" with NLCIL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification. Hence the bidder shall submit the Integrity Pact agreement duly filled and signed in his offer enclosed in Cover-II.

As on date, the Independent External Monitors are:

Sl. No.	Name and Address	Phone No. and e-mail
1	Shri. M.N. Krishnamurthy, I.P.S(Retd.) Former DGP of Kerala, 3C-910, HRBR Layout, Kalyan Nagar, Bangalore- 560 043.	Ph.No.080 – 25427282 ((R ) Mobile No. 9591110000 Email:krishnamurthymn19@gmail.com
2	Shri Najib Shah, Ex.Chairman, Central Board of Excise and Customs, 32, Prestige Mayberry, Nagondanahalli Main Road, Whitefield Main Road, Bangalore – 560 066.	Ph.No.080 – 49518850 Mobile No. 9311706358 Email: najibshah@hotmail.com
3	Shri S.Srinivasan, IAS (Retd.), Former Secretary of GOI & Member (Finance), Dept. of Space / Atomic Energy/ Earth Sciences, Flat No. D-5-107, Block No.5, V Floor KendriyaVihar, B B Road (Bangalore – Bellary Road) Yelahanka, Bangalore – 560 064.	Ph No. 080 – 22930107 (Res) Mobile 9483536100 Email: s.srinivasan1980@gamil.com

21.0 **Agency Commission**

No Agency commission shall be payable under this Contract.

22.0 **Vital Clauses**

All the clauses in the Commercial conditions of Contract and Technical Specifications and conditions of contract are vital and no deviations are permitted in these clauses.

23.0 **Conditions of Contract**

Subject to the conditions enumerated in the Commercial Conditions of Contract, the tender will be governed by "Technical Specification and Conditions of Contract" as detailed in the document. The Technical Conditions of Contract shall prevail over the other conditions elsewhere specified in the tender document in case they differ from other conditions to the extent they differ from the other conditions.

Yours faithfully,  
For NLC INDIA LIMITED,

CHIEF GENERAL MANAGER/ CONTRACTS

**Section -E**

**SPECIMEN FORMATS**

**SCHEDULE OF PRICES**  
**GENERAL INSTRUCTIONS TO BIDDERS**

**ANNEXURE-A**

1.0 The Bidder shall furnish their prices only in the online form 'schedule of prices'.

**1.0 PREAMBLE**

1.1 This section covers the price schedule to be filled up by the BIDDER for the entire scope of work.

1.2 After Reverse Auction, the BIDDER shall furnish price-breakup as per the format in respective currency as per the ratio indicated in Section D, Cl.16.4.2.

1.3 The BIDDER shall carefully scrutinise the specification and drawings and include price for all items of work in the price schedule. This is a turn key lump sum contract and over and above the prices quoted, no extra claim will be admissible. All piping, cabling, earthing, roads and pathways, with in the terminal points are deemed to have been included within the quoted price.

**1.4 Special Notice:**

- i) The BIDDER shall note that the list of items indicated in the price schedule are not necessarily exhaustive and the price quoted shall be inclusive of all necessary equipment, accessories, gauges, instruments, etc., labour, duly supplied, constructed, installed, tested, commissioned and handed over to the Purchaser in perfect working conditions.
- ii) It is incumbent on the successful BIDDER to arrange for and obtain necessary/ approval from the concerned appropriate authority for the complete installation included in the scope of supply, construction, installation and commissioning. The installation will be deemed to have been completed only when all such approval is obtained and handed over to NLCIL.
- iii) The prices for supply items shall be quoted as delivered at site including packing & forwarding, loading and freight up to door delivery at site. The services provided at site shall be on turnkey basis. All prevailing applicable taxes and duties shall be indicated separately along with the quoted price.
- iv) The prices shall be firm throughout the contract period in force.
- v) While quoting for taxes and duties, the bidders shall consider all prevailing laws and concession available and quote accordingly. Where any concessional taxes have been considered the same shall be considered in the bid. The rate of taxes and duties adopted shall be indicated in Schedule -8 of prices.
- vi) The price quoted in the schedule of price for 10 years operation and maintenance for Solar PV Power Plant (Schedule 6) and the schedule of price for operation and maintenance for BESS (Schedule 7) added together shall not be less than 15% of the total quoted price.

If the schedule of price for 10 years operation and maintenance for Solar PV Power Plant (Schedule 6) and the schedule of price for operation and maintenance for BESS (Schedule 7) added together is less than 15% of the total quoted price, the offer will be summarily rejected.

## SUMMARY OF PRICE TABLE

**Note: This format of price tables are given for guidance and understanding to quote the price. Bidders are requested to quote the price in the online price schedule form only.**

### **PART - A : SUPPLY AND SERVICES**

<b>Sl.No.</b>	<b>Description</b>	<b>Item</b>	<b>Total Price (In Rupees/ FC)</b>
1	SCHEDULE-1	Schedule of prices for Site Preparation	
2	SCHEDULE-2	Schedule of prices for Plant and Equipment (Solar PV Plant and 33KV Switchyard)	
	SCHEDULE-3	Schedule of prices for Plant and Equipment (BESS)	
3	SCHEDULE-4	Schedule of prices for Installation & commissioning	
4	SCHEDULE-5	Schedule of prices for Civil and structural works	
	<b>SUB-TOTAL(A)</b>		

### **PART -B : O&M for 10 years after one year warranty period**

<b>Sl.No.</b>	<b>Description</b>	<b>Item</b>	<b>Total Price (In Rupees)</b>
1.	SCHEDULE-6	Schedule of prices for Operation And Maintenance for 10 years after one year warranty period for Solar Plant	
2.	SCHEDULE-7	Schedule of prices for Operation And Maintenance for 10 years after one year warranty period for BESS	
	<b>SUBTOTAL(B)</b>		
	<b>GRAND TOTAL(Part-A+Part-B)</b>		

Signature:

Name:

Designation:

Company:

Date:

**Scan copy to be uploaded online**  
**SCHEDULE OF PRICES-SITE PREPARATION - SCHEDULE-1**

<b>Sl. No.</b>	<b>Details</b>	<b>In Rupees.</b>
1.0	Lumpsum and firm price basis for Site preparation activities	
1.1	GST on ceiling basis (Details to be furnished in Schedule-8)	
1.2	Total price for Site preparation(sum of items 1.0+1.1)	

Signature:

Name:

Designation:

Company:

Date:

**Scan copy to be uploaded online**  
**SCHEDULE OF PRICES FOR PLANT AND EQUIPMENT (Solar)**

**SCHEDULE-2**

Sl. No.	Details	In Rupees/Foreign currency
	<b>Design, engineering, manufacture and supply of Solar PV module, SMB, MMS, Cables Power collection Sub-Station and Equipments, Transformers, Power Export Sub-station and Equipments, SCADA&amp; EMS and Switchyard Equipments etc. as per details in Technical specification.</b>	
1.0	Lump sum and firm price basis for supply & delivery items on FOB basis/ex-works including loading into container, storage, assembly and commissioning. (port of shipment to be indicated in case of FOB)	
1.1	Customs Duty including basic CD, IGST etc., for above items (Ceiling) (Details to be furnished in Schedule-8)	
1.2	All Transport charges including GST on lumpsum and firm price basis for Supplies of all items from Ex works to site storage Yard. This shall include intercarting, storage at intermediate place and also unloading at site and stacking.	
1.3	Ocean Transport charges including GST on lumpsum and firm price basis for Supplies of all items on FOB basis from loading Port to site storage Yard. This shall include intercarting, storage at intermediate place and also Port handling etc., unloading at site and stacking.	
1.4	Comprehensive marine insurance including GST on lumpsum and firm price basis for the above items	
1.5	GST for Sl.No.1.0	
2.0	Total Cost of equipment (1.0 to 1.5)	

Signature:

Name:

Designation:

Company:

Date:



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**SCHEDULE OF PRICES FOR PLANT AND EQUIPMENT (BESS)**

**SCHEDULE-3**

<b>Sl. No.</b>	<b>Details</b>	<b>In Rupees/Foreign currency</b>
	<b>Design, engineering, manufacture and supply of BESS Equipments as per details in Technical specifications</b>	
1.0	Lumpsum and firm price basis for supply& delivery items on FOB basis/ex-works including loading into container, storage, assembly and commissioning. (port of shipment to be indicated in case of FOB)	
1.1	Customs Duty including basic CD, IGST etc., for above items (Ceiling) (Details to be furnished in Schedule-8)	
1.2	All Transport charges including GST on lumpsum and firm price basis for Supplies of all items from Ex works to site storage Yard. This shall include intercarting, storage at intermediate place and also unloading at site and stacking.	
1.3	Ocean Transport charges including GST on lumpsum and firm price basis for Supplies of all items on FOB basis from loading Port to site storage Yard. This shall include intercarting, storage at intermediate place and also Port handling etc., unloading at site and stacking.	
1.4	Comprehensive marine insurance including GST on lumpsum and firm price basis for the above items	
1.5	GST for Sl.No.1.0	
2.0	Total Cost of equipment (1.0 to 1.5)	

Signature:

Name:

Designation:

Company:

Date:

Scan copy to be uploaded online

**SCHEDULE OF PRICES FOR INSTALLATION & COMMISSIONING**  
**SCHEDULE-4**

<b>Sl.No.</b>	<b>Details</b>	<b>In Rupees</b>
1.0	Lumpsum and firm Price for erection, testing and commissioning of all Equipments as per details in the Technical Specifications.	
1.1	Comprehensive storage and erection insurance including GST on lumpsum basis	
1.2	GST for Sl.No. 1.0 above on ceiling basis (Details to be furnished in Schedule-8)	
1.3	Total (1.0 + 1.1+1.2)	

Signature:

Name:

Designation:

Company:

Date:

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**SCHEDULE OF PRICES FOR CIVIL & STRUCTURAL WORKS**

**SCHEDULE- 5**

<b>Sl.No</b>	<b>Details</b>	<b>In Rupees</b>
1.0	Lumpsum and firm price basis for complete civil and structural works including design and engineering.	
1.1	GST for the above on ceiling basis	
1.2	Total price for civil works (sum of items 1.0 + 1.1)	

Signature:

Name:

Designation:

Company:

Date:

**Scan copy to be uploaded online**  
**SCHEDULE OF PRICES FOR OPERATION AND MAINTENANCE, FOR 10 YEARS**  
**AFTER ONE YEAR WARRANTY PERIOD FOR SOLAR POWER PLANT**  
**SCHEDULE-6**

Sl.No.	Details		Total
	<b>Lumpsum and firm price for Operation and Maintenance for 10 years after one year warranty period in Rs. (I)</b>	<b>GST on ceiling basis year wise in Rs. (II)</b>	<b>In Rupees (I + II)</b>
1			

Signature:

Name:

Designation:

Company:

Date:

**Scan copy to be uploaded online**  
**SCHEDULE OF PRICES FOR OPERATION AND MAINTENANCE,**  
**FOR 10 YEARS AFTER ONE YEAR WARRANTY PERIOD FOR BATTERY**  
**ENERGY STORAGE SYSTEM (BESS)**

**SCHEDULE-7**

<b>Sl.No.</b>	<b>Details</b>		<b>Total</b>
	<b>Lumpsum and firm price for Operation and Maintenance for 10 years after one year warranty period in Rs. (I)</b>	<b>GST on ceiling basis year wise in Rs. (II)</b>	<b>In Rupees (I + II)</b>
1			

Signature:

Name:

Designation:

Company:

Date:

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**RATES AND CLASSIFICATION OF TAXES AND DUTIES**

**SCHEDULE-8**

The bidder shall give below the details of the prevailing rates and classification of component in accordance with the CD/GST. The details of any other taxes and duties applicable shall be furnished.

**A) GST**

---

<b>Sl.No.</b>	<b>Materials adopted</b>	<b>GST Classification</b>	<b>Rate of GST</b>

---

**B) CUSTOMS DUTY**

---

<b>Sl.No.</b>	<b>Materials Adopted</b>	<b>Classification</b>	<b>Rate of CD</b>

---

**C) In case of FOB offer indicate the port of shipment:**

**D) In case of FOB offer, FOB payment on receipt of : Yes/No  
materials receipt of Indian Port**

Signature:

Name:

Designation:

Company:

Date:

## Annexure – B

### REVERSE AUCTION

1. **RULES OF REVERSE BIDDING/AUCTION:** From the ranking made as per Cl. 16.0, the bidder whose bid becomes the Highest Evaluated Price per MW (H1) shall be eliminated, subject to ensuring minimum **four** bidders participation in the reverse Auction. i.e., H1 will be eliminated if **five** or more bidders participated. In case, participation is less than or equal to **four**, all the bidders will be qualified for the Reverse Auction. In case, more than one bidder turn out to be H1 bidders (within the same evaluated price), all H1 bidders will be eliminated subject to ensuring **four** bidders participation in the Reverse Auction. Due to such elimination of H1 bidders, if the available eligible bidders get reduced to less than **four**, all will be included without elimination.
2. **Schedule for Reverse Bidding:** After Price e-Bids are opened online, date and time of start of Reverse Auction shall be intimated to all the *eligible* bidders. Scheduled duration of Reverse Auction shall be normally **one hour**.
3. **Auction extension time:** If a valid bid is placed within Ten (10) minutes of End Time of the Reverse auction (RA), then RA duration shall get automatically extended for another Ten (10) minutes from the existing end time. It may be noted that the auto-extension will take place only if a valid bid comes in those last Ten (10) minutes. If a bid does not get accepted as the lowest bid, the auto-extension will not take place even if that bid might have come in the last Ten (10) minutes. The above process will continue till no bid is received in last Ten (10) minutes which shall mark the completion of Reverse Auction. However, bidders are advised not to wait till the last moment to enter their bid to avoid complications related to internet connectivity, their network problems, system crash down, power failure etc.
4. **Procedure of Reverse Auctioning:**
  - i. Reverse Auction will be conducted based on Lowest evaluated bid price emerged as per Clause 16.4 of Invitation to Bid.
  - ii. The ‘Opening Price’ i.e. Start Price for RA (Reverse Auction) shall be Rs. 5,00,000/- lower than the lowest evaluated bid price per MW.
  - iii. Bid Decrement shall be Rs. 5,00,000/- of the Start Price for RA and its multiples.
  - iv. “RL1” Bid is the last offered rate i.e. further no bidders responds within the time limit.
  - v. After completion of the online Reverse Auction, the Closing Price (CP) i.e. RL1 bid shall be available for further processing.
  - vi. After reverse auction, the price break up for all components shall be arrived as follows:
    - (a) The closing price (CP) in the Reverse Auction is the lowest offered evaluated price per MW of the successful bidder in the Reverse Auction.
    - (b) The ratio (R), between this closing price and the originally evaluated price per MW of the successful bidder (EP) will be calculated as  $R = CP/EP$ .

(c) The order value for the successful bidder will be calculated in the above ratio (R) of the quoted price of the successful bidder as below:

$$\text{Order value} = \frac{R * \text{Grand Total}}{(\text{PART-A} + \text{PART-B})}$$

Correspondingly the individual price schedules will be arrived based on the above ratio (R).

## 5. **System Requirement**

Refer to NLCIL's portal ([econts.nlcindia.com](http://econts.nlcindia.com)) for System Requirements:

6. Bidding in Reverse auction: In all cases, bidder should use their own ID and Password along with Digital Signature at the time of submission of their bid.
7. During the entire e-reverse auction process, the bidders will remain completely anonymous to one another.
8. The e-reverse auction shall remain open from the pre-announced date & time and for as much duration as mentioned above.
9. All electronic bids submitted during the e-reverse auction process shall be legally binding on the bidder. Any bid will be considered as the valid bid offered by that bidder and acceptance of the same by the Buyer will form a binding contract between NLCIL and the Bidder for execution of work.
10. It is mandatory that all the bids are submitted with digital signature certificate otherwise the same will not be accepted by the system.
11. NLCIL reserves the right to cancel or reject or accept or withdraw or extend the e-tender-e-Reverse Auction in full or part as the case may be without assigning any reason thereof.
12. The prevailing/current lowest bid will be displayed on the bidding screen during the course of e-reverse auction and all subsequent bids shall have to be quoted lower than the prevailing/current lowest bid.
13. The server time shall be treated as final and binding. Bids recorded in the server before the bid closing time will only be treated as valid bid. Bidders are, therefore, advised to submit their bids well before the closing time of e-reverse auction. If any bid reaches the server after the bid closing time as per server time, the same will not be recorded and no complaint in this regard shall be entertained.
14. Bidders are advised to exercise caution in quoting their bids in e-reverse auction to avoid any mistake. Bids once submitted can't be recalled.
15. Any order resulting from this bidding process shall be governed by the terms and conditions mentioned in the NIB. No deviation to the technical and commercial terms & conditions are allowed.



**Annexure - C**  
**LETTER OF UNDERTAKING**

From:

(Name & Address of Bidder)

.....  
.....  
.....

SUB: Tender for (Name of Work to be filled up). – Reg.

REF: Tender No \_\_\_\_\_.

1. With reference to the aforesaid tender for (Name of Work to be filled up) I/we, \_\_\_\_\_ Ltd., (the Company) having our Registered Office at \_\_\_\_\_ hereby give the following declarations and undertaking.
2. I/We have read and understood all the terms and conditions of the tender and hereby agree and undertake to confirm all the technical and commercial conditions of this tender without any deviation.
3. I/We also confirm and certify that all the relevant documents have been submitted in conformity to the Qualifying Requirements specified in the tender.
4. I/We hereby agree and undertake that NLC India Limited shall have the right to reject the offer and take penal action against us, if any deviation is noticed during evaluation of the tender in contradictory to this letter of undertaking.
5. The information and documents provided by us are correct and authentic to the best of our knowledge.
6. I/We attached duly filled in Check list for Compliance of Important Tender Conditions.

Authorized Signatory

(Name & Designation)

Encl.:- Check List.

Place:

Date :

Company Seal

**Annexure - D**  
**Check list for Compliance of Important Tender Conditions**  
(to be attached with the Letter of Undertaking)

Bidders to submit their bid accepting all the terms and conditions of the Tender and the required / relevant documents wherever required, as per the formats given below:

**EMD, COST OF TENDER DOCUMENTS & INTEGRITY PACT:**

Sl. No.	Description	Acknowledgement for enclosing as per NIB (please tick)		Details if YES
1	Tender Fee details	YES	NO	Cost : Bank :
2	Bid Guarantee	YES	NO	<b>EMD</b> Cost : Bank : BG No : Validity :
3	Integrity Pact	YES	NO	.....
4	Bid Validity as in NIB	YES	NO	<b>Date</b>

**PQR QUESTIONNAIRE:**

Sl. No.	Description	Acknowledgement for enclosing as per NIB	Details of documents submitted in support of QR conditions
1	PQR	YES / NO	

Signature of Bidder.

**ANNEXURE - E**

**Bid Guarantee Form**

**NOTE:**

1. This guarantee should be furnished by a Nationalized Bank / Scheduled Bank (other than Bank of China) authorized by Reserve Bank of India in the format as given below.
  2. This bank guarantee should be furnished on stamp paper of value not less than Rs.80/- as per Stamp Act.
  3. The stamp paper should have been purchased in the Name of the Bank executing the guarantee.
- 

Bank Guarantee No.....

Date.: .....

Ref. Tender No.....

To

NLC India Limited,

Block-1, Neyveli – 607 801.

Cuddalore District, Tamil Nadu, INDIA.

Dear Sirs,

In accordance with your ‘ Invitation to Bid’ under your Tender No.:..... dated ..... M/s. .... hereinafter called the Bidder, having its Registered Office/ Head Office at ..... with the following Directors on their Board of Directors / partners of the firm.

1	.....	2	.....
3	.....	4	.....
5	.....	6	.....
7	.....	8	.....
9	.....	10	.....

wish to participate in the said bid for .....

As an irrevocable Bank Guarantee against Bid Guarantee for a sum of \*..... (in words and figures) valid for 10 months from ..... (the date of bid opening) is required to be submitted by the Bidders as a condition precedent for participation in the said bid, which amount is liable to be forfeited on the happening of any contingencies mentioned in the bid documents.

We the ..... Bank at ..... having our Head Office at ..... (local address) guarantee and undertake to pay immediately on demand by NLC India Limited, stating that

- a. the bid has been unilaterally revoked / revised / modified / withdrawn before expiry of bid validity period, by the Bidder(s) ; or
- b. The price(s) have been unilaterally increased or altered after the bid opening and during validity of the offer, by the Bidder; or
- c. On issue of LOA by NLC to the bidder, the bidder has omitted or refused to accept the said LOA within the stated period and/ or execute the Contract agreement; or
- d. the Bidder, after issue of LOA, omitted or failed to submit Contract Performance Guarantee within the specified period or
- e. the Bidder furnished Forged/Bogus Certificates

the amount of ...\*.....to the said NLC India Limited without any reservation, protest, demur and recourse. Any such demand by the NLC India Limited shall be conclusive and binding on the bank irrespective of any dispute or difference raised by the Bidder.

The guarantee shall be irrevocable and shall remain valid upto ...@..... If any further extension of this guarantee is required the same shall be extended on receiving instruction from M/s. .... on whose behalf this guarantee is issued.

In witness where of the Bank, through its authorized Officer has set its hand and stamp on this.....day of .....at.....

Notwithstanding anything contained herein:

- a. our liability under this bank guarantee shall not exceed ..... (in words)
- b. this bank guarantee shall be valid upto .....; and
- c. we are liable to pay the guaranteed amount or any part thereof under this bank guarantee only and only if you serve upon us a written claim or demand on or before .....

WITNESS (Signature)

- |  |   |
|--|---|
| 1. Signature<br>Name in Block letters<br>Occupation<br>Address | Name in Block Letters<br><br>Designation  |
| 2. Signature<br>Name in Block letters<br>Occupation<br>Address | Staff code No.<br>(Bank's seal)<br>Attorney as per Power of<br>Attorney No.....<br>Dated..... |

\* The amount shall be as specified in the tender documents

@ This date should be 10 months after the date of Bid Opening.

(To be executed on plain paper and applicable for all tenders of value above Rs 1 crore)

**INTEGRITY PACT:**

Between

NLC India Limited (NLCIL) hereinafter referred to as "The Principal"

and

..... hereinafter referred to as "The Bidder/ Contractor"

**Preamble:**

The Principal intends to award, under laid down organizational procedures, contract/s for ..... The Principal values full compliance with all relevant laws and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder/s and Contractor/s.

In order to achieve these goals, the Principal cooperates with the renowned international Non-Governmental Organization "Transparency International" (TI). Following TI's national and international experience, the Principal will appoint an external independent Monitor who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

**Definitions:**

In pursuance of the above Pact, for the purposes of this provision, the Principal defines the relevant terms set forth therein as under:

- 1) "Contract" means the contract entered into between the Principal and Bidder (or Bidder) / Contractor for the execution of work mentioned in the preamble above.
- 2) "Contractor" means the bidder or Bidder whose tender (bid) has been accepted by the principal or Company whose tender (bid) has been accepted and shall be deemed to include his/its/their successors, representatives, heirs, executors and administrators unless excluded by the Contract.
- 3) "Coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the procurement process or affect the execution of a contract: In order to achieve these goals, the Principal proposes to appoint one or more External Independent Monitor/s who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.
- 4) "Collusive practice" means a scheme or arrangement between two or more bidders, with or without the knowledge of the Principal designed to establish bid prices at artificial, noncompetitive levels; and
- 5) "Corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution;
- 6) "External Independent Monitor" means a person, hereinafter referred to as EIM, appointed, in accordance with Section 7 below, to verify compliance with this agreement.
- 7) "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Principal and includes collusive practices among Bidders (Prior to or after bid submission) designed to establish bid prices at artificial, non competitive levels and to deprive the Principal of the benefits of free and open competition;
- 8) "Party" means a signatory to this agreement.

- 9) “Purchaser” means NLC India Limited, Neyveli, incorporated under the Companies Act 1956, having their registered Office at Chennai, 600 010 and includes their successors.
- 10) “Bidder or Bidders” means the person, firm or company submitting a tender (bid) against the invitation to Tender (bid) and includes his/its/their staff, consultants, parent and associate and subsidiary companies, agents, consortium and joint venture partners, sub-contractors and suppliers, heirs, executors, administrators, representatives, successors.

### **Section 1 - Commitments of the Principal**

- (1) The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:
  1. No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for him/herself or third person, any material or immaterial benefit which he/she is not legally entitled to.
  2. The Principal will, during the tender process treat all Bidders with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidders the same information and will not provide to any Bidder confidential/additional information through which the Bidder could obtain an advantage in relation to the tender process or the contract execution.
  3. The Principal will exclude from the process all known prejudiced persons.
- (2) If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the relevant Anti-Corruption Laws of India, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

### **Section 2 - Commitments of the Bidder/Contractor**

- (1) The Bidder / Contractor commits itself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.
  1. The Bidder / Contractor will not, directly or through any other person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or immaterial benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
  2. The Bidder / Contractor will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to form cartels in the bidding process.
  3. The Bidder /Contractor will not commit any offence under the relevant Anticorruption Laws of India: further the Bidder /Contractor will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

4. The Bidder / Contractor will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
  5. The Bidder / Contractor of foreign origin shall disclose the name and address of the Agents / representatives in India, if any. Similarly the Bidder / Contractor of Indian Nationality shall furnish the name and address of the foreign principals, if any.
- (2) The Bidder / Contractor will not instigate third persons to commit offences outlined above or be an accessory to such offences.

### **Section 3. Disqualification from tender process and exclusion from future contracts**

If the Bidder, before contract award has committed a transgression through a violation of Section 2 or in any other form such as to put his reliability or credibility as Bidder into question, the Principal is entitled to disqualify the Bidder from the tender process or to terminate the contract, if already signed, for such reason.

- (1). If the Bidder / Contractor has committed a transgression through a violation of Section 2 such as to put his reliability or credibility into question, the Principal is entitled also to exclude the Bidder /Contractor from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of the transgression. The severity will be determined by the circumstances of the case, in particular the number of transgressions, the position of the transgressors within the company hierarchy of the Bidder and the amount of the damage. The exclusion will be imposed for a minimum of 6 months and maximum of 3 years.
- (2) A transgression is considered to have occurred if the Principal after due consideration of the available evidence, concludes that no reasonable doubt is possible.
- (3) The Bidder accepts and undertakes to respect and uphold the Principal's absolute right to resort to and impose such exclusion and further accepts and undertakes not to challenge or question such exclusion on any ground, including the lack of any hearing before the decision to resort to such exclusion is taken. This undertaking is given freely and after obtaining independent legal advice.
- (4) If the Bidder / Contractor can prove that he has restored / recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal may revoke the exclusion prematurely, provided such systems has been audited by an independent agency.

### **Section 4 - Compensation for Damages**

- (1) If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover from the Bidder liquidated damages equivalent to Earnest Money Deposit / Bid Security.
- (2) If the Principal has terminated the contract according to Section 3 or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to Security Deposit /Performance Bank Guarantee.

### **Section 5 - Previous transgression**

- (1) The Bidder declares that no previous transgressions occurred in the last 3 years with any other Company in any country conforming to the TI approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- (2) If the Bidder makes incorrect statement on this subject he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

### **Section 6 - Equal treatment of all Bidders / Contractors/ Subcontractors**

- (1) The Bidder / Contractor undertakes to demand from all subcontractors a commitment in conformity with this Integrity Pact, and to submit it to the Principal before contract signing.
- (2) The Principal will enter into agreements with identical conditions as this one with all Bidders, Contractors and Subcontractors.
- (3) The Principal will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

### **Section 7 - Criminal charges against violating Bidders/Contractor/ Subcontractors**

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor, which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

### **Section 8 – External Independent Monitor /Monitors (three in number depending on the size of the contract) (to be decided by the Chairperson of the Principal)**

- (1) The Principal appoints competent and credible external independent Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
- (2) The Monitor is not subject to instructions by the representatives of the parties and performs his functions, neutrally and independently. He reports to the Chairperson of the Board of the Principal.
- (3) The Contractor accepts that the Monitor has the right to access without restriction to all Project documentation of the Principal including that provided by the Contractor. The Contractor will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor is under contractual obligation to treat the information and documents of the Bidder / Contractor / Subcontractor with confidentiality.
- (4) The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.
- (5) As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or heal the violation, or to take other relevant action. The monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.



- (6) The Monitor will submit a written report to the Chairperson of the Board of the Principal within 8 to 10 weeks from the date of reference or intimation to him by the 'Principal' and, should the occasion arise, submit proposals for correcting problematic situations.
- (7) Monitor shall be entitled to compensation on the same terms as being extended to / provided to Outside Expert Committee members / Chairman as prevailing with Principal.
- (8) If the Monitor has reported to the Chairperson of the Board a substantiated suspicion of an offence under relevant Anti-Corruption Laws of India, and the Chairperson has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- (9) The word 'Monitor' would include both singular and plural.
- 10) The Monitor can be removed from his office, before the expiry of his tenure only with the approval of the Board of the Principal.

**Section 9 - Pact Duration**

This Pact begins when both parties have legally signed it. It expires for the Contractor 12 months after the last payment under the respective contract, and for all other Bidders 6 months after the contract has been awarded.

If any claim is made / lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged / determined by Chairperson of the Principal.

**Section 10 – Other provisions**

- (1) This agreement is subject to Indian Law. Place of performance and jurisdiction is the Registered Office of the Principal, i.e. Chennai / Neyveli. The Arbitration clause provided in the main tender document / contract shall not be applicable for any issue / dispute arising under Integrity Pact.
- (2) Changes and supplements as well as termination notices need to be made in writing.
- (3) If the Contractor is a partnership or a consortium this agreement must be signed by all partners or consortium members.
- (4) Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

.....

For the Principal for the Bidder /Contractor

Place ..... Witness1 .....

Date ..... Witness 2 .....

**ANNEXURE - F**  
**LIST OF FORMS**

## LIST OF FORMS

### I. QUALIFICATION REQUIREMENT FORM

#### 1. QUALIFICATION REQUIREMENT

Sl.No.	Qualification Requirement	Bidder Response
1.0	The bidder shall meet the following qualifying requirements related to solar PV Power Plants and Battery Energy Storage System. (a) Bidder should have executed contracts of Design/Engineering, Supply, Erection/Supervised erection, commissioning of Solar PV Power Plant(s) with cumulative capacity of 10MWp or above as on the original scheduled date of tender opening and out of which at least one Solar PV Power Plant shall be of minimum 5MWp capacity or above and should be in successful operation for at least one year within the last 7 years as on the original scheduled date of tender opening. AND 2.1(b) Bidder should have executed contracts of Design/Engineering, Supply, Erection/Supervised erection, commissioning of Battery Energy storage system with cumulative capacity of 1.0MWhr. or above as on the original scheduled date of tender opening and out of which at least one Battery Energy Storage System shall be of minimum 0.5MWhr. capacity or above and should be in successful operation for at least one year within the last 7 years as on the original scheduled date of tender opening.	
1.1	Whether bidder is submitting as his own or with Collaborator(s) or with Consortium or is a Joint Venture Company?	
1.2	Please specify the cumulative capacity of Grid Interactive Solar PV Power Plants in MWp have executed for Design/Engineering, Supply, Erection/Supervised erection, commissioning as on the original schedule date of Tender opening	
1.3	Out of 10 MWp cumulative capacity please specify the capacity of at least one plant which is connected to Grid and in successful operation for at least one year as on the original scheduled date of Tender opening and within the last 7 years	
1.4	Please specify the period in months of 5MWp capacity or above of Grid Interactive Solar PV Power Plants is in successful operation.	
1.5	Please specify the cumulative capacity of Battery Energy Storage System executed contracts of Design/Engineering, supply, Erection/Supervised erection, commissioning of Battery Energy storage system as an original schedule date of Tender opening	
1.6	Out of 1.0MW Hr please specify the capacity at least one Battery Energy storage system is in successful operation for period of at least one year as on the original schedule date of Tender opening and within last 7 years	
1.7	Please specify the period in months of 0.5 Mwhr capacity of Battery Energy storage system is in successful operation.	
1.8	Upload documentary evidence along with the bid in the form of user certificate together with full contact details for verification for having executed cumulative capacity 10MWp and one plant which is connected to grid of 5MWp capacity or above is in successful operation for at least one year as on the original scheduled date of tender opening and within the last 7 years	

1.9	Upload documentary evidence along with the bid in the form of user certificate together with full contact details for verification for having executed cumulative capacity of Battery Energy storage system 1.0 MWhr and one plant which is 0.5 MWhr capacity or above is in successful operation for at least one year as on the original scheduled date of tender opening and within the last 7 years	
2.0	Bidder who doesn't fulfill the qualifying requirements stipulated in clause 2.1 (a) and (b) above by himself can also participate provided the bidder collaborates with not more than two firms and together they fully meet the qualifying requirements stipulated in clause 2.1 (a) and (b) above and the Collaborator (s) should furnish along with the bid valid collaboration agreement to execute this project and a back-up Bank Guarantee as required in the relevant clauses. OR Bidder can also be a leader of a consortium consisting of not more than three firms, such that together they meet the Qualifying Requirements stipulated in clause 2.1 (a) and (b) above and the members of the consortium should furnish back-up Bank Guarantee as required in the relevant clauses. In case of bidding by a Consortium, the consortium partners shall necessarily identify a leader of the Consortium who will furnish the Consortium Agreement and the consortium partners shall execute a Joint Deed of Undertaking in which the partners are jointly and severally liable to the Owner for successful performance of the contract. OR Bidder can also be a Joint Venture Company, provided the qualifying requirement in clause 2.1 (a) and (b) above is met by any one or more partners of the Joint Venture (JV) Company. Each partner of the JV Company on the basis of whom the JV Company gets qualified shall have minimum 26% equity in the JV Company and should furnish back-up Bank Guarantee as required in the relevant clauses	
2.1	Whether bidder is with collaborator(s)?	
2.2	If yes name of the Collaborator(s)	
2.3	Please upload Collaboration Agreement obtained from each of the Collaborator for this project	
2.4	Whether bidder is a leader of a consortium consisting of not more than three firms, such that together they meet the Qualifying Requirements	
2.5	If yes mention name of the consortium partners	
2.6	Please upload the Consortium Agreement and the consortium Joint Deed of Undertaking in which the partners are jointly and severally liable to the Owner for successful performance of the contract.	
2.7	Whether bidder is a Joint Venture Company meeting QR by any one or more partners of the Joint Venture Company	
2.8	If yes name of the partners and indicate the equity share in the JV Company	
3.0	The Bidder or Bidder with Collaborator or the Lead Member of Consortium or major partner of JV company shall have Positive Net Worth as per the latest audited financial Statements.	
3.1	Whether the Bidder or Bidder with Collaborator or the Lead Member of Consortium or major partner of JV company having Positive Net Worth as per the latest audited financial Statement	
4.0	Average Annual Turn Over of the Bidder, combined Average Annual Turn Over of the Bidder and Collaborator(s), combined Average Annual Turn Over of the Consortium partners and the combined Average Annual Turn Over of all the promoters of the Joint Venture Company, as the case may be, shall not	

	be less than Rs.48.648 Cr. in the preceding three (3) consecutive financial years as on the original scheduled date of tender opening.	
4.1	Upload audited profit and loss accounts and balance sheets for the preceding three (3) financial years from the original schedule date of Tender opening of the bidder or the bidder with collaborator(s) or all individual firms in the consortium or all partners in the Joint Venture Company, as the case may be	

## 2.Schedule of places of Manufacture for Solar and BESS Equipment

Sl.No.	Name	Address	Telephone No.	Fax No.	E-Mail	Country Origin	Place of Manufacturer	Attachment
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**3. SCHEDULE OF BIDDER'S EXPERIENCE DETAILS OF SOLAR PROJECT  
AND BESS**

Sl. No.	Purchaser/Institution Contact name	Address	Phone No.	Fax No.	Email id	Contract /PO ref.	Exact place/location of the PV Solar Power Plant is in use	Capacity of the PV Solar power plant / BESS supplied	Scope of work covered	Date of commissioning	Number of years successful operation	Whether performance certificate from the customer enclosed	Attachment
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#### 4. BID GUARANTEE

Sl.No	Description	Bidder Response
	Bid Guarantee Type	
BG	Bank Guarantee	
1	Bank Guarantee No.	
2	Bank Guarantee Date	
3	Details of Stamp paper	
3.1	Stamp Paper Amount	
3.2	Whether stamp paper purchased in the Name of the Bank	
3.3	Stamp paper purchased address	
3.4	Date of Purchase	
4	Bank details	
4.1	Banker's Name	
4.2	Banker's Address	
4.3	Bank email-id	
4.4	Bank Phone No.	
4.5	Bank Fax No.	
4.6	Banker's Seal	
5	Manager's Name & No.	
6	Whether signed by two Witness	
7	Whether overwriting/cutting if any on the BG authenticated under signature & seal of executants	
8	Whether the BG has been issued by a Nationalized/Scheduled Bank in India	
9	If the bank guarantee issued by a foreign bank. Whether it is in the approved list of RBI.	
10	Details of value and validity	
10.1	Currency of BG	
10.2	Value of BG	
10.3	Validity upto	
11	Whether Bank Guarantee is as per NLCIL Format	
RTGS/NEFT	RTGS/NEFT details	
1	RTGS/NEFT UTR No.	
2	UTR Date	
DD	Demand Draft / Pay order / Banker's Cheque	
1	Demand Draft / Pay order / Banker's Cheque No.	
2	Date of DD	
3	DD in favour of	
4	Payable at	
MSME	Micro, Small and Medium Enterprises (MSME) Details	
1	MSME No.	
2	Registration Date	
3	Registration Category	
NSIC	National Small Industries Corporation Ltd. (NSIC) Details	
1	NSIC No.	
2	NSIC Expire Date	
3	NSIC Category	
	Please attach supporting scanned document(s)	



## II. TECHNICAL FORMS

### 1. TECHNICAL FORMS

<b>S. No</b>	<b>DESCRIPTION</b>	<b>BIDDER'S RESPONSE</b>
1.0	Please confirm acceptance of the Scope of Work stipulated in the tender document?	
2.0	Please confirm acceptance of the time schedule stipulated in the tender document?	

### III. COMMERCIAL FORMS

#### 1. DOCUMENT STRUCTURE

Code	Description	Type	Bidder Acceptance
Vol-1	Qualifying Requirement	QR	
SO_1	Qualifying Requirement		
VOL_2	COMMERCIALCONDITIONS OF CONTRACT	Commercial	
SO_1	S1. Instruction to Bidders for submission of Online Bids in e-Tender and e-Reverse auction. S2. Invitation to Bid S3. The specimen Form of Bank Guarantee, Integrity Pact and List of Forms S4.Commercial Conditions of Contract for equipment S5. Commercial Conditions of Contract for O&M.		
VOL_3	TECHNICAL SPECIFICATION	Technical	
SO_1	Section 1.0, Section-2.1 to 2.9, Annexure-1 to 3 and drawings etc.		

## 2. COMMERCIAL FORM

Sl.No	Description	Bidder Response
1.0	Particulars of the firm	
1.1	Bidder's Name and Address	
1.2	Telephone No.	
1.3	Fax No.	
1.4	E – Mail address	
1.5	Name of Contact Person	
1.6	Mobile Number of Contact Person	
2.0	Bank Details	
2.1	Name of the beneficiary	
2.2	Bank A/c No.	
2.3	Name of the Bank	
2.4	Name of the Branch	
2.5	IFS Code (For NEFT/RTGS Payment)	
2.6	BANK ADDRESS	
2.7	BANK FAX NO.	
2.8	BANK EMAIL-ID	
2.9	Bank Phone No.	
3.0	PAN No.	
4.0	GST Registration No.	
5.0	Other Statutory Registration No., if any	
6.0	Name and full address of Chief executives	
7.0	Upload Supporting Documents	

### 3. CHECK LIST FOR BID SUBMISSION

Sl.No	Description	Bidder Acceptance
1.0	Please ensure that all the attachments in the offer are only in English language? If any document is in any other Language, the same shall be got translated in English version duly authorized by the Notary Public or Competent Authority by the Bidder and upload both the versions.	
2.0	Have you read and filled all the forms?	
3.0	Have you attached performance certificates?	
4.0	Have you attached related work orders/agreements?	
5.0	Have you attached audited annual reports?	

#### 4. RATE OF TAXES & DUTIES

Sl.No.	Description	Bidder Response
1	Port of shipment	
2	GST rate adopted in %	
3	Customs duty rate adopted in %	
4	Whether FOB supplies payment is agreeable on receipt of materials at Indian Port .	
5	Upload scan copy of Schedule-8 (Rate of Taxes & Duties)	

## 5. FORM OF BID

Sl.No	Description	Bidder Acceptance
1.0	Having carefully examined all the Tender Documents and its Amendments / errata / Corrigendum / Clarifications issued till the date of tender opening, we agree to Complete the WORKS in conformity with all the terms and conditions stated in Tender Documents and its Amendments / Errata / Corrigendum / Clarifications issued till the date of tender opening and as per time schedule given in Tender Document. The Services offered are of best and of latest technology and of international standards.	
2.0	I / We declare and certify that I / We fully satisfy the Qualifying Requirements and the documentary proof as called for, have been attached.	
3.0	We undertake, in case our bid is accepted, to commence the work from the date of Letter of Award and to complete and deliver the whole of the work and responsibilities comprised in the contract within as per time schedule given in Tender document.	
4.0	We are submitting the Bid Guarantee as instructed by you. This Bid Guarantee shall be governed as per the stipulations provided in the “ Invitation to Bid”.	
5.0	We agree to abide by and keep our Bid valid initially for a period of 8 (eight) months from the date of opening of Bid (Part I) by NLC India Ltd. (NLCIL) formerly Neyveli Lignite Corporation Limited and it shall remain binding on us and may be accepted at any time before the expiry of that period.	
6.0	I/We, the undersigned have carefully examined and understood the Bidding Documents including the amendments / errata / Corrigendum / Clarifications issued till the date of tender opening. I / We hereby agree to carry out the entire works as described in the specifications in conformity with the specifications and Bidding documents, as per prices quoted by us in the Schedule of Prices.	
7.0	Should our Bid be accepted, we hereby agree to abide by and fulfill all Terms and conditions of Tender Document as accepted by us and in default thereof, to forfeit and pay to NLCIL or NLCIL’s successors, assignees or authorized nominees such sum of money as are stipulated in conditions contained in Tender Documents and agree to furnish Bank Guarantee for Contract Performance as per the Proforma prescribed by NLCIL and acceptable to NLCIL for a sum equal to 5% of the aggregate sum of contract price within 30 days from the date of Letter of Award. We understand that NLCIL is not bound to accept the lowest or any Bids received and NLCIL has the right to reject any bid, without assigning any reason whatsoever.	
8.0	This Bid together with written acceptance thereof shall constitute a binding CONTRACT between NLCIL and ourselves till a formal contract is executed.	
9.0	We have noted the contents of clause 2.6 in line with DIPP order dated 15.06.2017 and confirm compliance to the requirements.	
10.0	We have enclosed necessary self-certification for local content furnishing the details of the location(s) at which the local value addition is made	
11.0	We have enclosed a certificate from the statutory auditor / cost auditor of the company (in the case of companies) or from a practicing cost accountant/ practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.	

## 6. SUMMARY OF PRICE TABLE

Sl. No	Description	Item	USD	EURO	INR
PART -A	SUPPLY AND SERVIES				
1	SCHEDULE-1	Schedule of prices for Site Preparation			
	Upload scan copy of SCHEDULE-1				
2	SCHEDULE-2	Schedule of prices for Plant and Equipment (Solar PV Plant and 33KV Switchyard)			
	Upload scan copy of SCHEDULE-2				
3	SCHEDULE-3	Schedule of prices for Plant and Equipment (BESS)			
	Upload scan copy of SCHEDULE-3				
4	SCHEDULE-4	Schedule of prices for Installation &commissioning			
	Upload scan copy of SCHEDULE-4				
5	SCHEDULE-5	Schedule of prices for Civil and structural works			
	Upload scan copy of SCHEDULE-5				
	SUB-TOTAL(Part -A)				
PART -B	O&M for 10 years after one year warranty period				
1	SCHEDULE-6	Schedule of prices for Operation And Maintenance for 10 years after one year warranty period for Solar Plant			
	Upload scan copy of SCHEDULE-6				
2	SCHEDULE-7	Schedule of prices for Operation And Maintenance for 10 years after one year warranty period for BESS			
	Upload scan copy of SCHEDULE-7				
	SUBTOTAL(Part -B)				
	GRAND TOTAL(Part- A+Part-B)				

**Section - F**

**DRAFT CONTRACT AGREEMENT AND  
COMMERCIAL CONDITIONS OF  
CONTRACT**



**SECTION - F**  
**COMMERCIAL CONDITIONS OF CONTRACT**  
**CONTENTS**

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<b>CONTRACT AGREEMENT</b>		<b>75-77</b>
<b>SCHEDULE-1</b>	<b>DEFINITIONS</b>	<b>78-83</b>
<b>SCHEDULE-2</b>	<b>SCOPE OF SUPPLY &amp; SERVICES</b>	<b>84-91</b>
<b>SCHEDULE-3</b>	<b>CONTRACT PRICE</b>	<b>92</b>
<b>SCHEDULE-4</b>	<b>TIME SCHEDULE</b>	<b>93-99</b>
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## CONTRACT AGREEMENT

This contract No..... made this ..... day of ..... between THE NLC INDIA Limited, a company incorporated under the Companies Act, 1956 and having its registered office at First Floor, No.8 Mayor Sathyamurthy Road, FSD, Egmore Complex, Chetpet, Chennai-600031, India hereinafter referred to as the “PURCHASER” (which expression shall unless repugnant to the context or the meaning thereof, be deemed to include its successors and permitted assignees), of the ONE PART,

AND

M/s. .... a Company incorporated under the Companies Act, 1956 and having its registered office at ..... hereinafter referred to as the “CONTRACTOR” (which expression shall, unless repugnant to the context or meaning thereof, be deemed to include its successors and permitted assignees) of the SECOND PART,

WHEREAS, the purchaser invited the CONTRACTOR to submit tender for scope of work for installation of 2 x 10 MW (AC) Grid interactive Solar PV Power Project integrated with 8MWhr. Battery Energy Storage System at Attam Pahad and at Dolly Gunj, Port Blair, South Andaman with associated 33 KV Switchyard and grid interconnection at the take off points of Electricity Department of Andaman & Nicobar Administration including Design, Engineering, Manufacture, Inspection at supplier’s works, supply, insurance, transport, storage, erection, testing, commissioning.

The scope of work also includes Operation and Maintenance of the entire system for twenty five years including one year warranty period.

The scope is indicative only and detailed scope of work is contained in the tender specification.

AND

WHEREAS, the CONTRACTOR submitted tender to the Purchaser for execution of the work in accordance with the tender documents including technical specifications, schedule of items and tender drawings.

AND

WHEREAS, the Purchaser has accepted the tender submitted by the CONTRACTOR for the construction and completion of the scope of work.

NOW IT IS HEREBY AGREED AND DECLARED BY AND BETWEEN THE PARTIES AS FOLLOWS:

*Article – 1*

In consideration of the promises and the payments to be made by the Purchaser to the Contractor, the Contractor hereby covenants with the Purchaser to perform the work as detailed in schedule – 2 “Scope of work” and Technical specifications to this contract subject to and on the terms and conditions contained herein.

It is clearly understood between the parties that the Contractor shall be solely responsible for the completion of the scope of work.

## *Article – 2*

If the Contractor wishes to appoint Sub-Contractor during execution of the contract, the Contractor shall take prior written approval of the Purchaser spelling out the scope of the work proposed to be entrusted to the said Sub-Contractor together with the relevant experience and other details of such proposed Sub-Contractor(s).

Notwithstanding the approval accorded by the Purchaser to the appointment of Sub-Contractor(s), the Contractor shall be solely responsible for the completion of the works as per specifications and within the time schedule agreed in this Contract. Approval of any Sub-Contractor by the Purchaser shall not relieve the Contractor from any of his liabilities or obligations under the Contract and he shall be responsible for the acts, defaults and neglects of any Sub-Contractor(s) as fully as if they were the acts, defaults or neglects of the Contractor.

## *Article – 3*

This Contract shall come into effect from the date of letter of Award.

## *Article – 4*

The following schedules appended to this Contract shall be deemed to form and be read and construed as part of this Contract:-

Schedule – 1:Definitions of Terms & Specification Documents

Schedule – 2: Scope of Supply & Services

Schedule – 3:Contract Price

Schedule – 4:Time Schedule

Schedule – 5:Taxes & Duties

Schedule – 6:Terms of Payment

Schedule – 7:Facilities to be provided by the Purchaser

Schedule – 8:Contract Specifications

Schedule – 9: Performance Guarantee

Schedule –10:General Terms & Conditions of the Contract

ANNEXURE-I to III

## *Article – 5*

In addition to the aforesaid, the following documents shall be deemed to form and be read and construed as a part of this Contract:-

Technical Specifications with drawings (Volume-II)

Quantities, quoted rate and amount quoted against each item

Bank Guarantee Proforma for Contract Performance Guarantee

Bank Guarantee Proforma for Advance Payment, LDBG, RMBG and Financial Back up Guarantee

Schedule of References

Power of Attorney

Letter of Award

Quality Assurance Plan by the Contractor

Project Information

*Article – 6*

All the words and expression used in this contract shall, unless repugnant to the context, have the same meaning as are respectively assigned to them in Schedule – 1. All headings and marginal notes to the Articles, Schedules, Annexure, Technical Specifications or to any other part of the Contract are solely for the purpose of giving a concise indication and not a summary of a contents thereof and they shall never be deemed to be part thereof or be used in the interpretation or construction thereof.

*Article – 7*

The Contract shall be governed in accordance with the Law of India. The civil court having original jurisdiction over Andaman& Nicobar Islands shall have exclusive jurisdiction to try any matter arising out of this contract.

*Article – 8*

This Contract is executed in English language in two originals, each party receiving one duly signed copy. Both these copies are authentic. The Contractor shall submit Twenty five (25) photocopies of the entire Contract documents to the Purchaser for his use.

IN WITNESS WHEREOF THE parties hereto by representatives duly authorised have executed the Contact on the day, month and the year first above written.

Name

Name

Designation

Designation

For and on behalf of  
(Contractor)

For and on behalf of  
NLC India Limited  
Neyveli – 607 801

(Seal of the Office)

(Seal of the Office)

In the presence of

In the presence of

1.

1.

2.

2.

## SCHEDULE-I

### **1.0 DEFINITIONS**

- 1.1 The following words and expressions as used in this Contract (as hereinafter defined) shall have the meanings hereof assigned to them except where the context otherwise requires
- 1.2 Acceptance shall mean the manifestations by the owner of his assent to the mutually agreed terms of the offer by the bidder.
- 1.3 Agreement shall mean mutual understanding between the parties which creates obligations between each other
- 1.4 'Approval of the Purchaser' shall mean the written approval by the 'Purchaser' or 'Consultant' with respect to matters delegated to the consultant by the purchaser of a document or drawing or other particulars or matters in relation to the Contract.
- 1.5 Base Date shall mean the working day of the calendar month, one month prior to the date set for opening of tenders-Part-I.
- 1.6 Bid shall mean a valid offer made against any tender enquiry, indicating terms, conditions and prices
- 1.7 Bidder / Tenderer shall mean a person/party/ firm/ company /consortium who submits an offer/ bid against a tender enquiry.
- 1.8 Billing Schedule shall mean the item, description and Quantities arrived at after detailed design and engineering are prepared. It generally occurs in lump sum Price contracts, where rates are fixed up for such items, based on the Break up prices indicated in the offer.
- 1.9 Codes and Standards shall mean such codes and Standards as prescribed in ISS/ DIN/ BSS as applicable to the equipments, components, plant, machinery, consumables. ASM Test Codes –AIEE Codes– Indian Electricity Act, etc.
- 1.10 Commercial use' shall mean that use of the equipment for works, which the 'Contract' contemplates.
- 1.11 'Commissioning' shall mean subjecting the entire Solar Power Plant and BESS for Preliminary operation, initial operation and carrying out adjustment/ modifications necessary for smooth operation and exporting power to the grid.
- 1.12 Compensation shall mean anything as an equivalent as to make assessment for loss or damage.
- a. The consideration for services rendered by contract agreed or implied.
- b. Remuneration for injury suffered, especially when it has resulted in measurable loss or in expenditure Money paid for damage caused by any wrong or breach of contract, to the person defrauded or injured.
- 1.13 'Completion of erection' shall be defined as to be completion of erection of all the materials and items of the equipment covered under the scope of Contract, successful completion of functional tests

- 1.14 Completion of Handing Over shall mean that completion certificate as indicated in the technical specifications and conditions of contract.
- 1.15 Completion Time shall mean the period stated in the contract for the completion of Works up to and including successful completion upto provisional takeover and shall be reckoned from the date of Letter of Award.
- 1.16 Condition shall mean the conditions agreed between the parties and stipulated in the Contract agreement.
- 1.17 Consequential damages means the damages, claimed in a tort or breach of contract which do not normally follow from the tort or breach.
- 1.18 `CONSULTANT' shall mean the CONSULTANTS appointed by the PURCHASER for the `Project' or their duly authorised representatives.
- 1.19 `CONTRACTOR' shall mean the successful BIDDER whose bid has been accepted by the PURCHASER and on whom the `Contract' or `Purchase order' is placed by the Purchaser and shall include his heirs, legal representatives, successors and permitted assignees.
- 1.20 Contract shall mean and include this contract between the owner and Contractor for the execution of the works as per agreed terms, conditions, specifications prices and enforceable as per law.
- 1.21 Contract period shall mean the period / time schedule agreed in the contract during which period the Contracted work shall be performed / executed, inclusive of any period covered by extension(s), duly issued.
- 1.22 `Contract Price' in relation to particular contract shall mean the total consideration to be paid by the Purchaser to the Contractor.
- 1.23 "Contractor's works "or "Manufacturer's works" shall mean and include the land and other places which are used by the CONTRACTOR/SUB-CONTRACTOR for the manufacture of equipment.
- 1.24 Day shall mean the period between midnight to next midnight.
- 1.25 Delivery shall mean delivery of only such equipment, materials and supplies specified in the Contract and manufactured and/or supplied by the Contractor in accordance with the sequence of delivery schedule of the Contract and in case of construction and erection work, delivery shall mean the approval of the owner to the said construction and erection work.
- 1.26 Dimensions shall mean length, area, Volume etc. all expressed in metric system.
- 1.27 Drawing shall mean such drawings provided along with bid documents / furnished during the progress of work by the Contractor and approved.

- 1.28 `Date of Contract' shall mean the calendar date on which PURCHASER and the CONTRACTOR have signed the `CONTRACT'.
- 1.29 `Design Charges' shall mean the charges payable for design and engineering of the equipment.
- 1.30 "Effective date of Contract" shall mean the date of Letter of Award.
- 1.31 `ENGINEER' / Project Manager shall mean the Officer nominated by the Purchaser for the performance of the Contract.
- 1.32 The term `Equipment Portion' of the Contract Price shall mean the Ex-works. Price of the equipment components and goods including charges for design, manufacture, shop-testing, packing and forwarding and loading into containers / carriers.
- 1.33 Erection shall mean the putting up of structures and/or installation of plant and equipment under the Contract by the Contractor and/or under the supervision of the Contractor and will include any service which the Contractor is required to perform at the site with his own and/or other staff and/or labour and/or Sub-Contractor for the due fulfilment of the Contract.
- 1.34 The term `Erection Portion' of the `Contract Price' shall mean the value of field activities of the `Works' including unloading, handling, storage till erection, erection, commissioning and testing including supervision to be performed at "site" by the Contractor.
- 1.35 Final take over will occur when the following are achieved.
- a) All supplies and services completed as per contract.
  - b) Final balance documentation, if any, incorporating latest modifications in as built drawings has been submitted by the contractor in requisite copies.
  - c) The contractor has rectified in a definite manner all objections/observations /defects mentioned in the `Provisional acceptance certificate.
  - d) Successful completion of Performance Guarantee Test for the plant and acceptance of PG Test Report submitted.
  - e) Taking over of the site and the completed works after issue of completion certificate by the Purchaser.
- 1.36 `Functional tests' shall mean all activities undertaken after completion of erection and shall include mechanical and electrical check outs, safety checks, calibration of instruments and protection devices and such other tests carried out to ensure functional reliability of various sub-supporting systems.
- 1.37 Guarantee/ Warranty period shall mean the period of 12 (twelve) months from the date of provisional take over.
- 1.38 Words `impairing' person shall include firms, Companies, Corporation, associations or body of individuals whether incorporated or not. Words imparting masculine gender or singular number shall also include the feminine gender and plural number and vice-versa where the context so required or permits.
- 1.39 `Inspector'/ `Inspecting Engineer' shall mean any person or persons, or any firm nominated by or on behalf of the Purchaser or his duly authorised agent or Consultant to inspect equipment, supplies, materials or any type of work under the contract.

- 1.40 'Instructions' shall mean any drawings and/or instructions, oral and/or in writing details, direction and explanations issued by the CONSULTANT or the PURCHASER from time to time during the 'CONTRACT PERIOD'.
- 1.41 Initial Operation shall mean all operations undertaken as part of "Commissioning" after completion of "Preliminary Operation" It shall be the first integral operation of the complete plant/system/ equipment covered under the "Contract" and shall include first startup on no-load and/or partial load and/or full load runs for PV arrays, inverter and electrical equipments and gathering of operational data, calibration, setting and commissioning of control systems, and shut-down inspection and adjustment after running of the plant/system/equipment covered under the Contract.
- 1.42 Letter of Award (LOA) shall mean the official communication issued by the owner notifying legally to the bidder that his bid has been accepted on mutually agreed terms, conditions and prices.
- 1.43 Liquidated damages, not as a Penalty, is agreed upon between parties in the Contract towards time delay. Liquidated damages can also be prefixed towards shortfall in performance parameters agreed in a Contract.
- 1.44 Manufacturer shall mean a person firm/company who manufactures and/or produces Plant, Equipment, Component Spare Parts etc.
- 1.45 Mechanical Completion shall be defined to be a state of readiness for "Preliminary Operation" after due erection of all the materials and items of equipment covered under the scope of the contract.
- 1.46 'Mobilisation' shall mean establishment as per contract of sufficiently adequate infrastructure by the Contractor at site inclusive of construction equipment, aides, tools & tackles, setting up site offices with facilities such as power, water, communication etc. establishing man power organisation consisting of Resident Engineers, Supervisory personnel and an adequate strength of skilled, semi-skilled and unskilled workers, who, with the so established infrastructure shall be in a position to commence execution of work at site(s), in accordance with the agreed time schedule of completion of works. 'Mobilisation' shall be considered to have been achieved if the Contractor is able to establish infrastructure as indicated above to begin work at site in accordance with agreed schedule of work to the satisfaction of the Purchaser.
- 1.47 Month shall mean English Calendar month.
- 1.48 Notice shall mean any written Notice issued by the owner / Bidder / Contractor.
- 1.49 A Notice published by the owner with the intention to invite offer/ bid for his requirements.
- 1.50 Particulars shall mean the following:
- a) Specification
  - b) Drawing
  - c) Sealed pattern denoting a pattern sealed and signed by the Inspector.
  - d) Proprietary make denoting the product of an individual firm.
  - e) Any other details governing the construction, manufacture, supply and / or erection as per the Contract.



- 1.51 Performance Guarantee Test shall mean such tests as are prescribed in the Specification to be done by the Contractor.
- 1.52 Preliminary Operation shall mean all activities undertaken, as part of “Commissioning” after “Mechanical Completion” upto commencement of “Initial Operation” and include mechanical and electrical checkouts, calibration of instrument and protection devices, commissioning of sub/supporting system of the plant/system/equipment covered under the Contract.
- 1.53 Plant, Equipment, Stores, Item or Material shall mean and include plant, equipment, material, machinery or any part thereof to be provided for and the erection work to be done by the Contractor under the Contract.
- 1.54 Price shall mean the price agreed in the contract between the parties towards the scope of work.
- 1.56 Project shall mean the project specified in the tender documents and specification.
- 1.57 Purchaser/Owner shall mean and include NLC India Limited (NLCIL) and its different functionaries entrusted with the responsibilities in relation to this contract in respect of the area of responsibilities of such functionaries.
- 1.58 Provisional take over shall mean acceptance of prima facie and in principle subject to completion of / fulfilment of certain conditions and entire plant is exporting power to grid.. This is not a complete acceptance of work entitling the contractor to get full payment or to assume that all the obligations and terms and conditions of the contract have been fulfilled to the satisfaction of the Owner / Purchaser.
- 1.59 Site shall mean the land acquired and set for the location of the project / work.
- 1.60 Specification shall mean the Technical – Commercial specification including modification set in the tender / contract documents.
- 1.61 Sub-contractor means a Contractor selected with the approval of the owner to carry out certain part of the scope of work.
- 1.62 Sublet shall mean to let out the work to another.
- 1.63 Sub-supplier means the supplier selected with the approval of the owner to supply certain items included in the Scope of Work.
- 1.64 Supervision shall mean the successive control and directions given by the Contractor in relation to Contract work during execution of the Contractor’s and/or his sub-Contractor’s work.
- 1.65 SUCCESSFUL BIDDER/TENDERER shall mean the bidder whose bid is considered for acceptance.
- 1.66 ‘Supply’ shall mean the goods to be supplied by the Contractor under the ‘Contract’.
- 1.67 Tender shall mean the bidder’s offer with his terms, conditions, Specifications and prices to perform the scope of work.

- 1.68 Test shall mean such test / tests stipulated or considered necessary by the Inspecting Officers.
- 1.69 Time shall be reckoned by months, weeks, days and hours, month being equivalent to the Calendar month according to the Gregorian Calendar. The day or days unless herein otherwise expressly defined shall mean Calendar day or days of 24 hours each.
- 1.70 Time of completion shall mean the time / period stated / agreed for completing the scope of work specified in the contract.
- 1.71 The term 'Transport Portion' of the Contract Price shall mean charges on all the mode of transport envisaged under Contractor's scope including inter-carting storage at any intermediate point.
- 1.72 Warranty shall mean Contractor's assurance to the Purchaser that the goods or property is or shall be as represented and if not it will be repaired and reconditioned or replaced by the Contractor at his cost or expenses.
- 1.73 Weight shall mean the calculation of a load. It is to be stated in ton (1 ton = 1000 kilogram) and / or kilogram (1 Kilogram = 1000 gram).
- 1.74 Works shall mean plant, non-plant, buildings, Structures, Foundations and all plants, Equipment, Components to be provided and other construction/ erection services that the contract requires the contractor to provide.
- 1.75 Words importing persons shall include firms, Companies, Corporation, Words importing masculine gender or singular number shall also include the feminine gender and plural number and vice-versa where the context so requires or permits.
- 1.76 Terms and expressions not herein defined shall have the same meaning as are assigned to them in the Indian Sales of Goods Act (1930), failing that in the Indian Contract Act (1872) and failing that in the General Clauses Act (1897) and such others as mentioned from time to time.
- 1.77 'Writing' shall include any manuscript, typewritten or printed statement, under or over signature and/or seal as the case may be.
- 1.78 When the words 'Approved', 'Subject to Approval' 'Satisfactory', 'Equal to', 'Proper', 'Requested', 'As requested', 'Where directed', 'When Directed', 'Determined by', 'Accepted', 'permitted', or words and phrases of like import are used the approval, Judgement, direction, etc. is understood to be function of the PURCHASER or the CONSULTANT.
- 1.79 The various Acts and Regulations are normally available for sale from the following address:  
'Deputy Controller -Publication Department,  
Government of India,  
Civil Lines, Delhi - 110 006.

and with leading authorised Government of India book sellers.

## **SCHEDULE- 2**

### **SCOPE OF SUPPLY AND SERVICES**

#### **2.1 SCOPE OF WORK:**

The scope of work for supply and services Contract includes development of land, design, engineering, manufacture, inspection at supplier's works, supply, insurance, transport, storage, erection, testing and commissioning of 2X10MW(AC) grid interactive solar PV power project integrated with installed capacity of 8 MWhr. With ½ hr. backup Battery Energy Storage System to feed smoothed power to the grid with associated 33kV switchyard and grid interconnection at the take off points of Electricity Department of Andaman & Nicobar Administration (A&NA) with all accessories at Attam Pahad and Dolly gunj areas in Port Blair, South Andaman.

The scope of work for O&M Contract includes Operation and Maintenance of the entire system for ten years after one year warranty period.

a. The scope of Design, engineering, manufacture, inspection at supplier's works, supply, installation, testing and commissioning shall include

i) Solar PV Power Plant

- Adequate number of Solar PV modules with cables, connectors and module junction boxes,
- module supporting structures,
- string monitoring and combiner boxes,
- power conditioning units,
- Auxiliary Transformers,
- Switchgears, cables,
- HT switchgear, CT, PT,
- Power Transformers,
- LT panels, protective relays, Control and Metering panels, UPS, DC system- Battery, Battery chargers to cater the needs of DC loads.

ii) Battery Energy Storage System

- Battery cells /Modules
  - Power Conversion System, Battery Management System, Control panels and HMI interfaces
  - Lightning Arrestor, CT, PT, Protective relays, Control and Metering Panel, Surge Protection devices, Filters etc.
  - Panels, Switch gears, cables and distribution boards
  - Transformers
  - Data communication units
  - Auxiliary systems and ventilation systems
  - Fire Protection system and suppression system, safety equipments
  - Container unit
  - Mounting structures
- Civil foundation works and platform as per Battery Manufacturer requirement. Dike structures surrounding the battery units to protect the environment during ruptures of BESS units if required.

- iii) Power Export Switchyard
  - 33KV switchyard equipments,
  - SCADA and Energy Management system
  - Control room,
  - Data/voice communication system,
  - 33KV transmission lines, towers, Metering station, 33KV cables,
  - LT panels, UPS, DC system-Battery, Battery charger (DC loads required for switchgear),
  - Fire protection and suppression system, safety equipments,
  - Reactive power control for grid inter connection at the take off points of Electricity Department of Andaman & Nicobar Administration (ANA) as per grid requirements.
- b. The scope of work includes all cabling, auxiliary power supply and distribution, lighting, air conditioners, weather monitoring unit, earthing and lightning protection as defined in the relevant Technical Specification sections.
- c. The scope of civil construction work includes land development, removal of trees, vegetation removal, site survey, soil investigation, site preparation, Site grading, fencing, foundations for Solar PV module mounting structures, RCC building for Power Collection Sub Stations, construction of 33KV Power Export switchyard and RCC Building for control room, approach roads, internal roads, peripheral roads, path ways, cable trenches, drains, Main Gate and security buildings & watch towers, Sign Board, etc. as defined in the relevant Technical Specification sections.
- d. The Scope of work also includes facilities for arrangement, storage, construction as well as O&M water supply, Module water washing network system with proper drainage/ sewage system and disposal and construction power supply.
- e. The scope of work shall also include the following :
  - i. Furnishing of all relevant drawings, data sheets, technical catalogues of equipments / devices, QAP, MQP, FQP, type test certificates, Inspection reports etc. as required for construction and O & M of the Solar Power Project.
  - ii. Supply of all spares, Consumable materials, replacements, tools and tackles and accessories etc. which are necessary or useful for satisfactory and trouble-free operation and maintenance of the plant during the entire period of O&M of ten years.
- f. The works to be performed on all equipment and accessories shall include but not limited to the following:
  - i. Insurance, Transportation, unloading, receiving and storage at site.
  - ii. Arranging to repair and/or re-order all damaged or short-supply items.

- iii. Final check-up of equipment, erection, testing and commissioning and putting the entire system including the power evacuation facility into successful operation.
- g. The scope of work shall also include coordination activities with respect to Grid connectivity and establishing Energy Management Centre being implemented by A&N Administration Electricity Department, system study, alteration required in the grid take off points of the existing Panther I and Panther II feeders towers, termination and support structures, gantries etc.

### **Scope of Supply**

#### **Plant & Equipment**

The scope of supplies and services of the Contractor for Plant and Equipment is described in Technical Specification and the relevant Annexure subject to General Terms and Conditions of Contract in Schedule-10.

#### **Scope of Services**

#### **Technical Services**

The Contractor shall be responsible for the following services including those Services stipulated elsewhere in the Tender Specification:

- a) Detailed design and engineering
- b) Technical services related to planning, procurement, manufacturing, inspection, expediting, packing, shipping, storing, etc.
- c) Project management services and complete feedback of data and information to Purchaser regarding Contractor's scope of supply and services.
- d) Time bound project co-ordination relating to transportation, insurance, claim settlement, inspection, construction planning and scheduling, erection planning, field construction engineering, testing, start up, trial run, commissioning and performance guarantee tests. The Contractor shall bring his own/Sub-contractor/Sub-vendor Specialists for the performance of the above mentioned works.
- e) Total day to day supervision of construction including erection and specialised services, if any.
- f) Technical consultation/liaison/guidance relating to detail design and plant engineering by its sub-contractors.
- g) Quality control and adherence to the time schedule control of site work and other works.
- h) Start-up trial runs and commissioning services.
- i) Demonstration of performance guarantee tests by deputing commissioning engineers/specialists.
- j) Clearance for installations including power evacuation system from the statutory and other concerned authorities on behalf of Purchaser. The Contractor shall also assist in preparing application forms, providing necessary drawings, documents, test certificates etc., including necessary co-ordination with statutory and other concerned authorities.
- k) Submission of complete as built drawings/documents, O&M Manuals etc., approved by NLCIL.

The Contractor shall be responsible for supply of all the drawings and technical documents & information in respect of the plant & equipment. The Contractor shall deliver the drawings, technical documents and information to the Purchaser and their authorized agency.

## **Supervision**

The Contractor shall depute Technical personnel/ Specialists from various disciplines for the supervision of construction work under his scope of work. The above mentioned Technical personnel/Specialists shall supervise the construction and commissioning of the project so as to establish to the Purchaser that the guarantees as agreed by the Contractor are fully met.

## **Construction & Erection Works**

1. The Contractor shall provide all necessary construction and erection tools & tackles, small hand tools, instruments, all commissioning instruments, bolts, nuts, washers, jigs and fixtures, winches, alignment tools etc. and the material handling equipments such as cranes, hoists etc., welding equipment and accessories, measuring instruments, temporary supports and staging, consumables (e.g. welding gas, electrodes etc), erection packs etc for erection of steel structures, and other equipment which may be required for carrying out the construction and erection work efficiently within the time schedule provided herein in the Contract. The Contractor shall ensure that proper documentation is followed at entry gate of the premises for such items which shall be carried back by Contractor after completion of work.
2. The Contractor shall carry out any and all such works, as may be required, to build the project complete in all aspects as per the Contract Specification.
3. The Contractor shall make all necessary arrangements to deliver the equipment at the project site by wagons/trucks/trailers/Light motor vehicles/lorries/ships/boats etc build his own stores (covered, uncovered, air-conditioned, if necessary) for the proper storage of equipment, maintain the stores and all related documents and records, transport the equipment to site for erection purpose. Necessary security arrangements also shall be made by the Contractor. Arrangements shall be made available by the contractor for construction of stores and construction site office, labour colony, etc.
4. The Contractor shall be responsible for proper and neat storage and also undertake conservation of all consignments including damaged boxes. During storage of equipment, the Contractor shall take into account deterioration and carry out the re-conservation of the complete equipment/parts/supplies as may be necessary as per the storage instructions of the Manufacturer of equipment/components. The Contractor shall also supply the consumables required for such re-conservation work and repair/replace parts required thereof for the proper functioning of the equipment after erection and commissioning.
5. The Contractor shall unpack and do visual checking against physical damages to the equipment/cases, clean equipment before start of erection. Damage/ shortage, if any, will be reported to the Purchaser and shall be rectified/replaced expeditiously, so as not to upset the erection and commissioning schedule. Delay on account of settlement of insurance claims by the Contractor shall not be considered as an excuse for delay in completion of erection and commissioning.
6. The Contractor shall provide all necessary erection equipments including material handling equipment such as cranes and hoists, compressors and other equipment and instruments and consumables, all commissioning equipment and instruments, welding equipment, winches, alignment tools, precision levels, the odolite, etc. which may be required for carrying out the erection and commissioning work efficiently. All instruments shall be properly calibrated before use. Unless otherwise specified, the

above erection equipment/ materials shall be the property of the Contractor. However, Purchaser's prior permission shall be required for removal of these erection equipment/ materials from the site. The Contractor shall ensure that proper documentation is followed at entry gate for such items which shall be carried back by Contractor after completion of work.

7. The Contractor shall provide all temporary ladders, scaffolding materials, platforms, supports and other necessary facilities required for handling, erection, testing and visual inspection of supplies at the point of installation and shall also provide necessary packing plates, wedges, shims, leveling screws etc. required for erection of equipment and structures.
8. The Contractor shall provide erection consumables like oxygen gas, acetylene gas, argon gas, welding rods, filler wire, solder lugs, oil, grease, kerosene, cotton waste, etc. required for erection of equipment and steel structures and required items for commissioning activities.
9. The Contractor shall erect and maintain his own site offices and stores, as required for the work and arrange for proper house-keeping and up-keep of the area.
10. The Contractor shall provide sufficient fencing/barricade, notice boards, signage and lighting to protect and warn others as may be considered necessary by the Purchaser. All materials used for providing these facilities shall be the property of the Contractor.
11. The Contractor shall mobilise adequate material handling equipment such as mobile cranes, forklifts, trailers, dozers, winches etc in addition to other erection tools & consumables keeping in view the erection schedule. The Contractor shall provide as per time schedule from the date of Letter of Award, his scheme for mobilisation with Bar Chart indicating clearly the resources, manpower and machinery proposed to be deployed to ensure timely completion of work and quality of workmanship.
12. Underground services, if any to be diverted / protected shall be the responsibility of the Contractor and shall be informed to the Purchaser. Approval from authorities required for such works shall be obtained by the contractor. The compensation / statutory payments if any for such works shall be borne by the contractor.
13. The Contractor shall organise the work in such a manner that work being carried out simultaneously at site is not impeded and the workmen not endangered and shall arrange all temporary access as required for the erection work.
14. The Contractor shall carry out base/primer and final painting of all Plant & Equipment, Structures, Pipelines, etc. supplied. The painting including its process shall be carried out as specified in the detailed technical specification. Where not specified, the same shall be as per the standard codes & practices normally applicable and adopted internationally for the type of Plant & Equipment offered.
15. Grouting of the equipment and steel structures on the foundations with approved non-shrink-grouting compound shall be the responsibility of the Contractor. The grouting materials shall be supplied by the Contractor.
16. All safety, health and pollution control measures as required to be adopted as per the statutory regulations, guidelines, etc., The safety codes for projects issued along with the tender or otherwise required or implied by local statutory regulations or practices shall be strictly followed by the Contractor during the entire duration of execution of the Contract. The Contractor shall set up a suitable safety organization of its own at site, in this regard.

17. The Contractor shall not dispose of, transport or withdraw any tools, tackles, equipment, and material provided by him for the "contract" without taking prior written approval from the Purchaser.

### **Demonstration of Performance Guarantee**

The Contractor shall undertake Performance Guarantee (PG) Test as defined in the relevant clauses of the technical specification. In case the Contractor fails to demonstrate and prove the Performance Guarantees and achieve the results as agreed in this Contract, the Contractor shall rectify the Plant and Equipment and demonstrate the performance guarantees failing which the Purchaser's option of either to reject the equipment or to levy LD will be exercised.

### **Water for Construction and for O & M**

1. Water for Construction and for O & M shall be arranged at each location of project site by the contractor. All payments towards arrangement and supply of water shall be borne by the contractor. The Contractor shall make his own arrangements to lay and maintain necessary distribution lines at his own cost. The contractor shall arrange for storage sumps, pumps and distribution piping to various locations within the solar power plant. The Contractor shall be responsible to store water in sufficient quantity to meet its requirements in well built covered/protected water storage tanks / sumps.

The Contractor shall ensure that there is no wastage of water. He will also be responsible for maintaining the taps, pipe lines etc. in proper condition. The Contractor shall obtain prior approval of the Purchaser of his distribution scheme before laying the pipelines. Non availability of water in the project site shall not be excuse for delay in completion of Project. The contractor may at his own cost arrange suitable backup water supply.

### **Construction Power**

1. The Contractor shall arrange construction power for the purpose of the construction and erection for each location of project site /sites. All payments towards availing power supply and usage charges and deposits shall be borne by the contractor. The Contractor shall make his own arrangements for further distribution. The Contractor shall make his own arrangements to lay and maintain necessary supply lines for temporary power. All temporary wiring must comply with local regulations and relevant Indian Electrical Act and will be subject to the Purchaser's inspection and approval before connection to supply and later. Non-availability of power shall not be an excuse for delay in completion of erection construction. Contractor may at his own cost arrange suitable back-up power.
2. The Contractor shall supply and install all distribution cables, wires and switches etc. of rated capacity for the commencement of work from the source of power at his own cost. The contractor shall employ Electricians having valid Electrical License for carrying out the installations as well as for the maintenance works.
3. The Contractor shall facilitate the Purchaser or his authorised representative for inspecting his temporary electrical installation as and when required. The Contractor will immediately attend to the defects so pointed out during this inspection including replacement of faulty cables, switches etc.
4. The Contractor shall be responsible for all damages, losses etc. due to fire or otherwise if it is due to his negligence, improper installation, operation and/or maintenance of his part of installations.



## **Codes and Standards**

All works to be executed and/or engineering services and technical services to be rendered under this Contract, shall be completed in the manner set out in this Contract and in accordance with the specified codes, Standards and best trade/ engineering practices. Wherever the codes are not mentioned or in case of code discrepancies, relevant Indian Standards / International Standards approved by Purchaser shall be followed.

## **Total Responsibility**

The Contractor shall be solely responsible for the entire supplies, engineering services and technical services, irrespective of whether supplies and services have been made/ rendered by him directly or by his Sub-Contractor/ sub-vendors or all associates of this contract.

## **General**

- a) The bidder is required to carefully examine the Technical & General Specification, Terms and Conditions of Draft Contract, drawings and other details relating to work as given in the Tender Document and fully acquaint himself as to all conditions and matters which may in any way affect the work or the cost thereof. The bidder shall be deemed to have on his own and independently obtained all necessary information for the purpose of preparing the Bid and his bid as accepted shall be deemed to have taken into account all contingencies as may arise due to such information or lack of the same.
- b) The bidder shall be deemed to have exhaustively examined the Tender documents including the Draft Contract, to have obtained all information and clarifications on all matters whatsoever that might affect the carrying out of the work and to have satisfied himself as to the adequacy of his Bid. He is deemed to have known the scope, nature and magnitude of the work and the requirements of materials and labour involved etc. and as to all work he has to complete in accordance with the Contract whatever be the defects, omissions or errors that may be found in the Tender/Bid Documents.
- c) The bidder shall be deemed to have acquainted himself with the Indian Income Tax Act, 1961, Indian Companies Act, 1956, Indian Customs Act, 1962, Indian Electricity Act, CEA rules, A&N Electricity rules, CERC/JERC regulations, A&N regulations, grid codes. MNRE guidelines, Factories Act, Pollution Control Regulation and other related Acts & Laws prevalent in India and as amended from time to time. The Purchaser shall not entertain any request for clarifications from the bidder regarding such local conditions.
- d) Any neglect or omission or failure on the part of the bidder in obtaining necessary and reliable information as stated above or on any other matter affecting the bidder shall not relieve him from any risks or liabilities or the entire responsibility of completion of the work in accordance with the Contract.

## **Surplus materials and scrap**

- a) Surplus materials / defective materials available after commissioning of the project shall be taken back free of cost by the Contractor with prior approval of the Purchaser. The cost of removal shall be borne by the Contractor.
- b) Contractor shall take back all crates, packing cases, all packing materials including steel packing materials and other scrap materials then and there to keep the site free from scraps.

- c) No imported material shall be allowed to be taken out other than imported tools and tackles and instruments brought by the Contractor on draw back basis, provided he has carried out necessary documentation at the time of bringing such items inside the Plant.
- d) Replacements/ Disposal of materials during construction as well as O&M shall be carried out by the contractor with utmost care without affecting the environment and all the scrap shall be taken out by the contractor and shall be disposed as per the standards and prevailing practices norms of A&N Islands.
- e) Necessary permission from concerned authorities shall be obtained for disposal of any item within the Island.

### **SCHEDULE-3**

#### **3.0 CONTRACT PRICE:**

- 3.1 The contract price shall be paid in currency or currencies in which the price has been quoted. The contract price shall be firm till completion of contract period.
- 3.2 The total lumpsum prices quoted by the Contractor in his bid with additions and deletions as may be agreed to before award of Letter of Award/ Contract, for the entire scope of work, viz., design, manufacture, supply transportation, insurance, storage Erection, commissioning and testing of the equipment etc. covered by detailed scope of work of contract and in accordance with all terms, conditions, stipulations, specifications, requirements and other conditions of the Contract and incorporated in the Price Schedule and documents shall be treated as the Contract Price.
- 3.3 The Contract Price shall be deemed interalia to include and cover the cost of deployment of construction equipment, temporary works, establishment of labour camp, all materials and supplies, labour, insurance, fuel, stores, appliances, security arrangements, safety and fire fighting arrangements (including those required during construction, storage and erection) to be supplied/used by the Contractor and all such other materials and services and actions that may be necessary or derived or statutorily required in connection with the execution of the works as per the Contract or any portion thereof complete in every respect and maintained as detailed in the contract documents or as may be required in terms of the Contract.
- 3.4 The Contract Price shall be deemed to include and cover the cost of all royalty and fees for all articles, and processes, protected by letters patent or otherwise incorporated in or used in connection with the work, also all royalties, rents and other payments in connection with obtaining all materials for the work and the Contractor shall indemnify and keep indemnified the Purchaser, which indemnity, the Contractor hereby gives against all actions, proceedings, claims, damages, costs and expenses arising from the incorporation in or use of work of any such articles, processes or supplies.
- 3.5 Single Contract or Separate Contracts for Supplies, Services, Maintenance during warranty period etc., may be entered with. However, the Separate Contracts shall have necessary provisions to take care of Single Bidder responsibility, Liquidated Damages (LD), Purchaser's right to recover dues including LD from payment due under any of the contracts, warranty and Performance Guarantee etc.,
- In view of the above, any liabilities arising out of such Separate Contracts shall be borne by the bidder/Contractors
- However separate contracts will be entered in to for ten years operation and maintenance.
- 3.6 The contract price shall be firm till completion of the contract period.
- 3.7 **Contract Price Break-up**
- 3.7.1 The Contract Price indicated in the Price Schedule shall be for the scope of work and services detailed under scope covered under technical specification and for all the contractual obligations of the Contractor if any, under the Contract.
- 3.7.2 The Contractor shall furnish the detailed billing break-up for each item for the approval of Purchaser, which after the approval only, will be the basis for submission of invoices for progress of payments.

**SCHEDULE-4**  
**TIME SCHEDULE**

**4.1 TIME SCHEDULE- Firm and Binding:**

The basic considerations and the essence of the `Contract` shall be the strict adherence to the time schedule for performing the works in the contract. The time and the date of completion of the project activities as stipulated in the Time Schedule of Tender specification and accepted by the Purchaser shall be deemed to be the essence of the Contract. The Contractor shall so organise his resources and perform this work as to complete it not later than the date agreed to. The time to complete the Works contracted for shall be reckoned from the date of issue of the "Letter of Award" to the Contractor.

**4.1.1 Completion Time:**

The contractor shall complete the design, engineering, manufacture, Inspection at supplier's works, supply, insurance, transport, storage, erection, testing and commissioning of 2x10 MW (AC) grid interactive solar PV power project integrated with installed capacity 8MWhr with ½ hr. backup BESS to feed smoothed power to the grid associated 33 KV switchyard and grid interconnection at the takeoff points of Electricity Department of Andaman & Nicobar Administration within 18 months from the date of issue of LOA.

**4.2 TIME SCHEDULE FOR SUBMISSION OF PROJECT DATA, DRAWINGS AND DOCUMENTS:**

4.2.1 The Contractor shall submit the various drawings and documents listed in Technical Specification. Minimum four numbers of hard copies shall be submitted for NLCIL approval. Additional copies, if any, required by Purchaser shall be furnished by the Contractor, without any extra cost. The Contractor shall supply all drawings/documents and the drawings/documents supplied will be the property of Purchaser. In addition to hard copies, soft copy of all drawing/ documents shall be submitted by the Contractor through NLCIL mail, details of which will be furnished after issue of LOA.

Within one month from the date of issue of Letter of Award, the Contractor shall submit to the Purchaser the list of all drawings and documents by title, using the approved numbering system and indicating the schedule of submission of drawings in conformity with the time schedule. This list of submission and approval shall be updated and submitted by the Contractor at the end of every month.

4.2.2 All the drawings and documents shall be prepared in accordance with contractual requirements and also as per the best engineering practices. Approval in respect of drawings shall be accorded by the Purchaser within two weeks of receipt of the same. In case drawing is not complete and/or is not approved, the comments shall be furnished to the Contractor within two weeks of receipt of drawing. Any submission with gross omissions and/or errors will not be considered as a valid submission. If any document/drawing were commented by Purchaser, the Contractor has to incorporate the comments and resubmit the document within one week for approval by the Purchaser. This review and / or approval of the drawings by the Purchaser will not relieve the contractor of any of his responsibilities under this contract.

4.2.3 The sequence of submission of feedback data, delivery of structural, mechanical equipment and electrical equipment, instrumentation, submission of erection instruction and erection drawings and other supplies and services by the Contractor shall be as per the L1 PERT network schedule.

#### 4.3 PERT NETWORK

4.3.1 Level-I PERT network of the project (submitted along with the bid) shall be resubmitted by the Contractor for NLCIL approval and finalised within one month from the date of Letter of Award. The approved L- 1 PERT will be annexed to at the end of this schedule in the contract document.

4.3.2 Detailed Level-2 PERT network of all systems/sub systems/ discipline/ equipment etc. incorporating activity-wise quantity shall be submitted and finalised within three months from the date of Letter of Award. These-detailed networks shall be prepared based on the milestones reflected in Level-I network, which shall be the basis for performance of the Contract. The salient activities and their time schedule for the project shall be as follows:

Sl No	Description of Time Schedule	Number of months from LOA
1	Issue of LOA – Zero Date	D
2	Land development and Site preparation for the entire project	D+6
3	Approval of all major Drawings	D+9
4	Completion of all supplies	D+14
5	Completion of Erection and Interconnection of all equipment and system for the entire project including Power Export, Switchyard, SCADA and ENS	D+16
6	Completion of Commissioning and exporting power to grid by <b>capacity</b> of the entire plant	D+18

4.3.3 The Contractor shall submit detailed construction resource planning along with Level-2 networks.

4.3.4 The Contractor shall submit estimates of quantities/volume of work sub-system wise, discipline wise, list and weights of equipment (mechanical/electrical/instrumentation) etc during execution stage as per requirement.

4.3.5 All PERT network shall be furnished in MS Projects both in Hard copies and Softcopies.

4.3.6 Detailed assignment schedules of foreign specialists Experts for rendering technical services shall be submitted by the Contractor for the approval of the Purchaser within three months from the date of Letter of Award. The bio-data of key personnel shall be submitted within one month from the date of Letter of Award and for others, within three months before their deputation.

4.3.7 Drawings of equipments shall be supplied at least one month before the shipment of the equipment.

4.3.8 All “as built drawings” shall be submitted by the Contractor before Final Take Over.

- 4.3.9 Erection Instructions for the Plant and Equipment shall be submitted by the Contractor at least one month before the shipment of the respective Plant & Equipment.
- 4.3.10 The delivery of equipment shall be deemed to be completed when all equipment and drawings/documentations have been supplied by the Contractor.
- 4.3.11 Erection of the system / equipment shall be deemed to be completed when all equipment for the normal functioning of the plant / system are erected at site.
- 4.3.12 Completion of successful commissioning of the system/ equipment shall be deemed to have taken place when the system/ equipment has been successfully commissioned as per relevant Clauses of Schedule-10.
- 4.3.13 Demonstration of performance guarantee tests shall be deemed to have completed when the Contractor has demonstrated and has achieved PG parameters as per Technical Specification and Schedule-9.
- 4.3.14 The Contractor shall render timely and adequate technical services through his Specialists to ensure completion of entire work and demonstration of performance guarantee tests.
- 4.3.15 The Contractor shall prepare and submit in a time bound manner necessary drawings of proper standard with best engineering practices. The Contractor shall be responsible for obtaining timely approval of the drawings from the Purchaser to ensure completion of work within the time schedule. Any delay due to incomplete submission and consequent delay in approval shall be to the account of the Contractor. The Contractor shall not claim any time extension on this ground.
- 4.3.16 The Contractor shall ensure to send all letters with authentication through FAX/E-mail and a confirmation copy of the same through courier/Speed Post/Hand delivery. All drawings and documents shall be sent through Courier/ Speed Post/Hand delivery.

#### **4.4 DELIVERY OF EQUIPMENTS, ITEMS ETC.**

The delivery periods shall be reckoned from the date of Letter of Award.

- 4.4.1 The delivery of imported equipment and components including the foundation bolts and inserts in respect of the plant and equipment shall be completed on FOB basis, as given in the Overall time schedule.
- 4.4.2 Delivery of all indigenous equipments, and items shall be completed on FOR site basis as given in the Overall Time schedule.
- 4.4.3 Delivery of all supplies shall be made strictly in sequence of erection at site unless otherwise differently agreed to by Purchaser.

#### **4.5 MAINTAINING SPARES**

The required spares shall be maintained and shall be dispatched along with the consignment of the respective equipment. The required Mandatory spares shall be maintained by the contractor at the stores after the Provisional Takeover.

#### **4.5 DELIVERY OF ENGINEERING SERVICES**

The delivery of the engineering services, drawings and documents will be completed as per the time schedule mentioned herein before and will be delivered to the Purchaser.

#### **4.7 Liquidated Damages for Delay:**

The time stipulated in the Contract shall be deemed to be the essence of the Contract. In case the Contractor fails to adhere to the time specified in the Contract Clause 4.1.1, then L.D. will be levied by the Purchaser.

- 4.7.1 If the satisfactory commissioning of the entire capacity of the integrated system in the manner prescribed is delayed beyond the stipulated dates, Liquidated Damages shall be payable at the rate of 0.5% per week of delay or part thereof of supply and services subject to a ceiling of 10% of the total value of contract for supply & services.
- 4.7.2 If the reason for the delay is solely attributable to the Purchaser, adequate time extension will be given to the Contractor to the extent of delay attributable to the Purchaser. Further in any delay in commissioning attributable to the contractor, the losses incurred by NLCIL due to the withdrawal of subsidiary by GOI shall be compensated by the contractor.
- 4.7.3 If the reason for the delay is purely attributable to the Contractor, L.D. will be levied, and extension of time may be granted.
- 4.7.4 If the decision regarding the reasons for the delay is required to be analysed and the same can only be determined after completion of the work or if the issue is likely to enter into dispute or requires in-depth study to fix the responsibility for the delay, then extension of time will be given to the Contractor subject to levy of L.D. if considered necessary. However, as a precaution the amount equivalent to the maximum L.D. leviable would be withheld from the running bills at the stage where the balance payment may not be able to cover the L.D. and other obligations as per the provisions of the Contract.
- 4.7.5 In case this arrangement causes difficulty to the Contractor in cash flow and progress of work, an amount up to 90% of the withheld amount can be released to the Contractor against suitable Bank Guarantee for 100% of the withheld amount if requested by Contractor.
- 4.7.6 However, 90% of the withheld/ leviable Liquidated Damage amount may be considered by the Purchaser for release against submission and acceptance of LDBG as per the format enclosed for 100% of the leviable LD amount.
- 4.8 **Liquidated Damages for shortfall in Performance Guarantee values**  
For non-fulfilment of Performance Guarantee values the LD will be levied as indicated in the Technical Specification.
- 4.9 Total Liability for Delay & shortfall in Performance Guarantee (PG) Values The liquidated damages for (1) delay in commissioning (2) non-fulfilment of performance guarantee values are independent and shall be applied separately. However, the total liability of the Contractor towards delays and for shortfall in Performance shall be limited to 17.5% of the total value of contract for supply & services.
- 4.9.1 The Purchaser may without prejudice to any method of recovery deduct the amount for such Liquidated damages from any amount due or become due to the Contractor either under this or any other Contract. Payment of Liquidated Damages shall in no way relieve the Contractor from his Contractual obligations to complete the works or from any of the obligations under this Contract. Any delay in the levy or recovery of LD shall not constitute waiver of the right of the Purchaser under the Contract towards levy and recovery of LD.

## 4.10 IMPLEMENTATION STRATEGY

### 4.10.1 Time Schedule

The heads to be covered in the L1 PERT network schedules broadly are:

Submission of basic engineering and approval, issue of ordering specifications, placement of orders of equipment, submission and approval of drawings for Mechanical/ Electrical/Instrumentation equipment, etc. manufacture and supply of equipment, civil and structural works, submission of erection drawings and manuals, erection of mechanical/electrical equipment, testing and commissioning etc. The major milestones for the principal items are to be highlighted in the schedule.

### 4.10.2 The Contractor shall submit:

- i) Level- 2 PERT network schedule including details of pre-construction activities and execution work.
- ii) Estimates of quantities/volume of work and other details such as list of specifications, list of drawings, quantum of work discipline wise, list of equipment (mechanical/ electrical/instrumentation) etc.
- iii) Updated level II networks along with progress reports (formats to be mutually finalised) shall be furnished as and when required.

## 4.11 CONSTRUCTION/ERECTION PLAN

### 4.11.1 The Contractor shall submit a write-up for construction/erection plan for the plant & equipment under his scope of supply.

- i. The plan will indicate a broad outline:
- ii. The construction/erection techniques to be employed.
- iii. Resource planning for deployment of construction / erection of equipment/machineries.
- iv. List of various construction equipment such as cranes, dumpers, etc. planned to be mobilized with quantity & rated capacity/specification.
- v. List of machinery, tools and tackles such as welding transformers, welding generators/sets, gas cutting sets, drilling machines, chain pulley blocks, survey instruments, etc. and indicate specification and quantity of each item

### 4.11.2 Deployment of manpower

The Contractor shall submit a list showing deployment of manpower of the following categories indicating number of personnel, schedule and duration of their posting at site, educational background, and experience.

- i) Engineers to be engaged for design and engineering coordination, follow up and expediting.
- ii) Engineers and supervisors are to be directly attached to site work i.e. civil construction, erection, testing, commissioning and demonstration of performance guarantee values.
- iii) Organization for implementation of the project.

## 4.12 PROGRESS MONITORING

### 4.12.1 It is proposed to have an effective system of progress monitoring to ensure timely completion of all project activities. The guidelines laid down herein shall ensure progress monitoring by the Purchaser.



- 4.12.2 The intention is to dwell upon the progress of the activities related to Engineering Procurement, Manufacturing, Dispatch, Site Erection, testing, Commissioning and PG Test.
- 4.12.3 In the interest of the timely completion of the project, the area of monitoring can be altered in consultation by the Purchaser with the Contractor. The Contractor shall furnish adequate information in the monthly progress reports on the formats to be mutually agreed upon. The Contractor shall submit the requisite no. of progress reports in five (5) copies.
- 4.12.4 The Purchaser will invite the Contractor for monthly/fortnightly meetings to review the progress of each activity, and depute Purchaser's authorized representatives for ascertaining/ expediting progress at Contractor's works and suggest remedial actions to bridge-up time gap if any between planned progress and observed progress.
- 4.12.5 **Progress report**
- a) A monthly progress report with exception report showing current status of various activities including status of ordered/yet to be ordered items shall be submitted to the Purchaser by the Contractor in five hard copies, referring to the schedule of order, reasons for not achieving it and remedial measures proposed.
  - b) The Contractor shall submit programme of execution both in the form of activities in 'Network' as well as quantitative programme in terms of month wise physical targets for various disciplines of work.
  - c) The Contractor shall submit computerised updated time analysis report every month along with progress report. The updated PERT network drawing (both Level I and Level II) are to be submitted in requisite no. of copies at least once in every month. The format of the submission are to be mutually discussed and agreed.
  - d) The monthly progress report shall indicate progress of activities against targeted dates and targeted quantities in proforma as per the requirement of the Contract for maintaining consistency of reporting and for maintaining database by the Purchaser. Reasons for shortfalls, if any, shall be clearly brought out and proposed remedial measures to arrest the delays shall be indicated by the Contractor in the progress report, wherever applicable.
  - e) Quantitative programme which is termed as "Work Plan" shall be updated regularly at a mutually agreed interval of time and Principal Contractor shall submit the same for Purchaser's approval keeping in view the balance time available to execute the balance of activities. Once approved, subsequent progress report shall indicate the revised targets.
  - f) The Contractor shall furnish information on site activities viz. daily progress report, weekly receipt of equipment, monthly erection plan, etc. The Contractor has also to indicate resource deployment at site, highlights of critical areas and constraints in the daily progress report once in a week.
  - g) Other information related to site activities as may be required by the Purchaser, shall also be submitted by the Contractor.
  - h) The Contractor shall submit progress photographs in 5 copies and also in a Compact Disc (CD) every month relating to the progress in sequence of work of all major site activities. The Purchaser will arrange necessary permission for the same.

- i) The progress report will also highlight inspection status. The Contractor shall submit one copy of the inspection certificate duly signed by representatives/authorized agencies after inspection along with the progress report.

#### 4.13 **OVERALL TIME SCHEDULE**

The overall time schedule shall be as follows:

1. The time schedule for the scope of work up to commissioning shall be 18 months.
2. The time schedule for PG test shall be one year after provisional take over which shall be in concurrence with one year warranty period O & M.
3. After successful completion of PG test and final take over, O & M shall be carried out for balance 10 years.

After completion of above overall time schedule, entire system shall be handed over to NLCIL in working condition.

#### 4.14 **EXTENSION OF TIME**

4.14.1 The Contractor shall not be allowed for any extension of time for completion except in the following cases:

- i) Force Majeure – As per details stated in the Contract.
- ii) Major changes or substantial addition to work ordered by the Purchaser adversely affecting the completion time.
- iii) Any other circumstance of any kind whatsoever which may occur making the Contractor entitled to an extension of time which, however, shall be in the absolute discretion of the Purchaser.

4.14.2 The Contractor, upon the happening of any such event as stated above shall immediately inform the Purchaser but nevertheless use constantly his best endeavors to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Purchaser to proceed with the work.

4.14.3 Request for extension of time shall be submitted by the Contractor in writing and the Purchaser, based on the merit, shall consider the request and convey his decision to the Contractor in writing within a reasonable time.

4.14.4 The Contractor shall not be eligible for any extension of time on account of any delay in procurement of materials.

## SCHEDULE- 5

### 5.0 TAXES & DUTIES

#### 5.1 GST/CD

<b>i.</b>	GST wherever applicable shall be paid at actuals subject to ceiling indicated in the schedule of price
<b>ii.</b>	Any statutory variation on account of GST/Customs Duty arising beyond delivery schedule shall not be payable for the reasons directly attributable to contractor.
	(a) any statutory variation on account of GST arising between the date of submission of offer by the Contractor and scheduled date of completion of supplies can be allowed for the supplies made within the scheduled delivery period based on the rates prevailing on the dates of supply.
	(b) If there is any delay in supplies due to Contractor's fault, the rate prevailing on the scheduled date of completion of supplies will apply for the belated supplies and upward revision after the scheduled date will be to the Contractor's account.
<b>iii.</b>	Details of items, tariff no. with break-up values for despatches shall be indicated separately in the <u>PRICE SCHEDULE</u> with rate of taxes in percentage and total amount of taxes.
	Any benefits arising out of application of GST shall be passed on to Purchaser in full. Final claim will be settled only after certification by Chartered Accountants that all benefits arising out of GST have been passed on to the Purchaser.
	Statutory variations due to imposition of new taxes, duties and levies or reduction/ withdrawal of existing taxes, duties and levies by the Central or State Government as may be applicable on the supply of Plant and Equipment etc., shall be to Purchaser's account to the extent applicable as direct liability of the Indian Contractor in execution of this Contract with the Purchaser. In the case of any upward revision, the same shall be reimbursed by the Purchaser which shall not be within the ceiling quoted subject to production of relevant documentary evidence. However, the same will be limited to the Contractual delivery period/ execution schedule.

5.1.1 Customs Duty if any, shall be reimbursed at actuals subject to ceiling indicated in the schedule of price. However, the purchaser shall not be liable to clear the goods at Port.

#### 5.2 GST

The Contractor shall register with statutory / tax authorities wherever required.

- i. The Supplier / Contractor has to provide a copy of the **GST Registration Certificate** and also mention their **GST Registration No.** and Date in each of their invoices / bills without fail. No invoice or bill will be paid unless the **GST Registration No.** is mentioned therein.

- ii. While claiming the **GST** payment, the contractor should furnish the requisite details in the invoice **as per statutory requirements**

5.5 **Direct Tax (Income Tax):**

- 5.5.1 The Purchaser shall not be liable towards income tax of whatever nature including variations, arising out of this Contract, as well as tax liability of the Contractor and his personnel. Deduction of tax at source at the prevailing rate shall be effected by the Purchaser before remittance as a statutory obligation. The Certificate for the tax deducted at source shall be furnished by the Purchaser indicating the amounts deducted.

5.6 **Personal Income Tax and Cess:**

- 5.6.1 Income tax and cess, if any payable by the Contractor's / Sub-contractor's employees shall be paid by the said employees directly and the purchaser shall not be liable to pay the income tax and cess payable by the employees of the Contractor/ Sub-Contractor and the purchaser is not responsible for filing the tax return of the Contractor's employees/experts. The Purchaser is not responsible for any tax arrears of Contractors employees who have been associating their service, towards this scope of work on any circumstances whether they are in service or otherwise.

5.7 **Customs duties, Port handling, clearance and forwarding**

- 5.7.1 For imported supplies on F.O.B. basis Customs Duty, Port handling, clearance and forwarding if any, shall be reimbursed at actuals subject to ceiling indicated in the schedule of price. However the purchaser shall not be liable to pay such charges in respect of items supplied by the Contractor on free of charge basis. For the domestic supplies all charges regarding customs duties, if any, shall be to the account of the Contractor.
- 5.7.2 The Purchaser shall bear any statutory variation ( $\pm$ ) in CD tariff rate (i.e. between the CD rate prevailed at the time of submission of the offer and the CD rate paid at the time of actual imports) and also the variation in CD due to exchange rate fluctuation (i.e between the Exchange rate prevailed at the time of submission of offer and the Exchange rate prevailed at the time of actual imports). The variation ( $\pm$ ) in CD tariff rate and variation in CD due to exchange rate fluctuation will be regulated based on the Bill of Entries of actual imports made by the Contractor and the variation will be considered for the imports made within the agreed delivery schedule.

## **SCHEDULE- 6**

### **6.0 TERMS OF PAYMENT:**

#### **6.1.1 GENERAL PROCEDURE:**

The payment to the Contractor for the supply, services & works under the Contract will be made by the Purchaser as per the guidelines and conditions specified herein. All payments made during the Contract shall be on account payment only. The final payment will be made on completion of all the works and on fulfillment by the Contractor of all his liabilities under the Contract to the satisfaction of the Purchaser.

#### **6.2 DUE DATES FOR PAYMENT:**

The Purchaser will make progressive payment as and when the payment is due as per the terms of payment set forth herein. Payment will become due and payable by the Purchaser within 30 days from the date of receipt of Contractor's bill/invoice/debit note by the Purchaser provided the documents submitted are complete and correct in all respects, and is accompanied with a checklist substantiating the pay ability of the bill /invoice.

The Contractor shall certify the following in all the bills:

"Certified that no payment has been claimed and received before, for the components for which payment has been claimed in this invoice".

PURCHASER reserves the right to deduct any un-payable claims admitted inadvertently from any amount due to the CONTRACTOR.

6.2.1 Notwithstanding any amount becoming due and payable to the Contractor by the Purchaser, the Contractor shall not be entitled to any interest on delayed / overdue payments.

#### **6.3 PAYMENT SCHEDULE:**

6.3.1 The Contractor shall prepare and submit to the Purchaser for approval, a detailed Billing Break Up (BBU) of the Contract Price component wise. This Contract Price BBU shall be interlinked with the agreed detailed PERT Network of the Contractor setting forth his starting and completion dates for the various key phases of works prepared. Any payment except the advance payment under the Contract shall be made only after the BBU is approved by the Purchaser. The aggregate sum of the BBU shall be equal to the Lumpsum Contract Price. BBU shall be reviewed, updated and submitted to the Purchaser, by the Contractor as and when required.

6.3.2 The Contractor shall submit to the Purchaser his Sequential delivery schedule for all the equipment correlated to the sequence of erection within 1 month from the date of Letter of Award (LOA). Such schedules shall be in line with the agreed detailed PERT for all phases of the works of the Contractor. If required such schedules shall be reviewed, updated and submitted to the Purchaser, by the Contractor as and when required.

- 6.3.3 Dispatches shall be as per such approved time schedule and payment shall be regulated accordingly. No early payment shall be made for the 65% stage payment and subsequent payment further indicated in the case of early dispatches effected.
- 6.3.4 All demurrages and wharfage if any arising out of any dispatches shall be to the account of the CONTRACTOR only.
- 6.4. **ADVANCE PAYMENT:**
- 6.4.1 No advance payment shall normally be made. However if the contractor wishes to claim advance payment for mobilization of work, equipments, materials etc., then advance shall be paid limited to a maximum of 10% (Ten percent: First Down Payment 5% of Contract price for supplies and site preparation work by 2 months from the date of LOA subject to fulfillment of conditions laid down in clause No. 6.5 and Second Down payment of 5% of Contract price for supplies and site preparation work by 3 months from the date of LOA subject to signing of Contract).
- 6.4.2. Except Initial Advance, all other payments shall be made only after signing the contract. The terms of payment for the various price components of the Contract price are detailed herein:
- 6.5 **Payment Terms:**  
Advance payment:
- 6.5.1 All Advance Payment shall be made as per the terms of payment within 90 days from the date of LOA for F.O.B. (imported portion) and Ex-works (Indian portion) supply and Site preparation works on fulfilling the conditions specified below:
- i) Acceptance of Letter of Award (LOA)
  - ii) Submission of an unconditional Bank Guarantee covering 110% of the advance amount in the prescribed form and acceptance of the same by the PURCHASER.
  - iii) Submission of Contract Performance Bank Guarantee and Financial Backup Bank Guarantee, if any, as stipulated and acceptance of the same by the PURCHASER.
  - iv) On resubmission of detailed L1 PERT chart and acceptance thereof by PURCHASER.
- 6.5.2 **FOR SUPPLY, ERECTION, CIVIL WORKS, TESTING & COMMISSIONING OF PV SOLAR:**
- 6.5.2.1 The payment of contract price shall be regulated and paid as per price quoted in various schedules i.e Schedule-1 to Schedule-5 in Volume-I and also as per break up details furnished in their BBU.
- 6.6 **Schedule-1: Site Preparation works:**
- 6.6.1 90% (If advance payment availed) /100 % of price of each item on prorata basis quoted in Schedule-1 shall be paid on certification of the same by the Project Manager.

**6.7. Schedule-2 and 3 : Plant and Equipment (for Solar and BESS):**

- 6.7.1 50% (If advance payment availed) / 60% in case of not availing advance pro-rata value of Contract price of F.O.B. supplies (as per agreed billing schedule) against shipping documents as detailed out below in clause "Documents for Payments". In case of Ex-works supplies, the same shall be against certificate of receipt of consignment at site by the PURCHASER on Unit rate basis and after physical verification and certification of the same by the Project Manager for having received and stored the equipment at site. For this purpose the Contractor shall furnish a billing break up and get it approved by the Project Manager. This stage payment will be made subject to signing of the Contract.
- 6.7.2 Twenty five percent (25%) price of each item quoted in Schedule -2 and Schedule-3 shall be paid after installation of each item on Unit rate basis and certification of the same by the Project Manager.
- 6.7.3 Ten percent (10%) price of Schedule-2 and Schedule-3 of the plant and Equipment shall be payable on installation of the entire Solar PV Power Plant and BESS and after it is tested and commissioned and exporting power to the Grid and against issue of Provisional Acceptance Certificate by the Project Manager.
- 6.7.4 The final five percent (5%) price of Schedule-2 and Schedule-3 of the plant and Equipment shall be payable on successful completion of Performance and Guarantee tests as specified and issue of Final Acceptance Certificate by the Project Manager.
- 6.7.5 100% of Transport charges under price Schedule-2 and Schedule-3 shall be paid along with 50% / 60% equipment charge against documentary evidence subject to the lumpsum ceiling quoted.
- 6.7.6 100% Insurance charges shall be paid against documentary evidence and submission of the Insurance Policy subject to the lumpsum ceiling quoted.
- 6.8 Advance Payment for Civil and Structural works and Installation and commissioning:**
- 6.8.1 If the Contractor willing to avail Advance Payment for Civil and structural works storage, Installation and commissioning shall be paid as follows:

First 5% advance shall be paid as certified by the Purchaser

- (i) on establishing office at Project Site preparatory for mobilisation of storage, Installation and commissioning
- (ii) on making ready the storage area before despatch of first consignment of supply and
- (iii) Submission of an unconditional Bank Guarantee covering 110% of the advance amount in the prescribed form and acceptance of the same by the PURCHASER

Second 5% second advance shall be paid

- (i) after the Contractor moves the required construction plant and machinery and commences at site the first installation activity as per PERT network subject to certification by the engineer of the Purchaser and
- (ii) Submission of an unconditional Bank Guarantee covering 110% of the advance amount in the prescribed form and acceptance of the same by the PURCHASER

**6.9 Schedule-4-Installation and commissioning:**

6.9.1 80% / 85% (If advance payment avail)90% in case of not availing advance the price of the installation services quoted in Schdule-4 shall be payable on pro-rata basis after completion of installation of equipment of the Solar PV Power Plant and after it is made ready for hooking up to the Grid

6.9.2 Five percent (5%) price of the installation services quoted in Schdule-4 shall be payable on pro-rata basis after completion of installation of equipment of the Solar PV Power Plant and after it is tested and commissioned and exporting power to the Grid .

6.9.3 The final five percent (5%) price of the installation services quoted in Schdule-4 shall be payable on successful completion of Performance and Guarantee tests as specified and issue of final Acceptance Certificate by the Project Manager.

**6.10 Schedule-5 Civil and Structural works:**

6.10.1 80% / 85% (If advance payment avail)90% in case of not availing advance the price component of the Schedule-5 shall be payable on Pro-rata basis after completion of work and certification of the same by the Project Manager.

6.10.2 5% of price component of the Schedule -5 shall be payable after completion of work and certification of the same by the Project Manager.

6.10.3 Five percent (5%) of price component of the Schedule-5 shall be payable on successful completion of Performance and Guarantee tests as specified and issue of Final Acceptance Certificate by the Project Manager.

**6.11 Schedule-6 & Schedule-7 Operation and Maintenance charges for 10 years after warranty period for Solar Power Plant and BESS respectively:**

6.11.1 After completion of Warranty period as defined in bid documents, the Operation and Maintenance charges quoted in Schedule-6 & Schedule-7 for 10 years shall be payable on pro-rata on quarterly basis on the certification of work by the Project Manager after completion of each quarter. The total compensation for shortfall in net energy shall be calculated on annual basis and deduction if any shall be carried out from the quarterly payment of the year.

6.12 The O&M during warranty period for Solar and BESS is the responsibility of the Contractor.



6.12 **Taxes and Duties:**

- 6.12.1 One hundred percent (100%) of GST/ Customs Duty shall be reimbursed against invoices to the Contractor subject to ceiling quoted upon receipt of equipment at site along with the 50%/ 60% payment of the respective items.
- 6.12.2 GST for the Operation and maintenance services and other applicable services will be paid along with progressive payment subject to ceiling quoted in the price schedule after completion of the respective portion of the works.

6.13 **GENERAL:**

- 6.13.1 The advance Bank Guarantee will be reduced progressively on quarterly pro-rata basis as evidenced by the copy of invoice duly passed /approved by the Purchaser for which the Contractor shall submit the request letters with necessary supporting calculations.
- 6.13.2 All payments shall be paid only against submission of complete and correct invoices and documents by the Contractor duly certified by the Purchaser except as otherwise specified in the Contract. Payment shall be due and payable by the Purchaser within a reasonable period, which will not normally exceed one month from the date of receipt of complete and correct invoices. If it is not payable the invoice will be returned to the Contractor stating the reasons for rejection within a month from the date of receipt by the Purchaser.
- 6.13.3 All payments shall be released directly by the Purchaser to the Contractor except as otherwise provided in the contract. If as per provisions of Contract any payments are made directly by the Purchaser to the Associates, such payments shall constitute a proper discharge of Purchaser's obligations for such payments to the Contractor.
- 6.13.4 All the progressive payments mentioned above shall be made by the Purchaser based on the satisfactory progress of work as agreed.
- 6.13.5 All interim/progressive payments shall be regarded as payments by way of advance against the final payment only and not as payment for work actually completed and shall not preclude defective/imperfect/ incomplete work to be removed. It will not be considered as an admission by the Purchaser of the due performance of the Contract, or any part thereof by the Contractor nor shall it preclude, determine or affect in any way the powers of the Purchaser under these conditions or in any other way vary or affect the Contract.
- 6.13.6 The Purchaser reserves the right to encash Bank Guarantees if sufficiently convinced of negligence and lack of dedication to work on the part of the Contractor.
- 6.13.7 If the Contract is terminated due to default of the Contractor, the 'Mobilization Advance' pay would be deemed as interest bearing advance at the rate applicable to cash credit facility prevailing at the time of issue of NIT to be compounded quarterly.
- 6.13.8 For delays in scope within the agreed time schedule, interest at the prevailing rates applicable to cash credit facility will be charged on the unadjusted portion of advance paid.

6.14 **PAYMENT PROCEDURE:**

- a. The successful Bidder shall submit the bills for claim in four copies. The payment shall be made after the verification of the bill by concerned Accounts Centre at NLC India Ltd., Neyveli.
- b. It is expressly understood that the release of payment to the successful Bidder in the manner specified will not be construed as the fulfillment of the Bidder's obligations either in part or whole under the contract and that the Bidder shall continue to remain responsible to NLCIL until all the obligations under the agreement have been fulfilled.

6.15 **PAYMENT OF CONTRACTORS BILLS THROUGH ELECTRONIC FUND TRANSFER (EFT)**

The Bidder should submit the consent in a mandate form for receipt of payment through NEFT and provide the details of bank A/c in line with RBI guidelines for the same. These details will include bank name, branch name & address, A/c type, bank A/c no., bank and branch code as appearing on MICR cheque issued by bank. Further, the Bidder should also submit certificate from their bank certifying the correctness of all above mentioned information in the mandate form.

6.16 **Payment for Ocean freight and Inland Transport**

6.16.1 **Ocean Freight**

100% ocean freight charges for respective shipment shall be reimbursed at actual on production of documentary evidence. Total claim shall not exceed the ceiling price quoted in the price schedule for ocean freight.

6.16.2 **Inland Transport**

Inland transport charges for imported portion from Chennai port to the site will be borne by the Contractor.

100% of the transport charges for indigenous supplies on pro-rata basis shall be reimbursed on production of invoices and documentary evidence along with 50%/60% supply invoices after receipt of materials at site. However, the total claim shall not exceed the ceiling quoted in the price schedule for inland transport.

6.17 **Insurance Charges**

6.17.1 The Insurance premium in respect of Marine and inland transport shall be prepaid by the Contractor and got reimbursed subject to production of documentary evidence including the copy of respective policies.

6.17.2 The reimbursement of premium can be made at periodical intervals as per the policy's conditions. The premium receipt issued by the Insurance company shall have to be produced for claiming reimbursement. After all the instalments of premium are paid, the difference between lump sum insurance charges indicated in the contract and the premium actually reimbursed to the contractor on documentary evidence as referred above, shall be paid to the contractor on the basis of invoices from the contractor, without supporting documents to

compensate the service charges incurred by the contractor during the pendency of the Insurance policy. However, the total claim shall be restricted to the lump sum price quoted in the schedule of price.

6.18 **Customs duties, Port handling, clearance and forwarding**

For imported supplies on F.O.B. basis Customs Duty if any, shall be reimbursed at actuals subject to ceiling indicated in the schedule of price along with 50%/60% payment. However the purchaser shall not be liable to pay such charges in respect of items supplied by the Contractor on free of charge basis. For the domestic supplies all charges regarding customs duties, if any, shall be to the account of the Contractor.

6.19 **Mode of Payment**

6.19.1 **Indigenous supply**

The payment shall be made direct to the Contractor by the Purchaser through e-payment only. Payment, will become due and payable by the Purchaser within a reasonable period which will not exceed one month from the date of receipt of Contractor's bill / invoice / debit note by the Purchaser provided the documents submitted are complete and correct in all respects. If it is not payable the invoice will be returned to the Contractor stating the reasons for rejection within a month from the date of receipt by the Purchaser.

6.19.2 **Imported supply**

In case of stage payment (50%/60%) in foreign currency for the supplies of Equipment, the Purchaser will establish irrevocable Letter of Credit in favour of the Contractor through the Purchaser's Bank in India and payment will be effected through Letter of credit. The Balance payment for supplies will be made through direct disbursement method.

The payment for indigenous supplies, the inland transportation, insurance and other lump sum charges shall be made direct to the Contractor by the Purchaser wherever applicable through E-payment.

6.20 **Opening of Letter of Credit., Validity & Extension of Letter of Credit**

6.20.1 The Purchaser shall open an irrevocable Letter of Credit at the State Bank of India or any principal Bank of NLC and advice through its foreign branches/ correspondents to be specified by the Contractor in due course. The Letter of Credit will be kept valid for 3 months covering 50%/60% value of equipment. Letter of Credit will be opened after the receipt of information from the contractor regarding readiness of the shipment.

6.20.2 The bank charges incurred in India shall be to the account of the Purchaser and all bank charges incurred in abroad shall be to the Contractor's account. Should the Contractor need confirmation of LC, charges there of is to be borne by the Contractor. The Purchaser will bear all bank charges in India for establishing/ renewal of L/Cs with State Bank of India or any principal Bank of NLC. However, if extension of Letter of Credit become necessary for delay due to

reasons attributable to the Contractor then all bank charges for such extension shall be borne by the Contractor.

6.20.3 In respect of all Ex-works supplies all payment will be made through e-payment in INR and bank charges if any would be to the contractor's account.

## 6.21 Documents for Payment

### 6.21.1 Invoice for imported supplies

#### 6.21.2 *For 50%/60% payment*

The following documents in original are to be submitted to bank for payment.

- i. Contractor's signed commercial invoice showing 100% FOB price for equipment /components supplied, 25% to be received against receipt at site and verification and 10% to be received on successful completion of commissioning and final 5% payable on successful completion of Performance Guarantee test 50%/60% as amount falling due and a certificate confirming that delivery has been effected according to the conditions of the Contract.
- ii. 3 originals of marine Bill of Lading clean on board marked freight prepaid consigned to NLCIL plus one non-negotiable copy, evidencing shipment to Indian sea port.
- iii. Copy of transit insurance declaration made by Contractor.
- iv. Packing list / despatch note – one copy.
- v. One copy of certificate of origin.
- vi. One copy of Soundness certificate in the following form  
"Certified that the materials shipped EX S.S./M.V .....  
under B/L No. .... dated ..... for the value of ..... against  
Contract No. .... were in sound condition at the time of shipment."
- vii. One copy of Test certificate, if no such certificate is necessary, confirmation by NLC to this effect.
- viii. Certificate to the effect that liquidated damages have been deducted/ No L.D is payable by Contractor.
- ix. Confirmation by Contractor that the copy of the above documents have been sent to NLC immediately after shipment.
- x. In respect of last consignment in addition to the above documents the following certificates and documents shall also be furnished.
  - a) Certificate by the Contractor that no further shipment will be made and the supplies are completed in all respects.
  - b) Summary of all invoices for the equipment also showing the amount due and amount claimed/received.

Two copies of each of the above documents shall be sent simultaneously to the Head of Unit Finance / Neyveli.

In addition, 10 copies in each of the above documents shall be sent direct to the GENERAL MANAGER/CONTRACTS after effecting the shipments, within 7 days from the date of shipment.

6.21.3 ***For 25% Payment***

The documents in original to be submitted to Purchaser shall consist of the following:

- i. Contractors signed commercial invoice, one copy showing 100% FOB price for equipment / components supplied, deductions of 50%/60% of payment already received, and 25%+15% of payment to be received on successful completion of commissioning & PG Test and amount now falling due as 25% payment.
- ii. Certificate of verification by Purchaser for components received directly at site.
- iii. In respect of last consignment in addition to the above documents the following certificate and document shall also be furnished.
  - a) Certificate by the Contractor/that no further shipment will be made and the supplies are completed in all respects.
  - b) Summary of all invoices for the equipment also showing the amount due and amount claimed/received.

6.21.4 ***For 10% Payment***

Documents in original to be submitted to the purchaser shall consist of the following:

- i. Contractor's signed commercial invoice, one copy showing 100% FOB price for equipment/components supplied, deductions of 85% of payment already received, and the balance 10% amount falling due provisional take over.
- ii. Purchaser's Certificate of successful completion of commissioning of the equipment.

6.21.5 ***For final 5% Payment***

Documents in original to be submitted to the purchaser shall consist of the following:

- i. Contractor's signed commercial invoice, one copy showing 100% FOB price for equipment/components supplied, deductions of 95% of payment already received, and the balance 5% amount falling due after Performance Guarantee Test..(PG Test).
- ii. Purchaser's Certificate of successful completion of PG Test of the equipment

6.21.6 ***Invoice for indigenous supplies:***

The following documents in original shall be sent by Registered Post to the Head of the unit Finance/New Project/CO,the General Manager/PBD as applicable within 10 days from the date of despatch to enable the Purchaser to make progressive payment to the indigenous supplier.

6.21.7 ***For 50%/60% payment***

- i. Certificate of receipt of materials at site as certified by the Purchaser-1 original + two copies.
- ii. Supply invoice -1 original + 2 copies
- iii. Packing list (despatch note)- 2 copies
- iv. Soundness certificate -1 original + 2 copies  
The Certificate of soundness referred to above will be furnished in the following form:  
"Certified that the materials despatched in RR dated ..... for the value of

Rs. .... against Contract No. .... were in sound condition at the time of despatch.

- v. Test certificate if applicable and/or inspection certificate of the Contractor- 1 original + 2 copies
- vi. Freight invoice of the Contractor - 1 original + 2 copies
- vii. RR/lorry way bill /delivery note - 1 original + 2 copies
- viii. Transit insurance declaration- 1 original + 2 copies
- ix. In respect of last consignment in addition to the above documents the following certificate and document shall also be furnished:
  - a. Certificate by the Contractor that no further supplies will be made and supplies are complete in all respects.
  - b. Summary of all invoices for the equipment also showing the amount due and amount claimed / received.

6.21.8 *For 25% stage payment*

- i. Invoices – 1 Original + 3 Copies
- ii. *Certificate of verification by the Purchaser of the equipment received at site.*
- iii. *In respect of last consignment in addition to the above document the following certificate and document shall also be furnished:*
  - a) Certificate by the Contractor that no further supplies will be made and the supplies are completed in all respects.
  - b) Summary of all invoices for the equipment also showing the amount due and amount claimed/received.

6.21.9 For balance 10% payment:

- i. Invoices 1 Original + 3 Copies.
- ii. Purchaser's Certificate of successful completion of commissioning.

For balance 5% payment:

- i. Invoices 1 Original + 3 Copies.
- ii. Purchaser's Certificate of successful completion of PG Test.

**SCHEDULE - 7**

**FACILITIES TO BE PROVIDED BY THE PURCHASER**

Covered in Technical Specification

## **SCHEDULE -8**

### **CONTRACT SPECIFICATIONS**

The Technical Specifications issued along with the Tender Specifications duly modified and up-dated based on the changes/modifications agreed between the Purchaser and the successful Bidder shall constitute Schedule-8 "Contract Specifications" of this Contract and shall form an integral part of the Contract for all purposes.



## SCHEDULE-9

### 9.0 PERFORMANCE GUARANTEE

#### General

1. The contractor shall guarantee that the equipments offered shall meet the ratings and performance requirements stipulated for various equipments covered in the Technical / Contract specifications.
2. The contractor shall demonstrate and achieve guaranteed values during the one year, performance guarantee test period as per Contract Specification, at site in the presence of the Purchaser for the complete system.
3. Details of performance guarantee test and method of computation of performance values shall be as per Technical Specification.
4. The Contractor shall supervise and direct the operation during performance guarantee test and shall take complete responsibility in this regard.
5. During performance guarantee test, the Contractor shall make available necessary experienced operating & maintenance personnel.
6. The Contractor shall provide and install all measuring instruments with required calibration for checking the guaranteed generation during performance guarantee test.

#### **Demonstration of Performance Guarantee Test and LD for Shortfall in net energy export due to Non-Performance**

1. The guaranteed net energy export furnished by the bidder in his offer, shall be without any tolerance values and all margins required for instrument inaccuracies and other uncertainties (permitted as per Technical Specification) shall be deemed to have been included in the guaranteed figures.
2. Bid price quoted by the Bidder shall include all costs associated with the tests. No credit shall be given to the Bidder, in the bid evaluation or in the evaluation of the results of the guarantee tests for performance predictions / guarantee etc. if the values considered by the bidder are better than those furnished by the bidder in their offer.
3. The performance guarantee tests shall be conducted by the successful Bidder/ Contractor for the whole system including grid tie up and LD shall be levied for any shortfall in energy export as specified in the Technical Specification.

#### **Performance Guarantee Test**

1. The performance guarantee test shall be conducted at site by the Contractor in presence of the Purchaser. Such test will be conducted for one year after the successful commissioning and provisional take over of the plant.
2. Instrumentation used, their accuracy class, their numbers & location etc. for carrying out performance guarantee test shall be as per relevant Technical Specification and shall be subject to Purchaser's approval. In addition the values of parameters shall be logged for the entire period in the Data Acquisition system provided under SCADA.

3. Any special equipment, tools and tackles required for the successful completion of the performance guarantee test shall be provided by the contractor at his cost.
4. If equipment / system fail in the PG test, all necessary modifications and / or replacements shall be carried out by the successful bidder (contractor) without any extra cost to the Purchaser so that the equipment / system comply with the guaranteed requirements. However, if even after above modifications / replacements, the contractor is not able to successfully complete the PG test within a reasonable period allowed by the Purchaser, Purchaser will have the right to the following:
  - (a). To reject the equipment / system / plant and recover the payment already made

**OR**

to accept the equipment / system / plant after levying for shortfall in energy export as specified in the Technical Specification`

### **Schedule of Performance Guarantees**

Details of performance guarantee tests and method of computation of performance values shall be as per Technical Specification.

Necessary write ups, schemes, instruments, schedules, logs, detailed procedures clearly indicating period of tests, frequency of observations, etc. shall be prepared and submitted for Purchaser's review and shall be got specifically approved from the Purchaser at least one month before the tests are carried out.

### **LD for Shortfall in Net Energy Export.**

1. Should the results of the performance guarantee test show that the Solar PV system along with grid tie up has failed to meet its guarantee values, the Contractor shall carry out necessary modification at their own cost, to meet the guaranteed values. In such a case the performance guarantee test shall be repeated by the Contractor within one (1) month from the date the equipment is ready for retest. If the specified guarantees are not established again, the Purchaser may at his discretion reject the equipment and recover the payments already made or accept the equipment after assessing the LD at the rates specified in the Technical Specification. The recovery of such amount shall be from the amounts due to the Contractor.
2. The Bidder shall furnish declarations in the formats prescribed in the Technical Specification for these guarantees.

### **PG test report**

On successful completion of demonstration of performance guarantees for the plant following shall be supplied:

- a) Performance Guarantee Evaluation Report.
- b) Operation log book for 1 year
- c) Power export log for 1 year

## **SCHEDULE- 10**

### **GENERAL TERMS AND CONDITIONS OF THE CONTRACT**

#### **10.1 BANK GUARANTEES**

##### **10.1.1 GENERAL**

- i) All the Bank Guarantees shall be irrevocable. The Bank Guarantee shall be from any Nationalised Bank or any Scheduled bank in India (other than Bank of China) authorised by Reserve Bank of India to issue such Bank Guarantee. Except bid guarantee, all bank guarantees are to be furnished directly by the banker to NLCIL by RPAD/Courier to the following address:

The Chief General Manager/Contracts,  
Corporate Office, NLC India Ltd., Block-1,  
Neyveli - 607 801.

- ii) The Bank Guarantee shall be furnished as per respective format prescribed by the Purchaser and shall be submitted on Non-judicial stamp paper of value Rs.80/- and the stamp paper shall be in the name of the Bank.
- iii) All the Bank Guarantees shall be payable on first demand, without demur, irrespective of any dispute between the Bank and the Contractor to the Purchaser without any condition or dispute whatsoever.
- iv) The Contractor shall arrange to keep the several bank guarantees referred to herein valid for the requisite duration by making timely request to the Bank or Banks concerned. All the extension for Bank Guarantees also shall be on non-judicial stamp paper of value Rs.80/- obtained in the name of Bank. All charges connected with the bank guarantees shall be to the account of the CONTRACTOR.
- v) No interest shall be payable by the Purchaser on the Bank Guarantee on amount of Bank Guarantee encashed.
- vi) The Purchaser shall have the right to encash the Bank Guarantees for non-compliance of any or all the terms and conditions of the contract and also in terms of the Joint Deed of Undertaking, if any, which the Contractor may enter into along with other parties with the purchaser. Non-compliance of any or all the terms and conditions of the contract by the Contractor, will be intimated to the Contractor, specifying the reason with supporting documents, before encashment of the Bank Guarantee.
- vii) **Confirmation of BG under the through “Structured Financial Messaging System (SFMS)”**
- a. The Bank Guarantee issued by the issuing Bank of Behalf of Bidder/ Contractor / Supplier in favour of “Name of Company” shall be in paper form as well as issued under the “Structured Financial Messaging System. The details of beneficiary for issue of BG under SFMS platform is furnished below:-

Name of Beneficiary & its details	Name	NLCIL
	Unit/ Area/ Division	Contracts branch /Corporate Office
Beneficiary Bank, Branch & Address		State Bank of India
		Block-2, Neyveli – 607801
IFSC Code		SBIN0000958

The above particulars are to be incorporated by the issuing bank properly while issuing BG under SFMS mode to avoid any problem in future.

#### 10.1.2 **Bank Guarantee for Advance Payment:**

The advance stipulated in the payment terms shall be made to the CONTRACTOR by the PURCHASER subject to the CONTRACTOR providing a bank guarantee for 110% of the advance amount as per the stipulations and on acceptance of the said bank guarantee. This bank guarantee shall be valid till completion of the supplies/ commissioning / scope of work, as the case may be with a grace period of 2 months thereafter.

All Bank Guarantees against advance payments shall be progressively reduced in value on prorata basis after attainment of progress and payment made, once in every quarter only on approval by the Purchaser for which the Contractor shall submit the request letters with necessary supporting calculations.

#### 10.1.3 **CONTRACT PERFORMANCE BANK GUARANTEE (CPG)**

- i) The CONTRACTOR guarantees the successful and satisfactory operation of the equipment supplied under the Contract as per specifications and documents. The CONTRACTOR further guarantee that the equipment supplied and installed shall be new and free from all defects in design, material and workmanship. The CONTRACTOR shall, upon written notice from the PURCHASER, fully remedy free of expenses to the PURCHASER such defects as may develop in the normal use of the said equipment within the warranty period as specified in the Contract.
- ii) As a contract security, the successful Bidder to whom the work is awarded, shall be required to furnish Contract Performance Bank Guarantee(s) covering the warranty period in the form stipulated subject to approval of the Owner in-favour of the Owner within 30 (Thirty) days from the date of Letter of Award. The Guarantee amount shall be equal to 10% (Ten Percent) of the total contract price for supply and services excluding O&M charges for 10 years and it shall guarantee the faithful performance of the contract in accordance with the terms and conditions specified in these documents and specifications. The guarantee shall be valid till the expiry of 90 days beyond the actual date of final take over or after the end of the

warranty period or after the end of the Performance Guarantee test whichever is later. The Guarantee amount shall, on demand, be payable without demur in respective of any legal dispute between bank and the contractor and between the contractor and the owner without any condition or dispute whatsoever.

- iii) The PURCHASER shall have the right to encash the Contract Performance Guarantee in full or part thereof for non-compliance of any or all the terms and conditions of the contract and to recover any Liquidated Damages under the contract as well as against defects in the equipment/ shortfall in guaranteed generation and for failure to comply with any of the warranty obligations as enumerated in the Contract.
- iv) In case of part encashment, CPG shall be valid for the remaining period as per contract for the balance amount or for the period as requested by owner.
- v) The Contract Performance Bank Guarantee value shall be suitably adjusted towards the variation in the Contract price.
- vi) The 90% of Contract Performance Bank Guarantee value will be allowed to reduce on the expiry of warranty period or after date of final take over or after the end of the warranty period or after the end of the Performance Guarantee test whichever is later subject to submission of CPG for O&M Contract. The remaining 10% of the CPG value will be retained till the completion of 10 years O&M Contract and will be returned to the contractor without any interest after 90 (ninety) days from completion of 10 years O&M contract period.

#### **10.1.4 LIQUIDATED DAMAGES BANK GUARANTEE (LDBG)**

If the delay is not purely attributable to the Contractor and requires detailed analysis, the amount equivalent to the maximum L.D leviable would be withheld from the running bills as indicated in Schedule 6. In case the Contractor faces difficulty in cash flow and progress of work, an amount up to 90 % of the withheld amount shall be released to the Contractor against a Bank Guarantee as per the format enclosed for 100 % of the withheld amount, if requested by the Contractor. The Bank Guarantee shall be initially valid for 6 months and shall be suitably extended by the Contractor till the LD issue is settled.

#### **10.1.5 RETENTION MONEY BANK GUARANTEE (RMBG)**

- i) The final five percent (5%) payment of price indicated in Schdule-1, 2 &3 and final five percent(5%) payment of the price indicated in Schdule-4 shall be payable on successful completion of Performance Guarantee tests as specified and issue of Final Acceptance Certificate by the Purchaser.
- ii) In case of delay in Performance Guarantee test for reasons not attributable to the Contractor, the final five percent (5%) payment of price indicated in Schdule-1,2&3 and final ten percent (5%) payment of the price indicated in Schdule-4 will be released at the latest by 6 months from the scheduled date of completion of Performance Guarantee test against furnishing of RMBG and acceptance of the same by the Purchaser.

- iii) The Retention Money Bank Guarantee shall be initially valid for 6 months and shall be extended suitably in such a way that the Bank Guarantee is valid up to the actual date of successful completion of Performance Guarantee test.
- iv) The Purchaser shall have the right to encash the RMBG for deficiency and default in supplies and also for the recovery of L.D. in terms of the Contract.

#### 10.1.6 FINANCIAL BACK UP BANK GUARANTEE ( if applicable)

- i) In case of bidder who undertakes to execute the Contract on the basis of a collaboration agreement the bidder shall furnish an agreement to work together for this project with his collaborator. The same shall be backed up with a financial guarantee by the collaborator directly furnished (format enclosed vide Appendix-B) to the Purchaser for a value of 5% of their respective portion of the contract value to be made by the collaborator and initially valid for 15 months beyond the scheduled date of Performance Guarantee Test and shall be extended suitably to be valid till the expiry of 90 days beyond the actual date of completion of performance test or after the end of the warranty period, whichever is later.
- ii) In case of bidder who undertakes to execute the Contract on the basis of a consortium agreement the bidder shall furnish an Agreement/Letter of consent/Joint deed of under taking in which the partners are jointly and severally liable to the Owner for successful performance of the contract. The same shall be backed up with a financial guarantee by the consortium partner/s directly furnished (format enclosed vide Appendix-B) to the Purchaser for a value of 5% of their respective portion of the contract value to be made by the consortium partner and initially valid for 15 months beyond the scheduled date of Performance Guarantee Test and shall be extended suitably to be valid till the expiry of 90 days beyond the actual date of completion of performance test or after the end of the warranty period, whichever is later.
- iii) In case of bidder is Joint Venture Company, each partner of JV company shall furnish Financial Back-up Bank Guarantee for a value of 5% of their respective portion of the contract value to be made by the JV partner/s and initially valid for 15 months beyond the scheduled date of Performance Guarantee Test and shall be extended suitably to be valid till the expiry of 90 days beyond the actual date of completion of performance test or after the end of the warranty period, whichever is later.
- iv) In case the respective portion of work of the Collaborator/Consortium partners/Joint Venture partners is less than 1% of the total contract value, then Financial back up Bank Guarantee for a minimum of 0.05% of the total contract value shall be furnished.
- v) The Purchaser shall have the right to encash the financial backup bank guarantee for non-compliance of any or all the terms and conditions of the Joint Deed of Undertaking as well as for shortfall in guaranteed output as enumerated in the Contract.

## 10.2 INSURANCE

- 10.2.1 The Bidder shall at his own expense take out necessary insurance to-the supplies, transit, personnel and all other related to the satisfaction of the NLCIL including all third party risks as detailed below:

- i) Insurance to cover
  - a. marine transit
  - b. storage
  - c. erection
  - d. commissioning policy
- ii) Insurance to cover third party liability and surrounding property
- iii) Workmen compensation and/or group personal accidents Insurance policy covering all its employees and works including of the Sub- Contractor.

10.2.2 It is the responsibility of the Contractor to enter in to an agreement to operate and maintain the Solar PV Power Plant along with power evacuation system and its all equipment and facilities in perfect condition for the entire period of 25years O & M after final take over for which NLCIL shall pay the agreed Comprehensive O&M charges only. The replacement / repair / modification of any or all equipment have to be carried out by the Contractor at his own cost for the entire period of contract. NLCIL shall not be responsible for any break down /failure of any equipment to any reason thereof. After Provisional Take Over, comprehensive insurance coverage for the entire system shall be taken by the contractor in the name of NLCIL on yearly basis.

### 10.2.3 SCOPE OF INSURANCE

The Contractor shall take out a composite and comprehensive Marine-cum-Erection Insurance Policy with a Nationalised Indian Insurance Company/company regulated by IRDA which shall cover total erected value of the Facilities (115% of Contract price) and all risks specifically inclusive of the following:

- i) All Risk Insurance: The policy shall cover all risks and escalations, and revisions without ceiling.
- ii) Cargo Insurance: For supplies, the policy shall insure the goods originating from the Contractor's / Supplier's warehouse to Plant's warehouse and up to completion of erection and commissioning. This will be inclusive of supplies to and from warehouse / factory of intermediate processors / suppliers. This policy will also cover the replacement items, if any.
- iii) Third Party Liability Insurance: The policy shall cover third party liability. The third party liability shall cover the loss / disablement of human life (persons not belonging to the Contractor) and also cover the risk of damages to others' materials/equipment/ properties during construction, erection and commissioning at site. The value of third party liability for compensation for loss .of human life or partial / full disablement shall be of required statutory value but not less than Rs.2 lakh per death, Rs.1.5 lakh per full disablement and Rs.1 lakh per partial disablement and shall nevertheless cover such compensation as may be awarded by a Court of Law in India or abroad and cover for damage to others' equipment /surrounding property as approved by NLCIL.
- iv) Automobile Liability Insurance: Covering use of vehicles / mobile equipment used by the Contractor or its Sub Contractors (whether or not owned by them) in connection with the-execution of the Contract
- v) Contractor shall ensure that where applicable, its Sub-Contractor(s) shall take out and maintain in effect adequate insurance policies for their personnel and vehicles and for work executed by them under the Contract, unless such Sub-Contractors are covered by the policies taken out by the Contractor.

- vi) NLCIL shall be the principal beneficiary of the policy along with the Contractor. Sub-Contractors of the Contractor shall not be holders or beneficiaries in the policy nor shall they be named in the policy.
- vii) At no time shall goods and services required to be provided by the Contractor shall remain uninsured.
- viii) A copy of the 'Marine-cum-Erection' Insurance policy shall be made available to NLCIL within 60 days of signing of the Contract and policy shall be kept alive and valid at all times up to the stage of Commissioning Certificate.
- ix) NLCIL reserves the right to take out whatever policy that is deemed necessary by him if the Contractor fails to keep the said policy alive and valid at all times and / or causes lapses in payment of premium there by jeopardising the said policy. The cost of such policy(s) shall be recovered / deducted from the amount payable to the Contractor.
- x) The Contractor while taking out such 'Marine-cum-Erection' policy shall avail the best premium rates with the maximum discounts available.
- xi) In cases where the erection, modification etc., are to be carried out in the existing site of NLCIL the 'surrounding value' shall be intimated by NLCIL to the Contractor, who shall, ensure that this value is included in the policy.
- xii) Upon arrival of plant and Equipment / materials at site the-Contractor shall assume custody thereof and remain responsible thereafter for safe custody until the whole plant is successfully commissioned.
- xiii) In order to adequately cover the works under such composite and comprehensive insurance, the Contractor shall fulfill the necessary requirements / obligations which will inter-alia include the following:
  - a. Adequate fire-fighting equipment and extinguishing agents of sufficient capacity and quantity must always be available at site and kept ready for immediate use.
  - b. Sufficient number of workmen must be fully trained in the use of such equipment and must be available for immediate intervention at all times.
  - c. For storage of materials and equipment for the construction and erection work, storage must be subdivided into storage units and the distance between such storage units shall be as acceptable to the Insurance Company. All inflammable materials and especially all inflammable liquids and gases must be stored at a sufficient large distance from the property under construction or erection and from any hot work.
  - d. Welding, soldering or the use of an open flame in the vicinity of combustible material is only permitted if at least one workman suitably equipped with extinguishers and well trained in fire-fighting is present. At the beginning of preliminary acceptance test & pre-commissioning of Plant & Equipment all fire-fighting facilities must be rechecked thoroughly.
  - e. Observation of all safety rules and regulations.
- xiv) The Contractor shall arrange Accident Insurance Policy for all his personnel including Experts / Specialists / Personnel deputed to site and Contractor's / his sub-contractors' manufacturing works as well as for his engineers & supervisory staff. The Contractor shall also take out for his workmen a separate policy as per Workmen's Compensation Act.



- xv) The details of consignment along with its value and vessel's name and other shipping particulars shall be intimated to NLCIL by the Contractor by cable / E-mail immediately after shipment of the consignment.
- xvi) The Contractor shall intimate by E-mail / Fax to the Underwriter in giving the above particulars immediately after dispatch with a copy to NLCIL.
- xvii) In all Cases, the Contractor shall lodge the claims with the Underwriters and also settle the claims. However, the Contractor shall proceed with the repairs and / or replacement of the equipment / components without waiting for the settlement of the claims. In case of seizure of materials by concerned authorities, the Contractor shall arrange prompt release against bond, security or cash as required. NLCIL will extend all assistance to the Contractor in such a case.
- xviii) All the insurance claims shall be processed by the Contractor and the items which are missing / damaged in transit or during handling, storage, erection and commissioning, shall be replaced / repaired by them without any extra cost to NLCIL and without affecting the time for completion.
- xix) Before commencing the execution of the work the contractor (but without limiting his obligations and responsibility) shall, insure against any damages loss or injury which may occur to any property (including that of NLCIL) or to any person (including any employee of NLCIL) by or arising out of the execution of the works of temporary works or in the carrying out of the contract otherwise than due to the matters referred to in the provisions of Clause 10.2.3 thereof.

### 10.3 **Packing, Forwarding and Shipment**

- i) The Contractor wherever applicable after proper painting, pack and crate all equipments in such a manner to protect them from deterioration, damage, pilferage etc., during transportation to Site. The Contractor shall be held responsible for any damage caused due to improper packing.
- ii) The Contractor shall notify the Purchaser about the date of each shipment from his works and expected date of arrival at site furnishing the weight, dimensions and contents of each packing.
- iii) The Contractor shall be responsible for making necessary loading, unloading and handling arrangements from port / his Works to site.

### 10.4 **Marking**

- i) The equipment shall be packed suitably for marine transport /inland transport as the case may be. The packages shipped by the foreign supplier shall be addressed to the General Manager / Contracts, Corporate office, NLC India Limited, Neyveli-607 801, Tamil Nadu, India.
- ii) The Indian suppliers shall address the packages to the General Manager/PBD, NLC India Limited, Neyveli- 607 801, Tamilnadu, India.
- iii) In case of packaging and grating the under noted markings shall be stencilled , or otherwise conspicuously marked on to opposite sides - case No, Gross Wt./ Nett Wt., Order No. and Date.
- iv) The contractor shall keep in each case the packing list fully item wised to show case No., content, Gross Wt./ NettWt., Machinery, Contract/ Supply Order No. and date.

- v) The packages shall have to be marked as stipulated in the Contract / Supply Order.

## 10.5 Transport

### 10.5.1 Ocean Transportation - Imports

- i) The Contractor shall inform the Purchaser about the programme of despatches as contemplated by the Contractor to enable the Purchaser to have an effective follow up. Part shipment is permitted. Transshipment is prohibited.
- ii) The Contractor shall furnish a list of items with value of goods imported through Ports in India and furnish detailed information.
- iii) The terms of the contract shall be on FOB / CIF basis. The Contractor shall make shipping arrangements on behalf of the Purchaser upto destination port (Port Blair at Andaman). The Contractor shall give notice about readiness of cargo for shipment to the Purchaser. While giving such notice of readiness of shipment, the Contractor shall furnish the following to the Purchaser.
  - a. Contract No.
  - b. Brief description of material to be shipped.
  - c. Gross weight.
  - d. Net weight.
  - e. Dimensions of the Packages to be shipped.
  - f. Number of Packages.
  - g. Import Licence No., if any and L/C particulars.
- iv) If situation warrants, the contractor can arrange air freight with prior approval of the Purchaser. In such case the increase in freight and customs duties thereof shall be to the account of Contractor.
- v) All shipments will be done through approved vessels as per the 'Institute of London Classification Clause' of the Institute of London Underwriters as given below.

#### **Institute Classification Clause**

The Marine Transit rates agreed for this insurance apply only to cargoes and/or interests carried by mechanical self-propelled vessels of steel construction, classed as below by one of the following classification societies.

Lloyds Register -- 100A1 or B.S.\*

American Bureau of shipping -- \*A1 R

Bureau veritas -- 13/3E \*V

Germanischer Lloyd--\* 100 A<sup>4</sup>G

Korean Register of shipping -- \*KR S1J

Nippon KaijiKyokai-- NS\*N

Norske verites -- 1A1 N

Registro Italiano -- \*100A 1.1 Nau. L

Register of shipping of the USSR -- KM \*S

Polish Register of shipping --\*KM P

Provided such vessels are:

- i) Over 15 years of age but not over 25 years of age and have established and maintained a regular pattern of trading on an advertised schedule to load and unload at specified ports.
- ii) Chartered vessels and also vessels under 1000 GRT which are mechanically self propelled and of steel construction must be classed as above and not over 15 years of age. And for the Chartered vessels of 15 years of age the Contractor shall produce a certificate as follows:  
 "The shipment by sea-worthy vessels classed 100 A1 Lloyds or equivalent classification society and approved by General Insurance Company of India".  
 If the suppliers do not adhere to the above condition and if the insurers charge extra premium due to overage or non-classification of vessels, the suppliers may have to be held liable to pay the extra premium incurred.
- iii) The bills of lading should be drawn so as to show:

SHIPPERS CONSIGNEE	The NLC India Limited GENERAL MANAGER / CONTRACTS NLC INDIA LTD., NEYVELI-607 801, TAMIL NADU, INDIA
-----------------------	--

PORT CONSIGNEE ADDRESS OF CONTRACTOR /  
 CLEARING AGENT OF CONTRACTOR  
 IMPORTER/ GENERAL MANAGER/ CONTRACTS  
 NOTIFY PARTY NLC INDIA LTD.,  
 NEYVELI-607801, TAMIL NADU, INDIA

- iv) The Contractor shall send the following shipping documents With the Cargo - Quality certificate (one copy) Packing list (6) copies comprises 2 copies in case No.1 of each consignment of the goods and 4 copies in each case (three inside the Box and one copy in a special packet at the outer side of the Box).
- v) Whereas shipments are effected by FCL containers at the request of the consignee/agent/shipper the number of free days time granted shall be 10 days (Excluding Holidays).

#### 10.5.2 **Inland Transport**

- i) All Ex. works supplies with in India shall be handled and transported including inter-carting, storage at any intermediate point from the shops of the manufacturers' works to site/ stores through accredited/registered, reliable dependable transport carriers.
- ii) The Contractor shall assume complete, full and total responsibility for inland transport of these items and charges thereof shall be indicated separately as a fixed lump sum in the schedule of prices.
- iii) The Contractor shall thoroughly study the transportation routes and available transportation facilities and the Contractor shall take full responsibility for transport of all supplies.
- iv) For FOB items i.e., items imported, the inland transport from ports in India to project site shall be the scope of the Contractor.

### 10.5.3 **Demurrage and Wharfage**

- i) The Purchaser shall not be responsible for any demurrage penalties etc. that may be incurred due to reasons attributable to the Contractor for delayed sending of despatch /shipping documents, Bill of Lading, domestic invoices.
- ii) The Purchaser shall not be responsible for any detention enroute of any consignment arranged through any mode of transport and shall not also bear any charges thereon. It shall be the responsibility of the Contractor to make expeditious alternative arrangement, ensuring safety to the consignment in the event of any such detention and the Contractor shall bear the complete charges thereon.

## 10.6 **Licences**

### 10.6.1 **Import Licence**

For any portion of the supplies to be imported by the Contractor for incorporation in manufacture of the equipment, the Contractor shall arrange the necessary import including arrangements of licenses and Foreign Exchanges as may be required, on his own.

### 10.6.2 **Export Licence**

In case of foreign Contractor, he shall obtain and maintain the necessary Export licence from the competent authorities and shall pay at his cost any fee connected therewith. Failure to obtain and maintain export Licences shall not be considered as Force Majeure. In case the Contractor fails to obtain or maintain the Licences, or if the licences are withdrawn, he shall restore them within two months from the date of cancellation/withdrawal. However, the delay due to restore of Licence is attributable to the Contractor, the Purchaser has the right to cancel the Contract and the Contractor shall forthwith return the Purchaser all the amounts paid by the Purchaser to the Contractor.

## 10.7 **RESPONSIBILITY FOR PERFORMANCE OF CONTRACT**

The Contractor shall be responsible for the due and faithful performance of the Contract in all respects according to the drawings, specifications and all other documents referred to in this Contract. Any approval which the Purchaser/ Consultant may have given in respect of the materials, supplies or other particulars and the work or the workmanship involved in the Contract (whether with or without test carried out by the Contractor or the Purchaser) shall not relieve the Contractor from his obligations and notwithstanding any approval or acceptance given by the Purchaser/ Consultant, it shall be lawful for the Purchaser to reject the material on arrival at site, if it is found that the materials supplied and/or erection and/or construction work carried out by the Contractor are not in conformity with the terms and conditions of the Contract in all respects.

## 10.8 **COMPLETENESS OF WORK**

The Contractor shall expressly undertake full responsibility for the quality of supplies, timely deliveries as per the stipulated schedule of deliveries the faultless operation of the equipment, the warranty for the design of the equipment and manufacture of the complete equipment, including the Indian portion of supplies free of any defects and faults.

In the event of replacements becoming necessary on account of short deliveries and wrong supplies on account of short landing, loss/ damages during transit, storage, erection and commissioning the Contractor shall take special steps to make such replacements free of cost for timely commissioning of the equipment. The charges towards, freight, insurance, port handling clearance customs duty and all other incidentals including transport to site in respect of such replacements will be to the account of the Contractor. The Contractor shall take special steps to arrange for most expeditious manufacture and supply of these items to enable timely commissioning of the equipment.

Equipment furnished shall be complete in every respect with all mountings, fittings, fixtures and standard accessories normally provided with such equipment, and/or needed for erection, completion and safe operation of the equipment. They may not have been specifically detailed in the respective specifications, unless included in the list of exclusions. All similar standard components/parts of similar standard equipment provided, shall be interchangeable with one another. The Contractor shall not be eligible for any extra payment in respect of such mounting, fixtures and accessories.

#### 10.9 **TYPE, QUALITY OF MATERIALS AND WORKMANSHIP:**

- i) The Contractor shall be deemed to have carefully examined and to have knowledge of the equipment, the general and other conditions, specifications, schedules, drawings, etc. forming part of the Contract and also to have satisfied himself as to the nature and character of the work to be executed and the type of the equipment and duties required including wherever necessary of the site conditions and relevant matters and details. Any information thus procured or otherwise obtained from Purchaser/ Consultants shall not in any way relieve the Contractor from his responsibility and contractual obligations for designing, manufacturing and supplying the Plant and Equipment at site and executing the work in terms of the Contract. If the Contractor shall have any doubt as to the meaning of any portion of the Contract, he shall before signing it set forth the particulars thereof and submit to Purchaser in writing in order that such doubt may be removed.
- ii) The Equipment under scope of supply shall be of the best quality and workmanship according to the latest engineering practice and shall be manufactured from materials of best quality considering strength and durability for their best performance. All material shall be new. Substitution of specified material or variation from the method of fabrication may be permitted with the prior written approval of the Purchaser.
- iii) The Contractor shall procure and/or fabricate all materials and equipment in accordance with all requirements of Central and State enactments, rules and regulations governing such work in India and at site. This shall not be construed as relieving the Contractor from complying with any requirement of Purchaser as enumerated in the Contract Specifications which may be more rigid than and not contrary to the above mentioned rules, nor providing such construction as may be required by the above mentioned rules and regulations. In case of variance of the Contract Specification from the laws, ordinance, rules and regulations governing the work, the Contractor shall immediately notify the same to the Purchaser. It is the sole responsibility of the Contractor, however, to determine that such variance exists. Wherever required by rules and regulations, the Contractor shall also obtain the Statutory Authorities' approval for the plant, machinery and equipment to be supplied by the Contractor.

- iv) Codes and standards referred in Contract documents shall be followed. Codes and standards of other countries can be followed with the prior written approval of Purchaser, provided materials, supplies & equipment according to the standard are equal to or better than the corresponding standards specified in the Contract.
- v) All meters, gauges, recorders and other types of indicating, integrating or recording devices shall be calibrated in metric system and degree celsius. Where vernier attachments are related, English system gearing must be changed to produce result on a true decimal (metric basis). Functional and instruction plate shall be in English language.
- vi) Brand names mentioned in the Contract documents are for the purpose of establishing the type and quality of products to be used. The Contractor shall not change the brand name and qualities of the bought-out-items without the prior written approval of the Purchaser. All such products and equipment shall be used or installed in strict accordance with original manufacturer's recommendations, unless otherwise directed by the Purchaser.

#### **10.10 ENGAGEMENT OF CONSULTANT**

The Purchaser has the option to engage a consultant to follow up the progress, inspect and examine the work during design, manufacture, supply, erection, functional tests and safety checks, take over test and output guarantee tests or for any other purpose in connection with the supply and services covered by this Contract. The Contractor shall properly coordinate with the consultant in the execution of the contract.

#### **10.11 DRAWINGS AND DOCUMENTS**

The Contractor shall supply all drawings and documents to the Purchaser / Consultants as per technical specification.

#### **10.12 DISCREPANCIES, ERROR AND OMISSION**

- i) The Contractor shall be responsible for and shall pay for any alterations of the works due to any discrepancies, errors or omissions in the drawings, documents or other particulars supplied by him, whether such drawings or particulars have been approved by the Purchaser or not, provided that such discrepancies, errors or omissions be not due to inaccurate information or particulars furnished to the Contractor by the Purchaser. If any dimensions figured upon a drawing or plan differ from those obtained by scaling the drawing or plan, the dimensions as figured upon the drawing or plan, shall be taken as correct.
- ii) The Contractor shall take all corrective measures arising out of discrepancies, errors and omissions in drawings and other information within the time schedule and without extra cost to the Purchaser.
- iii) The Contractor shall also be responsible for any delay and/or extra cost if any, in carrying out engineering and site works by other agencies arising out of discrepancies, errors and omissions as well as of any late revision/s of drawings and information submitted by the Contractor.

### 10.13 SUB- CONTRACT

- i) The Contractor shall not sub-contract the Contract Work in whole to third parties for the performance of this Contract.
- ii) The Contractor may propose a panel of Sub- Contractors as stipulated in the Technical specification for the part of scope of works. The Contractor shall thereafter select any sub-Contractor out of this panel subject to the approval of the Purchaser. Any such assignment shall not relieve the Contractor from any obligation, duty or responsibility under the contract. Any assignment as above without the prior concurrence of the Purchaser shall be void.
- iii) The Contractor shall be responsible for transmitting all the pertinent data of all Contract terms and conditions with his Sub-Contractors. The Contractor shall also furnish the specification, place of manufacture, delivery schedule and adequate, unpriced copies of supply orders/contract he has entered into in respect of imported items and adequate copies of un-priced supply order/contract in the case of indigenous items.
- iv) The Purchaser shall give approval for Sub- contractor or shall refuse approval in writing within 15 days of receipt of request along with all supporting details.
- v) Bought-out items, critical components, proprietary items and equipment manufactured and supplied by specialised manufacturers which the Contractor intends to incorporate in the Contract Work shall also be subject to the written approval of Purchaser
- vi) The approval extended by the Purchaser in selecting Sub-Contractors recommended by the Contractor shall not discharge/relieve the later from his Contract obligations. The Contractor shall remain solely liable for any action, deficiency, and/or negligence on the part of his Sub-Contractors/sub-suppliers.
- vii) In the event certain obligations extended by a Sub-Contractor to the Contractor should extend beyond the guarantee period specified in the Contract, the Purchaser shall automatically be entitled to the benefit thereof.
- viii) In no event shall the Purchaser be deemed to have any Contractual obligations whatsoever in respect of Contractor's/ Sub-Contractors and/or title-holders of any sub-orders placed by the Contractor.

### 10.14 INSPECTION AND TESTS AT CONTRACTOR'S/MANUFACTURER'S PREMISES

10.14.1 The Purchaser or his authorised agent / Consultant shall have the right of inspecting and testing the contract work or any part thereof at any stage during the manufacture and the Contractor on demand from the Purchaser shall carry out such tests in appropriate manner in the presence and free of charge to Purchaser. Should the Contractor himself not be in a position to carry out the tests, he shall, on the Purchaser's demand prepare specimen and samples and send them at his own cost to such testing stations as the Purchaser may specify and the cost of the test so effected shall be to the Contractor's account. However, cost pertaining to the Purchaser's inspection personnel shall be borne by the Purchaser.

10.14.2 The inspection, examination or testing carried out by the Purchaser shall not relieve the Contractor from any of his obligations under this Contract. The inspection procedure will be discussed and finalised.

- 10.14.3 The Contractor shall bear all costs of any and all inspections and tests. Where special tests in addition to agreed tests are required by the Purchaser, the Contractor shall bear the cost of the testing provided the Contractor is convinced that within this/these special test(s) the quality of the equipment in accordance with the specification can not be proved. If such special tests are necessary based on the results of the agreed test, then cost of all such special tests shall be to the account of the Contractor in all cases.
- 10.14.4 The Purchaser upon giving 7 days notice in writing and stating any grounds of objection, shall have the right to reject any or all equipment or demand rectification or replacement thereof.
- 10.14.5 The Contractor shall give the Purchaser a minimum of 21 days clear notice of any work being ready for inspection and tests specifying the period likely to be required for such inspection and tests. Thereafter, the Purchaser or his inspector shall, unless inspection or test is voluntarily waived, attend at the contractor's or his sub-contractor's premises, such inspection and tests within 7 days of the date on which the equipment is notified as being ready for inspection and test. Should the Purchaser fail to attend such inspection and test, the Contractor may proceed with the inspection and test at his option and shall forthwith forward to the Purchaser copies of inspection/test certificates for acceptance by the Purchaser. The proforma and number of copies for inspection/test certificates shall be mutually agreed. However, if the Purchaser requests the Contractor for a revised date of inspection but within 15 days of the date of inspection as communicated by the Contractor, the Contractor shall arrange the inspection on the revised date as requested by the Purchaser.
- 10.14.6 Necessary facilities shall be provided by the Contractor to the Purchaser and their Consultants to carry out the inspection. The facilities to be provided shall not include travel expenses, boarding and lodging.
- 10.14.7 If during the design stage the Purchaser desires that any modifications are necessary, the Purchaser shall refer the same to the Contractor and if the Contractor also agrees that such modifications are necessary, the Contractor shall carry out the same without any extra cost to the Purchaser. Such modifications which are agreed to shall be recorded and signed by both the Contractor and the Purchaser.
- 10.14.8 If the tests were not witnessed by the Purchaser or his representative, the Contractor can arrange despatch along with the certificate as stated in 10.14.5 with the clear understanding that if the Purchaser reject such equipment at a later date, the contractor shall rectify the same at his own cost to the Purchaser's satisfaction. No equipment shall be shipped or left or otherwise despatched before such certificate has been issued. The satisfactory completion of these inspection and tests or the issue of the certificate shall not bind the Purchaser to accept the work, should it on further tests during or after erection be found not to comply with the Contract.
- 10.14.9 In case any equipment fails in inspection/tests, re-inspection/retest shall be carried out only after necessary rectification work/replacement by the Contractor.
- 10.14.10 In the case of mandatory spares the same shall be offered for inspection along with the main equipment or after the main equipment has been satisfactorily inspected and tested.
- 10.14.11 In the case of such equipment, structurals etc. where tests set forth above cannot be conducted either partially or fully in Contractor's/ Sub- Contractor's premises but have to be conducted at site only after erection, the provisions under this schedule shall also apply. However, in such cases prior approval of the Purchaser shall be obtained by the Contractor prior to despatch.



## 10.15 **STATUTORY AND OTHER REGULATIONS**

- 10.15.1 The Contractor shall comply with all the statutory obligations of Government of India/State Government applicable at project site and the Purchaser shall not be liable for any action of the statutes applicable due to non-fulfillment of statutory obligations by the Contractor.
- 10.15.2 The Contractor shall give all notices and conform in all respects with the provisions and pay all fees required to be given or paid under any Central or State statute, ordinance or other law or any regulation or by-law of any local or other duly constituted authority in relation to the execution of the Contract Work. The Contractor shall keep the Purchaser indemnified against all penalties and liabilities of every kind for breach of any such statute, ordinance, law, rule, regulation or by-law.

## 10.16 **SECURITY TITLES**

- 10.16.1 All maps, plans, drawings, specifications, schemes and the subject matter contained therein and all other information given to the CONTRACTOR by the Owner in connection with the performance of the Contract Work shall be held confidential by the CONTRACTOR and shall remain the property of the Owner and shall not be used or disclosed to third parties by the CONTRACTOR for any purpose other than for which they have been supplied or prepared. The CONTRACTOR may disclose to third parties, upon execution of secrecy agreements satisfactory to the Owner, such part of the drawings, specifications or information if such disclosure is necessary for the performance of the Work Contract.
- 10.16.2 Maps, layouts and photographs of the work or any part thereof including its surrounding regions showing vital installation for national security of Owners country shall not be published or disclosed to the third parties or taken out of the country without prior written approval of the Owner and upon execution of secrecy agreements satisfactory to the Owner with such third parties prior to disclosure.
- 10.16.3 The provisions of para 10.16.1 & 10.16.2 shall not apply to information:
- i) Which at the time of disclosure are in the public domain- or which later on become part of public domain through no fault of the party concerned.
  - ii) Which were in the possession of the party concerned prior to disclosure to him by the other party, or
  - iii) Which were received by the party concerned after the time of disclosure without restriction on disclosure or use from a third party who did not acquire such information directly or indirectly from the other party.

## 10.17 **REJECTION OF DEFECTIVE WORKS OR OTHER INSTALLATION**

- 10.17.1 If the Contract work or any portion thereof, before it is accepted or taken over, be defective or fails to fulfill the requirements of the Contract, the Owner shall give the CONTRACTOR notice setting forth particulars of such defects or failure and the CONTRACTOR shall forthwith make good the defects or alter the same to make it comply with the requirements of the Contract. Should he fail to do so within a reasonable time the Owner may reject and replace at the risk and cost of the CONTRACTOR the whole or any portion of the work as the case may be, which is defective or fails to fulfill the requirements of the Contract. However, such rejection/replacement by the Owner shall not absolve the CONTRACTOR of his responsibilities under this Contract.

- 10.17.2 Any materials, equipment, etc. brought to site and found to be not in accordance with the contract, shall be rejected by the Owner and the CONTRACTOR shall remove the materials from site within the period specified by the Owner. Should the CONTRACTOR fail to do, the Owner may remove the same at the risk and cost of the CONTRACTOR.
- 10.17.3 In the event of such rejection, the Owner shall be entitled to the use of the work in a reasonable and proper manner for a time reasonably sufficient to enable him to get the replacement.
- 10.17.4 The CONTRACTOR shall not be entitled to any extension of time or extra cost for rejection as per 10.17.1 and 10.17.2 above.

#### 10.18 **NEGLIGENCE**

- 10.18.1 If the CONTRACTOR shall neglect to execute the work with due diligence or expedition or shall refuse or neglect to comply with any reasonable order given to him in writing by the Owner in connection with the work or shall contravene the provisions of Contract, the Owner may give notice in writing to the CONTRACTOR calling upon him to make good the failure, neglect or contravention complained of within such time as may be deemed reasonable and in default of this compliance with the said notice, the Owner without prejudice to his rights under clause 10.18.2 hereto, may rescind or cancel the Contract as provided in Cl.10.36 holding the CONTRACTOR liable for the damages that the Owner may sustaining this behalf. The making good of the failure, neglect or contravention hereunder will be governed by clause 10.17.1. In addition the Contractor shall refund all the amounts paid to him by the Purchaser for all such work which may become in fructuous due to such cancellation.
- 10.18.2 Should the CONTRACTOR fail to comply with such notice within a reasonable period from the date of serving the Notice thereof in the case of failure, neglect or contravention capable of being made good within that time or otherwise within such time as may be reasonably necessary for the same making good then and in such case without prejudice to the Owner's right under clause 10.18.1 hereto the Owner shall have at his option the right to take the work wholly or in part out of the CONTRACTOR's hands and may complete the work envisaged in the contract either departmentally or by awarding a fresh Contract at a reasonable price with any other persons to execute the same or any part thereof and provide other materials, tools, tackle or labour for the purpose of completing the work or any part thereof
- 10.18.3 In such event the Owner shall, without being responsible to the CONTRACTOR for fair wear and tear of the same, be entitled to seize and take possession and have free use of all materials, tools, tackle or other things which may be on the site for use at any time in connection with the work to the exclusion of any right of the CONTRACTOR over the same and the Owner shall be entitled to retain and apply and balance sum which may otherwise be then due on the Contract by him to the CONTRACTOR or such part thereof as may be necessary to the payment of the cost of execution of such work as aforesaid
- 10.18.4 If the cost of executing the work as aforesaid shall exceed the balance due to the CONTRACTOR and the CONTRACTOR fails to make good the deficit the said materials, "tools, tackle, construction plant or other things, the property of the CONTRACTOR as may not have been used up in the completion of the works, may be sold by the Owner and the proceeds applied towards the payment of such difference and the cost of and incidental to such sale, any outstanding balance

existing after crediting the proceeds of such sale be paid by the CONTRACTOR on the certificate of the Owner, but when all expenses, cost and charges incurred in the completion of the work are paid by the CONTRACTOR, all such materials, tools, tackle, construction plant or other things not used in the completion of the works and remaining unsold shall be removed by the CONTRACTOR.

10.19 **Indemnity Bond**

For the equipment handed over to Contractor, for performing the work under this contract, Contractor shall execute a custody and indemnity bond in favour of Purchaser as per Appendix-E. The endorsement and handing over of despatch documents by purchaser to Contractor shall be construed as having handed over and entrusted to the Contractor all the equipments covered in such despatch documents.

10.19.1 The Contractor shall hold the equipments handed over to him by Purchaser, as trustee on behalf of the Purchaser without having any lien or charge against the equipment at any stage. For any loss or damage to the equipment and material till these are finally taken over by Purchaser, the Contractor shall immediately replace/repair the loss or damaged equipment entirely at his cost irrespective of the extent and/or time of realisation of claims by him from the insurer/underwriters.

10.19.2 The title of ownership and property to all goods materials equipment etc. originating in India shall pass to the purchaser as per the terms and conditions of this contract after the Contractor has effected the despatch of the same to Project site and the Contractor has prepared necessary documentation for handing over the same to NLCIL's authorised representative provided however, such passing of titles of ownership and property to the Purchaser shall not in any way absolved, dilute or diminish the responsibility and obligations of the Contractor under this Contract including loss or damage and all risks which shall vest with the Contractor till the successful commissioning and final Take over as per the Contract.

10.20 **Indemnity**

10.20.1 The Contractor shall at all times indemnify and keep indemnified the Purchaser against all claims which may be made against the Purchaser in respect of any infringement of any rights protected by patent registration of design of trade mark. In this connection, the Purchaser shall pass on all claims made against him to the Contractor for settlement.

10.20.2 The Contractor assumes responsibility for and shall indemnify and save harmless the Purchaser from all liability, claims, costs, expenses, taxes and assessments including penalties, punitive damages, attorney's fees and court costs which are or may be required to be paid by the Purchaser arising from any breach of the Contractor's obligations under the Contract or for which the Contractor has assumed responsibilities under the Contract including those imposed under any Contract local or national law or laws, or in respect to all salaries, wages or other compensation or all persons employed by the Contractor or his Associate(s)/Sub-Contractors or suppliers in connection with the performance of any work covered by the Contract. The Contractor shall execute, deliver and shall cause his Sub- Contractor and suppliers to execute and deliver, such other further instruments and to comply with all the requirements of such laws and regulation as may be necessary there under to conform and effectuate the Contract and to protect the Purchaser.

## 10.21 **INDEMINITY BOND FOR O&M**

- i) The successful bidder shall execute indemnity bond against loss or damage of the Solar PV Power Plant with all associated materials/equipments after 12 (Twelve) months of provisional take over and before the expiry of warranty period for an amount equivalent to the project cost which is valid till the expiry of the O&M period (10) Ten years. The Indemnity Bond has to be executed by the successful Bidder in the manner specified by Purchaser.
- ii) The said contractor hereby agreed to maintain the Solar PV Power Plant as per conditions of O&M agreement and his possession in trust for the Purchaser as their property until such time the O&M period is completed and the plant is handed over back to the authorised representatives of the Purchaser as per the terms of the Agreement.
- iii) The said contractor further agree to hold the Purchaser harm less and free from all liabilities for all losses, damages, etc., arising from any cause, whatsoever to the material while in his possession, and further under takes to indemnify and reimburse the Purchaser to the extent of loss or damage caused to the materials or any loss or any claims to the Purchaser in respect of the said material during O&M period.

## 10.22 **ACCEPTANCE OF THE SYSTEM**

### 10.22.1 **Mechanical Completion**

1. On completion of erection of all the materials / items of equipment covered under the scope of the Contract, a joint inspection shall be carried out by the Purchaser and the Contractor to verify physically that all materials /items / equipment have been placed and erected properly and the system is ready for commissioning. A defects list shall be prepared jointly.
2. On liquidation of the defects (except minor defects which shall be mutually discussed and agreed between the Purchaser and Contractor and which shall not affect the commissioning of the system), Mechanical Completion Certificates shall be issued by the Purchaser.

### 10.22.2 **Commissioning & PG Testing**

1. Commissioning shall include testing of individual sub systems till the successful completion of commissioning of the entire Solar PV Power plant along with power evacuation system and exporting power to the grid.
2. Commissioning shall include all activities after mechanical completion up to commencement of power export and shall include mechanical and electrical checkouts, calibration of instruments and protection devices, commissioning of sub/supporting system and charging the Plant/System/Equipment after getting statutory clearance(s), safety certificate etc., by the contractor from State/ Central Government authorities covered under the Contract.
3. Commissioning shall include all activities after completion of testing and shall be the integral operation of the complete System / Equipment covered under the Contract which shall include no-load / partial load / full load runs for mechanical/electrical try-out and gathering of operational data, calibration setting and commissioning of control systems and shut-down inspection and adjustment after running trial of the System / Equipment covered under the Contract.

After completion of the commissioning, the Contractor has to intimate the Purchaser in writing regarding the readiness of the system for PG Testing. However, Contractor has to furnish sufficient records/documents to satisfy the Purchaser that all the equipment including services, metering and instrumentations are tested and ready for PG testing.

Before the commissioning of the plant, the power evacuation system along with the billing and metering with grid tie up shall be on operation. During the commissioning, the Contractor shall be allowed to make minor adjustments as may be necessary, provided that such adjustments do not interfere with or prevent the operation of the plant.

During PG testing period, the contractor shall post sufficient number of qualified personnel. The onus of proving that any failure is not due to faulty design, materials and workmanship shall lie with the Contractor.

4. A commissioning report comprising observations and recordings of various parameters measured in respect of the 'reliability operation' shall be prepared and submitted to the Purchaser. This report, besides recording the details of various observations during operation shall also include the dates of start and finish of the operation and shall be signed by the representatives of both the parties. The report shall have recordings of all details of interruptions that occurred, adjustments made and any repairs done during the commissioning. The commissioning shall be considered successful, provided that each item of plant can meet the specified requirements.
5. On successful completion of commissioning, the Solar PV Power Plant along with Power Evacuation system shall be Provisionally Taken over with a list of major and minor defects and non conformities prepared jointly by the Purchaser and the Contractor. Differentiation of defects as major and minor shall be jointly discussed and agreed by the Purchaser and Contractor and recorded. Upon the completion of commissioning, as soon as practicable, or at such time as may be otherwise agreed to by the parties concerned, the Contractor Shall notify in writing to the Purchaser /Consultant that the plant is ready for Performance Guarantee Test only after liquidating all the major defects.
6. Readiness for "Performance Guarantee Test" shall be intimated to the Purchaser in writing at least 15 days before commencement of "Performance Guarantee Test". However, Contractor shall be allowed to conduct "Performance Guarantee Test" only after liquidating all the major defects.
7. The Performance Guarantee Test shall be conducted at site for the entire system by the Contractor. The Contractor shall make the plant ready for such test and carry out all operation and maintenance activities during the test. The test shall be commenced after the 'Plant / Equipment' has attained stable operation The date of commencement of the Performance Guarantee Test shall be after attending all the pending works if any and major/minor defects or as may be mutually agreed upon between the Contractor and Purchaser. The defects / non-completion of work which will directly affect the power generation, performance / safety of the equipment, safety of the personnel will be included under major defect / major work and the other will be included in the minor defect / minor work. The tests shall be binding on both the parties of the 'Contract' to determine compliance of the 'Plant' / 'Equipment' with the performance guarantee. The purpose of the Performance Guarantee Test is not only to check whether the plant meets the guaranteed generation but also provide a stable operation of the whole plant and exporting power to the grid

which shall serve as reference to evaluate the plant performance in future over the plant life.

8. In case of delay in conducting the Performance Guarantee Test due to reasons attributable to the Contractor, ageing factor shall not be considered during "Performance Guarantee Test". However, the contractor has to commence the performance guarantee test within one year from the date of completion of commissioning, failing which, it shall be construed that the guaranteed generation has not been met and liquidated damages for shortfall in generation shall apply in full subject to the condition that delay in carrying out performance guarantee test is attributable to the contractor. However, the purchaser shall retain the option to reject the equipment, if necessary. Results of the Performance Guarantee Test shall be submitted within 15 days of completion of Performance Guarantee Test to the Purchaser for review and approval. The approval shall be given within 30 days of submission of results.
9. The Performance Guarantee Test procedure, including the definition of the calculation method to be used, the instrumentation to be installed and indicated in the schemes, the instrument accuracy classes, and calibration of instruments during the test period, the areas of responsibility and the items which specifically require preparation and agreement shall be submitted by the Contractor for review and approval by the Purchaser /Consultant during detail engineering phase. Schematics identifying the guarantee test instrumentation shall be submitted along with procedure. It shall be ensured that necessary test points are indicated in the schemes during the detail engineering phase and also identified in the instrumentation and metering drawings. Contractor shall furnish detail program during detail engineering stage.
10. The Performance Guarantee Test instruments shall be of precision type with instrument accuracy limits as required and defined in the Technical specification. The Performance Guarantee Test shall be carried out as per test procedures and codes agreed in the Technical specification of performance guarantees.
11. All test instrumentation for the Performance Guarantee Tests as required shall be supplied by the Contractor. Data loggers shall be used for performance test. All costs associated with the supply, calibration, installation of the test instrumentation / data loggers / computers etc. are deemed to have been included in the contract price. The test shall be in accordance with those specified in the Technical specification.
12. Any special equipment, tools and tackles required for successful completion of the Performance Guarantee Test shall be provided by the Contractor.
13. It is the Contractor's responsibility to co-ordinate for suitably carrying out the Performance Guarantee Test.
14. The plant parameters during the Performance Guarantee Test shall be adjusted as far as practicable to the guaranteed Performance Guarantee Test conditions. The test shall be conducted to prove guaranteed generation as defined in the Technical specification.
15. The Performance Guarantee Test results shall be reported as computed from the Performance Guarantee Test observations.
16. Within one week after the conclusion of the Performance Guarantee Test the Contractor shall submit a test report to the Purchaser with a copy submitted to the Consultant stating:
  - (a). In the case of a Performance Guarantee Test, whether the Solar PV power plant passed or failed such test, accompanied by sufficient test

data and calculations to demonstrate the level of performance attained with respect to each of the tested parameters.

(b). The reports shall include as a minimum, the following:

- (i). Description of the test procedures
- (ii). Standards that were used
- (iii). Instrumentation details and calibration
- (iv). Full schematic diagrams with indication of instrument test location and identification tag of same.
- (v). Test logs and summary of test readings used for performance calculations
- (vi). Full set of data logger readings
- (vii). Computation of test results.
- (viii). Conclusions of Performance Guarantee Tests : test passed or not

17. Within two weeks of receipt such test report, the Purchaser /Consultant shall either:

- (i). Concur with the information provided in the Contractor's test report, or
- (ii). Disputes some or all of the information provided in the Contractor's test report, the areas being disputed, and the levels of performance being disputed.

18. If the tests could be carried out but are being unduly delayed by the Contractor the Purchaser may, by notice require the Contractor to make the tests within 14 days after the receipt of such notice. The Contractor shall make the tests on such days within that period as the Contractor may fix and of which he shall give notice to the Purchaser.

19. If the Contractor fails to make the tests within 21 (twenty one) days of such notice the Purchaser may himself proceed with the tests. All tests so made by the Purchaser shall be at the risk and cost of the Contractor and the cost thereof shall be deducted from the contract price or charged to the Contractor. The tests shall then be deemed to have been made by the Contractor.

20. If the Purchaser /Consultant and the Contractor disagree on the interpretation of the test results, each shall give a statement of his views to the other within 14 (fourteen) days after such disagreement arises. The statement shall be accompanied by all relevant evidence. If Purchaser disputes any or all of the results contained in the Contractor's test report, representatives of the Contractor, Purchaser and the Consultant shall meet after the receipt of the Purchaser's notice at a mutually acceptable date & location to review and discuss the dispute. Mutual discussions will be held and agreed to determine the interpretation of the test results.

#### 10.22.3 Final Take Over

1. After successful completion of Performance Guarantee Test, the Entire Plant shall be taken over and 10 years (Ten years) O & M period starts from this date of Final Take Over.
2. Till the 'Final Take Over' the Contractor shall carry out O & M of the Entire Plant.
3. Any non-conformity arising in the system and any rectification in the dismantling works till 'Final Take Over' shall be rectified by the Contractor at his own cost Purchaser shall not be held responsible for any such non-conformities arising during this period.
4. In case any stoppages are required for repairing/ replacing the parts of the

system by the Contractor, the same shall be carried out within a reasonable time.

5. Certificate for "Final Take Over" shall be issued by the Purchaser when
  - (a) All supplies and services have been completed as per Contract.
  - (b) The Contractor has met any and all obligations under this Contract.
  - (c) Final balance documentation, if any, incorporating latest modifications in 'as built' drawings has been submitted by the Contractor in requisite copies.
  - (d) The Contractor has rectified in a definite manner all objections / observations mentioned in the "Commissioning Certificate" and 'Final Project Punch List'

## 10.24 **REPLACEMENT OF DEFECTIVE PARTS AND MATERIALS**

- 10.24.1 If during the progress of the supplies / works the Purchaser or the Consultant shall decide and inform in writing to the Contractor that the Contractor has manufactured any plant /machine or part of the plant machine unsound or imperfect or has furnished any plant /machine inferior to the quality specified, the Contractor, on receiving details of such defects or deficiencies shall at his own expense, within 7 days of his receiving the notice, or otherwise, within such time as may be reasonably necessary for making it good proceed to alter, reconstruct or remove such work and furnish fresh equipment upto the standards of the specifications. In case the Contractor fails to do so, the Purchaser may on giving the Contractor 7 days notice in writing of his intentions to do so, proceed to remove the portion of the work so complained of and at the cost of the Contractor, perform all such work or furnish all such equipment provided that nothing in this clause shall be deemed to deprive the Purchaser of or affect any right under the Contract which the Purchaser may otherwise have in respect of such defects and deficiencies.
- 10.24.2 As the 50%/60% of Contract price of the components that were found defective has already been received by the Contractor, the Contractor shall pay interest for the entire amount received for the defective components noticed at the prevailing bank rate for the duration of such rectification/replacement of the defective part i.e., for the period between the date of intimation by the Purchaser about the defective part and the date of effecting the corrected supplies after rectification/replacement to the satisfaction of the Purchaser. This will be in addition to the Liquidated Damages for delay in supplies and/or commissioning envisaged elsewhere in this Contract, if applicable and also the extra expenditure incurred as per Cl.10.24.1
- 10.24.3 The Contractor's full and extreme liability under this clause shall be satisfied by the Payment to the Purchaser of the extra cost, of such replacements procured as provided for in the Contract, such extra costs being the ascertained difference between the price paid by the Purchaser for such replacements and the Contract price portion for such defective plants and repayments of any sum paid by the Purchaser to the Contractor in respect of such defective plant. Should the Purchaser not so replace the defective plant, the Contractor's extreme liability under this clause shall be limited to repayment of all sums paid by the Purchaser under the Contract for such defective Plant.
- 10.24.4 If the material/equipment or any portion thereof is found damaged or not received at site, on verification jointly by the Purchaser and Contractor of the materials received and stored the replacement of such material/equipment shall be effected by the Contractor within a reasonable time to avoid unnecessary delay in the commissioning of the equipment.



10.25 **HINDRANCES**

10.25.1 Events that caused hindrance to proceed and progress with the work shall be recorded daily and signed by the Construction Dept and the Contractor. The Project Coordination Committee shall take these data for settling the issues.  
A record of events shall be maintained by the contractor as under with the Signature of the Contractor and the NLCIL against each case.

**HINDRANCE RECORD REGISTER**

<b>Name of work:</b>				<b>Value of Contract:</b>			
<b>Name of Contractor:</b>				<b>Scheduled date of Completion:</b>			
Sl. No.	Description of Hindrance	Duration	Over lapping Period (if any)	Remedy	Delay by Contractor/ Purchaser	Signature of the	
						Contractor	Purchaser

10.25.2 The details of Hindrance Register along with the relevant factors will be taken into consideration for determining extension of time to the contract /LD.

10.26 **FORCE MAJEURE:**

10.26.1 Definition: “Force Majeure” means any act, circumstance or event or a combination of acts, circumstances and events which wholly or partially prevents or delays the performance of obligations arising under this Agreement if such act, circumstance or event is not reasonably within the control of and not caused by the fault or negligence of the non-performing Party, and provided that such act, circumstance or event is in one or more of the following categories:

- i) Flood, drought, lightning, cyclone, earthquake, Tsunami or geological disturbances, eruption of gases and such like natural occurrences.
- ii) Major explosion, fire and contamination of atmosphere by radio active or hazardous substances. Accidents and disruptions including but not limited to fires, explosions.
- iii) Transportation delay due to force majeure.
- iv) Civil disturbance including riot, terrorism, rebellion, sabotage and communal clashes, war, civil commotion, Acts of God or the public enemy.
- v) Piracy.

- vi) Any law, ordinance or order of the Central or State Government, or any direction of a statutory regulatory authority that prohibits or restricts performance of the obligations hereunder

Provided that a Force Majeure act, circumstance or event shall not include economic hardship, equipment failure/breakdown, or power failure/breakdown, or failure in water supply other than as specifically set forth above.

#### 10.26.2 Burden of Proof

The issue as to whether there is a Force Majeure condition or not and whether extension of time shall be granted or not shall be mutually discussed and agreed upon. However, the decision of NLCIL shall be final. The burden of proof as to whether a Force Majeure act, circumstance or event has occurred shall be upon the Party claiming the occurrence or existence of such Force Majeure act, circumstance or event.

#### 10.26.3 Effect of Force Majeure

If either Party is rendered wholly or partially unable to perform its obligations under this Agreement because of a Force Majeure act, circumstance or event, that Party shall be excused from whatever performance is affected by the Force Majeure act, circumstance or event to the extent so affected, provided that

- (a) Within five (5) Business Days after the occurrence of the inability to perform due to a Force Majeure act, circumstance or event, the non-performing Party provides a written notice to the other Party of the particulars of the occurrence, including an estimation of its expected duration and probable impact on the performance of its obligations hereunder, and continues to furnish periodic reports with respect thereto, every 7 days, during the period of Force Majeure;
- (b) the non-performing Party shall use all reasonable efforts to continue to perform its obligations hereunder and to correct or cure as soon as possible the act, circumstance or event constituting the Force Majeure;
- (c) The suspension of performance shall be of no greater scope and no longer duration than is reasonably necessitated by the Force Majeure act, circumstance or event;
- (d) The non-performing Party shall provide the other Party with prompt notice of the cessation of the Force Majeure act, circumstance or event giving rise to the excuse from performance and shall thereupon resume normal performance of obligations under this Agreement with utmost promptitude;
- (e) The non-performance of any obligation of either Party that was required to be performed prior to the occurrence of a Force Majeure act, circumstance or event shall not be excused as a result of such subsequent Force Majeure act, circumstance or event.
- (f) The occurrence of a Force Majeure act, circumstance or event shall not relieve either Party from its obligations to make any payment hereunder for performance rendered prior to the occurrence of Force Majeure or for partial performance hereunder during periods of Force Majeure;
- (g) The Force Majeure act, circumstance or event shall not relieve either Party from its obligation to comply with Applicable Laws;

- (h) The non-performing Party shall exercise all reasonable efforts, at their own expense, to mitigate or limit damages to the other Party;
- (i) No increase in Contract Price shall be payable due to Force Majeure act, event, etc. However any benefit of price fall shall be passed on to the NLCIL.

## 10.27 DEFENCE OF SUIT

10.27.1 If any action in court is brought against the Purchaser or any officer or agent of the Purchaser for the failure, omission or neglect on the part of the Contractor to perform any acts, matters, covenants or things under the Contract or for damage or injury caused by the alleged omission or negligence on the part of the Contractor, his agents, representatives or his sub-Contractors or in connection with any claim based on lawful demands of sub-Contractors, workmen, suppliers or employees, the Contractor shall in all such cases indemnify and keep the Purchaser and/or his representatives harmless from all losses, damages, expenses or decrees arising out of such action.

10.27.2 The Purchaser shall have full power and right at his discretion to defend or compromise any suit or pay claims or demand brought or made against him as aforesaid whether pending or threatened, as he may consider necessary or desirable and shall be entitled to recover from the Contractor all sums of money including the amount of damages and compensation and all legal costs, charges and expenses in connection with any compromise or award which shall not be called into question by the Contractor and shall be final and binding upon him. If the Purchaser decides not to defend or decides to compromise any suit or pay claim, the Contractor will be kept advised before such action by the Purchaser.

## 10.28 LIMITATIONS OF LIABILITY

10.28.1 Except in case of Criminal Negligence or Willful Misconduct,

i) The Contractor shall not be liable to the Purchaser, whether in Contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production or loss of profits or interest, costs, provided that this exclusion shall not apply to any obligation of the Contractor to pay liquidated damages to the Purchaser

and

ii) The aggregate liability of the Contractor to the Purchaser, whether under the Contract, in tort or otherwise, shall not exceed the total Contract Price, provided that this limitation shall not apply to any obligation of the Contractor to indemnify the Purchaser with respect to Patent infringement’.

## 10.29 SECRECY, TITLES AND RELEASE OF INFORMATION

10.29.1 All maps, plans, drawings, specifications, schemes and the subject matter contained therein and all other information given to the Contractor by the Purchaser in connection with the performance of the Contract Work shall be held confidential by the Contractor and shall remain the property of the Purchaser and shall not be used or disclosed to third parties by the Contractor for any purpose other than for which they have been supplied or prepared. The Contractor may disclose to third parties, upon execution of secrecy agreements, such part of the drawings, Specifications or information if such disclosure is necessary for the performance of the Work.

10.29.2 The Contractor shall not communicate or use in advertising, publicity, sales, releases or in any other medium, photographs or other reproduction of the `Works' under this `Contract' or descriptions of the `Site' dimensions quantity, quality or other information concerning the `works' unless prior written permission has been obtained from the Purchaser.

### 10.30 **ENFORCEMENT OF TERMS**

10.30.1 The failure of either party to enforce at any time any of the provisions of this Contract or any rights in respect thereto or to exercise any option herein provided, shall in no way be construed to be a waiver of such provisions, rights or options or in any way to affect the validity of the Contract. The exercise by either party of any of its rights herein shall not preclude or prejudice either party from exercising the same or any other right it may have hereunder.

10.30.2 The validity of the Contract shall not be affected, should one or more of its stipulations be or become legally invalid and such stipulation is severable from and not fundamental to the obligations of either party to this Contract. In such a case, the parties shall negotiate in good faith to replace the invalid clause by an agreed stipulation which is in accordance with the applicable law and which shall be as close as possible to the parties original intent.

### 10.31 **NO WAIVER OF RIGHTS**

10.31.1 Neither the inspection by the Purchaser or the Consultant or any of their officials, employees, or agents nor any order by the Purchaser or the Consultant for payment of money or any payment for or acceptance of the whole or any part of the `works' by the Purchaser or the Consultant, nor any extension of time, nor any possession taken by the Purchaser shall operate as a waiver of any provision of the `Contract' or of any power herein reserved to the Purchaser or any rights to damages herein provided nor shall any waiver of any breach in the `Contract' be held to be a waiver of any other or subsequent breach.

### 10.32 **POWER TO VARY OR OMIT**

10.32.1 No alterations, amendments, omissions, suspensions or variations of the works (hereinafter referred to as `variation') under the Contract as detailed on the Contract documents shall be made by the Contractor except as directed in writing by the Purchaser but the Purchaser shall have full power subject to the provision hereinafter contained from time to time during the execution of the Contract by notice in writing to instruct the Contractor to make such variation without prejudice to the Contract. The Contractor shall carry out such variation and be bound by the same conditions as far as applicable as though the said variations occurred in the Contract documents. If any suggested variations would, in the opinion of the Contractor, if carried out prevent him from fulfilling any of his obligations or guarantees under the Contract he shall notify the Purchaser thereof in writing and the Purchaser shall decide forthwith whether or not, the same shall be carried out and if the Purchaser confirms his instructions the Contractor's obligations and guarantees shall be modified to such an extent as may be mutually agreed. Any agreed difference in cost occasioned by any such variation shall be added to or deducted from the Contract price as the case may be.

- 10.32.2 In the event of the Purchaser requiring any variation, such reasonable and proper notice shall be given to the Contractor to enable him to work his arrangements accordingly and in cases where goods or materials are already prepared or any design, drawings, or pattern made or work done requires to be altered, a reasonable and agreed sum in respect thereof shall be paid to the Contractor.
- 10.32.3 In any case in which the Contractor has received instruction from the Purchaser as to the requirement of carrying out the altered or additional substituted work which will in the opinion of the Contractor, involve a claim for additional payments, the Contractor shall immediately and in no case later than 30 days after receipt of the instructions advise the Purchaser to that effect. But the Purchaser shall not become liable for the payment of any charges in respect of any such variations, unless the instructions for the performance of the same shall be confirmed in writing by the Purchaser within 30 days of such advice after mutual discussion and agreement.
- 10.32.4 If any variation in the works results in reduction of Contract price the parties shall agree so in writing to the extent of any change in the price before the Contractor proceeds with the change.

### 10.33 **PATENT RIGHTS AND ROYALTIES**

- 10.33.1 Royalties and fees for patents covering materials, articles, apparatus, devices, designs, equipment or processes used in the works shall be deemed to have been included in the Contract Price. The Contractor shall satisfy all demands that may be made at any time for such royalties or fees and he alone shall be liable for any damages or claims for patent infringements and shall keep the Purchaser, indemnified in that regard. The Contractor shall at his own cost and expenses defend all suits or proceedings that may be instituted for alleged infringements of any patent involved in the works and, in case of an award of damages the Contractor shall pay for such award. In the event of any suit or other proceedings instituted against the Purchaser, the same shall be defended at the cost and expenses of the Contractor who shall also satisfy/comply any decree, order or award made against the Purchaser. But, it shall be understood that no such machine, plant, work, material or thing has been used by the Purchaser for any purpose or any manner other than that for which they have been furnished and installed by the Contractor and specified under these specifications. Final payment to the Contractor by the Purchaser will not be made while any such suit or claim remains unsettled. In the event of any apparatus or equipment or any part thereof furnished by the Contractor is in such suit or proceedings held to constitute infringement, and its use is enjoined, the Contractor shall at his option, and at his own expense, either procure for the Purchaser the right to continue the use of the said apparatus/ equipment or part thereof, replace the equipment or modify it so that it does not constitute infringement.
- 10.33.2 The Contractor shall indemnify and keep indemnified the Purchaser, his successors or assigns for and against any and all claims, suits, damages,, losses, actions, demands, costs, charges, royalties and expenses arising from or for infringement.

**Warranty**

1. The Contractor shall guarantee that the equipment shall be new and in accordance with the Contract documents and be free from defects in design, material and workmanship. The warranty period in general shall be 12 (twelve) months from the date of Provisional Take Over. PG test period for one year and Warranty period shall be in concurrence with each other. If the PG test results fail and the test is carried out again, accordingly warranty period shall also get extended accordingly. Warranty period will be getting extended till the acceptance of PG test results. The Contractor's liabilities shall be limited to the replacement of any defective parts in the equipment of his own manufacture or those of his Sub-Contractors, under the normal use and arising from faulty design, materials and/or workmanship. The plant shall be operated as per the operating instructions and all records, log books and other information about the operation shall be kept. Such replaced defective parts shall be taken back by the Contractor. The Contractor shall carry out operation and maintenance of the entire Solar PV Power Plant and Power evacuation system including Civil maintenance, Horticulture maintenance and Security during the warranty period.
2. The Contractor shall carry out all the maintenance works including repairs and /or replacement until acceptance of PG test results to fulfil the warranty obligations. The Contractor shall provide O & M personnel as required to till the completion of warranty period.
3. In the event of any emergency where, in the judgment of the Purchaser or the Consultant, delay would cause serious loss or damage, repairs, replacements or adjustments may be made by the Purchaser or the Consultant or a third party chosen by the Purchaser or the Consultant with advance notice indicating the reasonable time required to the Contractor and the cost of such work shall be paid by the Contractor, or by the Surety. In the event of such action being taken by the Purchaser or the Consultant, the Contractor shall be notified promptly and he shall assist wherever possible in making the necessary corrections. This shall not dilute the Contractor's liability under the terms and conditions of the Contract.
4. If it becomes necessary for the Contractor to replace or renew any defective portions of the plant under this clause, the provisions of this clause shall apply to the portion of the plant so replaced or renewed until the expiry of 12 months from the date of such replacement or renewal. If any defects be not remedied within a reasonable time, the Purchaser or the Consultant may proceed to do the work at the Contractor's risk and costs, but without prejudice to any other rights which the Purchaser may have against the Contractor in respect of such defects.
5. The repaired or new parts shall be furnished and erected free of cost at site by the Contractor. If any repair is carried out on his behalf at the site, the Contractor shall bear the cost of such repair.
6. The cost of any special or general overhaul rendered necessary during the guarantee period due to defects in the plant or defective work carried out by the Contractor shall be borne by the Contractor.

7. The acceptance of the equipment by the Purchaser or the Consultant shall not in any way relieve the Contractor of his obligations under this clause.
8. In case of these defective parts which are not repairable at site but are essential for the commercial use of the equipment, the Contractor and the Purchaser or the Consultant shall mutually agree to a programme of replacement or renewal which shall minimise interruption to the maximum extent, in the operation of the equipment.
9. At the end of the warranty period and on successful completion of PG test, the Contractor's liability ceases except for latent defects.

“**Latent Defect**” means any repeated defect or repeated adjustment in the equipment / system which was not revealed in the normal standard inspection checklist of manufacture, erection and operation, but exhibits as observation or as deviation in operation parameters or as repetitive failure of certain components after Warranty Period and when variations in operating conditions are experienced and ultimately could be solved only by replacement or repair / correction of equipment or parts of equipment.”

For latent defects, the liability period shall be upto 3 (Three years) years after the expiry of the guarantee period. In respect of goods supplied by the Sub-vendors and Sub-Contractors to the Contractor where a longer guarantee (more than 12 months) is provided by such Sub- vendors and Sub-Contractors, the Purchaser shall be entitled to the benefit of such longer guarantee.

The equipment shall be operated as per the Original Equipment Manufacturer’s O&M Manual and standard O & M practices being followed for Solar PV Power Plants and power evacuation systems.

10. All costs on account of these warranty obligations shall be to the account of the Contractor.
11. The Contractor should furnish an Indemnity Bond in the prescribed format as enclosed for the equipment to be taken away from Project site for repair/rectification.
12. Defect Liability for Civil Works
  - (a). The Contractor guarantees that within one year from the date of work completion certificate or in the event more than one certificate having been issued by the Purchaser from the respective date so certified, the contract work shall not show any sign of defects, cracks, settlements, disfiguration, shrinkage, leakage, dampness or any other faults.
  - (b). The Contractor shall maintain and satisfactorily execute at his own cost all such works of repair, amendment, reconstruction, rectification, replacement and any other work to make good any faulty work during the defect liability period.
  - (c). The Contractor shall, if required by the Purchaser, search for the causes of any defects, imperfection or fault under the direction of the Purchaser. The cost of such work shall be borne by the Contractor.
  - (d). At intervals specified by the Purchaser, the Contractor along with the Purchaser shall inspect the contract work to satisfy himself that no defects have cropped up in the contract work. Should there be any signs of defects;

the Contractor shall take immediate steps to rectify the same.

- (e). At the end of the defect liability period, the Contractor along with the Purchaser shall carryout final inspection of the contract work to prove that no defects had appeared in the contract work or that all defects which appeared in the contract work have been rectified to the satisfaction of the Purchaser. If during the final inspection it is found that the defects still remain in the contract work, the period of defect liability shall be extended for further period, which will be mutually discussed and agreed, for rectifying the defects and the Contractor shall be liable to make good the defects and be responsible for the maintenance of the work till the defect have been fully removed.
- (f). To the intent that the works shall or as soon as practicable after the expiration of defect liability period be handed over to the Purchaser in perfect condition to the satisfaction of the Purchaser, all such repair works as stated herein above, shall be carried out by the Contractor at his own expense if the necessity thereof shall in the opinion of the Purchaser be due to the use of materials or workmanship not in accordance with the contract or failure on the part of the Contractor to comply with any obligation expressed or implied on Contractor's part under contract.
- (g). If the Contractor fails to commence rectification of such defects within 14 (fourteen) days from the date of Notice by the Purchaser or does not complete the said rectification with diligence and within mutually agreed time period, the Purchaser shall be entitled to carryout such work by his own workmen or by other Contractors and if such work is the work which the Contractor should have carried out at his own cost, the Purchaser shall be entitled to recover from the cost thereof or may deduct the same from any money due or that become due to the Contractor.
- (h). Upon the successful completion of defect liability period, the Purchaser shall issue final acceptance certificate to the Contractor along with the final take over.

## 10.35 CONTRACTOR'S DEFAULT

- 10.35.1 If the Contractor shall neglect to execute the `Works' with due diligence and expedition or shall refuse or neglect to comply with any reasonable orders given to him, in writing by the Purchaser in connection with the `Works' or shall contravene the provisions of the `Contract' the Purchaser may give notice in writing to the Contractor to make good the failure, neglect or contravention complained of, should the Contractor fail to comply with the notice within thirty (30) days from the date of service thereof, then and in such case the Purchaser shall be at liberty to employ other person /persons and forthwith execute such part of the `works' as the Contractor may have neglected to do or if the Purchaser shall think fit it shall be lawful for him without prejudice to any other right he may have under the `Contract' to take the `Works' wholly or in part out of the Contractor's hands and re-contract with any other person or persons, complete the `works' or any part thereof and in that event the Purchaser shall be free to use without hire charges, of all Contractor's equipment that may have been at the time on the `Site' in connection with the `Works' without being responsible to the Contractor for fair wear and tear thereof and to the exclusion of any right of the Contractor, over



the same and the Purchaser shall be entitled to retain and apply any balance of money which may otherwise due in the `Contract' by him to the Contractor or such part thereof as may be necessary to the payment of the cost of executing the said part of the `Works' or of completing the works as the case may be. If the cost of completing the `works' or executing a part thereof as aforesaid shall exceed the balance due to the Contractor, the Contractor shall pay such excess. Such payment of excess amount shall be independent of the Liquidated Damages for delay which the Contractor shall have to pay if the completion of `Works' is delayed.

10.35.2 In addition, such action by the Purchaser as aforesaid shall not relieve the Contractor of his liability to pay Liquidated Damages for delay in completion of `Works'.

10.35.3 The termination of the `Contract' under this clause shall not entitle the Contractor to reduce the value of the Performance Guarantee nor the time thereof. The Performance Guarantee shall be valid for the full value and full period as originally stipulated in the `Contract'.

10.35.4 In case the Contractor defaults in timely furnishing of engineering data specified in the Contract and this delays the performance by the Purchaser his part of the Contract and as a consequence the Contract execution schedule is delayed the responsibility for such delay will be that of the Contractor and he will become liable for all damages as per Contract.

#### 10.36 **SUSPENSION OF WORK**

10.36.1 The Purchaser may suspend the work in whole or in part at any time by giving Contractor notice in writing to such effect stating the nature, the date and the anticipated duration of such suspension.

10.36.2 On receiving the notice of suspension as above, the Contractor shall stop all such work which the Purchaser has directed to be suspended with immediate effect.

10.36.3 The Purchaser may at anytime cancel the suspension notice for all or any part of suspended work by giving written notice to the Contractor specifying the part of work to be resumed and the effective date of suspension withdrawal. The Contractor shall resume the suspended work as expeditiously as possible after receipt of such withdrawal of suspension notice.

10.36.4 In the event of suspension of work due to reasons attributable to (i) the Contractor or (ii) Force Majeure Conditions the Purchaser will not be liable to the Contractor for any cost-direct or indirect damage or loss or idle labour caused by such period of suspension of work. The Purchaser shall not be liable to Contractor for any payment towards watch & ward and any other expenditure, in such circumstances. If the suspension is for reason attributable to the Purchaser, the Purchaser shall pay to the Contractor, the cost as reimbursement to be agreed mutually.

#### 10.37 **TERMINATION OF CONTRACT**

10.37.1 The Purchaser reserves the right to terminate the Contract either in part or in full due to reason other than those mentioned under clause entitled Contractor's Default. The Purchaser shall, in such an event, give 15 (fifteen) days notice in writing to the Contractor of his decision to do so.

- 10.37.2 The Contractor upon receipt of such notice shall discontinue the work on the date and to the extent specified in the notice, make all reasonable efforts to obtain cancellation of all order and Contracts to the extent they are related to the work terminated and upon terms satisfactory to the Purchaser, stop all further sub-Contracting or purchasing activity related to the work terminated and assist the Purchaser in maintenance, protection and disposition of the works acquired under the Contract by the Purchaser.
- 10.37.3 In the event of such a termination, the Contractor shall be paid compensation, equitable and reasonable dictated by the circumstances prevalent at the time of termination. No consequential damages shall be payable by the Purchaser to the Contractor in the event of termination.
- 10.37.4 If the Contractor is an individual or a Proprietor concern and the individuals or the proprietor dies and if the Contractor is a partnership concern and one of the partners dies, then unless the Purchaser is satisfied that the legal representatives of the individual Contractor or the Proprietor of the proprietary concern and in the case of partnership, surviving partners, are capable of carrying out and completing the Contract the purchaser shall be entitled to cancel the Contract as to its incomplete part without being in any way liable to payment of any compensation to the estate of deceased Contractor and/ or to the surviving partners of the Contractor's firm on account of the cancellation of the Contract. The decision of the Purchaser that the legal representatives of the deceased Contractor or surviving partners of the Contractor's firm cannot carry out and complete the Contract shall be final and binding on the parties. In the event of such cancellation the purchaser shall not hold the estate of the deceased Contractor and/ or the surviving partners of the estate of the deceased Contractor and/ or the surviving partners of the Contractor's firm liable to damages for not completing the Contract.

#### 10.38 **TERMINATION OF SERVICES OF CONTRACTOR'S PERSONNEL**

- 10.38.1 In the event any of the Contractor or his Sub- Contractors, personnel, agents, sub-agents, assistants, or other employees shall be guilty of any misconduct or be incompetent or insufficiently qualified or negligent in the performance of their duties or it is undesirable for any administrative reasons for such person to be employed, the Contractor, if so directed, shall immediately remove such person or persons from employment thereon. Any person or persons so removed shall not again be employed in connection with this Contract without the written permission of the Purchaser. Any person so removed shall immediately be replaced by a qualified and competent substitute at the Contractor's cost and expenses. Should the Contractor be requested to repatriate any person he shall do so and shall bear all costs and charges in connection there with.

#### 10.39 **AMENDMENT**

- 10.39.1 Any amendment to the terms of this Contract (including Schedules & Annexures) shall be made in writing by both parties hereto and shall specifically state that it is an amendment to this Contract.
- 10.39.2 No amendment as per above Clause shall have any effect until the Purchaser has received such consent in writing (including that of the Contractor) as may be necessary under and in terms of the loan/financial Agreements.

#### 10.40 **NOTICES**

10.40.1 All notices under this Contract shall be given in writing and shall be deemed sufficiently given when delivered either in person or by telegram, telex, fax or by registered mail addressed to the other party at its address set forth in the contract agreement with a copy to the nominated representative at site.

10.40.2 If any such notice is delivered by hand, it shall be duly acknowledged and if given by telegram, telex, fax it shall be confirmed by Registered Letter within seven days of the date of such notice. Either party shall by notice in writing inform the other party of any change of its address as stated under Clause 10.40.1 for receiving such notices.

10.40.3 Date of notices under Clause 10.40.1 shall be the date of receipt of such notice by the receiving party.

#### 10.41 **DEDUCTIONS FROM CONTRACT PRICE**

10.41.1 The Contractor shall reimburse the Purchaser all costs, charges, damage or expenses which the Purchaser may have paid or incurred, if and to the extent to which the Contractor is liable under this Contract to pay within 30 days upon written request of the Purchaser, failing which such costs, charges, damages or expenses shall be deducted by the Purchaser from any money due or becoming due by him to the Contractor under this Contract or any other Contract and such amounts shall be considered as debt due from the Contractor to the Purchaser and shall be recoverable accordingly.

#### 10.42 **ENTIRE CONTRACT**

10.42.1 This Contract including the contract agreement, all the references included in all schedules, Commercial Conditions of the Contract, Erection Conditions of Contract, Technical Specifications and Special Terms and Conditions constitute the entire agreement of the parties unless otherwise modified or superseded by the terms and conditions of the Contract and after this contract is signed by both parties no amendments modifications, variance or change in the provisions of the Contract shall be made except in writing signed by the duly authorised representatives of the parties hereto.

#### 10.43 **RESOLUTION OF DISPUTES AND ARBITRATION**

##### 10.43.1 **Informal Dispute Resolution**

The parties agree to use reasonable efforts to resolve all disputes equitably and in good faith.

10.43.1.1 If any dispute between the Contractor and the Purchaser arises it shall in the first instance be referred in writing to the Purchaser, who shall endeavour to resolve the dispute amicably and render a decision within 30 days. The period of 30 days shall be reckoned from the date of intimation of the dispute is received by the Purchaser.

10.43.1.2 Save as hereinafter provided, in respect of a dispute so referred, the decision of the Purchaser shall be final and binding upon the Parties until the completion of the

Contract and shall forthwith be given effect to by the Contractor who shall proceed with the Contract with all due diligence, whether or not either Party has sought arbitration of the dispute as hereinafter provided.

#### 10.43.2 **Conciliation**

10.43.2.1 If the party is dissatisfied with the decision rendered by the Purchaser, or if the Purchaser omits or declines to render a decision within the said period of 30 days, then within a further period of 30 days, the dissatisfied Party shall require by a notification that the dispute be referred to Conciliation in the manner as per the 'NLCIL Conciliation Rules', copy of which is available with the NLCIL offices and the Bidders/ Contractors shall abide by the NLCIL Conciliation Rules' for resolving any dispute arising out of this contract. Such a notification shall be in writing and it shall be duly served on the other party. Failure to invoke the Conciliation within the time stipulated shall debar the party from seeking reference to Conciliation.

10.43.2.2 Except as otherwise provided in this clause, any dispute arising out of or relating to this agreement, or the breach, termination or validity thereof, shall be settled by Conciliation in accordance with 'NLCIL Conciliation Rules'. The Conciliation shall be held at Neyveli or Chennai or in a place with in India mutually agreed by the parties. The Conciliation proceedings shall be conducted, and the award shall be rendered in English. The award shall state the reasons upon which it is based.

10.43.2.3 Appointment and Number of Conciliators will be as follows:

##### Number of Conciliators

*For the sum of Provisional Claim & Provisional Counter Claim*

- *Upto Rs. 3.0 Crores* : One Conciliator
- *More than Rs.3.0 Crores* : Three Conciliators

The Provisional Claim / Counter claim amount shall be indicated by the respective parties while initiating / concurring for conciliation. However, number of conciliators in the Settlement Advisory Committee will not be modified, even if the Sum of Actual Claim and Actual Counter Claim amount vary from the sum of Provisional Claim and Counter Claim amounts. Appointment of Conciliators: Conciliator(s) will be appointed by CMD of NLC India Limited.

10.43.2.4 The Contract agreement / Purchase order conditions and the rights and obligations of the Parties, shall remain in full force and effect during the Conciliation proceedings. Supplies and / or services under the Contract shall, if reasonably possible, continue during the Conciliation proceedings.

10.43.2.5 For the purpose of this clause, the term 'dispute' shall include a demand or difference of any kind whatsoever, arising out of the Contract and respecting the performance of the Contract, whether during the Contract period including extensions if any, and whether before or after termination, abandonment or breach of the Contract. (except as to any matter, the decision of which is specifically otherwise provided for in any of these conditions).

10.43.2.6 Only in case of failure to resolve the dispute through Conciliation, Arbitration can be resorted to or Judicial remedy can be sought for.

10.43.2.7 Once the settlement agreement is signed with respect to a dispute, the same dispute is not subject to further appeal through Arbitration or Judicial Proceedings.

10.43.2.8 Anything not found included in the 'NLCIL Conciliation Rules', but necessary to conduct the conciliation proceedings will be dealt with as per the provisions of the 'Arbitration and Conciliation Act 1996 -Part-III' or as per the statutory provisions modified from time to time.

#### 10.44 **Arbitration of Disputes.**

##### 10.44.1 **BETWEEN NLCIL& ANOTHER PUBLIC SECTOR ENTERPRISE**

In the event of any dispute or difference, relating to the interpretation and application of the provisions of the Contracts, such dispute or difference shall be referred by either party to the arbitration of one of the Arbitrators in the Department of Public Enterprises. The Arbitration and Conciliation Act, 1996 shall not be applicable to the arbitration under this clause. The award of the Arbitrator shall be binding upon the parties to the dispute, provided, however, any party aggrieved by such award may make a further reference for setting aside or revision of the award to the Law Secretary, Department of Legal Affairs, Ministry of Law & Justice, Government of India. Upon such reference the dispute shall be decided by the Law Secretary or the Special Secretary/Additional Secretary when so authorized by the Law Secretary, whose decision shall bind the parties finally and conclusively. The parties in the dispute will share equally the cost of arbitration as intimated by the Arbitrator. The procedure to be adopted in the above case shall be as per DPE guidelines No. DPE OM No. 4(1)/2011-DPE(PMA)-GL dated 12.06.2013.

##### 10.44.2 **Between NLCIL & Contractor other than a Public Sector enterprise**

10.44.2.1 If either party is dissatisfied with the decision rendered by the Purchaser, or if the Purchaser omits or declines to render a decision within the said period of 30 days, then within a further period of 30 days, the dissatisfied Party may require by a notification that the dispute be referred to arbitration in the manner hereinafter provided. Such a notification shall be in writing and it shall be duly served on the other party. Failure to invoke the arbitration within the time schedule shall debar the party from seeking reference to arbitration.

10.44.2.2 Except as otherwise provided in this clause, any dispute arising out of or relating to this agreement, or the breach, termination or validity thereof, shall be finally settled by arbitration in accordance with the Arbitration and Conciliation Act 1996 (the "Act"). The arbitration shall be held at Neyveli or Chennai, Tamil Nadu. The arbitration proceedings shall be conducted, and the award shall be rendered in English. The award shall state the reasons upon which it is based.

10.44.2.3 There shall be three arbitrators of whom each Party shall appoint one. The Party requesting that the dispute be referred to arbitration shall, within 30 days of the notification in terms of Clause 10.44.2.1, appoint an arbitrator as also call upon the other Party to appoint an arbitrator within 30 days. The two arbitrators so appointed shall, within 30 days of the date on which the second of them is

appointed, agree on the third arbitrator who shall act as the presiding arbitrator of the tribunal.

10.44.2.4 The agreement and the rights and obligations of the Parties, shall remain in full force and effect pending the award in any arbitration proceedings. Supplies and/ or services under the Contract shall, if reasonably possible, continue during arbitration proceedings.

10.44.2.5 For the purposes of this clause, the term `dispute' shall include a demand or difference of any kind whatsoever, arising out of the Contract and respecting the performance of the Contract, whether during the Contract period including extensions if any, or after completion, and whether before or after termination, abandonment or breach of the Contract (except as to any matter, the decision of which is specifically provided for in any of these conditions).

10.44.2.6 The Arbitrators shall publish a speaking award which shall be binding on both the parties. The party in whose favour the award is passed shall be entitled to recover the entire cost of arbitration from the other party. The Arbitrators shall indicate the above in their award clearly.

#### 10.45 **COMPLETENESS OF THE CONTRACT**

10.45.1 The Contractor shall expressly undertake full responsibility for the quality of supplies, timely deliveries as per the stipulated schedule of deliveries the faultless operation of the equipment, the warranty for the design of the equipment and manufacture of the complete equipment, including the Indian portion of supplies free of any defects and faults.

10.45.2 In the event of replacements becoming necessary on account of short deliveries and wrong supplies on account of short landing, loss/ damages during transit, storage, erection and commissioning the Contractor shall take special steps to make such replacements free of cost for timely commissioning of the equipment. The charges towards, freight, insurance, port handling clearance customs duty and all other incidentals including transport to site in respect of such replacements will be to the account of the Contractor. The Contractor shall take special steps to arrange for most expeditious manufacture and supply of these items to enable timely commissioning of the equipment.

10.45.3 Equipment furnished shall be complete in every respect with all mountings, fittings, fixtures and standard accessories normally provided with such equipment, and/or needed for erection, completion and safe operation of the equipment. They may not have been specifically detailed in the respective specifications, unless included in the list of exclusions. All similar standard components/parts of similar standard equipment provided, shall be interchangeable with one another. The Contractor shall not be eligible for any extra payment in respect of such mounting, fixtures and accessories.

#### 10.46 **GRAFTS AND COMMISSION**

Any graft, commission, gift or advantage given promised or offered by on behalf of the Contractor or his partner, agent, officers, Director, employee or servant or any one on his or their behalf in relation to the obtaining or to the execution of this or any other Contract with the Purchaser, shall in addition to

any criminal liability which may it incur, subject the Contractor to the cancellation of this and all other Contracts and also the payments of any loss or damage to the Purchaser resulting from any cancellation. The Purchaser shall then be entitled to deduct the amounts so payable from any monies otherwise due to the Contractor under the Contract.

10.47 **CERTIFICATE NOT TO AFFECT RIGHT OF PURCHASER AND LIABILITY OF CONTRACTOR**

No interim payment certificate of the Purchaser or the Consultant nor any sum paid on account by the Purchaser nor any extension of time for execution of the `works' granted by the Purchaser or the Consultant shall affect or prejudice the rights of the Purchaser against the Contractor or relieve the Contractor of his obligations for the due performance of the Contract or be interpreted as approval of the `Works' done or of the equipment furnished and no certificate shall create liability in the Purchaser to pay for alterations amendments, variations or additional `Works' not ordered in writing, by the Purchaser or discharge the liability of the Contractor for the payment of damages whether due, ascertained, or certified or not or any sum against the payment of which he is bound to indemnify the Purchaser nor shall any such certificate nor the acceptance by him of any sum paid on account or otherwise affect or prejudice the rights of the Contractor against the Purchaser.

10.48 **INSOLVENCY, LIQUIDATION AND BANKRUPTCY ETC.**

If the Contractor shall die, dissolve or become bankrupt or insolvent or cause or suffer any receiver to be appointed on his business or any assets thereof with his Creditors, or being a corporation commence to be wound up, not being a member's voluntary winding up for the purpose of amalgamation or reconstruction, or carry on its business under a Receiver for the benefits of its Creditors or any of them, the Purchaser shall be at liberty:-

- i) to terminate the Contract forthwith upon coming to know of the happening of any such event as aforesaid by notice in writing to the Contractor or to the Receiver or Liquidator or to any person to whom the Contract may become vested to, or
- ii) to give such Receiver, Liquidator or other person the option of carrying out the Contract subject to his providing a guarantee up to an amount to be agreed for the due and faithful performance of the Contract. Notwithstanding the provision of Cl.10.48 (i) in the event of Indian contractor undergoing liquidation or being dissolved, become bankrupt as described above the principle contractor shall directly assume the responsibilities of Indian contractor to the extent not performed.

10.49 **MANNER OF EXECUTION OF CONTRACT**

- 10.49.1 After acceptance of the Letter of Award, the Purchaser shall draft the Contract and shall provide one copy to the Contractor for checking. The Contract, in two originals, prepared on a non judicial stamp paper shall be signed by the holders of power of attorney on a suitable date and time but within 60 (Sixty) days of the acceptance of the Letter of Award.

10.49.2 Before signing the contract, the Purchaser and the Contractor are deemed to have checked and verified all the Contract Documents for the completeness and correctness.

10.49.3 Thereafter, within another 30 (Thirty) days, the Contractor shall supply 25 (Twenty five) copies of the Contract Agreement, to the Purchaser free of cost.

#### 10.50 **CONTRACT DOCUMENTS**

10.50.1 The term `Contract' or `Contract Documents' shall mean and include the following which shall be deemed to form an integral part of the Contract.

10.50.1.1 `Notice Inviting Tender' and `Invitation to Bid' issued by the Purchaser.

10.50.1.2 The Bid proposal offered by the bidder, including all correspondences relation to the decision on the deviations, and on the clarifications sought for, exchange between the bidder and their purchaser prior to the award of the Contract.

10.50.1.3 All the materials, literature, data and information given by the Contractor along with his bid or later.

10.50.1.4 Minutes of all discussion between the Bidder and the Purchaser.

10.50.1.5 `Letter of Award' issued by the Purchaser and its acceptance by the Contractor.

10.50.1.6 Contract agreement, general and technical terms and conditions and all other documents exchanged.

10.50.1.7 Specifications of the equipment to be furnished under the Contract as mutually agreed between the Purchaser and the Contractor.

10.50.1.8 Any agreed variation to the conditions of the documents and specifications and special terms and conditions of Contract, if any.

10.50.2 In the event of any ambiguities and discrepancies between the above mentioned documents, the decision of the Purchaser shall be final and binding.

#### 10.51 **JURISDICTION**

The Civil Courts having ordinary original civil jurisdiction over Andaman & Nicobar Islands shall have exclusive jurisdiction in regard to all questions of disputes of whatever nature including the arbitration proceedings, if any arising under the Contract with the Purchaser.

#### 10.52 **GOVERNING LAWS AND REGULATIONS**

This Contract shall be governed and construed according to the Indian Laws and Regulations.

#### 10.53 **SAFETY**

The Contractor shall abide by the safety Code for Contractors which is enclosed.



10.54 **GENERAL CONDITIONS FOR ERECTION AND CIVIL WORKS**

The Contractor shall abide by the General Conditions for Erection & Civil Works, which is enclosed.

10.55 **GENERAL**

No director or official or employee of the Purchaser shall in any way be personally bound or liable for the acts or obligations of the purchaser under the contract or answerable for any default or omission in the observance or performance of any of the acts, matters or things or conditions which are herein contained.

10.56 **CORRESPONDENCE**

All further correspondence in connection with this offer shall be addressed to:

The General Manager/Contracts

Corporate Office

NLC India Limited,

Block-1, Neyveli – 607 801.

Fax: 04241-252026/252645/252646

Cuddalore District, Phone: 04142 – 252215/252210

Tamil Nadu, INDIA

**ANNEXURE-I**

**GENERAL CONDITIONS FOR ERECTION WORKS  
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## **GENERAL CONDITIONS FOR ERECTION WORKS**

### **1.0 General**

- 1.1 The following shall supplement the conditions already contained in the other parts of these specifications and documents and shall govern that portion of the work of this 'Contract' to be performed at 'site'.
- 1.2 The Contactor upon issue of LOA shall, in addition to a Project Coordinator, nominate another responsible officer as his representative at site suitably designated for the purposes of overall responsibility and co-ordination of the Works to be performed at site. Such person shall function from the site office of the Contractor during the execution of 'Contract'. This representative shall have full technical capability and complete administrative and financial powers to expeditiously and efficiently execute the work under this 'Contract'.
- 1.3 The Contractor shall proceed with the work to be performed under this 'Contract' and each and every part and detail thereof, in the best and most workman like manner by engaging qualified, careful and efficient workers, and do the several parts thereof, at such time and in such order as the Purchaser/Consultant may direct, and finish such work in strict conformity with the plans, drawings and/or specifications, and any changes, modifications or amplifications thereof made by the Purchaser/Consultant.
- 1.4 The Contractor shall not sell, assign, mortgage hypothecate or remove equipment or materials or materials which have been installed or which may be necessary for the completion of the 'Contract' without the written consent of the Purchaser.

### **2.0 REGULATION OF LOCAL AUTHORITIES AND STATUTES**

- 2.1 The Contractor shall ensure compliance with all statutes, laws, rules and regulations of the Central or State Government or any other authority such as the Workmen's Compensation Act 1923, Payment of Wages Act, Minimum Wages Act 1948, Employees State Insurance Act, Employees Provident Fund Act, etc. and any and all statutory modifications thereof in connection with employees engaged by him or his Sub-Contractors in the work.
- 2.2 The Contractor shall conform to the provisions of MNRE, DISCOMS, Andaman & Nicobar Islands Electricity authorities, Factory Laws, Indian Electricity Act and rules made there under, and any other acts of legislature relating to the work and to the regulations and bye-laws of any authority and of any water, lighting and other companies and/or authorities with whose systems the plant/structure is proposed to be connected and shall before making any variations from the drawings or specifications that may be necessitated by so conforming, giving to the Purchaser/Consultant written notice, specifying the variations proposed to be made and the reason for making it and apply for instructions thereof.
- 2.3 The Contractor shall arrange to give all notice required by the said Acts, Regulations or Bye-laws to be given to any Authority or to any Public Officer and pay all fees that may be properly chargeable in respect of the 'Works' and lodge the receipts with the

Purchaser/Consultant, unless otherwise, specified in the specification. Obtaining all permits and licenses required there upon is the responsibility of the Contractor.

- 2.4 All registration and statutory inspection fees, if any, in respect of his work pursuant to this 'Contract' shall be to the account of the Contractor. However, any registration, statutory inspection fees and any other statutory laws and its amendments from time to time during erection in respect of the plant and equipment ultimately to be owned by the Purchaser shall be to the account of the Purchaser. Should any such inspection or registration need to be re-arranged due to the fault of the Contractor or his Sub-Contractor, the additional fees for such inspection and/or registration shall be borne by the Contractor.

### 3.0 **CONTRACTOR'S HEALTH AND SAFETY PROGRAM**

Refer Technical specification.

### 4.0 **PURCHASER'S LIEN ON EQUIPMENT**

The Purchaser shall have lien on all equipment including those of the Contractor brought to the site for the purpose of erection, testing and commissioning of the plant. The Purchaser shall continue to hold the lien on all such equipment throughout the period of 'Contract'. No material brought to the site shall be removed from the site by the Contractor and/or his Sub-Contractor's without the prior written approval of the Purchaser/Consultant.

### 5.0 **INSPECTION, TESTING AND INSPECTION CERTIFICATES**

- 5.1 The provisions of the clause entitled Inspection, Testing and Inspection Certificates shall also be applicable to the erection portion of the 'Works'. The Purchaser / Consultant shall have the right to re-inspect any equipment (though previously inspected and approved by him, at the Contractor's works) before and after the same are erected at Site. If by the above inspection, the Purchaser / Consultant rejects any equipment, the Contractor shall make good for such rejections either by replacement or modifications / repairs as may be necessary, to the satisfaction of the Purchaser / Consultant. Such replacements will also include the replacements or re-execution of such of those works of other Contractor's and/or agencies, which might have got damaged or affected by the replacements or re-work done to the Contractor's work.
- 5.2 Any work, which proves faulty, shall be corrected by the Contractor without delay. The fact that the Purchaser / Consultant or their representatives have not pointed out faulty work or work which is not in accordance with plans and specifications shall not relieve the Contractor from correcting such work as directed by the Purchaser / Consultant without additional compensation.
- 5.3 When finished work is taken down for the purpose of re-inspection, the Contractor shall bear the entire expenses incident thereto in the event that said work is found to be defective. The Purchaser shall pay the cost incident thereto in the event that the work inspected is found to be in accordance with the 'Specification'. In the latter case, the replacing of the covering or the making good of any of the parts removed shall be paid for by the Purchaser at the Contract price for the class of work done and the uncovering

or taking out of materials or parts shall be paid for on the basis of actual direct cost of material, layout and incidental expense, plus reasonable rental prices for transportation of equipment, except that no percentage for the Contractor's fees shall be added to actual direct cost of material, labour and incidental expenses. However, no extension of time shall be given for completion of works on this account. If the Contractor shall fail to repair any defective work or replace any defective materials after reasonable notice, the Purchaser / Consultant may cause such defective work to be repaired or defective material to be replaced and the expenses thereof shall be deducted from the amount to be paid to the Contractor.

- 5.4 The Purchaser / Consultant, their representatives and employees shall, at all reasonable times, have free access to the works and/or to the workshops, factories or other places where materials are being prepared or constructed for the 'Contract' and also to any place where the materials are lying or from where they are being obtained, and the Contractor shall give every facility to the Purchaser / Consultant and his representatives for inspection and examination and test of the materials and workmanship even to the extent of discontinuing portions of the work temporarily, or of uncovering or taking down portions of finished work.

#### **6.0 ACCESS TO SITE AND WORKS ON SITE**

- 6.1 Suitable access to and possession of the site shall be afforded to the Contractor by the Purchaser in reasonable time.
- 6.2 The Purchaser shall have the necessary foundations to be provided by him ready, as per the agreed schedule for the execution of the individual phases of 'Works'.
- 6.3 In the execution of the 'Works', no persons other than the Contractor or his duly appointed representative, Sub-Contractor and workmen shall be allowed to do work on the site, except by the special permission, in writing of the Purchaser / Consultant or his representative.
- 6.4 Access to the site at all times shall be accorded to the Purchaser / Consultant and other authorized officials and statutory Public Authorities. Nevertheless, the Contractor shall not object to the execution of the work by other Contractors or tradesmen whose names shall have been previously communicated in writing to the Contractor by the Purchaser / Consultant and afford them every facility for the execution of their several functions simultaneously with his own.

#### **7.0 CONTRACTOR'S SITE OFFICE ESTABLISHMENT**

- 7.1 The Contractor shall establish a Site Office at the site and keep posted an authorized representative for the purposes of the 'Contract'. Any written order or instruction of the Purchaser / Consultant or his duly authorized representative, shall be communicated to the authorized representative of the Contractor at the Site Office and the same shall be deemed to have been communicated to the Contractor at his legal address.

7.2 The Contractor shall employ at least one competent representative whose name or names shall have previously been communicated in writing to Purchaser/Consultant by the Contractor, to supervise the erection of the plant and to carry out the work. The said representative or if more than one shall be employed, then one of such representatives shall be present at the site during working hours, and any written orders or instructions which the Purchaser/Consultant may give to the said representatives of the Contractor shall be deemed to have been given to the Contractor. It is essential that the supervisory personnel shall be capable of speaking and writing in English language.

## 8.0 **CO-OPERATION WITH OTHER CONTRACTORS IF ANY**

8.1 The Contractor shall cooperate with all other Contractors or tradesmen of the Purchaser, who may be performing other works on behalf of the Purchaser and the workmen who may be employed by the Purchaser and doing work in the vicinity of the 'Works' under the 'Contract'. The Contractor shall also so arrange to perform his work as to minimize, to the maximum extent possible, interference with the work of other Contractors and his workmen. Any injury or damage that may be sustained by the employees of the other Contractors and the Purchaser due to the Contractor's work shall promptly be made good at his one expense. The Purchaser/Consultant shall determine the resolution of any difference or conflict that may arise between the Contractor and other Contractors or between the Contractor and the Workmen of the Purchaser in regard to their Work. If the 'Works' of the Contractor is delayed because of any acts or omissions of another Contractor, the Contractor shall have no claim against the Purchaser on that account.

8.2 The Purchaser/Consultant shall be notified promptly by the Contractor of any defects in the other Contractor's works that could affect the Contractor's 'Works'. The Purchaser/Consultant shall determine the corrective measures, if any, required to rectify this situation after inspection of the 'Works' and such decisions by the Purchaser/Consultant shall be binding on the Contractor. If a part of the Contractor's work depends, for proper execution, upon the work of any other Contractor, the Contractor shall inspect and promptly report in writing to the Purchaser/Consultant any defect in such work of other Contractors that render it unsuitable for proper execution of the work under this 'Contract'. His failure to so inspect and report shall constitute an acceptance of 'Others' work as fit and proper for the reception of his work, except as to defects which may develop in the work of 'Others' after the proper execution of the work. To ensure proper execution of his sub-sequent work, the contractor shall inspect work already in place and shall at once report to the Purchaser/Consultant any discrepancy between the executed work and the drawings.

## 9.0 **DISCIPLINE OF WORKMEN**

The Contractor shall adhere to the disciplinary procedure set by the Purchaser/Consultant in respect of his employees and workmen at site. The Purchaser/Consultant shall be at liberty to object to the presence of any representative or employee of the Contractor at the site, if in the opinion of the Purchaser/Consultant such employee has misconduct himself or be incompetent or negligent or otherwise undesirable and then the Contractor shall remove such a person and provide in his place a competent replacement at his own expense.

## **10.0 CONTRACTOR'S FIELD OPERATION**

- 10.1 The Contractor shall keep the Purchaser/Consultant informed in advance regarding his field activity plans and schedules for carrying out each part of the 'Works'. Any review of such plan or schedule or method of work by the Purchaser/Consultant shall not relieve the Contractor of any of his responsibility towards the field activities. Such reviews shall also not be considered as an assumption of any risk or liability by the Purchaser/Consultant or any of his representatives and no claim of the Contractor will be entertained because of the failure or inefficiency of any such plan or schedule or method of work reviewed. The Contractor shall be solely responsible for the safety, adequacy and efficiency of plant and equipment and his erection methods.
- 10.2 The Contractor shall have the complete responsibility for the conditions of the work site including the safety of all persons employed by him or his Sub-Contractor and all the properties under his custody during the performance of the work. This requirement shall apply continuously till the completion of his 'Contract' and shall not be limited to normal working hours. The construction review by the Purchaser/Consultant is not intended to include review of Contractor's safety measures in, on or near the work-site, and their adequacy or otherwise.
- 10.3 The work so far as it is carried out on the Purchaser's premises shall be carried out at such time as the Purchaser may approve consistent with the construction schedule and so as not to interfere unnecessarily with the conduct of the Purchaser's business and the Purchaser will give the Contractor all reasonable facilities for carrying out the work.

## **11.0 PHOTOGRAPHS AND PROGRESS REPORT**

Refer relevant Clauses of Technical Specification and Schedule-10 of Volume II.

## **12.0 MANPOWER REPORT**

- 12.1 The Contractor shall submit to Purchaser/Consultant on the first day of every week, a man-power schedule for the next week, detailing the man-power scheduled skill-wise and area-wise.
- 12.2 The Contractor shall also submit to the Purchaser/Consultant on the first day of every month, a manpower report of the previous month detailing the number of persons scheduled to have been employed and actually employed, skill-wise and the areas of employment of such labour.

## **13.0 PROTECTION OF WORK**

- 13.1 The Contractor shall have total responsibility for protecting his 'Works' till it is finally accepted by the Purchaser/Consultant. No claim will be entertained by the Purchaser/Consultant for any damage or loss to the Contractor's 'Works' and the Contractor shall be responsible for the complete restoration of the damaged 'Works' to its original condition to comply with the specifications and drawings. Should any such damage to the Contractor's 'Works' occur because of other party not under his supervision or control, the Contractor shall make his claim directly with the party concerned. If disagreement or conflict or dispute develops between the Contractor and the other party or parties concerned regarding the responsibility for damage to the



Contractor's 'Works' the same shall be resolved as per the provisions of the Clause 8.0 above entitled 'Cooperation with other Contractors'. The Contractor shall not cause any delay in the repair of such damaged 'Works' because of any delay in the resolution of such disputes. The Contractor shall proceed to repair the work immediately and no cause thereof will be assigned pending resolution of such dispute.

- 13.2 The Contractor and his Sub-Contractors shall be responsible during work for protection of the work, which has been completed by Others. Necessary care shall be taken to see that no damage to the same is caused by his own men during the course of execution of their work.
- 13.3 All other work completed or in progress as well as machinery and equipment that are liable to be damaged by the Contractor's work shall be protected by the Contractor and such protection shall remain and be maintained until its removal is directed by the Purchaser.
- 13.4 The Contractor shall effectively protect all the works from action of weather and from damages or defacement and shall cover finished parts where required for their thorough protection. Face work shall be perfectly clean and free from defects.
- 13.5 The work shall be carried out onto completion without damage to any work and property adjacent to the area of his work, to whomsoever it may belong, without interference with the operation of their existing machines or equipment.
- 13.6 The Contractor shall provide the necessary temporary roadways, footways, guards as may be rendered necessary by reason of his work, for the protection and accommodation of foot passengers of other traffic of the Purchaser or occupier of adjacent property and of public. The Contractor shall at the times provide sufficient temporary barriers, notice boards and lights to protect and warn the public and post necessary watchman to guard the site and equipment. He shall take all precautions necessary and shall be responsible for the safety of the work to be performed by him. The Contractor shall also observe and display Safety First signs and shall have proper safety and fire protection equipment.
- 13.7 Adequate lighting at and near all the storage, handling, fabrication, pre-assembly and erection sites for properly carrying out the work and for safety and security shall be provided by the Contractor. The Contractor's work area would be adequately lighted during nighttime also. The Contractor should also engage adequate electricians/wiremen, helpers, etc., to carry out and maintain these lighting facilities. If the Contractor fails to provide all the above listed facilities, the Purchaser may provide such facilities as he may deem necessary and charge the cost thereof to the Contractor. In any case the Contractor shall be liable for all damages and consequences arising out of his neglect in this regard.

#### 14.0 **EMPLOYMENT OF LABOUR**

- 14.1 The Contractor/Sub-Contractors will be expected to employ on the work skilled employees with experience of his particular work. No person below the age of eighteen years shall be employed.

- 14.2 The Contractor shall furnish details of the qualifications and experience of his senior supervisors and Consultants assigned to the work, including their experience in supervising erection and commissioning of plant and equipment of comparable capacity.
- 14.3 All traveling expenses including provisions of all necessary transport to and from site, loading allowances and other payments to the Contractor's employees shall be the sole responsibility of the Contractor.
- 14.4 The hours of work on the site shall be decided by the Purchaser and the Contractor shall adhere to it. Working hours for each employee will normally be eight (8) hours per day.
- 14.5 The Contractor's employees shall wear identification badges while on work at site.
- 14.6 The Contractor shall ensure that he pays his men regularly their wages, overtime and other compensations. The attendance register and the wage register shall be submitted to the Purchaser for verification at regular intervals. The Contractor shall also furnish the Purchaser at fortnightly intervals a certificate that he has paid all the dues to his workmen. In case such payment is not made regularly by the Contractor, the Purchaser will be in his right to make such payments and deduct the same from the Contractor's progress payments.
- 14.7 In case the Purchaser becomes liable to pay any wages or dues to the labour or to any Government agency under any of the provisions of the Minimum Wages Act, Workmen's Compensation Act or any other law due to act of omission of the Contractor, the Purchaser may make such payments and shall recover the same from the Contractor's bills.
- 14.8 None of the Contractor's superintendents, supervisors, Consultants or labour may be withdrawn from the work without due notice being given to the Purchaser/Consultant. Further, no such withdrawal shall be made if, in the opinion of the Purchaser/Consultant, it will jeopardize the required pace of progress and/or the successful completion of the work.
- 14.9 In connection with the performance of work under this 'Contract', the Contractor shall agree not to discriminate because of race, religion, colour or national origin. It is also expected that the Contractor in his selection of personnel will give due regard to their ability to co-operate with the Purchaser/Consultant. Suggestions and recommendations made by the Purchaser/Consultant relating to the work and coordination thereof are to be carefully and courteously considered.

#### 15.0 **FACILITIES TO BE PROVIDED BY THE PURCHASER**

- 15.1 Refer relevant clauses in Technical Specification

#### 16.0 **FACILITIES TO BE PROVIDED BY THE CONTRACTOR**

- 16.1 Tools, Tackles and Scaffoldings

- 16.1.1 The Contractor shall provide at his own expense, all the construction equipment, false work, erection tools, machine tools, power tools, tackles, hoists, cranes, derricks,

cables, slings, skids, scaffolding work benches, tools for rigging, cribbing and blocking, welding machines preheating and stress relieving equipment, X-ray and all associated protective equipment, instruments, appliances, materials, and supplies required for unloading, transporting, storing, erection, testing and commissioning that may be required to accomplish the work under the 'Contract' unless otherwise provided for. Adequacy of such tools will be subject to final determination of the Purchaser/Consultant. He shall submit a list of all such materials to the Purchaser / Consultant before the commencement of pre-assembly at site. These tools and tackles shall not be removed from the site without the written permission of the Purchaser/Consultant.

16.1.2 The Contractor shall also furnish all necessary expandable devices like anchors, grinding and abrasive wheels, raw plugs, hacksaw blades, taps, dies, drills, reamers, chisels, files, carborandum stones, oil stones, wire brushes, necessary scaffolding, ladders, wooden planks, timbers, sleepers and consumable material like welding electrodes, oxygen, acetylene, argon, lubricating oils, greases, cleaning fluids, cylinder oil, graphite powder and flakes, fasteners, gaskets, temporary supports, stainless steel shims of various thickness as required, cotton waste, cheese cloth and all other miscellaneous supplies of every kind required for carrying out the work under the 'Contract'.

16.1.3 The Contractor shall provide all reasonable facilities including tools, personnel, etc. and ensure coordination with the Purchaser / Consultant and the Sub-Contractor's erection supervisors to enable them to carry out all supervision, measurements, checks, etc. in a satisfactory manner.

16.1.4 The Contractor shall not dispose of, transport or withdraw any tools, tackles, equipment and material provided by him for the 'Contract' without taking prior written approval from the Purchaser/Consultant, and the Purchaser/Consultant at all times shall have right to refuse permission for disposal, transport or withdrawal of tools, tackles, equipment and material if, in his opinion, the same will adversely affect the efficient and expeditious completion of the 'Project'.

## 16.2 **Communication**

The Contractor will make his own arrangement for all his communication needs such as telephone, email etc. at his Site Office. The Purchaser will assist the Contractor in getting the above facilities, in case he finds difficulty.

## 16.3 **First-aid**

16.3.1 The Contractor shall provide necessary first-aid facilities for all his employees, representatives and workmen at the site.

## 16.4 **Cleanliness**

16.4.1 The Contractor shall be responsible for keeping the entire area allotted to him clean and free from rubbish, debris etc. during the period of 'Contract'. The Contractor shall employ enough number of special personnel to thoroughly clean his work area at least once in a day. All such rubbish and scrap material shall be stacked or disposed in a place to be identified by the Purchaser / Consultant. Materials and stores shall be so

arranged to permit easy cleaning of the area. In areas where equipment might drip oil and cause damage to the floor surface, a suitable protective cover of a flame resistant, oil-proof sheet shall be provided to protect the floor from such damage.

- 16.4.2 Similarly, the offices of the Contractor shall be kept clean and neat to the entire satisfaction of the Purchaser/Consultant. Proper sanitary arrangements shall be provided by the Contractor in the work areas and office of the Contractor.

## 17.0 LINES AND GRADES

- 17.1 All the 'Works' shall be performed to the lines, grades and elevations indicated on the drawings. The Contractor shall be responsible to locate and layout the 'Woks'. Basic horizontal and vertical control points will be established and marked by the Purchaser / Consultant at site at suitable points. These points shall be used as datum for the 'Works' under the Contract. The Contractor shall inform the Purchaser / Consultant well in advance of the times and places at which he wishes to do work in the area allotted to him, so that suitable datum points may be established and checked by the Purchaser / Consultant to enable the Contractor to proceed with his 'Works'. Any work done without being properly located may be removed and/or dismantled by the purchaser/Consultant at Contractor's expense.

- 17.2 Where the Purchaser/Consultant had already established the base lines and bench marks adjacent to the various sections of work, the same must be carefully preserved by the contractor, and in case of their unnecessary destruction by him or any of his employees, these will be re-established by the Purchaser/Consultant at the Contractor's expense.

- 17.3 The Contractor shall be responsible for the accuracy of all dimensions within the various sections of the work according to the figures of dimensions in the drawings.

## 18.0 FIRE PROTECTION

Refer relevant clauses in Technical Specification.

## 19.0 SECURITY

Watch towers shall be provided by the Contractor around the periphery of Solar PV Power Plant and shall be designed and constructed considering the safety and security requirements of the Solar PV Power Plant as per the Technical Specification.

## 20.0 CONTRACTOR'S AREA LIMITS

The Purchaser/Consultant will mark-out the boundary limits of access roads, parking, spaces, storage and construction areas for the Contractor and the Contractor shall not tress-pass areas not so marked out for him. The Contractor shall be responsible to ensure that none of his personnel move out of the areas marked out for his operations. In case of such a need for the Contractor's personnel to work out of the areas marked out for him, the same shall be done only with the written permission of the Purchaser/Consultant.

## **21.0 CONTRACTOR'S COOPERATION WITH THE PURCHASER**

- 21.1 In cases where the performance of the erection work by the Contractor affects the operation of the system facilities of the Purchaser/Consultant or other agencies such erection work of the Contractor shall be scheduled to be performed only in the manner stipulated by the Purchaser/Consultant and the same shall be acceptable at all times to the Purchaser/Consultant. The Purchaser/Consultant may impose such restrictions on the facilities provided to the Contractor such as electricity, water etc. as he may think fit in the interest of the Purchaser and the Contractor shall strictly adhere to such restrictions and co-operate with the Purchaser/Consultant. It will be the responsibility of the Contractor to provide all necessary temporary instrumentation and other measuring devices required during start-up and operation of the equipment systems, which are erected by him. The Contractor shall also be responsible for consumables required for the equipment furnished and erected by him, so as to make such equipment ready for operation. The Contractor shall be responsible for supplying such consumables.
- 21.2 The Contractor at all times shall work in coordination with the Purchaser's Consultants and offer them all reasonable facilities to become familiar with the erection, operation and maintenance of the equipment.
- 21.3 In respect of observations of local rules, administrative orders, working hours and the like, the Contractor and his personnel shall cooperate with the Purchaser.

## **22.0 COMMISSIONING**

The 'Commissioning' of the equipment supplied and erected by the Contractor shall be the responsibility of the Contractor as detailed in Tender specification. The Contractor shall provide in addition, test instruments, calibrating devices etc. and the labour required for the successful performance of these tests. If it is anticipated that the above tests may prolong for a long time, the Contractor's workmen required for the above tests shall always be present at site during such tests.

## **23.0 MATERIAL HANDLING AND STORAGE**

- 23.1 All the equipment furnished under the Contract and arriving at site shall be promptly received, unloaded and transported and stored in the storage spaces by the Contractor.
- 23.2 The Contractor shall be responsible for examining all the shipment and notify the Purchaser/Consultant immediately of any damage, shortage, discrepancy etc. for the purpose of Purchaser's / Consultant's information only. The Contractor shall submit to the Purchaser / Consultant every week a report detailing all the receipts during the week. However, the Contractor shall be solely responsible for any shortages or damage in transit, handling and/or in storage and erection of the equipment at the site (Any demurrage, wharfage and other such charges claimed by the transporters, railways etc. shall be to the account of the Contractor).
- 23.3 The Contractor shall maintain an accurate and exhaustive record detailing out the list of all equipment received by him for the purpose of erection and keep such record open for the inspection of the Purchaser/Consultant at any time.

- 23.4 All equipment shall be handled very carefully to prevent any damage or loss. No bare wire ropes, slings etc shall be used for unloading and/or handling of the equipment without the specific written permission of the Purchaser/Consultant. The equipment stored shall be properly protected to prevent damage either to the equipment or to the floor where they are stored. The equipment from the store shall be moved to the actual location at the appropriate time so as to avoid damage for such equipment at site.
- 23.5 All electrical panels, control gears, motors and such other devices, shall be properly dried by heating before they are installed and energized. These equipments shall be protected against moisture ingress and corrosion during storage and periodically inspected. Heavy rotating parts in assembled condition shall be periodically rotated to prevent corrosion due to prolonged storage and shall also be periodically inspected.
- 23.6 All critical electrical equipments shall be tested for insulation resistance at least once in three months from the date of receipt till the date of commissioning and a record of such measured insulation values shall be maintained by the Contractor. Such records shall be open for inspection by the Purchaser/Consultant.
- 23.7 The Contractor shall ensure that all the packing materials, and protection devices used for the various equipments during transit and storage are removed before the equipments are installed.
- 23.8 The consumables and other supplies likely to deteriorate due to storage must be thoroughly protected and stored in a suitable manner to prevent damage or deterioration in quality by storage.
- 23.9 All the materials stored in the open or dusty locations must be covered with suitable weatherproof and flameproof and flame proof covering material wherever applicable.
- 23.10 If the materials belonging to the Contractor are stored in areas other than those earmarked for him, the Purchaser/Consultant will have the right to get it moved to the area earmarked for the Contractor at Contractor's cost.
- 23.11 The Contractor shall be responsible for making suitable indoor storage facilities to store all equipment which require indoor storage. Normally all the electrical equipments shall be stored in the closed storage space. The Purchaser/Consultant in addition, may direct the Contractor to move certain other materials which in his opinion will require indoor storage, to indoor storage areas which the Contractor shall strictly comply with.
- 23.12 The Contractor shall arrange for periodic inspection of material/equipment in his custody until taken over by the Purchaser and shall carry out all protective and preservative measures required thereupon.
- 23.13 The Contractor shall also keep a check on the deliveries of the equipment/material covered in his scope of erection and shall advise the Purchaser well in advance regarding possible hold-ups in his work due to expected delays in delivery of equipment, to enable the Purchaser to expedite the deliveries if supplier is different from the Contractor.

23.14 All materials of Contractors should be received only during normal working hours. Damage of any of the roads due to movement of heavy trucks, trailers, crane and other equipment of the Contractor shall be made good by the Contractor. Otherwise same shall be got rectified by the Purchaser at the risk and cost of the Contractor.

23.15 All the I& C electronic equipment shall be stored in Air-Conditioned storage.

#### **24.0 CONSTRUCTION MANAGEMENT**

24.1 The field activities of the Contractor working at site will be coordinated by the Purchaser/Consultant and the Purchaser's/ Consultant's decision shall be final in resolving any disputes or conflicts regarding scheduling and co-ordination of work. Such decision by the Purchaser/Consultant shall not be a cause for extra compensation or extension of time for the Contractor.

24.2 The Purchaser/Consultant shall hold weekly meetings at site with Contractor. The Contractor shall attend such meetings and take notes of discussions during the meeting and the decisions of the Purchaser / Consultant and shall strictly adhere to those decisions in performing his 'Works'. In addition to the above weekly meetings, the Purchaser / Consultant may call for other meetings and in such a case the Contractor, if called, will also attend such meetings.

24.3 Time is the essence of the 'Contract' and the Contractor shall be responsible for performance of his Works in accordance with the specified construction schedule. If at any time, the Contractor is falling behind the schedule, he shall take necessary action to make good for such delays by increasing his work force or by working overtime or otherwise accelerate the progress of the work to comply with the schedule and shall communicate such action in writing to the Purchaser / Consultant satisfying that his action will compensate for the delay. The Contractor shall not be allowed any extra compensation for such action.

24.4 The Purchaser / Consultant shall however not be responsible for provision of additional labour and/or materials or supply or any other services to the Contractor except for the co-ordination work between various Contractors as set out earlier.

#### **25.0 FIELD OFFICE RECORDS**

25.1 The Contractor shall maintain at his site Office up-to-date copies of all drawings, specifications and other Contract Documents and any other supplementary data complete with all the latest revisions thereto. The Contractor shall also maintain in addition the continuous record of all changes to the above Contract Documents, drawings, specifications, supplementary data, etc. effected at the field and on completion of his total assignment under the 'Contract' shall incorporate all such changes on the drawings and other Consultant data to indicate as installed conditions of the equipment furnished and erected under the 'Contract'. Such drawings and Engineering, data shall be submitted to the Purchaser / Consultant in required number of copies. A record of all readings taken during the testing and inspection shall be maintained by the Contractor. This shall be signed by the erection supervisor and the Purchaser/Consultant as a token of their acceptance of the same. All such records shall be handed over to the Purchaser on completion of the 'Works'.

## **26.0 CONTRACTOR'S MATERIAL BROUGHT TO SITE**

- 26.1 The Contractor shall bring to site all equipment, components, parts, materials including construction equipment, tools and tackles for the purpose of the 'Works under intimation to the Purchaser/Consultant. All such goods shall, from the time of their being brought vest in Purchaser, but may be used for the purpose of the 'Works' only and shall not on any account be removed or taken away by the Contractor without the written permission of the Purchaser/Consultant. But the Contractor shall nevertheless be solely liable and responsible for any loss or destruction thereof and damage thereto.
- 26.2 The Purchaser shall have a lien on such goods for any sum or sums, which may at any time, be due or owing to him by the Contractor, under, in respect of or by reasons of the 'Contract'. After giving a fifteen (15) days notice in writing of his intention to do so, the Purchaser shall be at liberty to sell and dispose of any such goods, in such manner as he shall think fit including public auction or private treaty and to apply the proceeds in or towards the satisfaction of such sum or sums due as aforesaid.
- 26.3 After the completion of the 'Works', the Contractor shall remove from the site under the direction of the Purchaser/Consultant the materials such as construction equipment, erection tools and tackles, scaffolding, etc. with the written permission of the Purchaser / Consultant. If the Contractor fails to remove such materials, within fifteen (15) days of issue of a notice by the Purchaser/Consultant to do so, then the Purchaser/Consultant shall have the liberty to dispose of such materials as detailed under Clause 26.2 above and credit the proceeds to the account of the Contractor.
- 26.4 On completion of the work, all rubbish materials and temporary structures of any sort or kind used for the purpose or connected with the construction/erection work and heaps are to be removed by the Contractor and all pits and excavations filled up and the site handed over in a tidy and workmanlike condition and no final payment or settlement of the account for the said work shall held or due shall be made to the Contractor till such site clearance shall have been effected by him and such clearance shall be made by the Purchaser at the expense of the Contractor in the event of his failure to comply with this provision within 7 (seven) days after receiving notice in writing from the Purchaser to that effect. If it becomes necessary for the Purchaser to have the site cleared as indicated above at the expense of the Contractor, the Purchaser shall under no circumstances be held liable for any losses of damages to such of Contractors property as may be on such site due to such removal there from, which removal may be effected by means of public sale of such materials and property in such a way as deemed fit and convenient to the Purchaser.
- 26.5 The Contractor must take sufficient care in moving his construction/erection plant and equipment from one place to another so that they may not cause any damage to the property of the Purchaser, particularly of the existing structures and overhead and underground services and in the event of the Contractors failure to do so, the cost of such damages shall be borne by the Contractor.

## **27.0 PROTECTION OF PROPERTY AND CONTRACTOR'S LIABILITY**

- 27.1 The Contractor shall be responsible for any damage resulting from his operations. He shall also be responsible for protection of all persons including members of public and employees of the Purchaser/Consultant and the employees of other Contractors and Sub-Contractors and all public and private property including structures, buildings, other plants and equipment and utilities either above or below the ground.
- 27.2 The Contractor will ensure provision of necessary safety equipment such as barriers, signboards, warning lights and alarms, etc. to provide adequate protection to persons



and property. The Contractor shall be responsible to give reasonable notice to the Purchaser/Consultant and the Owner of public or private property and utilities when such property and utilities are likely to get damaged or injured during the performance of his 'Works' and shall make all necessary arrangements with such owners, related to removal and/or replacement or protection of such property and utilities.

## **28.0 PAINTING**

28.1 All exposed metal parts of the equipment including pipings, structures, railings, etc. after installation, unless otherwise surface protected, shall be first painted with at least one coat of suitable primer which matches the shop primer paint used, after thoroughly cleaning all such parts of all dirt, rust, scales, greases, oils and other foreign materials by wire brushing, scraping or sand blasting, and the same being inspected and approved by the Purchaser for painting. Afterwards, the above parts shall be finished with two coats of alloyed resin machinery enamel paints. The quality of the finish paint shall be as per the standards of ISI or equivalent and to be of the colour as approved by the Purchaser/Consultant.

## **29.0 INSURANCE**

Refer relevant Clauses under Schedule – 10 of Volume – II

## **30.0 UNFAVOURABLE WORKING CONDITIONS**

The Contractor shall confine all his field operations to those works which can be performed without subjecting the equipment and materials to adverse effects, during inclement weather conditions, like monsoon, storms, etc. and during other unfavorable construction conditions. No field activities shall be performed by the Contractor under conditions which might adversely affect the quality and efficiency thereof, unless special precautions or measures are taken by the Contractor in a proper and satisfactory manner in the performance of such works and with the concurrence of the Purchaser/Consultant. Such unfavorable construction conditions will in no way relieve the Contractor of his responsibility to perform the 'Works' as per the schedule.

## **31.0 PROTECTION OF MONUMENTS AND REFERENCE POINTS**

31.1 The Contractor shall ensure that any finds such as relic, antiquity, coins, fossils, etc. which he may come across during the course of performance of 'Works' either during excavation or elsewhere are properly protected and handed over to the Purchaser/Consultant.

Similarly the Contractor shall ensure that the bench marks, reference points, etc., which are marked out either with the help of Purchaser/Consultant or by the Purchaser/Consultant shall not be disturbed in any way during the performance of his 'Works'. If any work is to be performed which may disturb such references, the same shall be done only after these are transferred to other suitable locations under the direction of the Purchaser/Consultant. The Contractor shall provide all necessary materials and assistance for such relocation of reference points, etc.

## **32.0 WORK & SAFETY REGULATIONS**

Refer Technical Specification.

## **33.0 ELECTRICAL SAFETY REGULATIONS**

Refer Technical Specification.

## 34.0 PURCHASER'S INSTRUCTIONS

34.1 The Purchaser/Consultant may, in his absolute discretion, from time to time, issue further drawings and/or written instructions, details, directions and explanations, which are collectively referred to as "Purchaser's Instructions", in regard to :

34.1.1 Any additional drawings and explanations to exhibit or illustrate details.

34.1.2 The variation or modification of the design, quality or quantity of work or the additions or omission or substitution of any work.

34.1.3 Any discrepancy in the drawings or between the Schedule of Quantities and/or specification.

34.1.4 The removal from the site of any materials brought thereon by the Contractor and the substitution of other materials thereof.

34.1.5 The removal and/or re-execution of any work executed by the Contractor.

34.1.6 The dismissal from the work of any persons employed thereupon.

34.1.7 The opening up for inspection of any work covered up.

34.1.8 The amending and making good of any defects.

34.2 The Contractor shall comply with and duly execute any work covered in such 'Purchaser's Instructions' provided always that verbal instructions, directions, and explanations given to the Contractor or his foreman upon the work by the Purchaser/Consultant shall, if involving a variation, be confirmed in writing by the Purchaser/Consultant within seven (7) days.

34.3 If compliance with the 'Purchaser's Instructions' as aforesaid involves work and scope beyond that contemplated by the 'Contract', unless the same were issued owing to some breach of this 'Contract' by the Contractor, the Purchaser shall pay to the Contractor the price of the said work as hereinafter provided.

34.4 If the Contractor after receipt of written notice from the Purchaser/Consultant requiring compliance, with such further drawings and/or 'Purchaser's Instructions' fails to comply with the same within seven (7) days the Purchaser may employ and pay other agencies to execute any such work whatsoever, as may be necessary to give effect thereto, and all costs incurred in connection therewith shall be recoverable from the Contractor by the Purchaser on a certificate by the Consultant as a debt or may be deducted by the Purchaser from any money that may become due to the Contractor.

## 35.0 RIGHTS OF THE PURCHASER/CONSULTANT

### 35.1 Right to Illustrate and Explain Plans

35.1.1 The various parts of the 'Contract' are intended to be complementary to each other but should any discrepancy appear or any misunderstanding arise as to the import of anything contained therein, the explanation of the Purchaser/Consultant shall be final and binding.

35.1.2 The correction of any errors or omissions of the Drawings and Specifications may be made by the Purchaser/Consultant, when such correction is necessary to bring out clearly the intention which is indicated by the reasonable interpretation of the Drawings and Specifications as a whole.

- 35.1.3 Whenever in the Specifications or on the Drawings which are a part of the 'Contract' or which may be furnished to the Contractor for directing this work, the terms and descriptions of various qualities of workmanship, material, structures, processes, plant or other features of the 'Contract' are described in general terms, the meaning or fulfillment of which must depend upon individual judgment, then in all such cases the question of fulfillment of such specifications or requirements shall be decided by the Purchaser / Consultant and said material shall be furnished, said work shall be done, and said structure, process, plant or feature shall be constructed, furnished or carried on in full and complete accordance with his interpretation of the same and to his full satisfaction and approval, provided such interpretation is not in direct conflict with the Drawings and Specifications and generally accepted good engineering practice.
- 35.1.4 Details shown either on the Drawings or in the Specifications shall be done and furnished as if shown in both except where expressly excepted either in the Specifications or on the Drawings. Figured dimensions shall in all cases be taken in preference to scale measurements and detailed drawings consistent with general drawings shall be taken in preference to the general drawings of the same part of the work.
- 35.1.5 The Purchaser / Consultant may, from time to time, prepare for his own use estimates of quantities or bills of materials required for the work. Copies of such estimates or bills of materials which may be given to the Contractor for his convenience, or any lists, weights or quantities of materials or structures which may appear on the drawings may not be considered as finally correct, sufficiently complete or accurately covering any portion or all of the work to be done under the 'Contract'. Such bills or estimates may be carefully assembled and prepared but their accuracy is not guaranteed. They may not be accurate as to any particular details and are given only as the best information available at the time of issue of the information. It is understood that any such lists or estimates are furnished to the Contractor for his convenience only and not as lists or estimates of work to be done and many necessary items of work might have been omitted.
- 35.1.6 Additional drawings and explanations to exhibit or illustrate details may be provided by the Purchaser / Consultant whenever necessary and if so provided, and if consistent with the Drawings and Specifications, it shall be binding upon the Contractor to take cognizance of the same. The written decision of the Purchaser / Consultant as to the true construction and meaning of the Drawings and Specifications and of such additional drawings and explanations shall be binding upon the Contractor.

## **35.2 Right to Direct Work**

- 35.2.1 The Purchaser / Consultant shall have the right to direct the manner in which all work under this 'Contract' shall be conducted, in so far as it may be necessary to secure the safe and proper progress and the specified quality of the work, and all work shall be done and all material shall be furnished to the satisfaction and approval of the Purchaser / Consultant.
- 35.2.2 Whenever, in the opinion of the Purchaser / Consultant, the Contractor has made marked departures from the schedule of completion laid down in the 'Contract' or when untoward circumstances force a departure from the said schedule, the Purchaser / Consultant, in order to assure the compliance with the schedule and the provisions of the 'Contract', shall direct the order, pace and method of conducting the work, which shall be adhered to by the Contractor.
- 35.2.3 If, in the judgment of the Purchaser / Consultant, it becomes necessary at any time to accelerate the overall plant erection work, the Contractor, when ordered and directed by the Purchaser / Consultant, shall cease work at any particular point and transfer his men

to such other point or points, and execute such portion of his work, as may be required, to enable others to hasten and properly engage and carry on their work, all as directed by the Purchaser / Consultant.

- 35.2.4 Night work will be permitted only with prior approval of the Purchaser / Consultant. The Purchaser / Consultant may also direct the Contractor to operate extra shifts over and above normal day shift to completion of 'Contract' on schedule if, in his opinion, such work is required.

### 35.3 **Right to Order Modifications of Methods and Equipment**

If at any time the Contractor's methods, materials or equipment appear to the Purchaser / Consultant to be unsafe, inefficient or inadequate for securing the safety of the workmen or the public, the quality of work or the rate of progress required, he may order the Contractor to ensure their safety and increase their efficiency and adequacy, and the Contractor shall promptly comply with such orders. If at any time, the Contractor's working force and equipment are in the opinion of the Purchaser / Consultant, inadequate for securing the necessary progress, as herein stipulated, the Contractor shall, if so directed, increase the working force and equipment to such an extent as to give reasonable assurance of compliance with the schedule of completion. The absence of such demands from the Purchaser / Consultant shall not relieve the Contractor of his obligations to secure the quality, the safe conducting of the work, and the rate of progress required by the 'Contract', and the Contractor alone shall be and remain liable and responsible for the safety, efficiency and adequacy of his methods, materials, working force and equipment, irrespective of whether or not he makes any change as a result of any order or orders received from the Purchaser / Consultant.

### 35.4 **Right to Perform**

The Purchaser reserves the right to perform or have performed in and about the 'Works' during the time when the Contractor is performing his work hereunder, such other work as the Purchaser desires, and the Contractor shall make all reasonable effort to perform his work hereunder in such a manner as will enable such other work to be performed without hindrance and shall make no claim for damage against the Purchaser arising out of such other work to be performed against hindrance and shall make no claim for damage against the Purchaser arising out of such other work or interference there from. The Contractor shall work in harmony with such other Contractor's regardless of race, religion, colour or national origin and any dispute between Contractors shall be arbitrated by the Purchaser / Consultant.

### 36.0 **MEASUREMENT OF WORK AND PROGRESS PAYMENTS**

- 36.1 The Purchaser / Consultant may, from time to time, intimate the Contractor that he requires the works to be measured and the Contractor shall attend or send a qualified agent to assist the Purchaser / Consultant or his representative in taking such measurements and calculations and to furnish all particulars as may be required by him.
- 36.2 Where the erection of equipment, steel structures panels are involved, the basis of such measurements and progress evaluation shall be weights specified in the shipping documents or invoices or drawings as decided by the Purchaser / Consultant. Should the Contractor not attend or neglect or omit to send such agents, then the measurement taken by the Purchaser / Consultant or approved by him shall be taken to be the correct measurements of the work. The Contractor or his Agent may, at the time of measurement, take such notes of measurements as he may require.
- 36.3 When measurements are effected by conditions already established, the Contractor shall take field measurements notwithstanding scale or dimensions shown on the drawings.

- 36.4 The measurements so taken and certified correct by the Purchaser / Consultant shall be the basis for the progress payment to the Contractor. Where the break-up of 'Contract on unit basis Price' is difficult to arrive at, the Purchaser / Consultant and the Contractor shall work out at the commencement of the 'Contract', the weightages or the cost or the cost break-ups to arrive at a mutually agreeable basis for computation of the progress estimates.
- 36.5 To the value so arrived at on the basis of the Contractor's monthly progress evaluated, shall be added the amounts earned by the Contractor under supplemental Contracts and orders if any, till date of the progress estimate. From the total thus computed, all previous payments plus any amounts due to the Purchaser in accordance with the terms of this Contract shall be deducted. The remainder shall be paid by the Purchaser to the Contractor under Interim Certificates from the Consultant.
- 36.6 In case work is nearly suspended or in case only unimportant progress is being made, or in case it is apparent that Contractor is about to forfeit his 'Contract' or that the money yet due to him shall not complete his 'Contract', the Purchaser may at his discretion withhold any payment which may be due to the Contractor.
- 36.7 The Purchaser may withhold part or whole of any payment for erection claimed by the Contractor, which in opinion of the Purchaser, is necessary to protect himself from loss on account of :
- a) Defective work not remedied or guarantees not met.
  - b) Claims filed against the Contractor.
  - c) Failure of the Contractor to make due payment for materials supplied or labour employed by him.
  - d) Damage to other Agencie's/Contractor's or Purchaser's or Others' property.
  - e) Failure to meet the mutually agreed schedules.
- 36.8 When the grounds for withholding payments are removed, payments of the amount due to the Contractor shall be made by the Purchaser within a reasonable period.
- 36.9 The Contractor shall not demand nor be entitled to receive payment for the work of portion thereof, except in the manner set forth in this 'Contract' and only after the Purchaser / Consultant shall have given a certificate for such payment.
- 37.0 **ADHERENCE TO MANUFACTURER'S INSTRUCTION**

Adherence to instructions of the Manufacturer's supervisory Consultants, is compulsory. The Contractor shall work under the guidance of the Manufacturer's supervisors to ensure that erection procedures adopted by the Contractor as well as completed erection of equipment is such as not to interfere with or prevent equipment from functioning as intended, as well as to the entire satisfaction of the Manufacturer's supervisor / Purchaser / Consultant. The Contractor shall also permit and provide all facilities for the Manufacturer's erection supervisors to carry out all checks that they may wish to, and approve any erection procedure and/or final setting and alignment of components, in order to satisfy themselves that erection has not been carried out as intended by them. This shall, however, in no way relieve the Contractor of his responsibility for providing adequate and competent supervision and quality workmanship.

### **38.0 MODIFICATIONS**

The Contractor shall carry out all modifications at site as directed by the Purchaser / Consultant to complete the work covered in this 'Contract'. It is the responsibility of the Contractor to get the prior approval for such modifications from the Purchaser / Consultant before such works are taken up. The Contractor shall also get the estimates and the actual time sheets certified by the Purchaser/Consultant, and these certified time sheets will be the basis for processing his bills for such modification works which are required to be carried out for no fault of the Contractor.

### **9.0 DEFECTIVE WORK**

If the work or any portion thereof shall be damaged in any way excepting by the acts of the Purchaser or if defects not readily detected by prior inspection shall develop before the final completion and acceptance of the whole work, the Contractor shall forthwith make good, without compensation, such damage or defects in a manner satisfactory to the Purchaser / Consultant. In no case shall defective or imperfect work be retained.

### **40.0 WORK OF OTHERS**

If any part of the Contractor's work depends, for proper execution, upon the work of any other Agency/ any other Contractor, the Contractor shall inspect and promptly report in writing to the Purchaser / Consultant any defect in such work of other agencies/other Contractors that render it unsuitable for proper execution of the work under this 'Contract'. His failure to so inspect and report shall constitute an acceptance of the other agency's/ other Contractor's work as fit and proper for the reception of his work, except as to defects which may develop in the work of other Agencies/other Contractors after the proper execution of the work. To ensure proper execution of his subsequent work, the Contractor shall inspect work already in place and shall at once report to the Purchaser / Consultant any discrepancy between the executed work and the drawings.

## ANNEXURE – II

### GENERAL CONDITIONS FOR CIVIL WORKS

- 1.0 The Contractor shall make his own arrangement for all labour, construction equipment, tools and tackles and construction materials. All temporary approach roads to the site for carrying out construction work shall be constructed and maintained by the Contractor at his own cost.
- 2.0 The Contractor shall take all necessary precautions to avoid damage to any property of the Purchaser or any third party. The Contractor shall also ensure that the progress of work of other Contractors in the adjoining areas is not hindered. Any damage occurring should then be made good by the Contractor at his own expense.
- 3.0 The Contractor shall take all precautions during execution, especially while excavating to avoid interference with or, damage to underground works, such as cables, pipe lines, drains etc. and provide all possible protection to these works and in case they are damaged, rebuild/divert them at his own cost.
- 4.0 The Contractor shall carry out necessary precision survey to set out and check the setting of all works including foundation & anchor bolts etc. to required tolerances using the grid reference points available in the plant site. The Contractor shall make and maintain proper bench mark and reference points and check lines and levels periodically.
- 5.0 Materials brought to the site shall not be removed from the site without the written consent of the Purchaser. The Contractor shall submit well in advance for approval, all samples and specimens as the Purchaser may demand from time to time. Any material brought to site and rejected by the Purchaser shall be removed by the Contractor from the site of work immediately within the time limit specified by the Purchaser. In case, the Contractor is not removing the rejected materials, the same will be removed by the Purchaser and cost thereof shall be recovered from the bills of the Contractor.
- 6.0 The Purchaser may during the progress of work, order the removal of part or whole of the work executed, found not in accordance with the approved drawings/ specifications/ written instructions. No extra claims shall be entertained for removal & re-execution of such work.
- 7.0 No work shall be covered up or put out of view without the approval of the Purchaser. In the event of failing to do so, the Contractor shall uncover any part of the work or make openings in or through the works as the Purchaser may direct and they shall be made good with materials approved by the Purchaser and should match with workmanship of the surrounding work.
- 8.0 The Contractor shall dismantle and remove the stagings and other temporary facilities like stores, offices, etc. on completion of work, clear and clean the site where such temporary facilities were built and restore the same to original condition at his own cost.
- 9.0 The Contractor shall provide all necessary storage at the site in specified areas for all materials such as timber, cement, lime and such other materials which are likely to deteriorate by the action of sun, winds, rain, coastal conditions or other natural cause due to exposure in the open in such manner that all such materials shall be duly -protected from damage by weather or any other cause. All such stores shall be cleared away and the whole site left in good order on completion

of the contract. All materials, shall be stacked in such a manner as to facilitate rapid and easy checking of such materials. The Contractor will not be permitted to store any of his material in the buildings under construction or already constructed by him without prior approval of the Purchaser.

- 10.0 After completion of work, the Contractor shall carry out micro-levelling of the site within plant area ensuring proper grades and slopes to achieve efficient drainage of the site. The Contractor shall remove all debris, surplus earth etc. and dump the same at places/place as directed by the Purchaser within a distance of 8 km from the site.
- 11.0 The Contractor shall be held responsible for proper performance for buildings and structures including all other civil work during the guarantee period. Any defect found during this period will be made good by the Contractor at his own cost failing which the Purchaser reserves the right to take remedial measures at the Contractor's risk and cost.
- 12.0 All excavated materials shall remain the property of the Purchaser. In case the Contractor wishes to utilise the boulders excavated by him during the excavation work at the site, the same may be issued to him at prevailing rates on cost recovery basis. Percentage of voids on stack measurement shall be mutually agreed. Contractor shall have to account for all excavated hard rock.
- 13.0 In respect of any portion of works which is to be embedded or covered up by other works, the Contractor shall submit them to Purchaser for technical inspection and have the necessary clearance certificates duly signed by the Purchaser and Contractor before letting such portion to be embedded or covered.
- 14.0 Wherever works are to be carried out in proximity or within existing facilities, contractor may have to adopt special methodology of construction suited to prevailing conditions. He shall make necessary schemes in advance and finalise the same with the approval of the Purchaser/Consultant.
- 15.0 On progressive completion of work, the Contractor shall submit to the Purchaser the following documents for the passing of the work:
  - a) Certificate on control checking.
  - b) A copy of each of the concerned working drawings showing thereon all approved additions and alterations, if any, in the process of execution.
  - c) Clearance certificates for embedded/covered up works.
  - d) Manufacturer's certificates, guarantees and test certificates, as relevant.
- 16.0 The Contractor shall carry out structural load check with structure test, concrete sieve test as per IS 456 for equipment foundation & pedestal at locations specified by the Purchaser on any part of the building/structure at his own cost if so directed by the Purchaser.
- 17.0 As the works under the contract are to be carried out within the protected area, the Contractor shall abide by all the security regulations promulgated from time to time by the Purchaser/other concerned authorities.
- 18.0 No blasting is allowed. If required it shall be done with prior approval of Purchaser without any extra cost.

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## ANNEXURE-III

### SAFETY CODE FOR THE CONTRACTOR

#### GENERAL

- 1.00 Safety is the responsibility of every employee individually and collectively.
- 1.01 The Contractor shall submit Safety Code and handed over a copy to all sub- Contractors working under his control and he should in turn display all rules on the office notice board for the benefit of all the men working under him.
- 1.02 The Contractor shall provide adequate guards, illumination, fencing and watching wherever necessary at the construction site & working area, for the safety & convenience of public or others.
- 1.03 Fire extinguishers adequate in number shall be kept by the Contractor at the site of works where there is risk of fire hazard, especially near the site stores.
- 1.04 Adequate washing facilities with proper drainage shall be provided properly maintained near the place of work but at a safe distance from approach roads, Electrical HT Lines etc.
- 1.05 When work is to be done near any place, where there is risks of drowning, arrangements to be made for safe barricading of such areas. All necessary equipment shall be provided and kept ready for use and necessary steps taken for prompt rescue of any person in danger and adequate provision shall be made for prompt first-aid treatment of all injuries likely to be sustained during the course of the work in case of mishap.
- 1.06 To ensure effective enforcement of the rules and regulations relating to safety precautions, the arrangements made by the Contractor shall be open to inspection by the Safety Engineer, the Labour Officer, Engineer-in-charge of the department or their representatives.
- 1.07 Notwithstanding the above clauses, there is nothing in those to exempt the Contractor from the operation of any other Act or Rule in Republic of India for the safety of men and materials.
- 1.08 An injury sustained in the plant, must be reported to the First-Aid Station no matter how slight it is, the injured person will inform Supervisor/Officer in-charge.
- 1.09 In case of a fatal accident, the Contractor must inform the Engineer in-charge of the department for which he is working and report in writing should be made in the form.
- 1.10 Smoking or keeping of naked light is strictly prohibited near gas lines, valves and any other equipment connected with the gas distribution.
- 1.11 Smoking and carrying of matches, lighters and other spark producing devices is strictly prohibited within the area where inflammable liquids are stored, handled or used or where loading or unloading operations are performed. Any tank or container containing flammable liquid should be properly grounded for preventing ignition due to static

electricity spark. Contractor should ear-mark such areas and provide necessary warning signals.

- 1.12 Contractors should ensure that employees do not come to work while still under the influence of intoxicants. Any employee found on duty under the influence of liquor or of intoxicating drugs, will be liable to severe disciplinary action.
- 1.13 Work surrounds should be kept clean, free from oil, grease and other obstructions or fallen objects like nuts bolts etc.
- 1.14 After a job or work is completed, all left-over junk and other scrap materials should be cleared from the area immediately.
- 1.15 Drums or other make-shift arrangement must not be used in place of ladders or as work benches or supports for any job.
- 1.16 Employees must not walk through or across any systems that is brought into operation unless their duties require them to do so or they are authorised to do so.
- 1.17 Compressed air should not be used for removing dust from one's clothes. Compressed air should not be blown against anyone as it may injure or even kill him.
- 1.18 If an employee, in the course of his work, encounters condition of unusual hazard with which he is not familiar, he should contact the supervisor for advice before proceeding further. He should also inform the Contractor as well as the Engineer in-charge.
- 1.19 Contractors should particularly ensure that they or their employees do not meddle with any equipment and see that they keep away from such equipment.
- 1.20 It should be ensured that no one takes rest/shelter below any under cut pit/excavation or near any stock of materials or under Solar PV arrays.
- 1.21
  - i. For any work involving repair & maintenance underground work the Contractor shall follow the safety procedural orders/instruction issued by the Purchaser.
  - ii The Contractor shall exercise supervision of such jobs by competent persons within the meaning of factories act & rules.
  - iii All persons engage on such jobs shall have to have before hand proper training instructions as required under Factories Act & Rules.
- 1.22 The site is in the vicinity of desert area with sand dunes. Contractor has to caution his employees at site against the associated hazards. If considered necessary, he shall arrange for a properly equipped team for taking care of contingencies.

## 2.0 **SAFETY MEASURES IN CONTRACTUAL WORK**

Whereas, it is necessary to take steps to ensure safety at work sites by the executing contractual agency, it is incumbent of the Purchaser to introduce all measures to guide, induce, train and bind the agencies concerned to adopt remedial steps to prevent accidents. Problem gets aggravated in contractual zones due to lack of training, in-adequate supply of personal protective equipment, shortage of skilled labour changing deployment of works etc. Accordingly, the following measures are intended to be introduced and the salient clauses will be included in the contract documents.

- 2.1 The Contractor shall take all safety precautions and provide adequate supervision in order to carryout the job safely and without damage to equipment.
- 2.2 Any special safety precautions, if required to be followed by the Contractor, such clauses shall be added.
- 2.3 The executing department would take necessary shut-downs wherever there are hazards of gases, electricity, moving machinery etc. The Contractor shall ensure that the shut-down/clearance are taken before sending workers to such locations.
- 2.4 The Contractor shall supply safety appliance like shoes, safety belts, ladies chappals, helmets, gloves etc. to his workers depending on working conditions and Life saving jackets shall be kept in readiness always at the site. The Contractor shall not deploy any workmen without safety boot and safety helmet and the safety applicable to the specific work conditions.
- 2.5 Before starting the day's job, the Purchaser's Supervisor/representatives will ensure that safety briefing has been done to the Contractor's supervisor who has been imparted safety induction earlier.
- 2.6 HOD/Zonal in-charge will nominate Engineer in-charge of the contractual work under reference who will be fully responsible for the safe execution of the work at site.
- 2.7 In case of injury to persons, the Contractors shall first take the injured person to the NLC Dispensary hospital with the necessary forms. In no case the Contractors are allowed to take injured persons directly to their own Doctors.
- 2.8 The Contractor shall abide by the provisions of Factories Act, State Factory Rules, Workmen's Compensation Act, Payment of Wages Act, Contract Labour (Regulation) Act etc. and keep the Purchaser indemnified of provisions of the above Acts and Rules.
- 2.9 The Head of Deptt. Executing the contract upon the satisfaction that the Contractor is not conforming to the Safety requirements may direct stoppage of work and require the Contractor to remedy the defects. The Contractor shall not proceed with the work until he has complied with each direction to the satisfaction of such Head of the Department.
- 2.10 The Contractor shall be fully responsible for accidents caused due to him or his agents or workmen's negligence or carelessness in regard to the observance of the safety requirements and shall be liable to pay compensation for injuries.
- 2.11 Without prejudice to the right conferred by the clause 2.09 above for stoppage of work for violations of safety requirements the Contractor shall be liable for penalty as deemed fit for violation of safety rules & regulations upto first two instances. For the third violation he shall be liable to be debarred from further contracts upto a period of one year from the date of issue of debarring notice.

- 2.12 The Head of the Safety Engg. Deptt. Or the Head of the Deptt. Executing the contract will assess the penalty amount having regard to the circumstances, in particular, the nature and gravity of the violation. After issuing a notice to the Contractor to show cause why the amount specified therein shall not be imposed as a penalty and considering the cause shown by the Contractors, if any, he shall pass final orders which shall then be final and binding on the Contractor. The penalty amount will be recoverable from any bill and/or EMD/SD of the Contractor without any further reference to him.
- 2.13 Whenever work, at height is involved, Contractor must obtain height passes from Safety Engg. Deptt. For those persons required to do work at height.
- 2.14 Contractor must insure all the workmen against “Workmen Compensation Act.”

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**ANNEXURE-IV**  
**COMMERCIAL TERMS AND CONDITIONS FOR OPERATION AND**  
**MAINTENANCE CONTRACT**

**1.0 DEFINITION OF TERMS:**

- 1.1 Codes and Standards shall mean all the applicable codes & standards as indicated in the system specification.
- 1.2 'CONTRACTOR' shall mean the successful BIDDER whose bid has been accepted by the PURCHASER and on whom the 'Contract' or 'Purchase order' is placed by the Purchaser and shall include his heirs, legal representatives, successors and permitted assignees.
- 1.3 Contract shall mean and include this contract between the owner and Contractor for the execution of the works as per agreed terms, conditions, specifications prices and enforceable as per law.
- 1.4 Contract period shall mean the period / time schedule agreed in the contract during which period the Contracted work shall be performed / executed, inclusive of any period covered by extension(s), duly issued.
- 1.5 'Contract Price' in relation to particular contract shall mean the total consideration to be paid by NLC to the Contractor.
- 1.6 'Date of Contract' shall mean the calendar date on which NLCIL and the CONTRACTOR have signed the 'CONTRACT'.
- 1.7 "Effective date of Contract for O&M" shall mean the date of final acceptance of installed PV Solar Power Plant.
- 1.8 'Notice in Writing', 'Written Notice' shall mean any notice in written, typed or printed characters sent (unless delivered personally or otherwise proved to have been received) by registered post to the last known private or business address or registered office of the addressee and shall be deemed to have been received when in the ordinary course of post it would have been delivered.
- 1.9 Purchaser/Owner shall mean and include NLC India Limited (NLCIL) and its different functionaries entrusted with the responsibilities in relation to this contract in respect of the area of responsibilities of such functionaries.
- 1.10 'Site ' shall mean the place or places envisaged by NLCIL at which the services are to be performed, as also such other places as may be specifically provided by NLCIL for the stated purposes.
- 1.11 'Work' shall mean the services to be provided by the CONTRACTOR under the scope of the 'Contract'.
- 1.12 'Writing' shall include any manuscript, typewritten or printed statement, under or over signature and/or seal as the case may be.

- 1.13 The various Acts and Regulations are normally available for sale from the following address:  
`Deputy Controller,  
Publication Department,  
Government of India,  
Civil Lines, Delhi - 110 006.

and with leading authorised Government of India book sellers.

## 2.0 **SCOPE OF WORK:**

The detailed Scope of Work is indicated in Technical Specification and Conditions of Contract.

## 3.0 **PRICE BASIS FOR OPERATION & MAINTENANCE:**

- 3.1 The Bidder shall quote "FIRM" price in Indian rupee for the entire contract period of ten (10) years after completion of warranty period.
- 3.2 Price quoted shall include cost of all spares and consumable, to meet NLCIL's requirement as specified in the tender specification.
- 3.3 Bidder are requested to quote their operation and maintenance charges as per the price schedule (Schedule-7.)

## 4.0 **TIME SCHEDULE:**

- 4.1 The time schedule for operation and maintenance shall be for a period of ten (10) years after one year warranty period.

## 5.0 **CONTRACT PERFORMANCE BANK GUARANTEE:**

- 5.1 As a contract security for faithful performance of the Contract in accordance with the terms and conditions specified in the Operation and Maintenance Contract the CONTRACTOR shall furnish a Contract Performance Bank Guarantee in the form of irrevocable bank guarantee from any Nationalized Bank or Scheduled Bank approved by RBI except banks from China in a non-judicial stamp paper for the value of Rs.80/- 30 days before commencement of operation and maintenance for an amount equal to 10% of the total Contract price of operation and maintenance contract. The Contract Performance Bank Guarantee shall be valid for 10 years and shall be valid till the expiry of 90 days beyond the actual date of successful completion of operation and maintenance contract period.
- 5.2 NLC shall have the right to encash the Contract Performance Guarantee for non-compliance of any or all the terms and conditions of the contract and non performance with respect to availability, discontinues to do the work before the completion of period mentioned in Cl. 4.0 above and for failure to comply with any of the obligations as enumerated in the Contract.

5.3 **The 90% of CPG value will be allowed for reduction for supply and services contract under contract No.....dt..... only on receipt and acceptance of CPG for this contract.**

#### 6.0 **TERMS OF PAYMENT**

6.1 The O & M charges quoted in Price Schedule-7 (Vol.1 of 3) shall be paid on pro-rata quarterly basis on certification of work by the Project Manager at the end of every quarter.

#### 7.0 **OPERATION & MAINTENANCE CHARGES**

a. The O&M charges shall be inclusive of taxes and duties as applicable except service tax. But any taxes, levies/fees newly imposed would be reimbursed extra (with submission of documentary proof from concerned authority). Similarly, due credit would be given to NLCIL in case of withdrawal or reduction in applicable taxes/fees/duties. The O&M charges should be quoted for a period of 10 years.

b. Payment will be made after all statutory deductions as applicable to such type of contracts. The rate quoted shall deem to be inclusive of all salaries and other cost, expenses of employees, cost of spares, cost of repair/replacement/modification of any equipment or system for the entire quoted period of 4 years so as to give maximum machine availability. The rates are also inclusive of tools & tackles, etc. and liabilities of every description and all risk of every kind to be taken in operation, maintenance and handing over the plant to NLCIL by the contractor.

#### 8.0 **MODE OF PAYMENT**

8.1 All Payments in Indian Rupees shall be made direct to the Contractor through E-payment. For effecting E-Payment, Contractor shall furnish necessary details to the Purchaser. All bank charges shall be to the account of the Contractor.

#### 9.0 **GST**

9.1 The Contractor shall register with statutory / tax authorities wherever required.

i. The Supplier / Contractor has to provide a copy of the **GST Registration Certificate** and also mention their **GST Registration No.** and **Date** in each of their invoices / bills without fail. No invoice or bill will be paid unless the **GST Registration No.** is mentioned therein.

9.1.1 i. The GST lumpsum indicated in the price schedule is as per the rates prevailing one month prior to original schedule date of Tender Opening . Any statutory variation in respect of GST within the agreed time schedule will be to the account of the purchaser, at actuals based on the documentary evidence, independent of the ceiling quoted. Statutory variation arising beyond agreed time schedule shall not be payable

ii. While claiming the **GST** payment, the contractor should furnish the requisite details in the invoice **as per statutory requirements.**

11.4 **PERSONNEL INCOME TAX & CESS:**

11.4.1 Income Tax and Cess, if any payable by the Contractors/ sub-Contractor's employees shall be paid by the said employees directly, and the Purchaser shall not be liable to pay the income tax & Cess payable by the employee of the Contractor/sub Contractor and the purchaser is not responsible for filing the tax returns of contracts employees/experts.

11.5 Deduction of Tax at source at prevailing rate shall be effected by the Purchaser before payment as a statutory obligation wherever applicable

12.0 **DEPLOYMENT OF QUALIFIED TECHNICAL STAFF IN EXECUTION:**

12.1 The Contractor shall engage required qualified & trained persons for the above O&M works for achieving the guaranteed output. The entire work shall be supervised by a B.E Degree Holder with experience in similar nature of works.

12.2 The Contractor shall see that one of the technically qualified persons is always available at the site of work, during working hours, to check all items of work.

13.0 **SUSPENSION OF WORK:**

13.1 NLCIL give directions from time to time in writing for any valid reasons, without in any way violating this contract, to the Contractor to suspend the work or any part thereof. The Contractor shall suspend the work till such time as indicated by NLC. The Contractor shall not, after receiving such written notice proceed with the works therein ordered to be suspended until he shall have received written notice or authority to the effect from the NLC.

14.0 **INSPECTION OF WORKS:**

14.1 The Purchaser or his duly authorized person shall have at all times, full power to inspect the Solar PV Power Plant where the Contractor is carrying out the Operation and Maintenance. The Contractor shall properly carry out the written instruction issued by the NLCIL.

15.0 **TOOLS & TACKLES SPARES AND CONSUMABLES:**

15.1 The Contractor shall arrange tools and tackles, spares, and consumables required for the Operation & Maintenance of the Solar PV Plant. .

16.0 **ASSIGNMENT AND SUBLETTING OF CONTRACT:**

16.1 The Contractor shall not sublet, transfer or assign the contract or any part thereof without the written permission of NLC. In the event of the Contractor contravening this condition Owner shall be entitled to entrust the work to other agencies at the Contractor's account and risk. The Contractor shall be liable for any loss or damage which the Corporation may sustain in consequence of or arising out of such replacing the contract notwithstanding any such permission to sublet, the Contractor shall always be held responsible for the due fulfillment of the terms and conditions of contract.



17.0 **REGULATION OF LOCAL AUTHORITIES & STATUTES:-**

- 17.1 The Contractor shall ensure compliance with all statutes, laws, rules and regulations of the Central or State Governments or any other authority such as the Workmen's Compensation Act 1923, Payment of Wages Act, Minimum Wages Act - 1948 Employees State Insurance Act, Employees Provident Fund Act, Mines Act Indian Electricity Rules 1956, the Contract Labour and Regulation Act etc. and the general rules there-under any and all statutory modifications thereof in connection with employees engaged by him or his Sub- Contractors in the work.
- 17.2 The Contractor shall arrange to give all notices required by the said Acts, Regulations or Bye-laws to be given to any authority or to any Public Officer and pay all fees that may be properly chargeable in respect of the `works' and lodge the receipts with NLC, Obtaining all permits and licenses required thereupon is the responsibility of the Contractor.
- 17.3 All registration and statutory inspection fees, if any, in respect of his work pursuant to this `Contract' shall be to the account of the Contractor.

18.0 **NLCIL'S LIEN ON EQUIPMENT:-**

- 18.1 No material brought to the "site" shall be removed from the "site" by the Contractor and/or his SUB- Contractor without the prior written approval of NLC.

19.0 **CO-OPERATION WITH OTHER CONTRACTORS-**

- 19.1 The Contractor shall co-operate with all other Contractor's or tradesmen of NLC who may be performing other works on behalf of the NLC and the workmen who may be employed by NLCIL and doing work in the vicinity of the works under their respective contracts. The Contractor shall also so arrange to perform his work as to minimize, to the maximum extent possible interference with the work of other Contractor's and his workmen. NLCIL shall determine the resolution of any difference of conflict that may arise between the Contractor and other Contractor or between the Contractor and the workmen of NLCIL in regard of their work. If the works of this Contractor is delayed because of any acts or omissions of another Contractor, the Contractor shall have no claim against NLCIL on that account other than an extension of time for a completing his works.

20.0 **DISCIPLINE OF WORKMEN:**

- 20.1 The Contractor shall adhere to the disciplinary procedure set by NLCIL in respect of his employees and workmen at 'Site'. NLCIL shall be at liberty to object to the presence of any representative or employee of the Contractor at the `Site' if in the opinion of NLCIL such employee has misconducted himself or be incompetent or negligent or otherwise undesirable and then the Contractor shall promptly remove such a person objected to, and provide in his place a competent replacement at his own expenses.

21.0 **MANPOWER REPORT:-**

- 21.1 The Contractor shall submit to NLCIL on the last week of every month, a man-hour schedule for the next month, detailing the man hours scheduled for the month, skill wise and area wise.

21.2 The Contractor shall also submit to NLCIL on the 7th day of every month, a manpower report of the previous month detailing the number of persons scheduled to have been employed and actually employed, skill-wise and the areas of employment of such labour.

21.3 The Contractor shall also submit periodically such of the reports as NLCIL may call for from time to time.

22.0 **FIRE PROTECTION: -**

22.1 The work procedures that are to be used during the maintenance shall be those, which minimize fire hazards to the extent practicable. Combustible materials, combustible waste and rubbish shall be collected and removed from the `Site' at least once a day.

22.2 The Contractor shall provide enough fire protection equipment of the types and number for the warehouses, office, temporary structures etc. Access to such fire protection equipment shall be easy and kept open at all times.

23.0 **SECURITY:-**

23.1 The Contractor shall have total responsibility for all equipment and materials in his custody. The Contractor shall make suitable Security arrangements including employment of Security personnel to ensure the protection of all materials, equipment and `Works' from theft, fire, pilferage and any other damages and loss. All materials of the Contractor shall enter and leave the Project `Site' only with the written permission of NLC in the prescribed manner.

24.0 **CONTRACTOR'S MATERIALS BROUGHT ON TO SITE:-**

24.1 The Contractor shall bring to `Site' all the equipment, components, parts, materials, including equipment, tools and tackles for the purpose of the `Works' under intimation to NLCIL. All such goods shall from the time of their being brought may be used for the purpose of the `Works' only and shall not on any account be removed or taken away by the Contractor without the written permission of NLC. But, the Contractor shall nevertheless be solely liable and responsible for any loss or destruction thereof and damage thereto.

24.2 NLC shall have lien on such goods for any sum or sums which may at any time be due or owing to him by the Contractor, under in respect of or by reasons of the `Contract'. After giving a fifteen (15) days' notice in writing of his intention to do so, NLCIL shall be at liberty to sell and dispose of any such goods, in such manner as he shall think fit including public auction or private treaty and to apply the proceeds in or towards the satisfaction of such sum or sums due as aforesaid.

24.3 After the completion of the `works' the Contractor shall remove from the `Site' under the direction of NLCIL his own materials such as equipment, tools and tackles, scaffolding, etc. which were brought by him with the written permission of NLC. If the Contractor fails to remove such materials, within 15 (fifteen) days of issue of a notice by NLCIL to do so, then NLCIL shall have the liberty to dispose off such materials and credit the proceeds thereto the account of the Contractor.

24.4 On completion of the work, all rubbish, kilns, vats, tanks, materials and temporary structure of any sort or kind used for the purpose or connected with the work are to be

removed by the Contractor and all pits and excavations filled up and the site handed over in a tidy and workmanlike condition and no final payment in settlement of the account for the said work shall be held to be due or shall be made to the Contractor till such site clearance shall have been effected by him and such clearance may be made by NLCIL at the expenses of the Contractor in the event of his failure to comply with this provision within 7 days after receiving notice in writing from NLCIL to that effect. If it becomes necessary for NLCIL to have the site cleared as indicated above at the expense of the Contractor, NLCIL shall under no circumstances be held liable for any losses or damages to such of Contractor's property as may be on such site due to such removal there from, which removal may be effected by means of public sale of such materials and property or in such a way as seems fit and most convenient to NLCIL.

- 24.5 The Contractor must take sufficient care in moving his equipment from one place to another so that they may not cause any damage to the property of NLCIL, particularly to the existing structures and overhead and underground services and in the event of Contractor's failure to do so, the cost of such damages shall be borne by the Contractor.

#### 25.0 **MODIFICATION AND UPGRADATION**

- 25.1 The Contractor shall advise NLC of any modifications or upgrades of the Solar PV Power Plant for increasing safety and reliability, improved production performance.

- 25.2 If Contractor on his own initiative wishes to upgrade or modify the Solar PV Power Plant then, the Contractor may carry out the upgrade at his own cost with the prior written consent of NLCIL.

- 25.3 If any alteration or modification is required to be made in the Solar PV Power Plant to comply with all provision of law for the time being in force on the Commencement Date of this agreements the Contractor shall take necessary step to make Solar PV Power Plant comply with the provisions of such law.

- 25.4 If modification is required in the Solar PV Power Plant to comply with the provisions of any Law, which came into force after the commencement date of this agreement, then such modification shall be taken up by NLCIL. The Contractor at the cost of NLCIL on the terms & conditions as may be agreed by the parties and in such case the time spent shall not be classified as down time hours.

- 25.5 Upgrading of Solar PV Power Plant will be done in consultation with O.E.M. (Original Equipment manufacturer) & through the Contractor on mutually agreed terms & conditions.

#### 26.0 **ACCIDENT / DAMAGE**

- 26.1 If there is any damage to Solar PV Power Plant due to accident or otherwise and it is established that the said accident and/or damage has been occurred due to the operators faults or negligence, Contractor shall be responsible for payment towards rectification of such damage of Solar PV Power Plant.

- 26.2 If any damage is caused to Solar PV Power Plant and / or accident occurred at the site of the said Solar PV Power Plant, due to improper maintenance of the Solar PV Power Plant by the Contractor, the Contractor shall be responsible and liable against all such damage and compensation and indemnify Purchaser against such loss or damage incurred or be incurred by NLCIL.

- 26.3 The parties hereto are independent to each other where in NLCIL is a principal, Contractor is a Contractor and all the relationships between NLC and Contractor under this agreement are contractual in nature but none else.
- 26.4 Nothing in this agreement shall be deemed to constitute or form an employment, partnership, agency or any other form of business relationship between the parties except as stated above.

## 27.0 **LIMITATIONS OF LIABILITY**

- 27.1 Except in case of Criminal Negligence or Willful Misconduct,
- i) The Contractor shall not be liable to the Purchaser, whether in Contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production or loss of profits or interest, costs, provided that this exclusion shall not apply to any obligation of the Contractor to pay liquidated damages to the Purchaser  
and
  - ii) The aggregate liability of the Contractor to the Purchaser, whether under the Contract, in tort or otherwise, shall not exceed the total Contract Price, provided that this limitation shall not apply to any obligation of the Contractor to indemnify the Purchaser with respect to Patent infringement'.

## 28.0 **GENERAL:**

- 28.1 Contractor shall meet the NLCIL authorised representative and receive instructions regarding the works to be carried out. The Contractor or his representative shall be available at all times in the site in order to execute any urgent work.
- 28.2 Decision of the NLCIL shall be final and binding in all matters regarding contract.

## 29.0 **SAFETY:**

- 29.1 The Contractor shall ensure the safety of his workmen against accidents and injuries while at work as required by the relevant rules. It shall be the obligations of the Contractor to pay compensation as per workmen compensation Act and to extend co-operation to the officers in any enquiry conducted there on. No responsibility shall rest with the corporation in this regard. The Contractor shall work in co-ordination and close co-operation with the staff working in the area.
- 29.2 While doing works, all the safety precautions and safety rules should be followed and failure to adhere to the same shall be viewed seriously and the contract shall be terminated if required."
- 29.3 The Contractor shall arrange all safety gadgets for workmen engaged by him.
- 29.4 Before the Contractor connects any electrical appliances to any plug or socket belonging to the other Contractor or NLCIL, he shall
- (a) Satisfy NLCIL that the appliance is in good working condition.
  - (b) Inform NLCIL of the maximum current rating, voltage and phases of the appliances.
  - (c) Obtain permission of NLCIL detailing the sockets to which the appliances may be connected

29.5 NLCIL will not grant permission to plug-in until he is satisfied that the appliance is in good conditions and is fitted with a suitable plug. the appliance is fitted with a suitable cable having two earth conductors, one of which shall be an earthed metal sheath surrounding the cores.

29.6 No electric cable in use by NLCIL will be disturbed without prior permission. No weight of any description will be imposed on any such cable and no ladder or similar equipment will rest against or be attached to it.

29.7 No work shall be carried out on any live equipment. The Equipment must be made safe and a permit to work issued before any work is carried out.

### 30.0 **WORKS:**

30.1 The site of work shall be kept clean, free from rubbish and dismantled materials. All rejected and unwanted materials, debris etc., shall be removed from the site then and there. If the Contractor fails to do such clearance work, the work shall be got done departmentally, two days after the issue of a single written notice to the Contractor and the expenditure incurred there for shall be recovered from the Contractor 's bills.

30.2 Any faulty work noticed and pointed out by NLCIL shall be rectified by the Contractor

30.3 The Contractor shall Work in co-ordination and close co-operation with other Contractor's staff working in the area.

### 31.0 **MATERIALS:-**

31.1 The material used shall comply with the relevant standard specification and shall be approved by NLCIL.

### 32.0 **LABOUR:-**

32.1 Under the provisions of the Contract Labour (Regulation and Abolition) Act 1970 the Contract Labour (Regulation and abolition) Rules 1971 any Contractor who employs or employed 20 or more men on any day of the preceding 12 months shall obtain a licence. The licence so obtained shall be renewed every year.

32.2 The Contractor shall maintain the following registers.

Register of workmen in Form XIII as per rule 75 of the Contract Labour (R & A Rule) central 1971.)

Muster Roll.

Register of wages

Register of deduction.

Register of over time.

Register of fines.

Register of Advances.

Wages slip.

32.3 The Contractor shall issue an employment card in Form XIV as per rule 76 of the contract labour (Regulation and Abolition) Rules 1971.

- 32.4 As per the provisions under Chapter IV of the Central Contract Labour (Regulation and Abolition) Rules 1971 the Contractor should observe the rules strictly regarding the payment of wages to the contract workmen.
- 32.5 Failure to comply with the statutory provisions will entail prosecution by the statutory authorities beside black listing the Contractor .

"The Contractor should produce the following declaration along with their application for issue of identity cards to the workmen. "Certified that the following contract workers engaged by me bear good conduct, that their antecedents have been verified and found satisfactory".

Sl. No.	Name of the Contract Worker	Address	Identification Marks

33.0 **INSURANCE:-**

- 33.1. The Contractor shall arrange for Workmen's Compensation Insurance, Comprehensive Automobile Insurance and Comprehensive General Liability Insurance and till completion of Operation & Maintenance period which shall also be the responsibility of the Contractor.
- 33.2 The Contractor should take group insurance scheme for the workers under his contract, which may or may not result in partial or permanent disablement. The first bill will be passed after producing group insurance policy.
- 33.3 The above are only illustrative list of insurance covers normally required and it will be the responsibility of the Contractor to maintain at his cost all necessary insurance coverage to the extent both in time and amount to take care of all his liabilities either direct or indirect in pursuance of the `Contract'.

33.4 Third Party Liability Insurance:

The policy shall cover third party liability. The third party liability shall cover the loss / disablement of human life (persons not belonging to the Contractor) and also cover the risk of damages to others' materials/equipment/ properties during O&M .The value of third party liability for compensation for loss .of human life or partial / full disablement shall be of required statutory value but not less than Rs.2 lakh per death, Rs.1.5 lakh per full disablement and Rs.1 lakh per partial disablement and shall nevertheless cover such compensation as may be awarded by a Court of Law in India or abroad and cover for damage to others' equipment /surrounding property as approved by NLCIL.

34.0 **RESOLUTION OF DISPUTES AND ARBITRATION:-**

34.1 **Informal dispute resolution:**

- 34.1.1 The parties agree to use reasonable efforts to resolve all disputes equitably and in good faith.
- 34.1.2 If any dispute between the Contractor and NLC arises it shall in the first instance be referred in writing to NLC, who shall endeavor to resolve the dispute amicably and render a decision within 30 days. The period of 30 days shall be reckoned from the date of intimation of the dispute is received by NLC.
- 34.1.3 The agreement and the rights and obligations of the Parties, shall remain in full force and effect pending the award in any arbitration proceedings. Supplies and/ or services under the Contract shall, if reasonably possible, continue during arbitration proceedings.

34.1.4 For the purposes of this clause, the term 'dispute' shall include a demand or difference of any kind whatsoever, arising out of the Contract and respecting the performance of the CONTRACT, whether during the CONTRACT period including extensions if any, or after completion, and whether before or after termination, abandonment or breach of the CONTRACT (except as to any matter, the decision of which is specifically provided for in any of these conditions).

### 35.2 **Conciliation:**

35.2.1 If the party is dissatisfied with the decision rendered by the Purchaser, or if the Purchaser omits or declines to render a decision within the said period of 30 days, then within a further period of 30 days, the dissatisfied Party shall require by a notification that the dispute be referred to Conciliation in the manner as per the 'NLC Conciliation Rules', copy of which is available with the NLC offices and the Bidders/ Contractors shall abide by the NLC Conciliation Rules' for resolving any dispute arising out of this contract. Such a notification shall be in writing and it shall be duly served on the other party. Failure to invoke the Conciliation within the time stipulated shall debar the party from seeking reference to Conciliation.

35.2.2 Except as otherwise provided in this clause, any dispute arising out of or relating to this agreement, or the breach, termination or validity thereof, shall be settled by Conciliation in accordance with 'NLC Conciliation Rules'. The Conciliation shall be held at Neyveli / Chennai / Tuticorin / Barsingsar/ or in a place within India mutually agreed by the parties. The Conciliation proceedings shall be conducted, and the award shall be rendered in English. The award shall state the reasons upon which it is based.

35.2.3 There shall be three Conciliators, who will be appointed as per Section-5 of the 'NLC Conciliation Rules'.

35.2.4 The Contract agreement / Purchase order conditions and the rights and obligations of the Parties, shall remain in full force and effect during the Conciliation proceedings. Supplies and / or services under the Contract shall, if reasonably possible, continue during the Conciliation proceedings.

35.2.5 For the purpose of this clause, the term 'dispute' shall include a demand or difference of any kind whatsoever, arising out of the Contract and respecting the performance of the Contract, whether during the Contract period including extensions if any, or after completion, and whether before or after termination, abandonment or breach of the Contract. (except as to any matter, the decision of which is specifically otherwise provided for in any of these conditions).

35.2.6 Only in case of failure to resolve the dispute through Conciliation, Arbitration can be resorted to or Judicial remedy can be sought for.

35.2.7 Once the settlement agreement is signed with respect to a dispute, the same dispute is not subject to further appeal through Arbitration or Judicial Proceedings.

35.2.8 Anything not found included in the 'NLC Conciliation Rules', but necessary to conduct the conciliation proceedings will be dealt with as per the provisions of the 'Arbitration and Conciliation Act 1996 -Part-III' or as per the statutory provisions modified from time to time.

### 35.3 **Arbitration of disputes : (Other Contractors)**

35.3.1 If either party is dissatisfied with the decision rendered by the NLCIL, or if the NLCIL omits or declines to render a decision within the said period of 30 days, then within a further period of 30 days, the dissatisfied Party may require by a notification that the

dispute be referred to arbitration in the manner hereinafter provided. Such a notification shall be in writing and it shall be duly served on the other party. Failure to invoke the arbitration within the time schedule shall debar the party from seeking reference to arbitration.

- 35.3.2 Except as otherwise provided in this clause, any dispute arising out of or relating to this agreement, or the breach, termination or validity thereof, shall be finally settled by arbitration in accordance with the Arbitration and Conciliation Act 1996 (the ``Act"). The arbitration shall be held at Chennai, Tamil Nadu. The arbitration proceedings shall be conducted, and the award shall be rendered in English. The award shall state the reasons upon which it is based. Interest, if awarded by the arbitrators, shall be at a rate not exceeding the Cash Credit rate prevailing on the date of the award. All interest payments so awarded are subject to deduction of TDS at sources as applicable at prevailing rates of Income Tax.
- 35.3.3 There shall be three arbitrators of whom each Party shall appoint one. The Party requesting that the dispute be referred to arbitration shall, within 30 days of the notification in terms of Clause 31.3.1, appoint an arbitrator as also call upon the other Party to appoint an arbitrator within 30 days. The two arbitrators so appointed shall, within 30 days of the date on which the second of them is appointed, agree on the third arbitrator who shall act as the presiding arbitrator of the tribunal.
- 35.3.4 The agreement and the rights and obligations of the Parties, shall remain in full force and effect pending the award in any arbitration proceedings. Supplies and/ or services under the Contract shall, if reasonably possible, continue during arbitration proceedings.
- 35.3.5 For the purposes of this clause, the term `dispute' shall include a demand or difference of any kind whatsoever, arising out of the Contract and respecting the performance of the Contract, whether during the Contract period including extensions if any, or after completion, and whether before or after termination, abandonment or breach of the Contract (except as to any matter, the decision of which is specifically provided for in any of these conditions).
- 35.4 The party, in whose favour the Award is passed shall be entitled to reach the entire costs of Arbitration from the other party. The Arbitration shall indicate the above in their award clearly.
- 35.5 **IN CASE OF PUBLIC SECTOR ENTERPRISES:**

In the event of any dispute or difference, relating to the interpretation and application of the provisions of the Contracts, such dispute or difference shall be referred by either party to the arbitration of one of the Arbitrators in the Department of Public Enterprises. The Arbitration and Conciliation Act, 1996 shall not be applicable to the arbitration under this clause. The award of the Arbitrator shall be binding upon the parties to the dispute, provided, however, any party aggrieved by such award may make a further reference for setting aside or revision of the award to the Law Secretary, Department of Legal Affairs, Ministry of Law & Justice, Government of India. Upon such reference the dispute shall be decided by the Law Secretary or the Special Secretary/Additional Secretary when so authorized by the Law Secretary, whose decision shall bind the parties finally and conclusively. The parties in the



dispute will share equally the cost of arbitration as intimated by the Arbitrator. The procedure to be adopted in the above case shall be as per DPE guidelines No. DPE OM No. 4(1)/2011-DPE(PMA)-GL dated 12.06.2013.

**36.0 FORCE MAJEURE:**

36.1 Force majeure herein defined is a cause which is beyond the control of the Contractor or the Purchaser, which they could not foresee and which substantially affect the performance of the “contract” such as

36.1.1 Natural phenomena, including but not limited to floods, droughts, Earthquakes and epidemics

36.1.2 Acts of any government, domestic or foreign, including but not limited to war, declared or undeclared priorities, quarantines, embargoes,

36.1.3 Strikes, lock outs and sabotage.

36.1.4 Piracy

36.1.5 Riots and civil commotions Provided either party shall within fifteen (15) days from the occurrence of such a cause notify the other in writing of such cause.

36.1.6 However Power cut and failure in water supply shall not be considered under “Force Majeure” condition.

36.2 The Contractor or the owner shall not be liable for delays in performing the respective obligations resulting from any force majeure condition occurred. The date of completion shall be extended by a reasonable time

36.3 If the performance as a whole or part by the Contractor or any obligations under the Contract is prevented or delayed by “Force majeure” condition for a period exceeding 120 days, the Purchaser may at his option terminate the contract by notice in writing.

36.4 Force Majeure conditions prevailing at the works of the Sub-Suppliers / Sub-Contractors other than 4 major sub-suppliers (the names of which to be indicated by the contractor) shall not be recognized by the Purchaser on any account and it shall be upto the Contractor to make necessary alternative arrangement to execute the Contract within the agreed time schedule.

36.5 No increase or decrease in price shall be payable due to Force Majeure condition.

**37.0 CONTRACTOR’S DEFAULT:**

37.1 If the Contractor discontinuous to do the work before the completion of time indicated in Cl.4.0 then in such case NLCIL may give notice in writing and shall be at liberty to employ other person / persons and forthwith execute such part of the `works' as the Contractor may have neglected to do or if NLCIL shall think fit it shall be lawful for him without prejudice to any other right he may have under the `Contract' to take the `Works' wholly or in part out of the Contractor’s hands and re-contract with any other person or persons, complete the `works' or any part thereof and in that event NLCIL shall be free to use without hire charges, of all Contractor’s equipment that may have been at the time on the `Site' in connection with the `Works' without being

responsible to the Contractor for fair wear and tear thereof and to the exclusion of any right of the Contractor, over the same and NLCIL shall be entitled to retain and apply any balance of money which may otherwise be due in the 'Contract' by him to the Contractor or such part thereof as may be necessary to the payment of the cost of executing the said part of the 'Works' or of completing the works as the case may be. If the cost of completing the 'works' or executing a part thereof as aforesaid shall exceed the balance due to the Contractor, the Contractor shall pay such excess.

37.2 In such an event NLCIL shall also have the right to encash the Contract Performance Bank Guarantee for non-performance of Contract.

#### 38.0 **TERMINATION OF CONTRACT:-**

38.1 NLC reserves the right to terminate the CONTRACT either in part or in full due to reason other than those mentioned under clause entitled Contractor's Default. NLC shall, in such an event, give 30 (thirty) days notice in writing to the Contractor of his decision to do so.

38.2 The Contractor upon receipt of such notice shall discontinue the work on the date and to the extent specified in the notice, make all reasonable efforts to obtain cancellation of all order and Contracts to the extent they are related to the work terminated and upon terms satisfactory to NLCIL, stop all further sub-Contracting or purchasing activity related to the work terminated and assist NLCIL in maintenance, protection and disposition of the works acquired under the Contract by NLCIL.

38.3 In the event of such a termination, the Contractor shall be paid compensation, equitable and reasonable dictated by the circumstances prevalent at the time of termination. No consequential damages shall be payable by the NLCIL to the Contractor in the event of termination.

38.4 If the Contractor is an individual or a Proprietor concern and the individual or the proprietor dies and if the Contractor is a partnership concern and one of the partners dies, then unless the NLCIL is satisfied that the legal representatives of the individual Contractor or the Proprietor of the proprietary concern and in the case of partnership, surviving partners, are capable of carrying out and completing the Contract NLCIL shall be entitled to cancel the Contract as to its incomplete part without being in any way liable to payment of any compensation to the estate of deceased Contractor and/ or to the surviving partners of the Contractor's firm on account of the cancellation of the Contract. The decision of NLCIL that the legal representatives of the deceased Contractor or surviving partners of the Contractor's firm cannot carry out and complete the Contract shall be final and binding on the parties. In the event of such cancellation NLCIL shall not hold the estate of the deceased Contractor and/ or the surviving partners of the estate of the deceased Contractor and/ or the surviving partners of the Contractor's firm liable to damages for not completing the Contract.

#### 39.0 **HANDING OVER OF THE EQUIPMENT AFTER COMPLETION OF CONTRACT PERIOD:**

39.1 The entire plant shall be handed over to NLCIL in good working condition after completion of ten years of O&M contract. The Contractor shall attend the defects if any or replacement of any worn-out parts before handing over of the plant to NLCIL. If the Contractor fails to attend the defects or to replace the worn-out parts, NLCIL shall recover the relevant cost from the payment due to the Contractor.

**40.0 MAINTENANCE OF HISTORY CARD:**

40.1 The Contractor shall maintain a history register and submit to the NLCIL at the end of each calendar year for review.

40.2 The history card shall contain all the works carried out including replacement of spares & consumables etc.

**41.0 COMPLETION OF CONTRACT PERIOD:**

41.1 The contract period shall automatically cease to exist after ten years from the effective date of O&M contract and the Contractor shall have no right to ask for any extension. However, NLCIL at its discretion can extend this contract, for further period at the mutually agreed price and terms & conditions.

**42.0 JURISDICTION:**

42.1 The Civil Courts having ordinary original civil jurisdiction over Andaman & Nicobar Islands shall have exclusive jurisdiction in regard to all questions of disputes of whatever nature including the arbitration proceedings, if any arising under the Contract with NLCIL.

**43.0 GOVERNING LAWS AND REGULATIONS:-**

43.1 This Contract shall be governed and construed according to the Indian Laws and Regulations.

**APPENDIX-A**

Sheet 1 of 3

**BANK GUARANTEE "FORMAT" FOR RELEASE OF  
"LIQUIDATED DAMAGES AMOUNT"**

Note:

1. This guarantee has to be furnished by a Nationalized Bank/Scheduled Bank authorised by RBI except Bank of China.
2. The Bank Guarantee should be furnished on Stamp Paper of value not less than Rs.80/-.
3. The Stamp Paper should have been purchased in the name of the Bank executing the Guarantee.

---

Bank Guarantee No.....

Date: .....

To  
The General Manager/ Contracts  
NLC India Limited,  
Block-1, Neyveli- 607 801,  
Cuddalore District, Tamil Nadu, INDIA.

Dear Sirs,

- 1.0 Pursuant to the Contract No..... dated ..... herein after referred to as " THE CONTRACT" with M/s..... herein after referred to as "THE CONTRACTOR" which expression shall, unless repugnant to the context or meaning thereof, includes its successors, administrators representatives and assignees have concluded with M/s. NLC India Limited, Neyveli, hereinafter referred to as the "PURCHASER" (which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators, representatives and assignees vide Contract No. . . . . and the subsequent amendments thereto the CONTRACTOR has undertaken to execute the work of..... for a Total Contract Value of Rs/FC..... (Rupees/FC..... only).
- 2.0 Whereas as per Clause ....., of the Contract the CONTRACTOR should have completed the work of..... by ..... and as per the Clause ..... of the Contract, the PURCHASER is entitled to levy Liquidated Damages for delays.
- 3.0 Whereas the CONTRACTOR failed to adhere to the Time Schedule or, stipulated in the Contract for which, the PURCHASER has recovered a sum of Rs/FC..... (Rupees/FC.....only) towards Liquidated Damages for the delays in the execution of works in accordance with the Clause.....of the Contract.
- 4.0 Whereas the CONTRACTOR has requested the PURCHASER for the release of the said amount withheld towards Liquidated Damages for the delay in execution of work to enable him to overcome the Liquidity problems. In consideration of the above request, the PURCHASER has agreed to withheld 10% of the amount recoverable and to release 90% of amount recovered towards Liquidated Damages subject to the

condition that the CONTRACTOR furnishes a Bank Guarantee for the 100% of amount withheld towards Liquidated Damages.

- 5.0 We,..... (bank).....(address) having our Head office at .....hereinafter referred to as the “BANK”, which expression shall include its successors, representatives, administrators, and assignees do hereby irrevocably undertake that in the event of the PURCHASER deciding not to waive the Liquidated Damages recovered from the CONTRACTOR and thereby deciding to finally confirm the levy and recover the amount of Liquidate Damages provisionally released, to pay the amount of Rs/FC..... (Rupees/FC.....only) due and payable under this guarantee to the PURCHASER without any demur, merely on demand from the PURCHASER. Any such demand made by the PURCHASER on the Bank shall be conclusive and binding, absolute and unequivocal as regards the amount due and payable by the Bank under this guarantee, notwithstanding any difference between the PURCHASER and the CONTRACTOR or any dispute or disputes raised/ pending before any court, tribunal arbitrator or any other authority.
- 6.0 This guarantee will not be discharged due to the change in the constitution of the Bank or the CONTRACTOR(S).
- 7.0 The PURCHASER shall have the fullest liberty without affecting in any way the liability of the Bank under this guarantee from time to time to extend the time of performance by the CONTRACTOR. The Bank shall not be released from its liabilities under these presents by any exercise of the PURCHASER of the liberty with reference to the matter aforesaid.
- 8.0 We, the Bank also agree that the PURCHASER shall be entitled at his option to enforce this Bank Guarantee against the Bank as a Principal debtor in the first instance notwithstanding any other security or guarantee that it may have in relation to the CONTRACTOR’S liabilities.
- 9.0 In any case our liability under this guarantee shall not exceed Rs/FC..... (Rupees/FC.....only). This guarantee will be valid upto..... (Scheduled date of completion of Contract) and shall be extended for such period as may be desired by M/s. .... on whose behalf this guarantee has been given.
- 10.0 The Bank further agrees that the decision of the PURCHASER as to the failure on the part of the CONTRACTOR to fulfill the contractual obligations stipulated in the said Contract and/ or to the amount payable by the Bank to the PURCHASER shall be final conclusive and binding.
- 11.0 This guarantee is revocable only with the written consent of the PURCHASER.
- 12.0 This guarantee deed must be returned to us to upon the expiration of the guarantee or after fulfilment of the obligations specified in the guarantee.

13.0 Notwithstanding anything contained herein:

- a. Our liability under this bank guarantee shall not exceed ..... (in words)
- b. This bank guarantee shall be valid upto.....: and
- c. We are liable to pay the guaranteed amount or any part thereof under this bank guarantee only and only if you serve upon us a written claim or demand on or before.....

Dated this..... day of..... 20

Witness	(Signature)
	Name in Block Letters
1	Designation
Signature	Staff Code No.
Name in Block Letters	
Occupation	
Address	

	(Banker's seal)
2	Attorney as per Power of
Signature	Attorney No.....
Name in Block Letters	Dated:.....
Occupation	
Address	

**APPENDIX-B**

**Sheet 1 of 3**

**FORMAT OF**

**RETENTION MONEY BANK GUARANTEE**

NOTE.

1. This guarantee has to be furnished by a Nationalized Bank/Scheduled Bank authorised by RBI except Bank of China. NLCIL reserves its rights to reject the Bank Guarantee if the same is not in the specified format.
2. This bank guarantee should be furnished on stamp paper of value not less than Rs. 80.00
3. The stamp paper should have been purchased in the name of the Bank executing the Guarantee.
4. In the case of foreign bidder the B.G may be furnished by an international reputed bank acceptable to the PURCHASER/ RBI.
5. The Retention bank guarantee shall be valid till the actual date of completion of Take over Test.
6. Any deviation in this format will not be acceptable.  
RETENTION MONEY BANK GUARANTEE No.....  
PLACE: .....  
DATE : .....  
Ref.

To  
The General Manager/Contracts  
M/s. NLC India Limited,  
Neyveli - 607 801.  
Cuddalore District, Tamil Nadu).

Dear Sirs,

- 1.0 In consideration of the NLC India Limited, Neyveli (hereinafter referred to as the 'Purchaser' which expression shall unless repugnant to the context or meaning thereof, include its successors administrators, representatives and assignees),having awarded to M/s..... with its Registered Office/Head Office at .....(hereinafter referred to as the "CONTRACTOR", which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators, executors, representatives and assignees) a Contract/ Letter of Award herein after referred to as the Contract/Letter of Award for `scope of work' on terms and conditions set out interlia in the Purchaser's Letter of Award/Contract No . . . . . dated . . . . . as well as contract document valued at .....at and the same having been unequivocally accepted by the Contractor, and whereas the Purchaser under the terms contract has agreed to

make the payment of the final 10% value of the contract price of the..... Unit to the Contractor amounting to..... (in words) against Retention Money Bank Guarantee to be furnished by the Contractor.

- 2.0 For this payment, we, the undersigned..... (Name) ..... (address) with Head Office at ..... (address) (hereinafter referred to as the `Bank' which expression shall unless repugnant to the context or meaning thereof include its successors, administrators, executors, representatives and assignees)do hereby guarantee to the effect that we irrevocably undertake to pay immediately upon the PURCHASER's first demand without any previous notice and without any demur, reservations recourse, contest or protest and/ or without referring to any other sources including the Contractor, any and all monies, but not exceeding ..... (.....in words) at any time upto..... Any such demand made by the Purchaser on the Bank shall be conclusive and binding notwithstanding any difference between the PURCHASER and the CONTRACTOR or any dispute pending before any court, Tribunal, Arbitrator or any other authority. We hereby agree that the Guarantee herein contained shall be irrevocable and shall continue to be enforceable till the PURCHASER discharges this guarantee.
- 3.0 The Purchaser shall also have the right to encash the RMBG for the recovery of penalties in terms of the contract.
- 4.0 The PURCHASER shall have the fullest liberty without affecting in any way the liability of the Bank under this guarantee from time to time extend the time performance of the contract by the CONTRACTOR. The Purchaser shall have full liberty without affecting this guarantee to postpone from time to time the exercise of any powers vested in them or of any right which they might have against the Contractor and to exercise the same at any time in any manner, and either to enforce or to forbear to enforce any covenants contained or implied in the contract between the Purchaser and the Contractor or any other course or remedy or security available to the Purchaser. The Bank shall not be released of its obligations under these presents by any exercise by the Purchaser or its liberty with reference to matters aforesaid or any of them or by reason of any other act or forbearance or other acts of omission or commission on the part of the Purchaser or any other indulgence shown by the Purchaser or by any other matter or thing whatsoever which under law would but for this provision have the effect of relieving the Bank. The Bank shall not be released from its liability under these presents by an exercise of the PURCHASER of the liability with reference to the matter aforesaid.
- 5.0 The Bank also agrees that the PURCHASER at his option shall be entitled to enforce this guarantee against the Bank as a principal Debtor, in the first instance, without proceeding against the Contractor and notwithstanding any other security or guarantee that the Purchaser may have in relation to the Contractor's liabilities.



- 6.0 a. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor.
- b. Notwithstanding anything contained herein above our liability under this guarantee does not exceed ..... (in words)
- c. This guarantee shall remain in force upto and including .....and shall be extended retaining the same terms and conditions from time to time for such periods as may be desired by M/s .....on whose behalf this guarantee has been given.

7.0 The Bank further undertakes not to revoke this guarantee during its currency without the previous consent of the Purchaser in writing.

This guarantee deed must be returned to us upon the expiration of the guarantee.

8.0 Notwithstanding anything contained herein:

- a. our liability under this bank guarantee shall not exceed ..... (in words)
- b. this bank guarantee shall be valid upto .....; and
- c. we are liable to pay the guaranteed amount or any part thereof under this bank guarantee only and only if you serve upon us a written claim or demand on or before .....

Return of this document to us by any person before the aforesaid date will, however, extinguish our liability as on the date of return.

Dated this ..... day of..... 20

WITNESS

1. Signature..... Signature.....  
 (Name in Block Letters)..... Printed Name.....  
 (Designation) Designation Staff Code No.....

Bank's Seal

2. Signature.....  
 (Name in Block Letters)..... (Designation)

## Appendix - C

### FORMAT OF FINANCIAL BACK UP GUARANTEE

To be stamped in accordance with Indian Stamp Act.

Proforma for Bank Guarantee to be furnished by Associate / Collaborator/ Joint Venture partner.

01. This guarantee should be furnished by a Nationalised Bank/ Scheduled Bank, authorised by RBI except Bank of China to issue a Bank Guarantee excepting Bank of China in the same format as given below.
02. The bank guarantee should be furnished on stamp paper of value not less than Rs.80.00
03. The stamp papers should be purchased in the name of the Bank executing the Guarantee.

Bank Guarantee No:

Dated

:

- 1.0 In consideration of NLC India Limited, hereinafter referred to as 'NLCIL' which expression shall unless repugnant to the context or meaning thereof include its successors, administrators, representatives and assignees, having awarded to M/s. .... (Bidder's Name) with its Registered Office at ..... hereinafter referred to as the Contractor a Contract for the .....vide its Letter of Award No ..... dated .....and the same having been unequivocally accepted by ..... (Bidder's Name) resulting in a 'Contract' which was awarded on the strength of Deed of Collaboration agreement/ Consortium agreement/Joint Venture Agreement dated ..... hereinafter referred to as 'Undertaking' given by .....(Bidder's Name) and by ..... with its Registered Office at ..... (hereinafter referred to as Consortium partners /Collaborator/Joint Venture partner) which expression shall unless repugnant to the context or meaning thereof include its successors, administrators representatives and assignees) and CONTRACTOR having further entered into with Consortium partner / Collaborator/J.V Partner a Contract No..... dated..... and the same having been unequivocally accepted by Consortium partners / Collaborator/Joint Venture Partner resulting in a Consortium Agreement/ Collaboration Agreement/Joint Venture agreement valued at ..... for the scope of work between Contractor & Consortium partners /Collaborator/Joint Venture Partner (hereinafter called Collaboration / Consortium Agreement/Joint Venture Agreement)' and the Consortium partners/ Collaborator/Joint Venture Partner having agreed to provide a financial back up guarantee amounting to ..... to NLCIL for the faithful performance of the contract on the terms and conditions specified in the 'Undertaking' dated.....
- 2.0 We,..... Bank..... (address) having its Head Office at ..... (hereinafter referred to as the 'Bank ' which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators, representatives and assignees) do hereby guarantee and undertake to pay to NLCIL on on mere demand any and all monies to the extent of ..... (currency and amount in figures) ..... as aforesaid at any time upto .....from the date of Letter of Award and till the obligations under the Contract are completed without any demur, reservation, contest

or recourse or protest and/or without any reference to Consortium partners / Collaborator/Joint Venture Partner.

- 3.0 The Bank do hereby undertake not to revoke this guarantee during its currency without previous written consent of NLCIL and further agrees that the guarantee herein contained shall continue to remain enforceable till NLCIL discharges this guarantee.
- 4.0 Any such demand made by NLCIL on the bank shall be conclusive and binding notwithstanding any difference between NLCIL and Consortium partners / Collaborator/Joint Venture Partner pending before any Court, Tribunal, Arbitrator or any other Authority.
- 5.0 NLCIL shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee from time to time to extend the time for performance of the contract of the Collaboration / Consortium Agreement/Joint Venture Agreement by CONTRACTOR and the Consortium partners / Collaborator/Joint Venture Partner.
- 6.0 NLCIL shall have the fullest liberty without affecting this guarantee to postpone from time to time the exercise of any powers vested in them or of any right which they might have against the CONTRACTOR and the Consortium partners / Collaborator/Joint Venture Partner and to exercise the same at any time, in any manner, and either to enforce or to forbear to enforce any covenants, contained or implied in the said contract or undertaking or any other course or remedy or security available to NLCIL.
- 7.0 The Bank shall not be released of its obligations/liabilities under these presents by any exercise by NLCIL of its liberty with reference to the matters aforesaid or any of them or by reason of any other acts or omissions or commissions on the part of NLCIL or any other indulgence shown by NLCIL or by any other matter or thing whatsoever which under law would, but for this provision, have the effect of relieving the bank from its obligations. The Bank also agrees that NLCIL at its option shall be entitled to enforce this Guarantee against the Bank as a Principal Debtor in the first instance without proceeding against the CONTRACTOR or Consortium partners / Collaborator/Joint Venture Partner and notwithstanding any other security or guarantee that NLCIL may have in relation to CONTRACTOR/ Consortium partner's /Collaborator's/Joint Venture Partner's liabilities.
- 8.0 Notwithstanding anything contained herein above our liability under this Guarantee is restricted to Rs..... (Rupees) in words and it shall remain in force upto and including.....and shall be extended from time to time for such period as may be desired by Consortium partners / Collaborator/Joint Venture Partner on whose behalf this guarantee has been given.

9.0 This guarantee shall expire on..... unless NLCIL`s claim under this guarantee in accordance with the above mentioned conditions has reached us by the end of the said date.

Notwithstanding anything contained herein:

- a. our liability under this bank guarantee shall not exceed ..... (in words)
- b. this bank guarantee shall be valid upto .....; and
- c. we are liable to pay the guaranteed amount or any part thereof under this bank guarantee only and only if you serve upon us a written claim or demand on or before .....

Dated this ..... day of..... 20..

WITNESS

1. Signature.....

(Name in Block Letters).....

(Designation) Designation Staff Code No.....

Bank's Seal

2. Signature.....

(Name in Block Letters).....

(Designation)

Signature.....

Printed Name.....

## Appendix -D

### FORMAT OF CONTRACT PERFORMANCE GUARANTEE

#### Note:-

1. This guarantee has to be furnished by a Nationalised Bank / Scheduled Bank Authorised by RBI except Bank of China.
2. The Bank Guarantee should be furnished on Stamp paper of value not less than Rs.80/- as per Stamp Act.
3. The stamp papers should be purchased in the name of Bank executing the guarantee.

---

Bank Guarantee No.....

Date: .....

To  
The General Manager/Contracts  
NLC India Limited,  
Block-1, Neyveli- 607 801,  
Cuddalore District, Tamil Nadu, INDIA.

Dear Sirs,

- 1.0 In consideration of the NLC India Limited, Neyveli hereinafter referred to as the PURCHASER, which expression shall, unless repugnant to the context or meaning, thereof include its successors, administrators, representatives and assignees, having awarded in favour of M/s. .... having registered office at ..... hereinafter referred to as the CONTRACTOR, which expression shall unless repugnant to the context or meaning thereof include its successors, administrators, representatives and assignees, a Contract, hereinafter "referred as the CONTRACT" for the ..... on terms and conditions set out interalia, in the PURCHASER`s Contract /Letter of Award No..... dated as well as "CONTRACT" documents, valued at ..... (In words) and the same having been unequivocally accepted by the CONTRACTOR and the CONTRACTOR having agreed to provide a Contract Performance Guarantee for the faithful performance of the entire "Contract" including the warranty obligations /liabilities under the contract Equivalent to 10% of the said value of the Contract plus .....% of the computed price adjustment, if any, to the PURCHASER amounting to..... (In words) as Contract Security in the form of a Bank Guarantee.
- 2.0 We, .....(Name).....(Address) hereinafter referred to as the "Bank which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators, representatives and assignees do hereby irrevocably guarantee and undertake to pay the PURCHASER merely on demand without any previous notice and without any demur and without referring to any other source, any and all monies payable by the CONTRACTOR by reason of any breach by the said CONTRACTOR of any of the terms and conditions of the said CONTRACT including non-execution of the "CONTRACT AGREEMENT" to the extent of 10% of the Contract price plus ..... % of the computed price adjustment, if any and adherence to Time Schedule stipulated at any time upto..... (day/month/year). Any such demand made by the PURCHASER on the bank shall be conclusive and binding, absolute and unequivocal not withstanding any disputes raised/pending before any court,

tribunal, arbitrator or any other authority. The Bank agrees that the guarantee herein contained shall continue to be enforceable till this sum due to the PURCHASER is fully paid and claims satisfied or till the PURCHASER discharges this Guarantee.

- 3.0 The Bank further irrevocably guarantees and undertakes to pay on mere demand, without any demur, reservation, contest, recourse or protest any and all monies due and payable by the CONTRACTOR by reasons of non-fulfillment of any of the following obligations.
- 3.1 For the successful and satisfactory operation of the equipment furnished and erected under the said Contract as per the specifications and documents.
- 3.2 That the equipment installed under the said Contract shall be new and in accordance with Contract Documents and be free from all defects in design, material workmanship and performance including modifications, improvements and replacements for a period of 12 calendar months, from successful completion of take over test/commissioning of the equipment and that immediately upon intimation /written notice from the PURCHASER, the CONTRACTOR shall remedy free of expenses to the PURCHASER such defects as noticed and developed under the normal use of the said equipment, within the said guarantee period.
- 4.0 The PURCHASER shall have the fullest liberty without affecting in any way the liability of the Bank under this guarantee, from time to time, to extend the time of performance by the CONTRACTOR. The Bank shall not be released from its liabilities under these presents by any exercise of the PURCHASER of the liberty with reference to the matter aforesaid.
- 5.0 The PURCHASER shall have the fullest liberty, without affecting this guarantee to postpone from time to time the exercise of any powers vested in them or of any right which they might have against the CONTRACTOR and to exercise the same at any time in any manner, and either to enforce or to forbear to enforce any covenants, contained or implied in the CONTRACT between the PURCHASER and the CONTRACTOR or any other course or remedy or security available to the PURCHASER and the BANK shall not be released of its obligations/ liabilities under these presents by any exercise by the PURCHASER of his liberty with reference to the matters aforesaid or any of them or by reasons of any other act or forbearance or other acts of omission or commission on part of the PURCHASER or any other indulgence shown by the PURCHASER or by any other matter or thing whatsoever which under law would, but for this provision, have the effect of relieving the Bank Guarantee. The Bank further undertakes not to revoke this guarantee during its currency without the previous consent of the PURCHASER.
- 6.0 The Purchaser shall have the fullest liberty to lodge their claims for encasements of the guaranteed sum in full or in part, in the manner suitable to them. However, payment made for a sum lesser than the guaranteed amount, shall not relieve or discharge the Bank from their obligations guaranteed hereunder, till the contractual obligation are fully performed by the Contractor or the Bank Guarantee is discharged by the Purchaser, as the case may be and the Bank Guarantee shall continue to be in force till such time.
- 6.1 The Bank further agrees that the decision of the PURCHASER as to the failure on the part of the CONTRACTOR to fulfill their obligations as aforesaid and/or as to the

amount payable by the BANK to the PURCHASER hereunder shall be final, conclusive and binding on the BANK.

7.0 The Bank also agrees that the PURCHASER shall be entitled at his option to enforce this guarantee against the BANK as a principal debtor, in the first instance notwithstanding any other Security or guarantee that it may have in relation to the CONTRACTOR`s liabilities.

8.0 This guarantee will not be discharged due to the change in the constitution of the BANK or the CONTRACTOR(S).

9.0 Notwithstanding anything contained herein:

- a. our liability under this bank guarantee shall not exceed ..... (in words)
- b. this bank guarantee shall be valid upto .....; and
- c. we are liable to pay the guaranteed amount or any part thereof under this bank guarantee only and only if you serve upon us a written claim or demand on or before .....

Witness

SIGNATURE

1

Signature

Name in Block Letters

Name in Block Letters

Designation

Occupation

Staff Code No.

Address

2

Signature

(Banker`s seal)

Name in Block Letters

Attorney as per Power of

Occupation

Attorney No.....dt.....

Address

## Appendix -E

### **FORMAT OF CUSTODY CUM INDEMNITY BOND TO BE EXECUTED BY THE CONTRACTOR FOR THE EQUIPMENT HANDED OVER AND TO BE HANDED OVER IN INSTALMENT BY----- FOR PERFORMANCE OF ITS CONTRACT.**

(On non-judicial stamp paper of appropriate value)

#### CUSTODY CUM INDEMNITY BOND

This CUSTODY CUM INDEMNITY BOND is made this .....day of .....20..... a Company registered under the Companies Act, 1956/Partnership firm/ proprietary concern having its registered office at .....(Hereinafter called as “Contractor” or “obligor” which expression shall include its successors and permitted assigns) in favour of NLC India Limited,, a company incorporated under the companies act, 1956 having at its registered office at Chennai

WHEREAS NLC India Limited, has awarded to the contractor a contract for .....vide its Letter of Award/Contract No..... date..... and its Amendment No.1 and Amendment No.2 (Applicable when amendments have been issued ) (hereinafter called the “Contract”) in terms of which NLC INDIA Limited, is required to hand over various equipment to the contractor for execution of the contract.

AND WHEREAS by virtue of clause No..... of the said Contract, the contractor is required to execute the Custody cum Indemnity Bond in favour of Neyveli Lignite corporation for the Equipment to be handed over to it by NLC India Limited, for the purpose of performance of the contract/ erection Portion of the contract (hereinafter called “Equipment” ).

NOW, THEREFORE, this Custody cum Indemnity Bond witnessth as follows:

1. That in consideration of various Equipment as mentioned in the contract, valued at Rs.....(Rupees .....) to be handed over to the Contractor in instalments from time to time for the purpose of performance of the contract, the contractor hereby undertakes to indemnify and shall keep NLC INDIA Limited, indemnified, for the full value of the Equipment. The contractor hereby acknowledges receipt of the initial installment of the Equipment as per details in the schedule appended hereto. Further, the contractor agrees to acknowledge receipt of the subsequent instalments of the Equipment as required by NLC India Limited, in the form of schedules consecutively numbered which shall be attached to this custody cum Indemnity Bond so as to form integral part of this Bond. It is expressly understood by the contractor that handing over the despatch title document in respect of the said equipment duly endorsed by NLC India Limited, infavour of the contractor shall be construed as handing over of the equipment purported to be covered by such title documents and the contractor shall hold such equipment in trust as a Trustee for and on behalf of NLC India Limited,

That the contractor is obliged and shall remain absolutely responsible for the safe transit/ protection and custody of the Equipment at NLC India Limited, project site against all risks whatsoever till the Equipment are duly used/ erected in accordance with the terms



of the contract and the plant/ package duly erected and commissioned in accordance with the terms of the contract is taken over by NLC India Limited, The contractor undertakes to keep NLC India Limited harmless against any loss or damage that may be caused to the Equipment.

1. The contractor undertakes that the Equipment shall be used exclusively for the performance /execution of the contract strictly in accordance with its terms and conditions and no part of the Equipment shall be utilized for any other work or purpose whatsoever. It is clearly understood by the contractor that non-observance of the obligations under this, custody cum indemnity bond by the contractor shall interalia constitute a criminal, breach of trust on the part of the contractor for all intents and purposes including legal/ penal consequences.
2. That NLC India Limited is and shall remain the exclusive, owner of the Equipment free from all encumbrances, charges or liens of any kind, whatsoever. The Equipment shall at all times be open to inspection and checking by Engineer-in-charge/Engineer or other employees / agents authorised by him in this regard. Further, NLCIL India Limited shall always be free at all times to take possession of the Equipment in whatever form the Equipment may be, if in its opinion, the Equipment are likely to be endangered, misutilised or converted to uses other than those specified in the contract, by any acts of omission or commission on the part of the contractor or any other person or on account of any reason whatsoever and the contractor binds itself and undertakes to comply with the directions or demand of NLCIL to return the equipment without any demur or reservation.
3. That this custody cum Indemnity Bond is irrevocable. If at any time any loss or damage occurs to the Equipment or the same or any part thereof is misutilised in any manner whatsoever then the contractor hereby agrees that the decision of the Engineer-in-charge/ Engineer of NLCIL as to assessment of loss or damage to the equipment shall be final and binding on the contractor. The contractor binds itself and undertakes to replace the lost and/ or damaged Equipment at its own cost and/ or shall pay the amount of Loss to NLCIL without any demur, reservation or protest. This is without prejudice to any other right or remedy that may be available to NLCIL against the contractor under the contract and under this custody cum Indemnity Bond.
4. NOW THE CONDITION of this bond is that if the contractor shall duly and punctually comply with the terms and condition of this bond to the satisfaction of NLCIL THEN, the above shall be void, but otherwise it shall remain in full force and virtue.
5. IN WITNESS, WHEREOF, the contractor has hereunto set its authorised representative under the common seal of the company, the day, the month and year first above mentioned.

**Schedule No.1**

<b>Particulars of The Equipment Handed over</b>	<b>Qty.</b>	<b>Particulars of Despatch Title documents RR/GR No. carrier Date, Bill of lading</b>	<b>Value of the equipment</b>	<b>signature of Attorney in token of receipt.</b>
(please Number Subsequent Schedule)				

For and on behalf on  
M/S .....

Name.....  
Signature.....  
Designation.....  
Authorised Representative \*  
(Common seal)  
(In case of company)

WITNESS

I Signature .....

Name.....

Address.....

II Signature.....

Name.....

Address.....

Indemnity Bonds are to be executed by the authorised persons and (i) in case of contracting company under common seal of the company or (ii) having the power of attorney issued under common seal of the company with authority to execute Indemnity Bonds, (iii) in case (ii), the original power of Attorney if it is specifically for this contract or a Photostat copy of the power of Attorney if it is General power of Attorney and such documents should be attached to Indemnity Bond.

**Appendix - F**

**DEED OF JOINT UNDERTAKING BY THE CONSORTIUM PARTNERS**

This Deed of undertaking executed this ..... day of ..... by ..... a Company incorporated under ..... and having its Registered Office at ..... herein after called ..... or Consortium partners which expression shall include its successors, executors and ..... permitted assigns and (Bidder's Name) ..... a Company incorporated under the Companies Act 1956 having its registered office at ..... hereinafter called ..... (Bidder's Name) or 'CONTRACTOR' which expression shall include its successors, executors and permitted assigns) in favour of NLC India Limited, a company incorporated under the Companies Act 1956 having its Registered Office at Chennai-600 010 (hereinafter called the 'PURCHASER'), which expression shall include its successors, executors and assigns.

WHEREAS the PURCHASER is desirous of getting work of the design, manufacture, supply, transport and insurance, Port handling, Customs clearance, forwarding, storage, erection, testing and commissioning of ..... (herein after called as system) at ..... done as per its specification No ..... dated ..... WHEREAS ..... (Bidder's Name) submitted its technical proposal vide its Letter No. .... dated ..... based on the association of M/s ..... (Consortium partners) AND WHEREAS it is a condition for the award of contract to ..... (Bidder's Name) that ..... (Bidder's Name) and its Consortium partners M/s ..... would be jointly and severally bound and shall be responsible to the PURCHASER for the successful performance of the system fully meeting the parameters guaranteed as per the PURCHASER's specifications in terms of the Contract. NOW, THEREFORE, THIS UNDERTAKING witnesseth as under:

1. That consideration of the award of Contract by the PURCHASER (herein after referred to as the 'Contract') we, the Consortium partners and CONTRACTOR do hereby declare and guarantee that we shall be jointly and severally bound unto to the NLC India Limited, (PURCHASER) for the successful performance of the system fully meeting the guaranteed parameters as per the contract and further shall be fully responsible for the correctness of design, manufacture, supply, transport, insurance, erection supervision, testing and commissioning of the system in accordance with the Contract specifications. Further, we, the Consortium partners and the CONTRACTOR hold ourselves jointly responsible for the timely execution of all activities in accordance with the contract.
2. Without prejudice to the generality of the undertaking in para -1 above, the methods of achieving the objectives setforth above shall be as follows:
  - a. The Consortium partners shall be responsible for the preparation of all design, design calculation and manufacturing drawings for the system and shall provide all additional necessary technical assistance to ..... (Bidder's Name) for the portion of the work to be performed by ..... (Bidder's Name) in India. Further the Consortium partners shall extend their quality surveillance to ..... (Bidder's Name) during manufacture at CONTRACTOR's work and/or at the PURCHASER's project site. Without prejudice to the overall responsibility of the Consortium partners as to the successful commissioning and performance of the system,

the Consortium partners shall in addition despite his technical experts from time to time to the CONTRACTOR's works/ PURCHASER and the CONTRACTOR in accordance with the stipulation in the Contract.

- b. The Consortium partners will be fully responsible for the quality of manufacture and the timely delivery of all the major components of system manufactured at his works or at his CONTRACTOR's work for incorporation in the equipment as per the Contract Schedule.
  - c. The CONTRACTOR shall be responsible to manufacture that portion of the equipment to be manufactured at his works or at the sub-Contractor's works as per the Consortium partners design and the Consortium partner's quality acceptance level. Further the CONTRACTOR shall supervise the erection, commissioning of the system as per the contract in accordance with the Consortium partner's advice, procedure and guidance.
3. In the event of any breach in the performance of the obligations set forth above, we the collaborator and the CONTRACTOR, shall jointly and severally pay the loss or damage to the PURCHASER on his demand. Further we the Consortium partners and the CONTRACTOR, jointly and severally undertake to pay to the PURCHASER the liquidated damages arrived at in accordance with the provisions of the Contract, in the event of any delay in supply or in completion of functional test including commissioning of the system without any demur, reservations, protest and recourse. Further, any extension of time, relaxation or indulgence by the PURCHASER to the CONTRACTOR/ Consortium partners shall not prejudice the rights of the PURCHASER under this undertaking against the Consortium partners of the CONTRACTOR.
  4. We, the Consortium partners and the CONTRACTOR agree that this undertaking shall be irrevocable and further agree that this undertaking shall continue to be enforceable till the end of warranty period under the Contract. We further agree that this undertaking shall without prejudice to the various liabilities of the CONTRACTOR including his Contract Performance Guarantee as well as his other obligations in terms of the Contract.
  5. The Performance, rights and responsibility of the party shall be in accordance with the Contract and further the liability of the CONTRACTOR/ Consortium partners under this Undertaking shall not in any case exceed the limits as stipulated in the Contract.
  6. As a security, the Collaborator, apart from the CONTRACTOR's Performance Guarantee, shall furnish a Performance Guarantee from his Bank, in the form acceptable to the PURCHASER, in favour of the PURCHASER, prior to signing of the Contract. The value of the Guarantee shall be 5% 0.05% value of the supplies /services to be made by the Consortium partners and it shall be guaranteed towards the faithful performance/compliance of this Deed of Undertaking in accordance with the terms and conditions specified herein. The Guarantee shall be irrevocable and valid for the entire period of the contract, namely till end of the warranty period of the

Contract or after three months. The guarantee amount shall be payable to the PURCHASER on demand without any condition whatsoever.

IN WITNESS WHEREOF the Consortium partners and the CONTRACTOR have through their authorised representatives executed this Undertaking and affixed common seals of their respective companies, on the day, month and year first above mentioned.

..... (Signature)	For Consortium partners Name Designation :
..... (Name in Block Letters)	Common seal of the company.
..... (Official address)	
..... (Signature)	For CONTRACTOR. Name : Designation :
..... (Name in Block Letters)	Common seal of the Company.
..... (Official address)	

# NLC INDIA LIMITED

(FORMERLY NEYVELI LIGNITE CORPORATION LIMITED)

(A "Navratna" -Government of India Enterprise)

Block – 1, NEYVELI – 607 801, Cuddalore Dist. Tamil Nadu, INDIA.

## OFFICE OF THE CHIEF GENERAL MANAGER / CONTRACTS CORPORATE OFFICE



CREATING WEALTH FOR WELL BEING

## Volume-2 of 2 TECHNICAL SPECIFICATION FOR

Installation of 2 x 10 MW (AC) Grid interactive Solar PV Power Project integrated with 8 MWhr. Battery Energy Storage System at Andaman includes Operation and Maintenance of the entire system for ten years after one year warranty period

INTERNATIONAL COMPETITIVE BIDDING  
Through e-Tender and e-Reverse auction

Tender No. CO CONTS/ 0006G / PV Solar - BESS /ICB/Andaman/e-conts/ 2018, dt.24.02.2018

**Pre bid conference : 14.03.2018 at 11.00 Hrs.**

**Last Date & Time for submission of Bid : 27.03.2018 at 14.30 Hrs.**

**Date & Time of Opening (Cover-I& II) : 27.03.2018 at 15.00 Hrs. (IST)**

**Phone No:04142/252210,251620 Fax No.04142-252026/252645/252646**

**Web site: [WWW.nlcindia.com](http://WWW.nlcindia.com) Email:gmconts\_co@nlcindia.com**

**Registered Office: First Floor, No.8,Mayor Sathyamurthy Road,  
FSD, Egmore Complex,Chetpet, Chennai-600 031.**

**VOLUME 2 of 2**  
**TECHNICAL SPECIFICATION**  
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**SECTION 1.0**  
**PROJECT INFORMATION**

**1.1 Project Site:**

The project site for the installation of 2x10 MW (AC) Grid Interactive Solar PV power plant integrated with Battery Energy Storage System (BESS) is situated in Attam Pahad and at Dolly Gunj, Port Blair, South Andaman. General information of the project site is as follows:

1. Project site area:

a. Attam Pahad Project site:

Refer Tender Drawing Number: NLCIL/PBD/Andaman/02

SI No	Area/village	Survey No	Area in Hectares
1	Garacharma (village) Port Blair (Tehsil) South Andaman (District)	1/1/2/2	12.3042
		1/1/6	4.4345
		1/502	4.5693
<b>Total</b>			<b>21.3080 Hectares</b>

b. Dolly Gunj Project Site:

Refer Tender Drawing Number: NLCIL/PBD/Andaman/03

SI No	Area/Village	Survey No	Area in Hectares
1	Dolly Gunj (Village) Port Blair (Tehsil) South Andaman (District)	200/1/P	4.0946
		200/1/P	0.1050
		200/1/P	0.3276
		200/1/P	1.1525
		200/1/P	0.2580
		200/3/P	0.8103
2	Garacharma (Village) Port Blair (Tehsil) South Andaman (District)	393/2/P	1.9762
		393/2/P	3.9400
		393/2/P	0.7000
		393/2/P	0.6775
		393/1/P	0.3327
		393/1/P	5.0330
3	Pahargaon (Village) Port Blair (Tehsil) South Andaman (District)	160/1/P	0.8000
<b>Total</b>			<b>20.2520 Hectares</b>

2. Site Elevation: Varies from approximately 3 Meters to 30 Meters
3. Land Topography: Undulated ground and slopped terrain.
4. High tide level: 2 Meters
5. Low tide level: 0 Meters
6. Access road: 250 Meters away from Andaman Trunk Road (ATR- NH 4).
7. Nearest Airport: The distance from Veer Savarkar International Airport, Port Blair to Attam Pahad/Dolly Gunj is 4.1 KMS.
8. Nearest Seaport: Port Blair is the main Harbour to receive all mainland vessels
9. Latitude of Attam Pahad site: 11.62<sup>0</sup>N



Longitude of Attam Pahad site: 92.7<sup>0</sup>E  
 Latitude of Dolly Gunj site: 11.627901<sup>0</sup>N  
 Longitude of Dolly Gunj site: 92.711303<sup>0</sup>E

10. Climate:  
 Monthly Average Maximum Temperature-29.89<sup>0</sup>C  
 Monthly Average Minimum Temperature-22.42<sup>0</sup>C  
 Relative Humidity: 90% (Maximum)  
 Relative Humidity: 70% (Minimum)  
 Average Annual rainfall: 254.75 cms  
 Basic Wind speed: 5.3 m/s  
 Seismic zone: V

**1.2 Solar Insolation:**

The estimated monthly average solar insolation on horizontal plane is as given below, the bidder has to adopt these solar insolation data for guaranteed net energy export calculations including other calculations.

Month	Jan	Feb	Mar	Apr	May	Jun
GHI (kWhr/m <sup>2</sup> /Day)	5.65	6.47	6.83	6.65	5.08	4.38
Month	Jul	Aug	Sep	Oct	Nov	Dec
GHI (kWhr/m <sup>2</sup> /Day)	4.45	4.45	4.64	4.99	4.86	5.19

**1.3 Power Evacuation:** (Refer Tender Drawing No: NLCIL/PBD/Andaman/01)

- 33/11 KV Garacharma Substation is the nearest Grid Substation available.
- 33 KV Tie Panther-I and Panther-II feeders are passing at a distance of 1KM from the location at 33 KV Tower Spans and interconnecting Garacharma Substation and Bambooflat substation.
- As Per Site conditions 33 KV Transmission line and 33 KV UG cables shall be installed by the contractor for Power Evacuation, by interlinking the Panther I & II feeders with the 33 KV Power Export Switchyard of the project. Refer tender drawing No: NLCIL/PBD/Andaman/01.

**1.4 Site Inspection:**

For detailed and more accurate information and for authenticated data, the bidder shall collect and confirm data from authorised and authenticated sources.

The bidder is advised to visit and examine the sites of the project and its surroundings and obtain for himself, on his own responsibility, all information that may be necessary for preparing the bid and entering into contract (s). The bidder shall assess and satisfy himself as to the adequacy of the local conditions such as approach roads to the site, adequacy of existing culverts/bridges/roads/ports, harbour for the expected traffic, water and power supply, nature of ground and sub soil condition, water table level, accommodations required during the contract, climatic conditions, local terrain, availability of labour, construction materials, details of taxes and levies as applicable and may other information required. The cost of visiting the site shall be at the bidder's own expenses. Claims and objections due to ignorance of site conditions will not be considered after submission of Bid.

**1.5** The site is under possession of the NLCIL and is deemed to be handed over to the Contractor as is where basis from the date of issue of LOA . Widening of the approach roads, strengthening of the sluice gate culvert across the back waters (if required), strengthening of slopes by construction of retaining walls where ever required, removal/shifting of permanent structures (over ground and underground) etc. as required for project installation shall be in the scope of the contractor.

**1.6 Mode of Execution:**

The entire work shall be executed on Lump sum, turnkey, firm price basis. Any minor item(s) not included in the schedule but required for completion of the work shall have to be carried out/supplied without any extra cost. Such works, not listed in the schedule of works but elaborately described to perform or to facilitate particular operation(s) required for completion of the project shall be deemed to have been included in the scope of this work and the contractor shall supply, install the same without any extra cost to NLCIL.

## SECTION 2.1

### 2.1.1 DESIGN BASIS

The contractor shall submit detailed design report for NLCIL approval for the 2X10MW (AC) Grid interactive Solar PV project integrated with installed capacity of 8MWhr with ½ hr backup Battery Energy Storage System. The entire design shall be done taking into consideration of the long term, lump-sum, turnkey, firm price basis EPC contract, uniqueness of the project, solar power generation integrated with large size battery energy storage for power application so that smoothed power can be injected into the 33 KV Grid, connected with the grid which is mostly powered with DG sets / LNG based power generation. The entire design shall be made taken into consideration of project site which is strategically important, environmentally sensitive, remote and island location with challenges of natural disasters, with limited resources etc. The present load demand in the existing 33KV South Andaman Grid is approximately 40 MW-peak load in the evening hours and around 26 MW-average load in other times.

2.1.1.1 The 2x10MW (AC) of Grid interactive solar PV power project integrated with installed capacity of 8 MWhr with ½ hr backup battery energy storage system shall be designed in such a way that for minimum 11 years ( including 1<sup>st</sup> year PG period ) the entire system is capable of injecting the smooth power from the solar PV into the grid and guaranteed net energy export to the existing 33 KV South Andaman Grid as per requirements stipulated in the relevant clauses of this specification. The general guiding principles for design basis shall be as follows:

- The month wise average solar Insolation values for the project site (Attampahad, ANI) shall be based on considering the long term published data from NASA, available for the location.
- The established efficiency of solar PV modules at different operating conditions shall be as per international standards and as per the standards of the manufacturer in India for the supply of solar cells / modules proposed for this project.
- The design and selection of solar PV module, panel, array configuration, series and parallel connections, orientation, inverter designs, transformer selection, power export scheme etc., shall be such as to ensure maximum electric power generation and minimum loss to the generated power results.
- The Contractor should carry out Shadow Analysis at the site along with the topographic survey for designing strings & arrays layout for optimal usage of space, material and labour. The Contractor shall submit Shadow Analysis Report along with the array layout drawings to NLCIL for review and approval. The Project site location is surrounded with back water from sea. To protect the

structures from corrosion, apart from painting the structures, cathodic protection shall also be envisaged if required.

- BESS scheme integrated directly with 33 KV system with point of common connection shall be envisaged. The maximum MW that shall be discharged from BESS to the 33 KV Grid during Solar hours shall be limited to 16 MW. However the BESS shall be designed to meet the system requirements and to meet the Annual Guaranteed Net Energy Export.
- Provision for seasonal tilt /fixed tilt/ tracking of solar modules and associated auxiliary power feeding arrangements shall be designed to achieve the guaranteed net energy export for the entire period of the contract.
- The design of entire system including PV array layout, general arrangement of equipments, location of BESS equipments and Power Export switchyard, location of Project Control Room etc. shall be such that the allotted project site area shall not exceed in Attam Pahad site and Dolly Gunj site and as per the contractors design approved by NLCIL. If any area is not utilized, the same shall be handed over back to NLCIL.
- The design of the system shall aim for a fully automated power plant requiring minimum operator intervention, with daily automatic startup and shutdowns, optimized power generation features, grid monitored safety functions, integration of Energy Management System with A & N Grid Energy Management Centre, HMI interfaces, User friendly operation, solar forecasting, solar smoothing, data management and remote function capabilities.
- Workmanship and finish shall be in accordance with the best and latest engineering practices. All materials used for the manufacture of equipment by the Contractor or his sub-suppliers or his sub-vendors and the workmanship shall be of good quality and acceptable, as per Indian Standards or other approved standards etc.
- Methods may be adopted for maximizing the quantum of power exported especially during Solar Hours . The distribution losses shall be kept to the bare minimum, by adopting high efficiency design for power transformers with minimum core and copper losses, with liberal use of active materials namely core and copper. The design shall also feature, use of such techniques and other methods to minimize stray losses, reduce harmonics, cater required reactive power loads, withstand all types of fault conditions etc.
- The Contractor shall submit the calculations of the Performance Ratio (PR) of the Solar PV Power Plant for NLCIL approval. It may be noted that the PR value will not be considered for the PG evaluation. With inputs received from various input devices in the field, the PR shall be dynamically calculated and displayed. Suitable software shall be incorporated in the SCADA for this purpose.

- 2.1.1.2 The DC power generated in the photo voltaic arrays will be fed through Array junction box / combiner box and String monitoring unit and then fed to central inverter in Power Collection Substation (PCSS). In case of string inverters/micro inverters the DC Power generated shall be fed directly to the inverters. **The inverter to module ratio shall be minimum 1: 1.10.** The rating of the inverter is chosen to have minimum line loss on DC side for a typical array layout and optimum power rating.
- 2.1.1.3 The inverters transform the DC power to 3 phase AC, 50Hz of suitable voltage. AC power from the inverter output side shall be taken to power transformers. The power transformers shall be located near the PCSS. The high voltage side of the transformers shall be connected to the HV switchgear. The selection of the type of PCSS shall be either indoor or outdoor or a combination with container unit, which shall be finalised during detailed engineering to match the system requirements.
- 2.1.1.4 In the project control room Energy Management System, breaker, distribution board, control and relay panels, metering panel, SCADA, DC and AC auxiliary control power equipment, communication system; fire alarm panel, etc. shall be installed suitably to meet the system requirements.  
BESS design basis and specifications shall be as per section 2.5.
- 2.1.1.5 The following power system parameters for LT system and HT system shall be as per the requirements of Electricity Department, Andaman & Nicobar Administration and to meet the overall system requirements.
- Nominal system voltage
  - Highest system voltage
  - System frequency
  - System Earthing
  - Fault level (3 phase symmetrical)
  - Short time current rating (For all current carrying parts)
  - Power frequency withstand voltage
  - Impulse withstand voltage
  - Other Power System parameters
- 2.1.1.6 The Contractor shall design the entire system to meet the requirements of safety and statutory regulations of the Andaman & Nicobar Administration authorities. If any modifications are required to meet the Andaman & Nicobar Administration regulations/requirements, the contractor shall carry out the same without any extra cost to NLCIL.
- 2.1.1.7 The equipments and systems shall be designed, manufactured, assembled, tested, shipped, installed and commissioned according to the applicable codes, standards and regulations. The design and installation shall be fully in conformity with the standards and codes as applicable but not limited to the following.
- |      |   |  |
|------|---|--|
| ANSI | : | American National Standard Institute           |
| ASME | : | American Standard of Mechanical Engineers      |
| AWS  | : | American Welding Society                       |
| ASTM | : | American Standards for Testing Material        |
| ISO  | : | International Organization for Standardization |
| ASA  | : | American Standard Association                  |
| DIN  | : | Deutsche Industrie Normen                      |
| EN   | : | European Standards                             |

BS	:	British Standards
BIS	:	Bureau of Indian Standards
IEC	:	International Electro-technical Commission
IEEE	:	Institute of Electrical and Electronics Engineers
ISA	:	Instrument Society of America
SI	:	International System of Units

- 2.1.1.8 Latest International / National codes and standards shall be followed for the design of the entire system. It is the contractor's responsibility to ensure the coherence of the codes and standards chosen as reference.

## **SECTION 2.2 SOLAR PV MODULES, ARRAY YARD AND DC SYSTEMS**

### **2.2.1 SOLAR PV CELLS AND MODULES**

- 2.2.1.1 The bidder should adopt only Mono or Poly Silicon Crystalline type flat plate Solar PV Module as detailed in this specification.
- 2.2.1.2 Solar PV Cells offered for this project shall be tested as per testing standards for its characteristics, surface condition, surface profiling, thickness shape, flatness measurements, etc. The modules using the solar cells described above shall conform to latest IEC 61215 in all respects. The contractor shall furnish latest IEC 61215 Test reports along with constructional data form for the offered PV modules to be supplied during detailed engineering. The IEC 61215 test certificates and test reports consisting of list of the Makes & Description of the each component including Solar PV Cells used in the manufacture of Solar PV modules shall be furnished during detailed engineering. The solar PV modules of same type and rating (above 240 Wp rating) will be maintained at each string level. The exact type and rating of solar PV modules at the respective inverter level will be finalised during detailed engineering. The Contractor shall submit IEC 61730 certificate and test reports (for safety qualification testing) for the offered PV modules. In addition, the bidder shall also furnish IEC 61701 certificate and test reports (for corrosion testing) for the offered PV modules during detailed engineering. The Project site location is surrounded with back water from sea. Any additional protective care in the manufacture of modules shall be taken to ensure design life of 25 years.
- 2.2.1.3 All materials used in the Solar PV module shall have a proven history of reliability and stable operation in external applications. It shall perform satisfactorily in high relative humidity with atmospheric temperatures prevailing at the site and should have lowest temperature coefficient and shall withstand gust prevailing at site on the surface of the panel. Each and every SPV module shall be checked for conformity with relevant standard. Modules shall not have negative tolerance and the same shall be incorporated in manufacturing and inscribed in the name plate rating.

- 2.2.1.4 The bidder shall provide the data sheet of technical specifications for the offered PV modules. The bidder shall furnish electrical characteristics such as current-voltage (I-V) performance curves and temperature coefficients of power, voltage and current during detailed engineering.
- 2.2.1.5 PV modules after manufacture must be tested for random sample and approved by one of the NABL accredited Test Centres in India/International Laboratory Accreditation Cooperation (ILAC) Member Labs in abroad. Manufacturing Quality Plan for PV modules shall be submitted for approval by NLCIL. Random sample testing by NLCIL during manufacture of PV Modules shall be included in the MQP.
- 2.2.1.6 Solar PV Peak power rating of the module shall not be less than 240Wp. The module conversion efficiency shall be minimum 15% and above under standard test conditions. The cell should have minimum fill factor of 0.7. It shall be made of high transitivity glass and front surface shall give high encapsulation gain.
- 2.2.1.7 The front surface of the module shall consist of impact resistant, low iron and high transmission, toughened, plain/patterned glass.
- 2.2.1.8 The interconnected cells shall be laminated in vacuum to withstand adverse environmental conditions.
- 2.2.1.9 The module frame shall be made of corrosion resistance materials, preferably having aluminium anodized finish.
- 2.2.1.10 Minimum clearance between the lower edge of the modules and the developed ground level shall be finalised during detailed engineering.
- 2.2.1.11 Bidder shall carefully design complete layout and arrangement of equipments in the land available and requisite number of modules shall be installed to achieve the rated power generation and guaranteed net energy export. The inter row distance between solar PV arrays shall be sufficient for easy movement of men / materials for panel cleaning, maintenance works, etc.
- 2.2.1.12 Solar PV Modules Material Warranty  
Material Warranty is defined as: The manufacturer should warrant the Solar PV and Modules to be free from the defects and/or failures specified below:
- Defects and/or failures due to manufacturing
  - Defects and/or failures due to materials
  - Non-conformity to specifications due to faulty manufacturing and/or inspection processes.

If the solar PV Modules fail to conform to this warranty, the manufacturer will repair or replace the solar modules as per contract terms.

2.2.1.13 PV modules used in Grid Interactive Solar PV power plant integrated with Battery Energy Storage System must be guaranteed for output wattage, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years.

2.2.1.14 Identification and Traceability

Each PV module used in solar power project must use an RF identification (RFID) tag. The following information must be mentioned in the RFID used on each module.

- Name of the manufacturer of Solar cells
- Name of the manufacturer of PV Module
- Month and year of the manufacture (separately for solar cells and modules)
- Country of origin (separately for solar cells and module)
- I-V curve for the module
- Wattage,  $I_m$ ,  $V_m$  and FF for the module
- Unique Serial No. and Model No of the module
- Date and year of obtaining IEC PV module qualification certificate
- Name of the test lab issuing IEC certificate
- Other relevant information on traceability of solar cells and module as per ISO 9000.

**The RFID label shall be placed either inside or outside the laminate.**

2.2.1.15 Modules shall be provided with a Module junction box of minimum IP 65 rated high quality enclosure with provision for external terminal connection and adequate capacity by-pass diodes. The Module junction box should have weatherproof lid, cable gland entry points and connecting copper cable with MC4 type/equivalent/compatible connector.

**2.2.2 ARRAY JUNCTION BOX / COMBINER BOX AND STRING MONITORING UNIT**

2.2.2.1 Array junction box and Combiner box shall be provided on the DC power side to combine the electrical power from the strings. String Monitoring Units (SMU) shall be provided for monitoring the DC power generation and other parameters at two string level. In case of String Inverters, the string level monitoring of the inverters shall be of 0.5 % high accuracy monitoring. If string inverters are made acceptable PCSS of container type may be used to accommodate other PCSS equipment. The Array junction box /Combiner box and String Monitoring unit shall be either integrated into a single box enclosure as intelligent array junction /combiner box or with individual box enclosures. However Array junction box /Combiner box and String Monitoring unit shall be standalone units erected nearer to the module mounting structures at an optimized distance to reduce the DC losses and shall be



either integrated box enclosures or individual box enclosures. The box enclosure for Array junction box/ Combiner box and String Monitoring Unit shall be dust, vermin and water proof, impact resistant and made of polycarbonate/ERP/metallic enclosures which should be sunlight/ UV resistive as well as fire retardant. The box must have minimum protection to IP 65 degree of enclosure and Protection Class II. The terminals inside the Array junction box/ Combiner box and String Monitoring Unit shall be connected to copper bus-bar arrangement of proper sizes. The Array junction box/ Combiner box and String Monitoring Unit shall have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables. Suitable markings shall be provided on the bus-bars for easy identification and cable ferrules will be fitted at the cable termination points for identification.

2.2.2.2 Each string shall have a suitable fuse to prevent the reverse current flow with suitable arrangement for its connection. Y harness is allowed for paralleling two strings. The Array Junction Box shall have suitable surge protection device (SPD) and shall consist of Metal Oxide Variastors (MOV) which shall be provided between positive and negative conductor and earth ground. DC photovoltaic fuses for positive side for each string shall be provided and shall have fuse holder with fuse blown indication, easy to isolate the string during fault conditions. It shall be so designed that it should protect the modules from reverse current flow.

2.2.2.3 The Surge Protection Device shall have following minimum specifications.

Repetitive Surges x15(8/20  $\mu$ S) In : 20kA  
Surge Current (8/20  $\mu$ S) I<sub>max</sub> : 40kA

During earth fault and failure of MOV, the SPD shall be capable of safely disconnecting the healthy system. SPD shall have thermal disconnecter to interrupt the surge current arising from internal and external faults. In order to avoid the fire hazard due to possible DC arcing in the SPD due to operation of thermal disconnecter, the SPD shall be capable of extinguishing the arc by itself.

2.2.2.4 The String Monitoring Units shall be tested using automatic calibration tools so that the accuracy of measured current and voltage reading shall be within +/- 0.15%.

2.2.2.5 The Array Junction Box / Combiner box and String Monitoring Unit shall have suitable arrangement for the following:

- Combine a cluster or group of modules into independent charging string that will be wired through the String Monitoring Unit.
- Provides DC Isolator of suitable rating for disconnection at the outgoing.
- Provides a test point for each sub-group for quick fault location.

- Means to measure voltage / current / power of individual and total string as well as means to indicate the status of disconnection, SPD and fuses
- The current carrying rating of Array Junction Box / Combiner Box and String Monitoring Unit shall be suitable with adequate safety factor to inter connect the Solar PV array.
- In each Array Junction box / Combiner box and String Monitoring Unit, 5% spare terminals (along with cable glands) rounded off to next higher integer shall be provided in Fuses and glands.

2.2.2.6 The String Monitoring Units shall be Intelligent, multichannel, industrial grade, reliable, field proven microprocessor based unit. Required operating power shall be made available to the String Monitoring Units from the respective PCSS 110V DC, UPS and 230 V AC Auxiliary power supply system through cable network. DC to DC converter for String Monitoring Unit power supply is also acceptable. Solar power shall be utilized to power the SMU by employing a suitably sized DC-DC converter. The constructional, operational, connectivity and communication features of the SMU are further elaborated in the control and automation section of this specification.

### **2.2.3 ARRAY YARD AND WATCH TOWER LIGHTING**

2.2.3.1 The offer shall include adequate array yard lighting including erection of poles, fixtures and cables as per IS standards, keeping the general security in mind. Watch Tower lightings shall be installed to cover the solar power plant boundary lighting. A minimum illumination level of 10 lux shall be maintained in the internal roads / pathways. It is preferable to adopt low height bollard type road / path way illuminators to avoid shadow on adjoining solar PV modules where ever warranted. The yard lighting and watch tower lighting shall be fed from the station auxiliary power system of the nearest PCSS. The lighting power from each PCSS shall be taken to surrounding road / yard lights and watch tower lights through buried cable network. Automated switching control shall be made available for the yard / road and watch tower lighting system. Array yard lighting schemes and design calculations along with drawings shall be submitted for approval by NLCIL.

### **2.2.4 DC CABLES**

2.2.4.1 DC cables used for inter connecting PV modules and for PV modules to array junction boxes / combiner boxes shall be FRLS, copper conductor cables and shall be electron beam cured with (+) and (-) colour identification, conforming to the requirements of TUV Specification 2Pfg 1169/08.2007.

DC cables used for connecting array junction boxes / combiner boxes to Inverters shall be of suitable voltage DC grade. These cables shall have compacted Aluminium conductor, XLPE insulated, Armoured, FRLS PVC outer sheathed conforming to IS:7098 ( Part-1).

2.2.4.2 Sizing of DC cable for PV array shall be selected in such a way that the maximum voltage drop at full power from the first PV module to inverter should be less than +3% (Including voltage drop in module to module interconnecting cable).

2.2.4.3 The Contractor shall design the array yard such that module mismatch loss shall be less than 2% loss in system power.

2.2.4.4 For inter connecting PV modules, no cable joints shall be used. MC4 equivalent/compatible connectors with necessary length of DC cables with positive and negative ends, which are built in component of the PV Modules, shall be used for interconnection of PV modules. DC cables for PV modules to Array junction box/ Combiner box and String Monitoring Unit shall be provided without any cable joints.

2.2.4.5 Cable terminations at Array JB, Combiner Box, SMU shall be made with suitable cable lugs and sockets etc, crimped properly and passed through suitable type cable glands (Double compression) at the entry and exit point of the cubicles. The panel bottoms should be properly sealed to prevent entry of snakes/lizard etc. inside the panel.

2.2.4.6 All cables shall be marked with good quality letter and number ferrules of proper sizes so that the cables can be identified easily.

2.2.4.7 Cables shall be fixed to non-moving module mounting structure / column with adequate looping for allowing tilt of the module frame. Bunching of cables and tying to module frame with cable ties shall not be adopted as temperature rise of module frame tend to increase cable power loss and reduce cable life. All cable routed in the array yard shall be laid taking into consideration of undulated, sloppy terrain of the project site. Cable duct bank/hume pipe shall be provided for road crossings. For buried cabling necessary cable markers shall be provided along the route.

2.2.4.8 Cable selection and sizing calculations and detailed explanations along with catalogues shall be submitted for approval by NLCIL.

## **2.2.5 ARRAY YARD LIGHTNING PROTECTION SYSTEM**

2.2.5.1 The Array yard shall be provided with lightning protection system. The lightning protection system must be completed prior to start-up of commissioning activities of the project. The main aim of lightning protection is to protect PV Modules or other sub-system components from any over voltage surge before it reaches the PV

Modules or other sub-system components. The source of over voltage can be lightning or other atmospheric disturbance.

- 2.2.5.2 The lightning conductors shall be designed as per Indian Standards in order to protect the entire Array Yard from lightning stroke including PCSS structure. Necessary concrete foundation for holding the lightning conductor and spike in position shall be made after giving due consideration to its shadow on adjoining solar PV modules, maximum wind speed and maintenance requirement at site in future.
- 2.2.5.3 The lightning conductor shall be earthed through flats and connected to the earth mats with earth pits as per applicable Indian Standards. Lightning protection of Early Streamer Emission (ESE) type as per NFC 17-102 is also acceptable. The protection class shall be minimum class II or higher as per NFC 17-102 (2011). Where ever required, Air Terminals shall be provided at the highest point, especially in PCSS as well as in watch towers. Each lightning conductor shall be fitted with individual earth pit as per standards with earth electrode of 3M length including accessories and masonry enclosure with cover plate as per IS 3043. The pit around the electrode shall be treated with carbon based earth enhancement compound or conductive concrete as per provisions of IS 3043. Test links shall be provided in the down conductor as per standards.
- 2.2.5.4 Design calculations of the lightning system along with drawings shall be submitted for approval by NLCIL.

## **2.2.6 ARRAY YARD EARTHING SYSTEM**

- 2.2.6.1 The earthing for array yard shall be made with earth electrode of 3 M length including accessories and masonry enclosure with cover plate as per IS 3043. The pit around the electrode shall be treated with carbon based earth enhancement compound or conductive concrete as required as per provisions of IS 3043. Necessary provision shall be made for bolted isolating joints of each earthing pit for periodic checking of earth resistance. Soil resistivity measurement at the project site shall be made by the contractor before commencing the earthing system design.
- 2.2.6.2 Each Array structure of the Solar PV Yard shall be grounded properly. The array structures are to be connected to earth pits as per IS standards.
- 2.2.6.3 The complete earthing system shall be mechanically and electrically connected to provide independent return to earth. All equipments shall have two distinct earth connections.
- 2.2.6.4 For each earth pit, necessary Test Point shall be provided.

- 2.2.6.5 In compliance to Indian Electricity Rules, (as amended up to date), all non-current carrying metal parts shall be earthed with two separate and distinct earth continuity conductors to an efficient earth electrode.
- 2.2.6.6 The bidder shall ensure adequate earthing system protection to provide an acceptable degree of protection as per IS 3043 for the array yard equipment. If necessary, more numbers of earth pit and conductors may be provided to achieve earthing resistance less than 1 Ohm. Design calculations along with drawings shall be submitted for approval by NLCIL.
- 2.2.6.7 Earth resistance of the earth pits shall be tested in the presence of the NLCIL officials.

## **2.2.7 SURFACE PROTECTION AND PAINTING**

- 2.2.7.1 All structures, boxes, panels and all other items except Galvanized and non-metallic items shall be provided with approved scheme of surface paint.
- 2.2.7.2 Surface preparation - The surface preparation procedure shall be done as per IS: 1477 Part-1C16.2.1.2 for power tool cleaning or equivalent DIN standard st.3 or as per paint manufacturer's recommendation.
- 2.2.7.3 Paint application
- a) Paint shall be applied in accordance with paint manufacturer's recommendation.
  - b) Paint shall generally be applied by brushing for prime coats and spraying for finish coats.
  - c) Paint shall not be applied in rain, wind, fog, or at relative humidity of 80% and above or when the surface temperature is below dew point resulting in condensation of moisture.
  - d) Each coat of paint shall be allowed to dry sufficiently before application of the next coat to avoid damage.
  - e) After the erection of fabricated steel structures or panels at the plant site, damaged and defective shop coats shall be touched up with the same type paint as used for shop coat after cleaning.

- f) If powder coating is followed for the inverter panel and other items, the application shall be in full conformity to paint system of the supplier.

2.2.7.4 Suggested Paint system for Fabricated Steel Structures

No. of coat	DFT/Coat in microns	Paint System	Total DFT in microns
1P	70	Ethyl silicate inorganic zinc primer	220
1I	70	Epoxy MIO	
1F	40	Epoxy paint two pack polyamide cured	
2F	40	Aliphatic Acrylic Polyurethane	

P-primer coat, I-intermediate, F-finish coat, DFT- Dry Film Thickness

The paint shall be applied immediately after surface preparation to the specified quality, preferably within two hours. Prior approval shall be obtained from NLCIL regarding type of paint and manufacturer

- 2.2.7.5 Colour code -The shade of finish paint coat to be applied shall be as per IS: 5.The colour scheme shall be approved by NLCIL.

- 2.2.7.6 Cathodic protection may also be incorporated to achieve longevity of structures for surface protection from corrosion.

**2.2.8 OTHERS**

- 2.2.8.1 Any array yard work which is not mentioned or included here but necessary for safe operation, maintenance, longevity and improvement in performance of the plant shall be included in scope and carried out.

**SECTION 2.3  
ELECTRICAL POWER COLLECTION & EXPORT SYSTEMS**

**2.3.1 POWER COLLECTION SUB STATION (PCSS)**

- 2.3.1.1 The contractor shall provide Power Collection Sub Stations (PCSS) of indoor type which will consist of Transformers, HT circuit breaker and, metering and protection devices.
- 2.3.1.2 Cables of adequate size shall transfer the DC power for conversion in to AC in the inverters. The location of each PCSS shall be selected in such a way to minimise cable losses.
- 2.3.1.3 The indoor Power Collection Sub Station (PCSS), shall be RCC building as per section 2.4.

2.3.1.4 The indoor PCSS building shall have PCUs, HT Switch Gear, Auxiliary power (AC&DC) system and other electronics for communication and shall be finalised during detailed engineering in line with system requirement. Cable trench shall be provided between the equipment for connecting external incoming / outgoing cables. The oil cooled transformer which steps up LT power to HT shall be an outdoor installation in a fenced area. HT power from transformer to the HT Switch Gear/ shall also be taken through cabling.

**2.3.1.5 POWER CONVERSION UNIT (PCU)**

The Power Conversion Unit (PCU) shall be Central inverter / string inverter complying to the statutory norms / CEA regulations /ED/A&N Administration requirements.

2.3.1.5.1 The Power Conversion Units shall consist of an electronic inverter along with associated control, protection and data logging devices. The system shall incorporate a unidirectional inverter and should be designed to supply the AC power to the grid at load end. The power conversion unit shall adjust the voltage and frequency levels to suit the grid. All three phases shall be supervised with respect to rise/fall in programmable threshold values of frequency. The PCU shall conform to IEC 62109 or equivalent standards for safety certification. The PCU shall have provision to be isolated from grid through Air Circuit Breakers which shall be inbuilt with the inverter or separate standalone panel.

2.3.1.5.2 PCU shall confirm to IEC 60068-2 standards for Environmental Testing.

2.3.1.5.3 The efficiency of the PCU shall be equal to or more than 98 % at 75% load as per IEC- 61683. The bidder shall submit the conversion efficiency curve on partial output powers for the inverter in his offer. The bidder should specify the overload capacity in the bid.

2.3.1.5.4 The inverter should be warranted for minimum 5 years and the service life of the inverter shall not be less than 25 years under harsh environmental conditions.

2.3.1.5.5 The PCU inverter shall capable to supply or absorb the reactive power for the grid pf 0.95 lead-lag. The PCU inverter shall also support for grid dynamic power factor of 0.8 lag-lead within its rated KVA capacity. The PCU shall have internal protection arrangement against any sustained fault in the feeder line and against lightning in the feeder line.

2.3.1.5.6 The PCU inverter shall have the required protection arrangements against earth leakage faults.

- 2.3.1.5.7. Specifically, the PCU inverter should be three phase power conditioning unit using static solid state components. DC lines shall have suitably rated isolators to allow safe start up and shut down of the system. Isolators used in the DC lines must be rated suitably for DC application..
- 2.3.1.5.8 The PCU inverter shall be transformer less design with necessary provision for galvanic isolation. Each solid-state electronic device shall have to be protected to ensure long life of the inverter as well as smooth functioning of the inverter.
- 2.3.1.5.9 The PCU inverter shall have special safety features like active anti islanding detection and isolation facility as well as modular system features to harness solar power during lesser irradiation conditions and to maintain equal aging of inverter modular system. The PCUs shall conform to the latest edition of IEEE1547/UL 1741/ equivalent for protection against islanding of grid.
- 2.3.1.5.10 The PCU inverter must and be able to be successively switched “ON” and “OFF” automatically based on solar radiation variations during the day.
- 2.3.1.5.11 Inverter system shall tend to balance unequal phase voltage (with 3-phase systems) with reference to the red phase (line-1). Protection shall include negative sequence protection also such that if the balancing of 3 Phase system failed, the protection shall envisage isolation of the inverter from the circuit.
- 2.3.1.5.12 The PCU inverter front panel shall be provided with a display (LCD or equivalent/ LED + Mobile App Display) of all important parameters such as DC input voltage, DC input current, AC output voltage, AC output current, AC output power, power factor, frequency etc. In addition to the display in PCU panel, the same shall be made available in the monitoring and controlling desk installed in the project control room forming part of the supervisory control and data acquisition system (SCADA) and EMS.
- 2.3.1.5.13 The PCU enclosure and internals including nuts, bolts etc shall have to be adequately protected, taking into consideration the atmosphere and weather prevailing in the area.
- 2.3.1.5.14 Dimensions and weight of the PCU shall be indicated by the bidder in the offer.
- 2.3.1.5.15 The PCU shall include appropriate self protective and self diagnostic feature to protect itself and the PV array from damage in the event of PCU component failure or from parameters beyond the PCU’s safe operating range due to internal or external causes. The self-protective features shall not allow signals from the PCU front panel to cause the PCU to be operated in a manner which may be unsafe or damaging. Faults due to malfunctioning within the PCU, including commutation failure, shall be cleared by the PCU protective devices.



It should have local LCD (Liquid crystal display) and keypad for system control, monitoring instantaneous system data, event logs, data logs and changing set points. Control and read-out should be provided on an indicating panel integral to the inverter. Display should be simple and self explanatory to show all the relevant parameter relating to PCU operational data and fault condition in front panel meters / LED's or two line LCD Display.

- 2.3.1.5.16 PCU shall have arrangement for adjusting DC input current and should trip against sustainable fault downstream and shall not start till the fault is rectified.
- 2.3.1.5.17 Operation and maintenance manual should be furnished by the Contractor before dispatch of PCUs.
- 2.3.1.5.18 Bill of materials associated with PCUs should be clearly indicated while delivering the equipment.
- 2.3.1.5.19 Standby Mode - The control system shall continuously monitor the output of the solar power plant until pre-set value is exceeded and that value to be indicated.
- 2.3.1.5.20 Basic System Operation (Full Auto Mode) - The system shall automatically “wake up” in the morning and begin to export power provided there is sufficient solar irradiance and the grid voltage and frequency is in range.
- 2.3.1.5.21 Maximum Power Point Tracker (MPPT) – MPPT control algorithm shall adjust the voltage of the SPV array to optimize energy fed into the grid.
- 2.3.1.5.22 Sleep Mode - Automatic “sleep” mode shall be provided so that unnecessary losses are minimized at night. The power conditioner must also automatically re-enter standby mode when threshold of standby mode is reached.
- 2.3.1.5.23 Maximum Power Point Tracking (MPPT) - Maximum power point tracker shall be integrated in the power conditioner unit to maximize energy drawn from the Solar PV array at all seasons and in varying solar insolation conditions. The MPPT should be microprocessor based to minimize power losses. The details of working mechanism of MPPT shall be furnished by the Contractor. The MPPT must have provision for constant voltage operation. The MPPT unit shall conform to IEC 62093 for design qualification. Multi MPPT and Master –Slave configuration shall also be considered as applicable. The MPPT shall conform to EN50530.
- 2.3.1.5.24 The inverter output shall always follow the grid in terms of voltage and frequency. This shall be achieved by sensing the grid voltage & phase and feeding this information to the feedback loop of the inverter. This control variable shall then control the output voltage and frequency of the inverter, so

that inverter is always synchronized with the grid. The inverter shall be self commutated with pulse width modulation technology. The design and operation of inverter shall be such as to limit the individual and total harmonic distortions (THD) within the limits specified in IEEE 519 at HT level and the same shall be demonstrated at site. Additional equipment, if any to meet the above requirement shall be included as part of inverter / HT bus at Power Export Switchyard. Inverter switching scheme shall have in built arrangement to minimize the circulating currents between inverters and the transformer.

Low/High Voltage Ride-Through (LHVRT): The inverter should not get tripped in the event of voltage drop for a pre determined time as per regulatory norms and the inverter need not stay in grid after this pre determined time if the voltage does not develop to a certain percentage of rated value as per regulatory norms.

Low/High Frequency Ride-Through (LHFRT): Immediate disconnections when momentary frequency disturbances should not occur. LHFRT shall allow inverters to stay connected if such frequency excursions are for very short time durations.

Power-frequency droop: Inverters shall not switch off abruptly. Inverters will be required to stay connected when the grid frequency changes after which the inverters are required to shut down.

2.3.1.5.25 Technical Parameters:

- Nominal AC Output Power - Output at 0.95 PF :
  - Minimum 526.32 KVA for 500KW central inverter
  - Minimum 26.3157 KVA for 25 KW string inverter
  - VA rating of micro inverter shall be rating of inverter/ 0.95.
- Nominal Output voltage : To suit.
- Minimum Efficiency at 75%load :  $\geq 98\%$
- Output frequency : 50 Hz +3% to -5% Hz (Inverter to follow grid frequency up to +3% to +/- 5% Hz of the nominal output frequency during normal operation)
- Power Factor (Adjustable) : 0.8 Lead to 0.8 Lag
- Maximum Input voltage : 1000 V DC or above
- Total Harmonic Distortion (THD) : Less than 3 %
- Ambient temperature : 0 to 50deg C
- Humidity : 5% - 95%, non- condensing

2.3.1.5.26 The Inverter shall have following features:

- a) No load loss < 1% of rated power and maximum loss in sleep mode shall be less than 0.05%
- b) Sinusoidal current modulation with excellent dynamic response.
- c) VAR control

- d) Unit wise and integrated data logging.
- e) Dedicated Ethernet for networking
- f) Protection against over current, loss of synchronization, over temperature, DC bus over voltage, cooling fan failure
- g) Power regulation in the event of thermal overloading
- h) Set point pre-selection for VAR control
- (i) Provision of Port and protocol for SCADA requirement:  
Data Acquisition Systems (DAS) as a combination of a software application programme and electronic hardware for monitoring PV plants and reporting data is required. This can be considered to be a subset of the Supervisory Control and Data Acquisition (SCADA) programme to monitor different datas. This data should be accessible as part of a central database for A&N Electricity department etc. The required protocol for A&N Electricity department is IEC 60870-5-104 protocol and shall be finalised during detailed engineering as per system requirement and A&N Electricity department requirement.
- j) Remote control via SCADA and EMS
- k) Integrated protection in the DC and three phase system
- l) Insulation monitoring of the PV array with sequential fault location.
- m) PID monitoring if applicable.
- n) Earth Fault Protection – through neutral CT. Alternatively, GFID kit (Ground Fault indication device) is also acceptable.

**2.3.1.6 AC BREAKER**

2.3.1.6.1 AC converted in the PCUs shall be transmitted through an AC breaker. AC breaker as part of PCU inbuilt is also acceptable. Outgoings of the AC breaker shall be connected to the HT transformer through appropriate size aluminium cables.

2.3.1.6.2 The AC Breaker shall consist of adequately sized ACBs conforming to IS 13947-Part 1&2 and IEC 947-Part 1&2 for circuit breakers of suitable rating for connection and disconnection of PCU from Grid. Suitable capacity breakers shall also be provided for the transformers. The control of the circuit breaker shall be with microprocessor technology and with electro-magnetic compatibility (EMC). The AC Breaker shall be equipped with adequate protection relays, fuses, annunciations and remote operating and controlling facility through SCADA and EMS.

2.3.1.6.3 The Contractor shall submit design calculations and drawings for the AC Breaker for approval by NLCIL.

### 2.3.1.7 HV POWER TRANSFORMER

2.3.1.7.1 The design, engineering, manufacture and testing of the oil cooled Power Transformer in each PCSS and its related equipment shall be carried out as per the latest Indian /International standards, Indian electricity rules, relevant code of practices and requirement of Central Electricity authority. Salient standards and code of practices are given below:

Power transformers	:	IS 2026, BS 171 and IEC 60076
Guide for loading of oil immersed transformers	:	IS 6600 / IEC 354
Tap changer	:	IEC 60542
Fittings and accessories (if applicable)	:	IS 3639
Insulating oil for transformer	:	IS 335
Bushings for alternating voltages above 1000 volts	:	IS 2099
Dimensions for porcelain Transformer Bushings	:	IS 3347
Recommended practice for hot dip Galvanizing of iron and steel	:	IS 2629
Methods of testing of coating of zinc coated items	:	IS 2633
Colour for ready mixed paints and Enamels	:	IS 5

Except where specified otherwise herein, all material, equipment and construction shall conform to all the acts, rules and standards indicated.

#### 2.3.1.7.2 Technical Particulars

The transformer offered shall meet the following technical particulars:

Service	:	Outdoor
Rating	:	To suit.
Cooling	:	ONAN
Voltage ratio	:	To suit
Number of phase	:	3
Primary Voltage	:	To suit
Secondary Voltage	:	HV as per requirement
Winding connection, Vector group	:	As per design requirement of the solar PV plant and actual requirements of A&N Electricity Department
Impedance voltage	:	To suit the system requirement.
HT short circuit level	:	As per system requirement.
System earthing at HV	:	As per system requirement.

System earthing at LV	:	As per system requirement.
Highest system voltage	:	As per system requirement
Insulation level HV	:	As per system requirement
Tap changers and Tapping	:	Off circuit type, with +/-2.5 % and +/- 5% taps. (5 Positions)
Temperature rise, degree C		
Top oil, by thermometer	:	45 degree C
Winding, by resistance	:	55 degree C
Terminal arrangement	:	Cable box on HV side for terminating XLPE, armoured, Al cable. Cable box on LV side for terminating XLPE, armoured Al cable.
Neutral	:	As per ED/A&N Administration requirements /system requirements

2.3.1.7.3 The transformer shall be of proven design and robust maintenance free construction featuring liberal use of active materials viz. core iron and copper to keep down losses at low levels and consequently the operating temperature well within the limits of oil cooled transformers.

- 2.3.1.7.4 Constructional Features
- i) The transformer shall be designed to withstand the extremes of all magnetic, electrical, mechanical and thermal stresses and gas pressures which may be encountered during its normal and abnormal operating conditions.
  - ii) The transformer shall be capable of withstanding the short circuit stresses due to a terminal fault on any one winding with full voltage maintained on the other windings for minimum period for three (3) seconds.
  - iii) The transformer shall be capable of working at high efficiency in both the directions of power flow.
  - iv) All materials used shall be new and of tested quality conforming to applicable national or manufacturer's standards and Indian Electricity Acts/rules. Equipment shall be transportable and capable of installation at site with ease and without damage. It shall give continuous reliable operation over long periods under worst specified site conditions. All similar parts shall be interchangeable.

2.3.1.7.5 Tanks

2.3.1.7.5.1 Tanks shall be welded construction and fabricated from tested quality commercial grade carbon sheet steel of adequate thickness. The transformer tank top shall be provided with detachable cover with bolted flanged gasket joint. Lifting lugs shall be provided for removing the cover with core and coil

assembly. Tank covers shall be welded from tested MS flats adequately reinforced externally by structural steel stiffeners. Two side walls of the tank shall be provided with extended finned tubes to act as a radiator. All seams, flanges, lifting lugs, braces and permanent parts attached to tank shall be double welded. Joints which may have to be opened for inspection and/or repairs shall be machined surface and be made oil tight with renewable oil resistant gaskets and seals. Guides shall be welded to the inner side of the tank to facilitate tanking and un-tanking. Tank shall be suitable for full vacuum required during drying out for oil filling and shall withstand the required pressure.

- 2.3.1.7.5.2 All removable covers shall be provided with weather proof, hot oil resistant, resilient gaskets. The openings for all removable covers shall be made on suitably elevated bosses/contour frames. The design shall be such as to prevent any leakage of water into or oil from the tank.
- 2.3.1.7.5.3 Adequate space shall be provided at the bottom of tank for collection of sediments.
- 2.3.1.7.5.4 After fabrication and welding of cooling fins, tank and its fittings with respective valves shall be pressure tested with transformer oil to withstand specified pressure. No valve shall drip and no weld or joint shall sweat.
- 2.3.1.7.5.5 All gasket joints shall be perfectly oil tight under all conditions of operations. Gaskets shall be of neoprene or approved oil resistant material and so placed that they will not be exposed to weather. Damaged gaskets shall not find way into the tank.
- 2.3.1.7.6 Core
- 2.3.1.7.6.1 The core shall be constructed from high grade, cold rolled, non-aging, grain oriented, silicon steel laminations to BS: 601. Core, its supporting steel and insulation shall be of such design, material and construction that harmful changes in electrical or physical properties shall not occur during the life of transformer. Limbs and yoke shall have similar section to minimise effects of transverse flux. Butt joints between yoke and limbs shall not be made. Generous cooling ducts shall be provided for core heat dissipation.
- 2.3.1.7.6.2 Core and winding shall be strongly braced to prevent displacement or distortion during transportation or abnormal electrical conditions in service. The core and coil assembly shall be securely fixed in position so that no shifting or deformation occurs during movement of transformer or under short circuit stresses.
- 2.3.1.7.6.3 Each core bolt and parts of core clamping framework shall be insulated from the core laminations and tested after assembly of core to withstand 2 kV RMS for one (1) minute. Preference shall be given to such construction of core, which does not involve use of core bolts. The core design shall be such as to limit the flux density to 1.6 Tesla.
- 2.3.1.7.7 Windings
- 2.3.1.7.7.1 Each coil shall be wound of paper insulated, continuous smooth, high grade, electrolytic copper conductor, without sharp corners or bends and shall be adequately transposed to minimize eddy current losses and equalize current and temperature distribution. Successive coils may be smoothly brazed or welded in an accessible location. Abrasive damage and high dielectric stresses in insulation shall not occur. Similar coils shall be interchangeable. Liberal ducts shall be provided for oil circulation and prevention of 'hot spots' that may

- affect insulation life. Insulation of windings and other live parts should be adequate to sustain 110% of rated operating voltage continuously.
- 2.3.1.7.7.2 An earthed screen shall be installed between the primary and secondary windings to capacitatively decouple primary and secondary windings and eliminate the effects of high frequency transients on the other winding
- 2.3.1.7.7.3 The coils shall be manufactured from electrolytic copper conductor. The materials used in the insulation and assembly of the windings shall be insoluble, non-catalytic and chemically in-active in the hot transformer oil and shall not soften or otherwise be affected under the worst operating conditions. Insulating material shall be of proven design, Coils shall be so insulated that impulse and power frequency voltage stresses are minimum
- 2.3.1.7.7.4 Coil supports shall be by permanently secured, highly compressed and dried, regularly spaced insulating spacers. Coil clamping rings, if made of steel shall each be earthed by connection to core clamping structure and shall otherwise be of insulating material built up from flat laminations.
- 2.3.1.7.7.5 Coil assembly shall be suitably supported between adjacent sections by insulating spacers and barriers. Bracings and other insulation used in assembly of winding shall be arranged to ensure free circulation of oil and to reduce the hot-spot of winding.
- 2.3.1.7.8 Fasteners
- 2.3.1.7.8.1 Clamping bolts for current carrying parts inside oil shall be of oil acidity resistant material. Terminal screws, studs, nuts and bolts shall be of non-ferrous material, threaded to IS. All fasteners exposed to weather shall either be nonferrous or hot dip galvanized or electroplated conforming to relevant IS.
- 2.3.1.7.9 Cooling
- 2.3.1.7.9.1 The transformer shall be provided with finned tube radiator panels on two sides to cool the oil.
- 2.3.1.7.9.2 The finned tubes shall be of heavy gauge, corrosion resistant steel construction. All internal surfaces of the tubes shall be pickled, free of all rust and scale and passivated. External surfaces shall be sand blasted and required number of coats of weather proof paint applied so as to prevent rusting.
- 2.3.1.7.10 Bushings
- 2.3.1.7.10.1 Oil communicating type porcelain bushing and its terminal fittings shall carry full rated current continuously without exceeding temperature of any component beyond 70°C. These shall operate satisfactorily in heavy sand storms, rain with lightning and other site atmospheric conditions. Freedom from corona and radio interference shall be ensured. Bushing shall be wet process porcelain with uniformly brown external shell. All bushings shall be designed or equipped to withstand arcing or flashover without damage to seals or any vital part. Terminal bushing shall be oriented for the minimum clear distances in air as per CBIP stipulation. Minimum distance between terminals of two windings of different voltage shall equal the phase-to-phase distance of the HV winding.
- 2.3.1.7.10.2 Bushings shall be provided with terminal connectors of approved type and size. Bushing location shall provide adequate phase and ground clearances. Bushings shall be suitable for surrounding atmosphere and shall have creepage distance.
- 2.3.1.7.11 Cable box and disconnecting chamber
- 2.3.1.7.11.1 On the HV side cable box, disconnecting chamber shall be provided for disconnecting and moving away the transformer without unsealing the cables or draining oil from the main tank leaving the cable box and part disconnecting chamber behind on external supports supplied by the vendor.

- 2.3.1.7.11.2 The HV cable box shall be complete with other accessories including armour and earthing clamps. The box shall be suitable for heat shrinkable type/push on type/tapex type termination kits of proven design against short circuit levels of as per standards for one second with a peak value as per standard.
- 2.3.1.7.11.3 The disconnecting chamber shall be air insulated, removable links and removable covers shall be provided for the disconnecting chamber. Plates through which high current carrying conductors pass, shall be of non- magnetic materials.
- 2.3.1.7.11.4 Phase to phase and phase to ground clearances within the chamber shall be such as to enable either the transformer or cable to be subjected to HV tests. Clearances shall be subject to approval by NLCIL.
- 2.3.1.7.11.5 LV cable boxes shall be of steel plate construction, self-supporting weather proof type complete with all accessories including brass cable glands & tubular copper lugs to receive number of 1.1kv grade Aluminium XLPE cables to suit.
- 2.3.1.7.12 Marshaling box
- 2.3.1.7.12.1 The marshaling box shall be corrosion resistant sheet steel, weather proof, dust and vermin proof construction conforming to degree of protection IP55 with 16 SWG thick sheet steel water tight hinged and padlocked doors, fully wired, for terminating all wiring for control, protection and alarm circuits of the transformer. All wiring shall be of 1100V grade, oil and fire resistant, multi core copper cables. All devices and terminal blocks within the marshaling box shall be identified by symbols corresponding to those used in applicable schematic or wiring diagram.
- 2.3.1.7.13 Insulating Oil
- 2.3.1.7.13.1 Transformer shall be filled with mineral insulating oil conforming to IS: 335. Material in contact with the oil shall be such as not to contribute to the formation of acid in oil.
- 2.3.1.7.14 OFF Circuit Tap Changers
- 2.3.1.7.14.1 OFF circuit tap changers suitable for variation of secondary (constant flux voltage variation) shall be provided on the primary Windings. The range of taps shall be as specified. The transformer shall be capable of operation at its rated KVA on any tap provided the voltage does not vary by more than  $\pm 10\%$  of the rated voltage corresponding to the tap. The winding including the tapping arrangement shall be designed to maintain electromagnetic balance between two primary and one secondary windings at all voltage ratios. The tap switches shall be of robust construction, of adequate rating, capable of repeated operation and of withstanding short-circuit forces. All contacts shall have ample area and shall be held in position under strong contact pressure to avoid contact pitting.
- 2.3.1.7.15 Grounding
- 2.3.1.7.15.1 Two grounding pads, located on the opposite sides of the transformer tank, shall be provided for connection to station ground mat. The core coil assembly shall be directly connected to this ground bus by removable bolted link for effective grounding. Ground terminals shall be provided on marshaling box, cable end box etc. to ensure its effective earthing. For continuity of earth connection, all gasket joints shall be provided with minimum two numbers braided copper conductor jumpers of adequate size.
- 2.3.1.7.16 Fittings and Accessories
- 2.3.1.7.16.1 The transformer shall be complete with oil for first filling and all standard fittings and accessories as per IS 2026 including the following:
1. First fill of oil as per IS2026 with 10% extra oil



2. Oil conservator with filling hole, cap, and air cell separator for the main and OLTC oil compartments
3. Drain plug for conservator
4. Magnetic oil level gauge with alarm contacts
5. Prismatic oil level indicator
6. Silica gel breather for conservator
7. Double float Buchholz relay with alarm and trip contact
8. Shut off valve for Buchholz relay on both sides
9. Dial type oil temperature indicator with alarm, trip contacts and maximum temperature indicator
10. Dial type CT operated winding temperature indicator with alarm, trip contacts and maximum temperature indicator
11. Thermometer pockets
12. Pressure relief valve with trip and alarm contacts
13. Air release vent, drain plug for radiators.
14. Flanged filter valve at top and bottom
15. Lifting lug and jacking pads
16. Rating and terminal marking plate
17. Bi-directional flanged wheels
18. Detachable radiators complete with top and bottom valves

2.3.1.7.17 Paint and Finish

2.3.1.7.17.1 All surfaces to be painted including interior and exteriors of tanks, mechanisms and enclosures and other metal parts. These shall be shot or sand blasted or chemically treated to remove all rust, scale, grease and other adhering foreign matters. All steel surfaces in contact with hot insulating oil, shall be painted with not less than two (2) coats of heat resistant and oil insoluble paint. Steel surfaces, exposed to weather shall be given two (2) coats of zinc chromate and two (2) coats of finishing paint light grey No. 631 of IS:5 with glossy finish except for panels which shall have matt finish. The final finished thickness of paint film on steel shall not be less than 100 microns and shall not be more than 150 microns

2.3.1.7.18 Tests and Inspection

2.3.1.7.18.1 The transformer shall be designed and manufactured to national and international standards. After manufacture, it shall be subjected to inspection and testing in the manufacturers' works which should be accredited by the National testing laboratory and tests as per MQP sampling shall be carried out in the presence of the NLCIL Engineer. The various tests to be carried out shall be as follows:

1. Assembly inspection
2. Measurement of winding resistance
3. Measurement of voltage ratio
4. Check of vector group

5. Measurement of impedance voltage, short circuit impedance and load loss
6. Measurement of no load loss and no load current
7. Temperature rise test
8. Separate source voltage withstand test
9. Inducted over voltage withstand test
10. Verification of type test reports for short circuit, impulse voltage and partial discharge tests

The contractor shall furnish type test reports of the transformer for NLCIL approval. The contractor shall also arrange to conduct site tests including ratio test, etc. after installation.

2.3.1.7.19 Performance Guarantee

2.3.1.7.19.1 The transformers shall be guaranteed for workmanship, materials and satisfactory performance in respect of voltage ratio, load / no load losses, heating etc. for a minimum period of twelve (12) months from date of Provisional take over. The guarantee for performance shall be inclusive of individual component parts and the equipment as a whole for their ratings/output as well as for the operation of the transformer. If it fails to meet the performance requirements due to defective material and workmanship, the same shall be replaced free by the contractor.

2.3.1.8 **HT Breaker**

2.3.1.8.1 Standards and Construction Features

The HT switchgear distribution board shall conform to IS 3427, IS 12729 and IS 13118 for all essential features of design, construction and testing. The board shall be factory assembled and wired, totally enclosed, dead front, draw out type, fully interlocked and compartmental design.

2.3.1.8.1.1 The switchgear must provide a maximum degree of personal safety and operational security for the operators and others in the vicinity of the switchgear under all operating and fault conditions. To fulfil the high safety requirement for personnel, the switchgear insulation must be designed to provide the best possible protection in the event of an arc fault. To ensure this condition, all compartments of the switchgear shall satisfy the requirements of IEC 298.

2.3.1.8.1.2 The products of the arc shall not transport from one compartment to another. There must be no danger to any person standing at the front or to the side of the switchgear, caused by the venting of hot gases or the scattering of other products of the arc. The circuit breaker compartment shall also meet the above test requirement while the circuit breaker is being raked in or out of service.

2.3.1.8.1.3 The bus bars shall be of electrolytic grade copper, air insulated and housed in a separate metal clad chamber at the top. The bus bars shall be provided with insulation sleeving rated for full system voltage. Adequate electrical clearances between live parts and between live part and earth shall be provided. The cross

section of bus bars shall be adequate to limit the temperature rise to 45degC over ambient of 50 deg C while carrying rated current.

- 2.3.1.8.1.4 The cable compartment shall be located at the bottom and shall be accessible through bolted cover plates at the rear. The current transformers shall also be located in the cable compartment.
- 2.3.1.8.1.5 The HT switchboard shall be provided with earthing truck or earthing switch with safety interlock features for bus earthing and outgoing cable earthing. The earthing switch / truck shall be interlocked with the circuit breaker so that it can be closed only when the circuit breaker is racked out to isolated position. The interlock shall also ensure that the cable side or bus side is dead before earth switch is closed through voltage metering facility, audio visual alarm and holding solenoid.
- 2.3.1.8.1.6 A copper earth bus shall be provided at the bottom of the switchboard throughout its length. The switchboard, devices and terminal blocks shall be provided with legibly engraved inscription plates for identification. The switchboard shall be provided with caution notice boards conforming to IS 2551 in the front and rear.
- 2.3.1.8.1.7 The circuit breaker compartment of the switchboard shall have a fixed and a moving portion, fixed portion being part of the switchboard. The moving portion shall contain the circuit breaker of horizontal draw out design mounted on a truck. The circuit breaker compartment shall have a front hinged door after opening of which the circuit breaker shall be accessible.
- 2.3.1.8.1.8 The design of the board shall permit the moving portions to be withdrawn and provide for isolation of the main contacts by means of plug and socket connections. Automatic safety shutters shall be provided over the isolating contacts in the stationary portion and shall be so designed as to close firmly over the contacts when the circuit breaker is in drawn out position. The draw out mechanism of the circuit breaker shall have Service, Isolated and Test positions
- 2.3.1.8.1.9 In the design of the switchgear, the following positive inter-locking shall be provided:
  - 2.3.1.8.1.10 Interlock to prevent movement of truck to “Service” position without engaging secondary plug socket connections.
  - 2.3.1.8.1.11 Interlock to prevent disconnection of secondary plug socket connection in “Service” position.
  - 2.3.1.8.1.12 Interlock to prevent withdrawal of truck past “Isolated” position without disconnecting secondary plug socket connection.
  - 2.3.1.8.1.13 Interlock to prevent switching ON of breaker unless truck is properly engaged in “Service” or “Isolated” positions.

- 2.3.1.8.1.14 Interlock to prevent movement of truck to “Test” position
- 2.3.1.8.1.15 Interlock to ensure that the breaker truck is in “Isolated” position before closing the integral earth switch if provided.
- 2.3.1.8.1.16 Interlock to prevent insertion of truck to “Service” position with earth switch “ON”.
- 2.3.1.8.1.17 Interlock to prevent opening of cubicle door with the breaker “ON” while in “Service” position.  
It shall be possible to achieve “Service” and “Isolated” positions of breaker truck with compartment door closed.

Front door shall be interlocked with the breaker such that the door cannot be opened with the circuit breaker in service position or can the circuit breaker inserted into the service position with door open. It shall be possible to defeat the interlock with use of tools if this becomes necessary.

- 2.3.1.8.2 Technical particulars of HT Circuit Breaker
  - 2.3.1.8.2.1 The circuit breaker shall be HT, required continuous 120% of load current and short circuit rating required for 1 second rated, fully interlocked horizontal draw out design. The circuit breaker shall be of vacuum design. The circuit breaker shall have motorized spring charged closing mechanism of trip free design with provision for manual closing, manual tripping and mechanical ON/OFF indicators. The circuit breaker shall be of tested and proven design and the bidder shall furnish type test certificates for short circuit making and breaking capacities, electrical and mechanical endurance tests and power frequency and impulse voltage withstand tests for the circuit breaker panel. The circuit breakers and accessories shall conform to IEC- 62271-100 or equivalent Indian Standard.
  - 2.3.1.8.2.2 The duty requirement of the Circuit breaker shall be C2/M1 class under all duty conditions and shall be capable of performing their duties without opening resistor. The circuit breaker shall meet the duty requirement of any type of fault or fault location and shall be suitable for line charging and dropping when used on HT effectively grounded or ungrounded systems and perform make and break operations as per the stipulated duty cycles satisfactorily. The circuit breaker shall be capable for breaking the steady & transient magnetizing current corresponding to HV transformers. It shall also be capable of breaking line charging currents as per IEC- 62271-100 with a voltage factor of 1.4. The rated transient recovery voltage for terminal fault and short line faults shall be as per IEC: 62271-100.
  - 2.3.1.8.2.3 The Contractor shall indicate the noise level of breaker at a distance of 50 to 150 m from base of the breaker.

- 2.3.1.8.2.4 The contractor may note that total break time of the breaker shall not be exceeded under any duty conditions specified such as with the combined variation of the trip coil voltage etc. While furnishing the proof of the total break time of complete circuit breaker, the contractor may specifically bring out the effect of non-simultaneity between same pole and poles and show how it is covered in the guaranteed total break time. While furnishing particulars regarding the D.C. component of the circuit breaker, the Contractor shall note that IEC-62271-100 requires that this value should correspond to the guaranteed minimum opening time under any condition of operation. The critical current which gives the longest arc duration at lock out pressure of extinguishing medium and the duration shall be indicated. All the duty requirements specified above shall be provided with the support of adequate test reports.
- 2.3.1.8.2.5 Operating Mechanism - Circuit Breaker of vacuum type shall be with electrically spring charged mechanism. The operating mechanism shall be electrically and mechanically operated with anti-pumping and trip free (as per IEC definition) under every method of closing. The mechanism of the breaker shall be such that the position of the breaker is maintained even after the failure in vacuum. The circuit breaker shall be able to perform the duty cycle without any interruption. Electrical tripping shall be performed by shunt trip coil. Provision shall also be made for local electrical control. "Local / remote" selector switch and close & trip push buttons shall be provided in the breaker control cabinet. Operating mechanism and all accessories shall be in control cabinet.
- 2.3.1.8.3 The technical particulars of the switch board shall be as follows:
- |   |   |   |
|---|---|---|
| Nominal system voltage                    | : | HT  |
| Highest system voltage                    | : | As per standards  |
| Phase                                     | : | 3   |
| System frequency                          | : | 50Hz  |
| System earthing                           | : | As per standards  |
| Type of circuit breaker                   | : | Vacuum  |
| Continuous rating of CB in enclosure:     | : | As per standards  |
| Continuous current rating of bus bar      | : | As per standards  |
| Short circuit interrupting capacity of CB | : | As per standards  |
| Power frequency withstand voltage         | : | As per standards  |
| Impulse withstand voltage                 | : | As per standards  |
| Degree of protection of enclosure         | : | IP 4X   |
| Terminal arrangement                      | : | HT Cable on the outgoing side, XLPE insulated , Al conductor armoured, PVC sheathed HT grade cable. |
- 2.3.1.8.4 Accessories
- Current transformer : Require sets of current transformers on the incoming and outgoing feeders as per IS-2705/IEC-185, each having two secondary cores of ratios as per system requirement.

The primary and secondary current limits and other technical parameters of the CTs shall be compatible with the protection relays.

One (1) additional CT core of 0.2 S class shall be provided in the outgoing breaker as redundancy for metering.

Potential transformer : One set of PT as per IS-3156/IEC-186, having two secondary cores of ratios and class of accuracy as per standards. The PT shall be mounted on the outgoing side and shall have fuse protection. PT shall be accommodated in a separate compartment in the breaker enclosure.

Instruments and meters : Electronic multi function energy meter to read current, voltage, kW, kVA, kVAr, kWh, power factor etc., in the incoming feeder and ammeter with selector switch in case of outgoing feeders.

Protective relays : Microprocessor based numeric protection relays for multi characteristic inverse minimum time/current type over current and earth fault protection with numerical display of setting values, measured values, memorized fault values and software self supervision with auto diagnosis. The relays shall have communication port for hooking up to PSS (pooling substation) SCADA. The protection relays shall have the data transfer interface conforming to the IEC 61850 communication protocol. One set of trip circuit supervision relay and one set of high speed trip relay shall also be provided. The protection relays shall be provided with non-volatile memory for preserving important data during auxiliary supply breaks.

Other devices : Requisite number of LED type indication lamps, breaker control switches, HRC fuses and other devices.

Control and trip power supply for the HT switchgear shall be derived from 110 Volts DC and from the station auxiliary supply switch board at 230V single phase AC to ensure availability of trip supply at all times including when there is a terminal short circuit.

#### 2.3.1.8.5 Inspection and Tests

After manufacture, the switchgear panel shall be subjected to inspection and testing in the manufacturers' works in the presence of NLCIL Engineer. The various tests to be carried out shall be as follows.

1. Operation test
2. Power frequency voltage test
3. Measurement of resistance of main circuit
4. Functional test on control circuit.
5. Insulation Resistance (IR) value test.
6. Verification of type test reports for the following tests:
  - Short circuit making and breaking currents
  - Peak withstand current and short time current
  - Small inductive breaking current
  - Impulse voltage withstand
  - Electrical endurance
  - Internal arc test

**2.3.1.8.6** Instruments and Meters

2.3.1.8.6.1 All instruments and meters shall be of robust design, vibration proof and suitable for flush mounting on vertical panels.

**2.3.1.9 PROTECTIVE RELAYS**

The protective relays shall be as per CEA norms and it shall be designed to meet system requirements and Grid requirements. It shall be finalized during detailed Engineering.

**2.3.1.10 110 V DC SYSTEM - PCSS**

2.3.1.10.1 Each PCSS shall be provided with suitable capacity 110 V DC system for meeting the power requirement of switchgears, control panels, Inverter Monitoring Units (IMU), etc in each PCSS and respective String Monitoring Units (SMU) in the yard. 110V (AC) UPS system instead of 110V DC system shall also be acceptable to meet the system requirements. The battery together with the charger and DCDB shall be suitable to meet the DC load. The basic design data for battery and battery charger shall be as given below:

2.3.1.10.2 Battery

Type of cell : Valve regulated lead acid type (VRLA) only and the battery shall be located in the ventilated room for RMU.

Nominal DC voltage : 110V DC

Load : To meet the requirements of breakers, ventilation fans, system panels, IMU and SMU.

Battery capacity : Ah to suit based on 10 hour rate of discharge

Duty : Sub Station duty

End cell voltage : 1.85 Volts (C10 or higher battery)

Shall be selected to achieve the same).

- Ampere hour efficiency : Better than 90%
- Watt hour efficiency : Better than 80%
- Self discharge : Not to exceed 1% per week.
- Accessories : Battery rack made of acid resistant paint coated steel sheet
- Set of lead coated heavy-duty copper strips with bolts and nuts as inter cell and inter row connectors
- Cell testing voltmeter
- Thermometer with temperature correction chart
- Back up: The 10 hours backup time for the 110V DC system in PCSS.

### 2.3.1.10.3 Battery Charger

- 2.3.1.10.3.1 The battery charger shall be designed for charging the battery in float as well as boost modes and simultaneously supplying the continuous load current indicated in the duty cycle. The charger shall be designed to operate with input voltage from auxiliary power of 415V  $\pm 10\%$ , 3 phase, 50 Hz  $+5\%/-3\%$  with an output voltage shall be 110VDC  $\pm 1\%$ .
- 2.3.1.10.3.2 The charger shall consist of input switchgears, two winding transformer, SCRs and diodes, regulator, filter circuit, output switchgear, metering and protective devices for under voltage, over voltage and earth fault, alarm indicator circuit and integral DC distribution board. All necessary indications and meters like AC voltmeter, DC voltmeter, DC ammeter etc. shall be provided. Indication for DC battery connected to load shall also be provided.
- 2.3.1.10.3.4 Both float and boost chargers shall have control device to vary the voltage to achieve the desired output.
- 2.3.1.10.3.5 The output voltage of bridge for float charger shall be 120V DC max. The output voltage of the bridge for boost charger shall be 145V DC max.
- 2.3.1.10.3.6 The charger shall be provided with auto-changeover circuitry from float to boost and vice versa in addition to manual changeover switch. The float circuit shall be designed for supplying the continuous load current as well as charge the battery. The boost circuit shall be suitable for delivering charging current suitable for 110V, battery. RMS ripple factor in input voltage of the charger shall not be more than 3%.
- 2.3.1.10.3.7 The charger shall be provided necessary communication port for interfacing with plant SCADA for remote monitoring and control through Station Facility Controller.



- 2.3.1.10.3.8 DC Distribution Board (DCDB)
- a) The DCDB shall form an integral part of main battery charger. It shall be compartmentalized; dust & vermin proof and shall be equipped with main incoming switch fuse unit and required number of double pole MCBs and switch fuse units.
  - b) The utilization category of the DC switching devices shall be based on the individual loads as recommended in IS 13947.
- 2.3.1.10.3.9 DC Battery, charger, DC power distribution system and remote control / monitoring design, calculations and drawings shall be submitted for approval by NLCIL.
- 2.3.1.11 Auxiliary AC Power Supply**
- 2.3.1.11.1 For 110 V DC system battery chargers, lighting, UPS , operation of ventilation fans, and other system loads, auxiliary power at 415 V 3 Phase 50 HZ power will be obtained from a PDB in all PCSS with necessary metering.  
To meet auxiliary power requirement of the plant such as lighting, water pumps, battery charger, UPS, switchgear panels, AC & Ventilation etc., the contractor has to provide auxiliary power supply to each PCSS. Auxiliary supply arrangements shall be finalized during detailed Engineering in line with approved design and system requirements.
- 2.3.1.11.2 The Control and trip power supply for the AC switchgear feeding the winding transformer as well as the HT circuit breakers in each PCSS shall be derived from DC supply. If the control and trip power supply is AC then the same shall be derived from auxiliary power ACDB of the Inverter Room. To ensure availability of trip supply at all times including when there is a terminal short circuit, a storage capacitor power pack shall be provided. The sizing of capacitor shall be such as to ensure adequate charge for at least 3 consecutive shots of tripping without recharging.
- 2.3.1.12 Ventilation System**
- 2.3.1.12.1 The Power Conversion Unit of PCSS shall be equipped with appropriate fan powered ducted ventilation system for effective heat dissipation. The system shall be designed to draw air from the compartment through filter and pass through thyristor cubicle and exhaust to outside atmosphere through suitable ducting arrangement such that the heat generated by the inverter is directly evacuated without heating other equipment and panels in the compartment. The battery bank shall also be enclosed and a separate ducted exhaust system shall be provided to prevent acidic fumes to enter the compartment. Provision shall be made to allow fresh air from outside to enter the compartment through suitable filter capable of preventing entry of sand during severe sand storms. The ventilation system fans shall be mounted on side walls with suitable sand filter / louver having easy access for cleaning and maintenance. The Battery bank shall have suitable exhaust system.

2.3.1.12.2 Power for the Ventilation system shall be fed from the auxiliary power supply system and will be automated to run during power generation period only. The operation, control and status monitoring of ventilation system shall be feasible from SCADA & EMS through HT kV / 415 V SS RTU. Ventilation system design, scheme, calculations and drawings shall be submitted for approval by NLCIL.

**2.3.1.13 PCSS Lighting**

2.3.1.13.1 LED lamp fixtures shall be indoor type and pre-wired comprising of Lamp(s) with lamp holder(s), Electronic powering unit(s) and metal reflector(s). The lamp fitting shall be covered by Glass or Perspex material.. The number of lighting fixtures should be such that it should give sufficient luminance level for comfortable operation as per BEE standards. All the switches shall be of modular type

2.3.1.13.2 Lighting Power System in each PCSS for powering the lights inside PCSS, yard lights and watch tower lights near each PCSS shall be derived from Auxiliary power system PDB with necessary controls and cabling. All outdoor lighting circuits will be controlled through industrial timers provided at LDBs.

2.3.1.13.3 PCSS Lighting and Lighting Power System design, calculations and drawings shall be submitted for approval by NLCIL.

**2.3.1.14 Cables and Wires**

2.3.1.14.1 HT Cables

2.3.1.14.1.1 The HT cable used in the work shall be XLPE insulated aluminium conductor flat steel armoured PVC insulated type rated for HT grade manufactured and tested to IS: 7098 part 1 and 2- 1985.

2.3.1.14.1.2 The insulation for the conductor shall be of high quality XLPE compound. The insulation shall be applied through an extrusion process and chemically cross linked in continuous vulcanizing process. The cable shall be shielded with metallic tape over the extruded semi-conducting shield. The cores shall be identified either by colour tape along the insulated core or running a number tape along the conductor. The cable shall be provided with inner sheath either with suitable fillers in the interstices and covered with a common tape or an extruded sheath of required thickness. Armouring over the inner sheath shall be provided with flat steel strips or steel wire. Outer sheath for the cable shall be provided with heat resistant PVC compound to IS: 5831. The outer sheath shall also be extruded over the steel armouring. The colour of the outer sheath shall be black or orange.

2.3.1.14.1.3 The cable shall undergo the following type tests and copy of type test certificate shall be submitted to NLCIL for approval and it shall be subjected to inspection and testing in the manufacturer works in the presence of NLCIL engineers.

- Tensile test
- Conductor resistance test
- Physical test for insulation
- Physical Tests For PVC sheath
- Wrapping test
- Test for armour wire/ flat steel strip
- Test for insulation resistance test
- Dielectric power factor test
- High voltage test.
- Routine and acceptance test.

2.3.1.14.1.4 Manufacturer's identification mark, NLCIL mark along with ISI certification mark shall be printed on the outer sheath of the cable as stipulated in IS 7098 part1 and part 2 of 1985 as applicable.

2.3.1.14.2 LV Power Cables

2.3.1.14.2.1 All LV power cables used in the work shall be armoured cables unless otherwise stated and of 1100 V Grade. All cables shall be of XLPE insulated and flat steel or steel wire armoured cables manufactured to IS: 7098 1988 part I and PVC insulated and PVC sheathed Armoured cable in conformity with IS: 1554 of 1988 part I. The cables shall be identified as XLPE/SWA or SFA/PVC for XLPE cables and PVC/SWA/PVC for PVC insulated cables. The insulation used in manufacturing the LV Power Cables shall be of flame retardant and low smoke generating material.

2.3.1.14.2.2 The cable used in the work shall be as far as possible of one manufacturer only. The cables used in the yard shall be delivered to the site as complete coiled drums/coils with wrapping seals intact. The contractor shall provide manufacturer's test certificate and date of manufacture at the time of delivering the cables to the site. All multi-core cable drums shall be from manufacturer and unwound cables delivered to site shall not be approved for installation

2.3.1.14.2.2 The cable conductor shall be of electrolytic pure grade Aluminium conforming to IS 8130 of 1984.

2.3.1.14.2.3 All cables shall be fitted with suitable compression or packing ring to protect the same from ingress of water and moisture. All glands shall be provided with locking nut, earth tag and PVC cable shoe/shroud. PVC insulated earth continuity conductors of appropriate size in conformity with Indian Electricity Rules shall connect all earth tags to the main earth bars at terminations of cables.

The earth tags shall be individually connected to the Earth Terminals and Looping of conductors through more than one tap is not permitted.

2.3.1.14.2.4 The compression type cable lugs shall be used for terminations. The Crimping termination of the cables shall be carried out with the help of correct compression type crimping tool with proper size dies. The compression tools and terminations materials shall be from a single manufacturer and care shall be taken to adhere to manufacturer's recommendations. PVC shoe/ shroud shall be fitted to cable terminations to prevent dust and moisture entry into terminations.

2.3.1.14.2.5 Only terminal cable joints shall be accepted. No cable joint to join two cable ends shall be accepted.

2.3.1.14.2.6 All LV cables shall be tested for insulation resistance and continuity test at two stages.

2.3.1.14.2.6.1 Insulation and continuity test before after laying but before backfilling.

2.3.1.14.2.6.2 Insulation and continuity test after backfilling.

In addition, Insulation resistance test shall be conducted to measure the insulation resistance between phase conductors and between each phase conductors and earth. The resistance shall be measured with the help of megger by applying 1000 volts for duration as specified by relevant standards. Earth continuity tests to confirm that the cable armouring has been properly bonded to earth shall be carried out. Phase rotation test shall be conducted to prove that the cables have been properly connected.

h) Cable shall be laid in the cable trench in PCSS building, routed in cable trays on the module frames and Combiner box / Array JB support frames and shall be buried in the yard with suitable protection. The type and specification of the cable tray used and cable burying scheme shall be submitted for approval by NLCIL before commencement of work.

2.3.1.14.3 LV Wiring Cables

2.3.1.14.3.1 The low voltage wiring cables shall be PVC insulated single core, colour coded, stranded Copper conductor rated for 1100 V and conforming to IS 694 and IEC 227. Conductor strand diameter and resistance of the conductor shall be in conformity with IS: 8130 of 1984. The insulation used in manufacturing the cable/wires shall be of flame retardant and low smoke generating material.

2.3.1.14.3.2 The stranded conductor shall be made of thin strands of electrolytic copper not less than 0.25mm. The number of strands shall be suitable for the size of the cable. However the minimum number of strands shall be as follows:

Size of the wire	Thickness of the conductor	No. of Strands.
1.5 Sq. mm	0.25 or 0.3 mm	32 or 22
2.5 Sq. mm	0.25 or 0.3 mm	50 or 36
4.0 Sq. mm	0.3 mm	56
6.0 Sq. mm	0.3 mm	84

2.3.1.14.3.3 All wiring for connecting various fittings shall be through steel conduits of approved make. All Tees, Bends etc shall be of standard make. Approval for materials should be obtained from NLCIL.

2.3.1.14.4 Control, Data, FAS and Communication cabling shall be selected to suit the system configuration adopted by the contractor and as discussed further in automation and control system of this specification. The cabling and accessories for the same shall conform to relevant IEC/ IS codes and practices.

2.3.1.14.5 Cable terminations shall be made with suitable cable lugs & sockets etc, crimped properly and passed through brass compression type cable glands at the entry & exit point of the cubicles. The panel bottoms should be properly sealed to prevent entry of snakes/lizard etc. inside the panel.

2.3.1.14.6 All cable/wires shall be marked with good quality letter and number ferrules of proper sizes so that the cables can be identified easily.

2.3.1.14.7 Cable sizing shall be based on voltage drop not exceeding 1% on DC side and not exceeding 3% on AC side between source and load. Power and Control cabling and wiring design and calculations with drawings shall be submitted for approval by NLCIL.

**2.3.1.15 Fire Protection and Control System**

2.3.1.15.1 Each Power Collection Sub Station shall be provided with adequate number of smoke / fire detectors forming part of Plant Fire Detection and Alarm System. Zonal repeater panel shall be provided in PCSS with alarm and visual indication facilities.

2.3.1.15.2 Suitable capacity portable DCP type fire extinguishers shall be provided in each compartment of PCSS for fighting electrical fires.

**2.3.1.16 Lightning Protection**

2.3.1.16.1 The Power Collection Sub Station shall be provided with Lightning protection. The lightning protection system must be completed prior to start-up of commissioning activities of the project.

2.3.1.16.2 The Lightning protection system for PCSS shall comprise of lightning conductors on the roof with spike rods at the highest point above roof. The system shall be designed as per Indian Standards / IEEE in order to protect the entire Power Collection Sub Station from Lightning stroke.

2.3.1.16.3 The lightning conductor shall be earthed through flats and connected to the Earth mats as per applicable Indian Standards with earth pits. Each Lightning Conductor shall be connected to an individual earth pit as per required Standards including accessories. Lightning protection of Early streamer Emission (ESE) type as per NFC 17-102 (2011) with minimum protection class II or higher is also acceptable.

2.3.1.16.4 The contractor shall ensure adequate lightning protection to provide an acceptable degree of protection (minimum protection class 3) as per IS for the substation including transformer. If necessary more numbers of Lightning conductors may be provided. Theoretical lightning design calculations and drawings shall be submitted for approval by NLCIL.

### **2.3.1.17 Earthing System**

2.3.1.17.1 The earthing for LT power system of PCSS shall be made with an earth mat connected with number of earth pit around PCSS. Each earth pit shall be provided with an earth electrode of required diameter and minimum 3 M length including accessories and masonry enclosure with cast iron cover plate as per IS 3043. The pit around the electrode shall be treated with carbon based earth enhancement compound or conductive concrete as required as per provisions of IS 3043.

2.3.1.17.2 The earthing for the power collection substation equipment shall be made as per provisions of IS. Necessary provision shall be made for bolted isolating joints of each earthing pit for periodic checking of earth resistance.

2.3.1.17.3 The complete earthing system shall be mechanically & electrically connected to provide independent return to earth. All equipments shall have two distinct earth connections.

2.3.1.17.4 For each earth pit, necessary Test Point shall have to be provided.

2.3.1.17.5 In compliance to Rule 33 and 61 of Indian Electricity Rules, 1956 (as amended up to date), all non-current carrying metal parts shall be earthed with two separate and distinct earth continuity conductors to an efficient earth electrode.

2.3.1.17.6 The contractor shall ensure adequate Earthing system protection to provide an acceptable degree of protection as per IS for each PCSS. If necessary more numbers of Earth pit & conductors may be provided. Theoretical earthing design calculations with necessary drawings shall be submitted for approval by NLCIL.

2.3.1.17.7 Earth resistance of the earth pits shall be tested in the presence of the representative of NLCIL.

## **2.3.2 33 KV POWER EXPORT SWITCHYARD**

### 2.3.2.1 33KV Power Export Switchyard Equipments:

The 33 KV Power Export Switchyard shall be installed as Outdoor switchyard and the details of 33KV Power Export Switchyard equipments shall be as follows.

1. Required number of 33KV feeder bays which shall be connected through UG cables / Transmission lines and Gantries from Solar PV Power Plants, BESS, Auxiliary system and from Grid take off points (existing Panther 1 & 2 feeders)
2. 33KV Outdoor switchyard shall be single bus arrangement with suitable capacity sectionalizing isolator shall be provided within single bus arrangement
3. One no. 33KV / 415V Auxiliary Power Transformer of required capacity to feed the Auxiliary system.

The specification for UG cables / Transmission lines, termination, gantries etc from Grid take off points (existing Panther 1 and 2 feeders) shall be as per the existing practise and requirements of A & N Electricity Department and shall be finalized during detailed engineering and approved by NLCIL.

### 2.3.2.1 POWER SYSTEM PARAMETER

The power system parameters shall be as follows:

System Parameters	LT System	33KV System
Nominal system voltage	415	33 KV
Voltage variation	+ or – 10%	
Number of phases	3	3
System frequency	50Hz +3% / - 5%	50Hz +3% / - 5%
System Earthing	Solid Grounding	To suit the Solar power station 33KV Power output.
Fault level (3 phase symmetrical)	31.5kA	25 kA
Short time current rating (For all current carrying parts)	31.5kA for 1sec	25kA for 3 sec
Power frequency withstand voltage	2.5KV RMS	80KV RMS
Impulse withstand voltage	-	170 peak

### 2.3.2.3 DRAWINGS AND LAYOUT

The following drawings shall be submitted for approval by NLCIL / A & N Electricity Dept

- a) SLD of 33 KV Power Export Switchyard
- b) Equipment Layout
- c) Section Drawings

The Contractor shall finalize the location of the 33 KV Power Export Switchyard at suitable site within the project boundary.

The plant equipment and systems shall be designed, manufactured, assembled, tested, shipped, installed and commissioned according to the applicable codes, standards and regulations. The design and installation shall be fully in conformity with the following standards and codes as applicable.

ANSI	:	American National Standard Institute
ISO	:	International Organization for Standardization
ASA	:	American Standard Association
DIN	:	Deutsche Industrie Normen
EN	:	European Standards
BIS	:	Bureau of Indian Standards
IEC	:	International Electro-technical Commission
IEEE	:	Institute of Electrical and Electronics Engineers
SI	:	International System of Units

Nationally or internationally recognized codes and standards which meet or exceed the qualities specified in the lists above may be used. It is contractor's responsibility to ensure the coherence of the codes and standards chosen as reference.

2.3.2.4 The 33kv feeders shall be routed as per the overall layout. In the Project Control Room protection relays, metering and control panels, SCADA and EMS and control desk, Station DC control power system, Auxiliary AC power distribution system, UPS, lighting power distribution system, Data and voice communication facilities, Fire detection and alarm panel, interconnecting cabling, earthing and lightning protection shall be installed.

2.3.2.5 The 33KV Outdoor Switchyard Equipments include Circuit breaker, Current Transformers, Potential Transformers, Isolators, Surge arresters, Aluminium bus, ACSR conductors, Clamps and connectors, Columns, beams, poles, Support Insulators, String insulators, Bus post /Pole Insulators, earth wire, HV/LV power, control cables, communication cables etc., as per the requirement of CEA rules and norms and as per A & N Electricity Department requirements.

**2.3.2.6 CONDUCTOR**

This specification covers design, manufacture, testing before dispatch, supply and delivery of Aluminum Conductors Steel Reinforced (ACSR) Conductors. Bus bar conductor shall be 'Zebra' ACSR Conductor. Conductor sizing calculation for 33KV bus bar shall be submitted to the purchaser for establishing



the selected sizing of the conductor and any upward revision of conductor sizing shall be done based on calculation.

#### APPLICABLE STANDARD FOR CONDUCTORS

The Conductor shall strictly comply with the following Indian Standard Specification relevant to the conductor.

- i. IS : 398- Aluminium Conductors for Overhead Transmission Purposes (Part-I):Aluminium Stranded Conductors
- ii. IS :398- Aluminium Conductors for Overhead Transmission Purposes (Part-II): Aluminium Conductors Galvanised steel reinforced

#### **2.3.2.7 SWITCH YARD STRUCTURAL STEEL STRUCTURES**

- 2.3.2.7.1 The structural work shall include design, fabrication and supply of all switchyard structures, galvanized steel structural work for equipment supports, towers and lightning masts. All structural steel shall be of mild steel conforming to the latest edition of the standard as stated hereunder.
- 2.3.2.7.2 I.S. 2062 / 226 Specification for structural steel and quality steel.
- 2.3.2.7.3 I.S. 802. Use of structural steel in over head transmission line.
- 2.3.2.7.4 I.S 806 Code of practice for use of steel tubes.
- 2.3.2.7.5 I.S. 808 Specification of rolled steel, channel, beam and angle sections

#### **2.3.2.8 DESIGN REQUIREMENTS:**

- 2.3.2.8 Following general guide lines shall be followed for verification of design:-
- 2.3.2.8.1 For design of steel structures loads such as dead loads, live loads, wind loads etc. shall be based on IS 875 Part IV.
- 2.3.2.8.2 For materials & permissible stresses, IS 802 Part I Section 2 shall be followed in general.
- 2.3.2.8.3 Maximum slenderness ratios of leg members, other stressed members and redundant members for compressive force shall be as per IS 802.
- 2.3.2.8.4 In order to facilitate inspection & maintenance the structures shall be provided with step bolts spaced not more than 450 mm apart, staggered on faces on one leg extending from about 0.5 metre above ground level to top of the tower. The step bolts shall conform to IS: 10238.
- 2.3.2.8.5 All Structures shall be designed for worst condition of dead loads, live loads wind loads etc. as per IS 875 Seismic forces as per IS: 1893, loads due to deviation of conductor, loads due to un-balanced

vertical and horizontal forces, erection loads, short circuit forces.

- 2.3.2.8.6 Substation gantry structures shall be designed for 2 conditions i.e. Normal condition & Short Circuit Conditions. Factor of safety of 2.0 under Normal conditions & 1.5 under Short Circuit condition shall be taken.
- 2.3.2.8.7 Vertical levels of half the span of conductors/ string & the Earth wire on either side of beam shall be taken for design.
- 2.3.2.8.9 The contractor shall furnish design, drawing, Bill of Material (BoM) of structures on award of contract. The design drawing should clearly indicate sections numbers and sizes of the bolts & details of typical joints, member wise weights & total weight of the structure.
- 2.3.2.8.10 There should be provision of connectivity of beam in the last feeder gantries for future beam.
- 2.3.2.8.11 As designing is in the scope of contractor, supply/approval of design & drawing shall not relieve the contractor from his responsibility for :–
  - 2.3.2.8.11.1 Observing all the required clearances (phase to phase, phase to earth, sectional clearances & ground clearances) as per tender specifications.
  - 2.3.2.8.11.2 Calculation of force at all the joints/sections and their load carrying capacity shall be as per details of design requirements given above.
- 2.3.2.8.12 Minimum thickness of members other than bracings shall be 5 mm and that for bracings shall be 4 mm.
- 2.3.2.8.13 Switchyard structures shall be designed in accordance with IS 802-1977.
- 2.3.2.8.14 All fastening bolts and nuts shall conform to IS 1363/ IS 1367, all washers shall conform to IS 2016/ IS 6610 and spring washers shall conform to IS 3063.
- 2.3.2.8.15 Minimum size of bolts for all bolted connections shall be 16 mm dia and minimum two bolts shall be provided for each member connection in important structures like towers and gantries. The center to center distance between bolts shall be a minimum of 2.5 times the nominal diameter of the bolt.
- 2.3.2.8.16 All foundation bolts shall conform to IS 5624.
- 2.3.2.8.17 All embedded members shall be installed during concreting in accordance with construction drawings.
- 2.3.2.8.18 The steel structure shall not be erected on the foundations until at least 7 days after placing of the concrete in the foundations. All base plates shall be set level, in exact position and shall be given full and even bearing grouted into place. All anchor bolts and base plates shall be set accurately to the grade and alignment designated on drawing or as directed.
- 2.3.2.8.19 All galvanized steel shall be handled with care to avoid bending or damage to the galvanizing. Pieces bent in handling may be used only after they are straightened to

the satisfaction of the engineer. Material on which galvanizing has been damaged shall be repaired as specified.

2.3.2.8.20 All connectors of the steel structures shall be bolted. Welded or riveted joints shall not be permitted

2.3.2.8.21 The structures may be erected by assembling in sections on the ground and hoisting successive sections into place, or they may be built up in place by individual members at the option of the contractor. If erected by assembling in sections, not less than 50 percent of all bolting in place shall be done on each section before starting another section.

2.3.2.8.22 All bolts shall be drawn up tight but not to such a degree as to endanger the strength of the bolt. Wrenches approved by the engineer shall only be used on the work and the use of any wrench, which may deform the nut or cut or flake galvanizing shall not be permitted.

2.3.2.8.23 Reasonable amount of drift shall be allowed in assembling but reaming for correction of mismatched holes shall not be permitted.

2.3.2.8.24 During structural erection inspection shall be carried out at every stage to identify all loose bolts or other errors in erection are rectified in time.

2.3.2.8.25 All exposed structural steel shall be hot dip galvanized as per IS 4759. The thickness of zinc coating shall not be less than 610 g/m<sup>2</sup>.

2.3.2.8.26 All bolts, nuts and washers shall be hot dip galvanized as per IS 1367.

2.3.2.8.27 All spring washers shall be electro galvanized as per IS 1573.

2.3.2.8.28 All foundation bolts shall be galvanized as per IS 5624 up to a depth of 300 mm (minimum) below top of pedestal.

### **2.3.2.9 CLAMPS AND CONNECTORS**

2.3.2.9.1 The material of clamps and connectors shall be Aluminium alloy casting conforming to designation A6 of IS: 617 for connecting to equipment terminals and conductors of aluminium. In case the terminals are of copper, the same clamps/connectors shall be used with 2mm thick bimetallic.

2.3.2.9.2 The material of clamps and connectors shall be Galvanised mild steel for connecting to shield wire. Bolts, nuts and plain washers shall be hot dip galvanised mild steel for sizes M12 and above. For sizes below M12, they shall be electro-galvanised mild steel. The spring washers shall be electro-galvanised mild steel. Clamps & Connectors technical requirements are furnished in 2.3.2.19.

### **2.3.2.10 CIRCUIT BREAKERS**

The circuit breakers shall conform in all respects to the highest standards of engineering, design, workmanship, this specification and the latest revisions of relevant standards at the time of offer and the purchaser shall have the power to reject any work or materials, which, in his judgment, is not in full accordance therewith. Circuit Breakers shall be outdoor type, comprising three identical single pole units, complete in all respects with all fittings and wiring. The circuit breakers and accessories shall conform to IEC- 62271-100 or equivalent Indian Standard.

#### **2.3.2.10.1 DUTY REQUIREMENTS**

- 2.3.2.10.1.1 Circuit breaker shall be totally re-strike free under all duty conditions and shall be capable of performing their duties without opening resistor. The circuit breaker shall meet the duty requirement of any type of fault or fault location and shall be suitable for line charging and dropping when used on 33 kV effectively grounded or ungrounded systems and perform make and break operations as per the stipulated duty cycles satisfactorily.
- 2.3.2.10.1.2 The circuit breaker shall be capable for breaking the steady & transient magnetizing current corresponding to 33 kV transformers. It shall also be capable of breaking line charging currents as per IEC- 62271-100 with a voltage factor of 1.4.
- 2.3.2.10.1.3 The rated transient recovery voltage for terminal fault and short line faults shall be as per IEC:62271-100.
- 2.3.2.10.1.4 The circuit breaker shall be reasonably quiet in operation. Noise level in excess of 140 dB measured at base of the breaker would be unacceptable. Contractor shall indicate the noise level of breaker at distance of 50 to 150 m from base of the breaker.
- 2.3.2.10.1.5 The Contractor may note that total break time of the breaker shall not be exceeded under any duty conditions specified such as with the combined variation of the trip coil voltage, pneumatic pressure etc. While furnishing the proof of the total break time of complete circuit breaker, the Contractor may specifically bring out the effect of non-simultaneity between same pole and poles and show how it is covered in the guaranteed total break time.
- 2.3.2.10.1.6 While furnishing particulars regarding the D.C. component of the circuit breaker, the Contractor shall note that IEC-62271-100 requires that this value should correspond to the guaranteed minimum opening time under any condition of operation.
- 2.3.2.10.1.7 The critical current which gives the longest arc duration at lock out pressure of extinguishing medium and the duration shall be indicated.

**2.3.2.10.2 Operating Mechanism** – Circuit Breaker of vacuum type shall be with electrically spring charged mechanism. The operating mechanism shall be electrically and mechanically operated with anti-pumping and trip free (as per IEC definition) under every method of closing. The mechanism of the breaker shall be such that the position of the breaker is maintained even after the failure in vacuum. The circuit breaker shall be able to perform the duty cycle without any interruption. Electrical tripping shall be performed by shunt trip coil. Provision shall also be made for local electrical control. “Local / remote” selector switch and close & trip push buttons shall be provided in the breaker control cabinet. Operating mechanism and all accessories shall be in control cabinet.

**2.3.2.10.3 General Parameters for 33KV Circuit breaker:**

Type of circuit breaker	Vacuum
Highest system Voltage	36 kV
Rated frequency	50 Hz
Number of poles	Three (3)
Type	Outdoor
	To suit system requirements
Continuous Max. current rating	
Rated /Minimum Power Frequency withstand voltage	70KV
Rated lightning impulse withstand voltage	170KV
Minimum creepage distance	25mm/KV of highest system voltage
Rated operating duty cycle	O-0.3 sec. –CO-3 min.-CO
Rated line charging/breaking current (Voltage factor 1.4)	As per IEC
Control Circuit Voltage	110V DC
Reclosing	Three phase high speed auto reclosing
Maximum fault level	25kA (rms) for 3 sec.
Total closing time	Not more than 150msec.
Auxiliary contact	As required plus 4NO and 4NC contacts per pole as spare
Noise level	Maximum 140db at 50M distance from base of circuit breaker.
The VCB shall be suitable for one reclosing followed by one delayed reclosing and lock out	
Minimum clearances:-	
(a)Between phases	360 mm

(b) Between live parts & ground	3700 mm
(C) Creepage distance	900 mm or more
IR value live part to earth	50 Ohm

### 2.3.2.11 ISOLATORS

2.3.2.11.1 The isolators and accessories shall conform in general to IEC 62271-102 (or equivalent Indian standard) except to the extent explicitly modified in specification.

2.3.2.11.2 Earth switches shall be provided on isolators wherever called for.

#### 2.3.2.11.3 General Parameters

Operating mechanism of Isolator and earth Switch	Manually operated Double break, upright mounting with the movement of the blade in a horizontal plane suitable for outdoor installation
Nominal system voltage	33KV
Highest system voltage	36KV
Type	Outdoor
Rated Normal Current	To suit system requirements
Rated short time current of isolator and earth switch	25kA (rms) for 3 sec
Rated dynamic short time withstand current of isolator and earth switch	62.5kA (peak)
Impulse withstand voltage with 1.2/50 micro sec. wave	170kVp to earth 195 kVp across isolating distance
One minute Power frequency withstand Voltage	70 kV (rms) to earth & 80kV (rms) across isolating distance
Temperature rise	As per Table-IV of IS: 9921
Rated mechanical terminal load	As per 62271-102
Safe duration of over load	
150 % of rated current	5 minutes
120% of rated current	30 minutes
Creepage distance (Total)	900 mm
Temperature rise	Max.Temp deg.C
a. Copper contacts in air	
Silver faced Copper	105
Bare copper	75
b. Terminal of isolator to be connected to	
Silver faced copper	105
Bare copper	90

- 2.3.2.11.4 Isolator shall be gang operated for main blades and earth switches. The operation of the three poles shall be well synchronized and interlocked.
- 2.3.2.11.5 The design of linkages and gears shall be such so as to allow one man to operate the handle with ease for isolator and earth switch.
- 2.3.2.11.6 They shall be constructed such that they do not open under influence of short circuit current and wind pressure together. The earth switches wherever provided shall be constructional interlocked so that the earth switches can be operated only when the isolator is open and vice-versa.
- 2.3.2.11.7 In addition to the constructional interlock, isolator and earth switches shall have provision to prevent their electrical and manual operation unless the associated and other interlocking conditions are met.

### **2.3.2.12 INSTRUMENT TRANSFORMERS**

#### **2.3.2.12.1 General Requirement**

- 2.3.2.12 .1.1 The instrument transformers i.e. current and voltage transformers shall be single phase transformer units and shall be supplied with a common marshaling box for a set of three single phase units.
- 2.3.2.12.1.2 The tank as well as top metallic shall be hot dip galvanised or painted Grey color as per RAL 9002.
- 2.3.2.12.1.3 The instrument transformers shall be oil filled hermetically sealed units. The instrument transformers shall be provided with filling and drain plugs.
- 2.3.2.12.1.4 Polarity marks shall indelibly be marked on each instrument transformer and at the lead terminals at the associated terminal block.

2.3.2.12.1.5 The insulators shall have cantilever strength of more than 500 kg.

#### **2.3.2.12.1.6 MARSHALLING BOX**

The wiring diagram for the interconnection of three phase instrument transformer shall be pasted inside the box in such a manner so that it is visible and it does not deteriorate with time. Terminal blocks in the marshaling box shall have facility for star/delta formation, short circuiting and grounding of secondary terminals. The box shall have enough terminals to wire all control circuits plus 20 spare terminals.

#### **2.3.2.12.2 CURRENT TRANSFORMERS (CTs)**

- 2.3.2.12.2.1 The CTs shall have single primary of either ring type or hair pin type or bar type. In case of "Bar Primary" inverted type CTs, the following requirements shall be met.
- 2.3.2.12.2.2 The secondaries shall be totally encased in metallic shielding providing a uniform equi- potential surface for even electric field distribution.

- 2.3.2.12.2.3 Different ratios shall be achieved by secondary taps only, and primary reconnections shall not be accepted.
- 2.3.2.12.2.4 The guaranteed burdens and accuracy class are to be intended as simultaneous for all cores.
- 2.3.2.12.2.5 The instrument security factor at all ratios shall be less than five (5) for metering core. If any auxiliary CT/reactor is used, then all parameters specified shall be met treating auxiliary CTs/reactors as integral part of CT. The auxiliary CT/reactor shall preferably be in-built construction of the CT. In case it is separate, it shall be mounted in secondary terminal box.
- 2.3.2.12.2.6 The secondary terminals shall be terminated on stud type suitable no's of non-disconnecting and disconnecting terminal blocks inside the terminal box of degree of protection IP:55 at the bottom of CT.
- 2.3.2.12.2.7 The CT shall have provision for measurement of capacitance and tan delta as erected at site.

**2.3.2.12.3 PARAMETERS FOR CURRENT TRANSFORMERS  
GENERAL PARAMETERS**

Highest system Voltage(Um)	36 kV
Rated frequency	50 Hz
System neutral earthing	effective earthed
Installation	Outdoor
Rated short time thermal current	25 kA for 1 sec
Rated dynamic current	63 kA (Peak)
Rated min power frequency withstand voltage (rms value)	70kV
Rated lightning impulse withstand voltage (peak value)	170kV
Partial discharge level	10 pico Coulombs max
Minimum Creepage distance	25 mm/kV of highest system voltage
Temperature rise	As per IEC 60044
Type of insulation	Class A
Number of cores	As per requirement
Number of terminals in marshaling box	All terminals of control circuits wired up to marshaling box plus minimum 20 terminals spare

**2.3.2.12.4 VOLTAGE TRANSFORMERS (VTs)**

**General Requirement of Voltage Transformer**

- 2.3.2.12.4.1 Voltage transformers shall be electro-magnetic (EMU) type and shall comprise of compensating reactor, intermediate transformer, and protective and damping devices. The oil level indicator of EMU with danger level marking shall be clearly visible to maintenance personnel standing on ground.



- 2.3.2.12.4.2 The secondaries shall be protected by HRC cartridge type fuses for all windings. In addition fuses shall also be provided for protection and metering windings for connection to fuse monitoring scheme. The secondary terminals shall be terminated on stud type non-disconnecting terminal blocks via the fuse inside the terminal box of degree of protection IP55. The access to secondary terminals shall be without the danger of access to high voltage circuit.
- 2.3.2.12.4.3 The accuracy of metering core shall be maintained through the entire burden range up to 50VA on all three windings without any adjustments during operations.

**2.3.2.12.5 PARAMETERS FOR VOLTAGE TRANSFORMERS**

Highest System Voltage(Um)	36 kV
System neutral earthing	effective earthed
Installation	Outdoor
System Fault level	25 kA
Rated min Power frequency withstand voltage (rms)	70kV
Rated lightning impulse withstand voltage (peak value)	170kV
Standard reference range of Frequencies for which the accuracy are valid	96% to 102% for protection and 99% to 101% for measurement
Rated voltage factor	1.2 continuous & 1.5 for 30 sec
Class of Accuracy	0.2
Stray capacitance and stray Conductance of LV terminal Over Entire carrier frequency Range	As per IEC:358
One Minute Power frequency Withstand voltage for secondary winding	2 kV rms
Temp. rise over an ambient Temp. of 50 <sup>0</sup> C	As per IEC 60044
Number of terminals in control spare.	All terminals of control circuits wired Cabinet up to marshaling box
Partial discharge level	10 pico Coulombs max.

**2.3.2.13 SURGE ARRESTOR  
General Requirement**

- 2.3.2.13.1 The surge arrestors (SAs) shall conform in general to IEC 60099-4 or IS: 3070 except to the extent modified in the specification. Arresters shall be of hermetically sealed units, self-supporting construction, suitable for mounting on

lattice type support structures. Contractor shall furnish the technical particulars of Surge arrester.

2.3.2.13.2 The SAs shall be of heavy duty station class and gapless Metal Oxide type without any series or shunt gaps. The SAs shall be capable of discharging over-voltages occurring during switching of unloaded transformers, and long lines.

2.3.2.13.3 Arrestors shall be complete with insulating base for mounting on structure. Self-contained discharge counters, suitably enclosed for outdoor use and requiring no auxiliary or battery supply for operation shall be provided for each single pole unit with necessary connection. Suitable leakage current meters should also be supplied within the same enclosure. The reading of millimeter and counters shall be visible through an inspection glass panel

2.3.2.13.4 The surge arrestors shall conform to type tests and shall be subjected to routine and acceptance tests in accordance with IEC-60099-4

2.3.2.13.5 Technical Requirement for Surge Arrester

Rated System Voltage	36Kv
Rated Arrester Voltage	30 kV
Nominal discharge current	10 kA of 8/20 micro-sec wave
Minimum discharge capability	5 kilo joule/kV(referred to rated arrester voltage corresponding to minimum discharge characteristics)
Maximum continuous operating	24 kV rms
Max. residual voltage (1 kA)	70 kVp
Max. residual voltage at 10 kA nominal discharge current(8/20 micro sec wave)	85 kVp
Max. switching impulse residual Voltage at 500A peak	70 kVp
Max. steep current residual Voltage	93 kVp at 10kA
High current short duration test Value (4/10 micro-sec-wave)	100 kAp
Current for pressure relief test	25kA rms
One minute power frequency withstand voltage of arrester housing (dry and wet)	70 kV (rms)
Impulse withstand voltage of arrester housing with 1.2/50 micro sec. Wave	170 kV (Peak)
Radio interference voltage at 156kV	Not more than 1000 micro volt
Partial discharge at 1.05 MCOV(continuous operating voltage)	Not more than 50 p.c

**2.3.2.14 TYPE TEST REQUIREMENTS FOR ALL 33KV SWITCHYARD EQUIPMENTS**

2.3.2.14.1 Type certificates and reports as per relevant standards shall be submitted for NLCIL approval for Current Transformers, Voltage Transformers Breakers, Isolators and Surge arrestors. These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract.

2.3.2.14.2 All acceptance and routine tests as per relevant standards shall be carried out.

### **2.3.2.15 LIGHTNING PROTECTION SYSTEM – 33 KV POWER EXPORT SWITCHYARD**

2.3.2.15.1 The outdoor switchyard shall be provided with lightning protection to protect the outdoor switchgear equipment and transformer against lightning. The lightning protection system shall be designed based on IS 2319 code of practice for protection of buildings and allied structures against lightning.

2.3.2.15.2 The lightning protection for switch yard shall comprise of vertical air terminations mounted on steel tower. The system shall be designed as per Indian Standards / IEEE in order to protect the entire switch yard and 33 KV POWER EXPORT SWITCHYARD from lightning stroke. The towers shall be interconnected using shield wire. The tower shall also be used for fixing light fittings for illumination of switchyard.

2.3.2.15.3 The lightning conductor shall be earthed through flats and connected to the Earth mats as per applicable Indian Standards with earth pits. Each Lightning Conductor shall be connected to an individual earth pit as per required Standards including accessories.

2.3.2.15.4 Theoretical lightning design calculations and drawings shall be submitted for approval by NLCIL. The detailed requirement for lightning protection is furnished under lightning and earthing section of this technical specification

### **2.3.2.16 33 KV POWER EXPORT SWITCHYARD EARTHING**

2.3.2.16.1 The 33 KV POWER EXPORT SWITCHYARD earthing system shall be designed to cover the system neutral earthing and earthing of non-current carrying metallic parts of equipment, cable trays etc. The design shall ensure that the touch potential and ground potential rise are within limits in accordance with the requirements stipulated in IEEE 80-Guide for Safety in AC Substation Grounding. The earthing system shall also conform to IS 3043.

2.3.2.16.2 The earthing for LT power system of 33 KV POWER EXPORT SWITCHYARD shall be laid with an earth mat connected with number of earth pit around 33 KV POWER EXPORT SWITCHYARD. Each earth pit shall be provided with an earth electrode of low carbon steel rod with molecularly bonded copper on the outer surface of required diameter and minimum 3 M length including accessories and masonry enclosure with cover plate having. The pit around the electrode shall be treated with carbon based earth enhancement compound or conductive concrete as required as per provisions of IS 3043.

- 2.3.2.16.3 The earthing for the power export substation equipment shall be made as per provisions of IS. Necessary provision shall be made for bolted isolating joints of each earthing pit for periodic checking of earth resistance.
- 2.3.2.16.4 The complete earthing system shall be mechanically & electrically connected to provide independent return to earth. All equipment shall have two distinct earth connections.
- 2.3.2.16.5 For each earth pit, necessary Test Point shall have to be provided.
- 2.3.2.16.6 In compliance to Rule 33 and 61 of Indian Electricity Rules, 1956 (as amended up to date), all non-current carrying metal parts shall be earthed with two separate and distinct earth continuity conductors to an efficient earth electrode.
- 2.3.2.16.7 The switch yard earthing shall consist of a mat buried in ground to cover the entire substation yard area with spacing between conductors as per design based on IEEE 80. The contractor shall ensure adequate Earthing system protection to provide an acceptable degree of protection as per IS / IEEE 80 for the switch yard. Individual earth pits shall be used for transformer neutral earthing and earthing of lightning arrestors. All the earth pits shall also be connected to the earth mat. If necessary more numbers of Earth pit & conductors may be provided. Theoretical earthing design calculations with necessary drawings shall be submitted for approval by NLCIL.
- 2.3.2.16.8 Earth resistance of the earth pits shall be tested in the presence of the representative of NLCIL.
- 2.3.2.16.9 The earth mat shall be designed considering the earth fault current and soil resistivity value at site. For the purpose of estimating requirement of earth conductor, the earth fault current on 33 KV side shall be taken as 31.5 kA for 1 second. The soil resistivity values shall be measured by the contractor at site during detailing and the system shall be designed accordingly.
- 2.3.2.16.10 The earth mat shall consist of GI flats of adequate size for the fault current magnitude. The conductor sizing shall also consider adequate allowance for corrosion for a period of 25 years. To estimate the touch and step potentials, shock duration of 0.5 seconds shall be considered. The risers and equipment connections shall be using a minimum conductor size of 50x6 & 75x12 mm galvanized steel strip.
- 2.3.2.16.11 Each equipment in switch yard shall have a minimum of two earth connections to the earth mat. The earth mat shall be buried at a depth of 600 mm from the finished ground level. All structures in the switchyard shall also be bonded to the earth mat. The installation of the earth mat shall be coordinated with the equipment foundations and cable trench construction so as to avoid interference. All cable

trays are to be earthed by 50x 6 mm GI flats at regular interval of 25 meters to the earthing grid or nearest earthing pit.

2.3.2.16.12 The switchyard earthing shall also include earthing of the substation fence at regular intervals. In addition the gate shall be earthed using flexible copper tape.

2.3.2.16.13 The detailed requirement for earthing scheme is mentioned under the section 'Earthing and Lightning protection of Power evacuation scheme'.

### **2.3.2.17 SWITCH YARD STRUCTURAL STEEL WORKS**

2.3.2.17.1 The structural work shall include design, fabrication and supply of all switchyard structures, galvanized steel structural work for equipment supports, towers and lightning masts. All structural steel shall be of mild steel conforming to IS 2062.

2.3.2.17.2 Minimum thickness of members other than bracings shall be 5 mm and that for bracings shall be 4 mm.

2.3.2.17.3 Switchyard structures shall be designed in accordance with IS 802-1977.

2.3.2.17.4 All fastening bolts and nuts shall conform to IS 1363/ IS 1367, all washers shall conform to IS 2016/ IS 6610 and spring washers shall conform to IS 3063.

2.3.2.17.5 Minimum size of bolts for all bolted connections shall be 16 mm dia and minimum two bolts shall be provided for each member connection in important structures like towers and gantries. The center to center distance between bolts shall be a minimum of 2.5 times the nominal diameter of the bolt.

2.3.2.17.6 All foundation bolts shall conform to IS 5624.

2.3.2.17.7 All embedded members shall be installed during concreting in accordance with construction drawings.

2.3.2.17.8 The steel structure shall not be erected on the foundations until at least 7 days after placing of the concrete in the foundations. All base plates shall be set level, in exact position and shall be given full and even bearing grouted into place. All anchor bolts and base plates shall be set accurately to the grade and alignment designated on drawing or as directed.

2.3.2.17.9 All galvanized steel shall be handled with care to avoid bending or damage to the galvanizing. Pieces bent in handling may be used only after they are straightened to the satisfaction of the engineer. Material on which galvanizing has been damaged shall be repaired as specified.

2.3.2.17.10 All connectors of the steel structures shall be bolted. Welded or riveted joints shall not be permitted.

2.3.2.17.11 The structures may be erected by assembling in sections on the ground and hoisting successive sections into place, or they may be built up in place by individual members at the option of the contractor. If erected by assembling in sections, not less than 50 percent of all bolting in place shall be done on each section before starting another section.

All bolts shall be drawn up tight but not to such a degree as to endanger the strength of the bolt. Wrenches approved by the engineer shall only be used on the work and the use of any wrench, which may deform the nut or cut or flake galvanizing shall not be permitted.

2.3.2.17.12 Reasonable amount of drift shall be allowed in assembling but reaming for correction of mismatched holes shall not be permitted.

2.3.2.17.13 During structural erection inspection shall be carried out at every stage to identify all loose bolts or other errors in erection are rectified in time.

2.3.2.17.14 All exposed structural steel shall be hot dip galvanized as per IS 4759. The thickness of zinc coating shall not be less than 610 g/m<sup>2</sup>.

2.3.2.17.15 All bolts, nuts and washers shall be hot dip galvanized as per IS 1367.

2.3.2.17.16 All spring washers shall be electro galvanized as per IS 1573.

2.3.2.17.17 All foundation bolts shall be galvanized as per IS 5624 up to a depth of 300 mm (minimum) below top of pedestal.

### **2.3.2.18 INSULATORS AND FITTINGS**

INSULATORS AND FITTINGS This specification covers post insulators and insulators and fittings for 33 KV POWER EXPORT SWITCHYARD

#### **2.3.2.18.1 CODES AND STANDARDS**

2.3.2.18.1.1 The design, material selection, constructional features and testing of insulators and fittings shall comply with all currently applicable statutes, regulations and safety codes in the locality where these are proposed to be used.

2.3.2.18.1.2 Insulators and fittings shall conform to the latest editions of standards specified in enclosed Data Sheet - A. In case of withdrawal/revision of any of the stipulated standards by issuing authorities prior to commencement of fabrication, mutual agreement with Purchaser shall be reached for compliance with applicable standard.

**2.3.2.18.2 GENERAL REQUIREMENTS**

2.3.2.18.2.1 Supporting insulators of circuit breakers, disconnecting switches and lightning arrestors, bushing insulators for instrument transformers as well as all post type insulators and string insulator assemblies for supporting bus-work shall be made of best quality porcelain and shall be brown glazed.

2.3.2.18.2.2 All insulators shall be suitable for heavily polluted atmosphere and shall be able to withstand the duty requirements of the associated equipment.

2.3.2.18.2.3 When operating under normal rated voltage, there shall be no electric discharge between the conductors and bushing which would cause corrosion or injury to conductors, insulators or supports by the formation of substances produced by chemical action.

2.3.2.18.2.4 No radio interference shall be caused by the insulators/bushings when operating at the normal rated voltage.

2.3.2.18.2.5 All iron parts shall be hot dip galvanised and all joints shall be airtight. All current carrying contact surfaces shall be silver plated.

2.3.2.18.2.6 The strain insulators shall be of ball and socket type. The socket shall be malleable cast iron and the pin shall be of steel. After machining is completed, the ball and sockets shall be hot dip galvanised.

2.3.2.18.2.7 Individual units of each strings shall be identical and interchangeable and shall be suitable for forming either suspension or strain strings and shall be so designed as to prevent formation of any defect due to expansion or contraction in porcelain or metal fittings.

**2.3.2.18.3 TESTING**

All routine tests and acceptance tests shall be carried out as per the latest applicable standards.

Type Tests : If type test report of equipment of same design is not available the test shall also be carried out on equipment as per relevant standards.

**2.3.2.18.4 MARKING AND PACKING**

Marking on insulators and fittings and packing of fittings shall be as per guidelines covered in applicable standards

**2.3.2.19 Clamps and Connectors**

#### **2.3.2.19.1 Clamps and Connectors**

This specification covers requirements of Bus bars, clamps and connectors for bus bars, transmission lines, Tubular Bus conductors, cable box terminals, equipment terminals and support insulators.

#### **2.3.2.19.2 CODES AND STANDARDS**

The design, materials, construction, manufacture, inspection and testing of the clamps and connectors shall comply with all currently applicable statutes, regulations and safety codes in the locality where the Equipment shall be installed. The equipment shall also conform to the latest applicable standards. Nothing in this specification shall be construed to relieve the VENDOR of this responsibility. The equipment shall conform to latest relevant standards.

#### **2.3.2.19.3 CASTINGS**

All castings shall be free from blow holes, surface blisters, cracks and cavities.

#### **2.3.2.19.4 CONSTRUCTIONAL DETAILS**

All sharp edges and corners shall be blurred and rounded-off. No part of a clamp or connector shall be less than 10 mm thick.

Bolts and nuts shall have hexagonal heads and threads as per applicable standards.

For bimetallic clamps or connectors, loose bimetallic strips or washers shall be provided.

Flexible connectors, braids or laminated straps shall be made from tinned copper sheets or aluminium laminates depending on the clamp.

Size of the terminal/conductor for which the clamp/connector is suitable, shall be embossed/punched (i.e. indelibly marked) on each component of the clamp/connector, except on the hardware.

Clamp shall be designed to carry the same current as the conductor as specified in Data Sheet-A and the temperature rise shall be equal or less than that of the conductor at the specified ambient temperature. The rated current for which the clamp/conductor is designed with respect to the specified reference ambient temperature, shall also be indelibly marked on each component of the clamp/connector, except on the hardware.

Connector design shall permit easy checking to ensure that the connector is installed correctly.

For parallel connector, power tied wedge pressure connectors (latest state of the art technology) shall be used instead of conventional parallel groove clamp.

Bolts shall have M10 or M12 thread. Tightening torque shall be 45 Nm and 80 Nm for M10 and M12 respectively.



Clamps shall be designed such that the support insulators are not subjected to extra stresses by butt torsional action from the tubular conductor during vibration, wind, ice load and short circuits.

#### **2.3.2.19.5 Contact Paste**

Contact paste shall be used on all contact surfaces during installation of non-tensile, rigid and flexible connectors, both clamped and crimped types. Contact paste shall effectively prevent corrosion occurring on the contact surfaces between aluminium and copper throughout the service period.

Contact paste shall be easy to apply to the contact surfaces within temperature range – 300o to +50oC, shall have good adherence and be chemically in relation to both aluminium and copper conductors and other materials included in the connector.

Contact paste shall not be poisonous or inflammable. Contact paste shall not decay, evaporate, run away, harden or crack under the service conditions described in the specification.

The clamps shall be light in weight and easy to handle. Suspension clamp shall have ease of oscillation around horizontal axis and moment of inertia enabling it to follow freely the movement of the conductor. The clamps shall have low effective power loss.

The natural frequency of mechanical vibration of clamps shall be different from that of the conductor, to avoid any effect of resonance. The clamp shall be designed, manufactured and finished to give it a suitable shape without sharp angles at the ends and radii of curvature so as to avoid any possibility of hammering between the clamp and conductor due to vibrations.

Strain clamps for GI shield wires shall be made from hot dip galvanised malleable cast iron, free from blow holes, cracks, etc.

Connectors used for copper to ACSR conductor connections shall be aluminium alloy clamps with necessary bimetallic strips.

Clamps shall be corona free.

Where suspension clamps / strain clamps / dead-end-assemblies / bus post clamps are procured separately, the VENDOR shall co-operate with the supplier of clamps / dead-end assemblies to ensure that the same fits properly with the hardware fitting supplied by him.

#### **2.3.2.19.6 Spacers**

No magnetic material should be used in the fabrication of the spacers except for the GI bolts and nuts.

Correct separation of conductors, as required shall be maintained by the spacer without wear even if no lubrication or maintenance is carried out.

Spacer design shall take care of ease of fixing and removing during installation and maintenance. Spacer shall have ultimate compression strength.

#### **2.3.2.19.7 Grading / Corona Rings**

Grading / corona rings shall be of such design that when added to suspension or strain strings, the flashover values of complete insulator string shall not be reduced below the following percentages of corresponding flashover values of these assemblies without grading / corona rings.

- i) Dry power frequency : 94%
- ii) Wet power frequency : 100%
- iii) 1.2 / .50 sec. impulse : 96% positive and negative

The grading / corona rings shall be of GI pipe / aluminium tube having outside diameter as required for corona control and minimum wall thickness of 2.5 mm. The brackets for supporting the rings shall be galvanised mild steel.

#### **2.3.2.19.8 DESIGN**

Bolted type of connector shall be designed to withstand normal assembly stresses without suffering permanent deformation.

Connectors shall be designed to withstand stresses in service due to wind, ice, vibrations, fluctuations in temperature and short-circuits, without suffering permanent deformation or breakages. In addition, connectors for bundled stranded conductors shall withstand short-circuit inertia forces.

Connector design shall be such that tensile bending and wrenching stresses transmitted to the equipment terminals are minimum possible. Connectors shall permit axial movement of the tubular conductor.

Parts of current carrying connectors which are in direct contact with the conductor shall be designed so that dangerous galvanic corrosion in the contact surface does not occur.

Flexible connectors shall be designed so that electric current during both normal load and short circuiting is not transferred through mechanical support.

Current carrying connectors shall be designed so that hysteresis and eddy current losses are small.

The shape of current carrying connectors shall be such that water collection is eliminated. If this is not possible, the connector shall be supplied with drainage holes of at least 6 mm.

Tubes in flexible connector shall not rattle.

Tubes in flexible connectors shall be prevented from falling out of connector.

The bus post clamps shall be so dimensioned that clashing between the copper tube and clamp does not occur during short circuit.

The bus post clamps shall be so dimensioned that it is not notably heated by hysteresis and eddy current losses.

The bus support clamp shall with respect to partial discharge be designed with a reliable electric contact between the copper tube, all parts in the clamp and insulator fixing.

Bus support clamp intended for flexible current carrying conductors shall for each copper tube allow a total axial movement of at least 60 mm.

Flexible conducting connectors between copper tubes shall be designed and constructed in such a way that the copper tube movements resulting from temperature changes and vibrations do not result in fatigue fracture.

#### **2.3.2.20 BUS BARS**

The bus bar for the 33KV bus shall be ACSR '**Zebra**' conductor. Conductor sizing calculation shall be submitted for the adequacy of conductor sizing to NLCIL for approval.

Aluminium strands of ACSR conductor shall be hard drawn from 99.5% pure electrolyte aluminium rods with 60% IACS conductivity. The VENDOR shall specify the guaranteed minimum and average values of conductivity.

Chemical composition of the material shall comply with the requirements of relevant Standards.

The surface of conductor shall be clean and dry and free from any excess grease that may be used in its fabrication. The surface strands shall be smooth and free from burrs and other projections which may be cause for increasing corona losses when the conductor is used on extra high voltage lines.

The steel wire strands of ACSR conductor and steel conductor shall be hot dip galvanised. Zinc coating shall be evenly and uniformly coated complying with relevant standards

The steel core and the inner layer of aluminium wires, (where more than one aluminium layer exists), shall be protected with a special grease in order to provide additional protection against corrosion due to saline pollution. The

grease shall fill the whole space between wires within circumscribed cylinder at inner aluminium layer or at steel core, if the conductor has only one aluminium layer.

The grease shall be chemically neutral with respect to aluminium, zinc and steel. It shall withstand weather conditions given under (Project Data) and permanent temperature of 85 deg C without alteration of its properties

#### **2.3.2.20.1 TUBULAR BUS CONDUCTOR**

Tubular Bus conductor wherever required may be provided and the same shall be finalized during detailed engineering.

#### **2.3.2.20.2 Material**

Tube material shall be aluminium and shall comply with properties as specified in Data Sheet A.

#### **2.3.2.20.3 Constructional Features**

For the inside diameter of the tube there shall be no plus tolerance and for the outside diameter and thickness there shall be no minus tolerance.

Corona bells shall be provided wherever the bus extends beyond the clamps on free ends for sealing the ends of the tubular conductor against rain and moisture and to reduce the electrostatic discharge loss at the end points. There shall be a small drain hole at the end of each tube.

#### **2.3.2.20.4 Sleeves for straight through joints**

Length of the jointing sleeves shall be six times the nominal size (diameter) of the tube and the outer diameter of sleeve shall be suitable to fit snugly in the main tube.

#### **2.3.2.20.5 TESTS**

All routine tests shall be carried out as per the latest applicable standards.

If Type tests reports of the components of same material are not available the test shall be carried out as per relevant standards.

#### **2.3.2.21 Protection Relays**

2.3.2.21.1 Protective relays shall be microprocessor based numeric type conforming to IEC 60255, IEC 60259, IEC 60068, IEC 60801, IEC 60521 and IEC-CISPR22 standards. The protective relays scheme shall be designed to provide maximum discrimination between faulty and healthy circuits and shall remain stable during transient and switching disturbances in the system.

- 2.3.2.21.2 The relay preferably shall be of withdrawable type to facilitate easy replacement and testing. The withdraw-able module shall have facility for shorting CT terminals when the relay is withdrawn. In case of non-withdrawable type, means of isolating the relay circuitry shall be provided for testing purposes.
- 2.3.2.21.3 Alphanumeric display LCD screen shall be utilized as man machine interface (MI) built onto the relays. The MMI shall be provided to visualize or display parameter settings and to manually interrogate the relay in the case of relay operation or tripping shall be made available on the screen.
- 2.3.2.21.4 Modbus protocol Communication ports shall be provided for remote connection for control and indication. Relay and Control Panel shall interface with plant SCADA and Energy Management system through RTU
- 2.3.2.21.5 The relays shall have indicators, such as LED indications, that show clearly and unambiguously that the relay had operated for various functions. A minimum of 3 indicators shall be provided for protection functions. The indications shall be maintained until reset by the operator. Facilities to test the indicators shall be available to indicate a healthy auxiliary power supply. Suitable labeling shall be provided for each indicator.
- 2.3.2.21.6 The relay auxiliary supply shall be supplied from 110V DC system. The functionality of the relay shall not be affected by the variation of DC supply. The power supply module shall tolerate a variation of plus/ minus 30 % of the station DC supply and shall also withstand higher DC voltage during rapid charging of station batteries. The power supply card or module shall also be able to remain stable when transient dips in the DC voltage occur.
- 2.3.2.21.6.1 The numerical relay shall be able to retain in a non-volatile memory all its latest logics, algorithm, settings, registered values, events, oscillography and operation indications in the event of DC power failure. The relay shall also be able to continuously keep track of its internal clock (time and date) in the event of DC power failure.
- 2.3.2.21.6.2 On-line changing of relay shall not affect the operational value until confirmed. The relay shall have a minimum of two protection function group settings and be able to be interchanged between the group settings. Any changes of relay settings shall be authentically verified. To maintain the level of security for relay operational setting, configurations, access to these functions shall only be permitted through a system of passwords.
- 2.3.2.21.6.3 The relay shall be provided with necessary interrogation and fault analysis software. The software shall be considered part of the relay and deemed to be provided as part of the contract. Any hardware and accessories that

is required to enable interfacing between relay and laptop shall also be provided.

- 2.3.2.21.6.4 An internal watchdog or self-supervision functions shall be provided. In the event of an internal relay failure, the relay shall trigger an alarm or indication and identify any internal relay errors and failures. Self-supervision separate alarm/trip contact shall be provided. The self-supervision functions shall not affect the performance of any protection functions.

#### **2.3.2.21.7 Trip Relays and Auxiliary Relays**

- 2.3.2.21.7.1 Auxiliary relays and High speed Trip relays shall be suitable for operation on DC system in the range of 80% to 120% of the nominal 110 volts DC for PSS. The relays shall be stable and not be affected by a slow decay, surges, dips, ripples, spikes and chattering of the DC supply. High speed trip relays shall utilize trip supply of the associated circuit breaker from dedicated protection supply circuit. This DC supply shall be monitored continuously and an alarm provided in event of failure.

- 2.3.2.21.7.2 Trip & Auxiliary relays shall be housed in dust and moisture proof cases and shall be arranged so that adjustments, testing and replacement can be effected with the minimum of time and labour.

- 2.3.2.21.7.3 Trip & Auxiliary relays shall be provided with LCD/ LED or flag indicators, phase labeled/coloured, where applicable. Where two or more phase elements or functions are included in one case, separate indicators shall be provided for each element or functions.

- 2.3.2.21.7.4 Resetting facilities shall be made available, either electrically or manually, without opening the front cover of the relay. All indicators shall be clearly visible without opening of relay front cover or relay panel door. Relays, with provision for manual operation from outside the case, other than for resetting, shall not be accepted.

- 2.3.2.21.7.5 Relay contacts shall be suitably rated for tripping, control and indication purposes. The contacts shall be suitable for making and breaking the maximum currents, which they may be required to control in normal service. Separate and sufficient number of contacts shall be provided for tripping, control and alarm functions. Separate contacts shall be provided for alarm tripping functions. Relay contacts shall make firmly without bounce and the whole of the relay mechanisms shall be as far as possible unaffected by vibration or external magnetic fields.

#### **2.3.2.21.8 Instruments and Meters**

- 2.3.2.21.8.1 All instruments and meters shall be of robust design, vibration proof and suitable for flush mounting on Control & Mimic panel /Relay panel.
- 2.3.2.21.8.2 Multifunction meters for all 33KV feeders: All Electrical parameters shall be shown in the Multifunction digital meters for all 33kv feeders. All phase current, voltage, Export /Import KW, KVAR, KWhr, Frequency, P.F, etc., shall be available in the Multi-function meters The multifunction meters of all 33kV feeders shall be suitably communicated to SCADA scheme for monitoring scheme. The multifunction meter shall have accuracy class of 0.2.
- 2.3.2.21.8.3 **Metering Station:** HT outgoing feeders shall be provided in the Power Evacuation Switchyard with metering stations with ABT billing energy meters at take off points inside the plant boundary of each location. The 2 nos. ABT energy meters (Main and check) as per ANI Electricity Authorities requirement at take off point at along with Metering CTs and PTs in Power Evacuation Switchyard with software shall be provided by the Contractor. The ABT energy meters shall be microprocessor based multi function type and ABT meters shall be suitable for billing purposes and shall have necessary sealing arrangement as per the requirements of ANI ELECTRICITY AUTHORITIES Separate CTs, PTs, ABT meters (Main and Check). The meters shall be capable of measuring voltage, current, frequency, power factor, active and reactive power, real and reactive energy, maximum demand etc. The meters shall have facility to monitor power interruptions, run hour with power on time and off time with date. The meters shall have crisp high visibility display and scrolling facility to display the desired parameter. The meters shall further have communication port for interface with plant automation system. The energy meters shall have class **0.2s** accuracy, meeting CERC/JERC norms and ANI ELECTRICITY AUTHORITIES norms and requirements. The contractor shall obtain approval from ANI ELECTRICITY AUTHORITIES for the Metering station. The responsibility of arranging for the meters, its inspection/calibration/testing charges etc. from Statutory authorities rests with the Contractor and all charges incurred on Meter testing, shall be borne by the Contractor. The energy meters shall be suitable for interfacing for synchronizing the built in clock of the meter by GPS time synchronization equipment to be provided in SCADA & EMS system. Meters must be provided with the necessary data cables.
- 2.3.2.22 Station DC control power system be installed in line with specification clause 2.3.1.10. Required capacity UPS shall be installed and UPS sizing and design calculation shall be submitted for NLCIL approval. Auxiliary AC power distribution system, Lighting power distribution system shall be installed to meet the system requirements and drawings shall be submitted for NLCIL approval.

### 2.3.3 SCADA AND ENERGY MANAGEMENT SYSTEM (EMS)

2.3.3.1 The Solar PV power plant integrated with battery Energy Storage System and Power Export system shall be provided with a comprehensive control automation system consisting of SCADA and EMS and it shall acquire all data, store, analyze and control the operation of various equipment and systems to achieve the objectives specified in Design Basis. The Control Automation system shall comprise of String Monitoring Units (SMU) connected to all Solar PV panels, Array Junction Boxes, DC Bus panel etc., in a looping ring as the first sub system at the field level.

2.3.3.2 All SMUs get connected to respective inverters of Power Conversion Unit located in PCSS through Inverter Monitoring Unit (IMU) as second level sub system. The third level sub system shall comprise of PCSS Control and Monitoring units connected to Central Processor for interface with Supervisory Control And Data Acquisition (SCADA) system and EMS. Other sub systems integrated into the main control automation scheme are Switchyard RTUs, Weather Monitoring Unit, RTUs of BESS, PCS, BMS etc. All three levels of subsystems shall be connected through OFC either UG or OPGW in a redundant ring network.

### **2.3.3.3 STRING MONITORING UNIT (SMU)**

2.3.3.3.1 The String Monitoring Units shall be installed in each Combiner Box, Array JB and DC Bus Panel and shall be connected to respective PCSS through the Optical Fibre Cable (OFC) in a redundant ring network in order to have better reliability with lesser field control cables.

2.3.3.3.2 The SMU shall be of Industrial Grade, reliable and field proven microprocessor based unit having the following minimum specifications:

1. Set of field PV panels shall be interconnected in string to form a cluster and multiple strings shall be interconnected to form an Array and multiple arrays will be connected to the PCSS sub-system with DC Bus panel. Each parallel string shall be monitored by the SMU and each string data shall be transmitted through OFC network to PCSS and to SCADA and EMS located in Project Control Room. Each string data shall be used for attaining smooth power during Solar hours by issuing commands for charging/discharging of BESS.
2. The system shall be designed to have a field bus connection from the PV Junction box / combiner box and the measurements are made at the initiation point and transmitted to the PCSS sub system as a digitalized data signal. For Zoning of faults, measurements are also taken at higher level Array JBs and DC Bus Panel and transmitted to PCSS sub system.
3. The SMU shall have multiple channels to interface the various strings of the PCSS through a field bus type of connectivity conforming to IEC 60870 bus standards and protocols and remote I/Os shall be used to achieve the same.



4. Necessary DC or AC power distribution system from respective PCSS shall be provided in the yard for meeting the operating power requirements of SMUs.

2.3.3.3.3 The SMU shall be capable of monitoring the parameters like Voltage, Current, and power as well as rate of rise /drop of parameters for each string and each array along with diagnostic digital status signals from each combiner box to provide adequate information with respect to the performance fluctuation and efficiency of the PV arrays connected to it. It shall be possible to monitor and identify the non-performing or underperforming PV panel strings from the PCSS sub system so that the same can be attended or isolated easily.

2.3.3.3.4 The SMU unit shall be of RTU type to acquire data on continuous basis and store the data in the SCADA. The SMU shall have logical capabilities to perform any interlocking and protection logics as per the process requirement. The SMU shall have other standard features like RTC, self-diagnostic routines, event logging, alarms, fluctuation feedback etc. For electrical parameters like voltage, current, etc., direct I/O modules without the usage of transducers shall be preferred.

2.3.3.3.5 The components and interconnections of SMU shall be suitable for higher service temperature within Array Junction box and Combiner box prevailing in the project site.

#### **2.3.3.4 INVERTER MONITORING UNIT (IMU)**

2.3.3.4.1 Inverter Monitoring Units shall be installed in each PCCS for each Power Control Unit (PCU) or Inverters. This inverter-monitoring unit shall be industrial grade microprocessor based unit with direct digital interface to the PCUs. The IMU can be built in to PCU / inverter itself or it can be a separate unit for each PCU / inverter or common for both PCUs / inverters.

2.3.3.4.2 The IMU shall collect all the operating conditions of the inverter including fluctuation parameters in AC side from the PCU / inverters and transfer the data to the PCSS Control and Monitoring Units through the bus connectivity as shown in the configuration diagram.

2.3.3.4.3 These monitoring units shall be connected through a redundant bus network to the control and monitoring unit (PCSS-CMU) as part of the PCSS Sub – system. Provision shall be made in PCSS to attach a portable HMI such as Lap Top when required.

2.3.3.4.4 The IMU shall be capable of accessing real time downstream and upstream performance values, analyzing dynamic PR, automatic changing of control parameters based on trending and comprehensive monitoring the status of all equipment connected to it along with its parameters. Commands from SCADA and EMS shall be issued through IMU to inverters for controlling and smoothing of the AC side output.

2.3.3.4.5 The IMU unit shall be of RTU type to acquire data on continuous basis and store the data in the SCADA. The IMU shall have logical capabilities to perform

any interlocking and protection logics as per the process requirement. The IMU shall provide required information to SCADA for self-diagnostic routines, event logging, alarms etc.

### **2.3.3.5 HT / 415 V SS RTU**

2.3.3.5.1 The HT / 415 V SS RTU shall be industrial grade microprocessor based unit with direct digital interface to the bus. This RTU is connected to different substation systems such as HT Three winding Transformer, Tap Changer, HT and 415 V Switchgears, voltage / current / Temperature measurement devices, Position Sensors, Control and Automation Relays, 110 V DC system battery status and charger functions, PCU Ventilation fan operating status, etc.

2.3.3.5.2 The HT / 415 V SS RTU shall be capable of controlling the operations of circuit breaker with intelligent interlocks and safety configurations from remote server such as SCADA and EMS. All relay functions shall be programmable through SCADA and EMS. Status abnormality of all equipment in Power Collection Sub Station shall be monitored by the HT / 415 V SS RTU for providing necessary alarm / alerts.

2.3.3.5.3 RTU shall be with built – in memory and extended removable type flash memory cards to acquire data on continuous basis and store the data in the memory modules .The RTU shall have logical capabilities to perform any interlocking and protection logics as per the process requirement . The RTU shall have other standard features like RTC, self-diagnostic routines, event logging, alarms etc.

### **2.3.3.6 PCSS CONTROL MONITORING UNIT (PCSS CMU)**

2.3.3.6.1 The PCSS CMU shall be an industrial grade microprocessor based unit which shall act as bridge between each PCSS data network and main Optic Fibre Ring Network. It shall be capable of handling all data and control functions of PCUs as well as Substation RTUs. The constructional features of PCSS CMU shall be similar to SS RTUs.

2.3.3.6.2 The other systems which shall be hooked up to the main OFR network at PCSS are, phone communication, Fire alarm repeater panel and Station Facility Controller. The Station Facility Controller shall handle all substation facilities such as yard and building lighting, UPS / 110V DC system battery, battery charger and access control.

### **2.3.3.7 OPTIC FIBER RING NETWORK**

2.3.3.7.1 An optic fibre cable network in ring architecture is envisaged to connect the entire plant for data transfers in a most economical manner. Single mode 6 or 12 core corrugated steel tape armoured Optical Fibre cable conforming to IEC 60794 shall be routed as buried at a depth of 600 mm below ground connecting the entire plant.

2.3.3.7.2 The optical fibre link shall be redundant and the ring network shall consist of necessary splitter boxes, closure terminals, couplers, drop / patch cables, attenuators, etc., of reputed make.

2.3.3.7.3 Where ever required the optical fibre link between site and SCADA/EMS shall be connected through Optical Fibre Ground Wire (OFGW) installed on Transmission line towers to avoid crossing of public roads and private areas.

### **2.3.3.8 CENTRAL PROCESSOR UNIT AND SUB NET**

2.3.3.8.1 Central Processor unit connected to Optical Fibre ring network collects data and interact with SCADA and EMS through sub net. The Central Processing unit shall be a rugged industrial type microprocessor based unit with built in redundancy.

2.3.3.8.2 The sub net in control room shall be a redundant data highway bus connecting SCADA and EMS servers and weather monitor unit, HT RTU etc.

### **2.3.3.9 WEATHER MONITORING UNIT (WMU)**

2.3.3.9.1 The WMU shall be an industrial microprocessor based unit capable of collecting weather data from field instruments listed in Clause 2.3.3.13 below. Functions of WMU are elaborated in Clause 2.3.13.15. Pyranometer data from WMS shall be taken by SCADA and EMS for control operations of BESS charging and discharging.

### **2.3.3.10 33 KV POWER EXPORT SWITCHYARD**

2.3.3.10.1 The constructional and operational features of HT SS RTU shall be similar to HT / 415V SS RTU of PCSS.

### **2.3.3.11 SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM (SCADA) AND EMS**

2.3.3.11.1 The computer aided SCADA and EMS shall be designed for simultaneous monitoring and recording of various parameters of different sub-systems in the solar power plant integrated with Battery Energy Storage System, power generation on the DC and AC sides, capable of computing performance ratios and efficiency of different sub system operations and implement corrective action for achieving smoothend power output to grid and achieving maximum plant output. SCADA and EMS shall be suitably connected with necessary hardwares and softwares and proper linkages.

2.3.3.11.2 The SCADA and EMS shall be designed on reliable operating platform and time tested software featuring, Energy Management, String level control if required and inverter control, Battery management system control, DC & AC switch gears, lighting automation system, security, alerts, analytical reporting, auditing and data archiving functions etc.

2.3.3.11.3 SCADA and EMS shall be capable of providing different on screen dashboards for overall / zone of the plant, combiner box monitoring, weather station parameters, DC / AC SLD, Trend Charts, Alarm / Alert listing, Audit Reports,

Equipment parameters, communication link monitoring, GIS based plant view with dynamic change key performance indices and operating parameters, Battery Management system parameters, Power Conversion Substation parameters etc.,

- 2.3.3.11.4 Minimum of three operating stations with servers is envisaged for the SCADA and EMS. Personal computer (PC) with monitor and key board shall serve as servers. One server shall be Operating Station with data storage, second server shall serve as back up data storage as well as Operating Station cum Engineering Station and the third server shall be web connected to act as Web Station with web data storage. The Data Acquisition System should be housed in a desk made of sheet steel, powder coated.
- 2.3.3.11.5 The SCADA and EMS configuration, equipment details, software features, on screen dashboards and other operational highlights shall be submitted for NLCIL approval. Necessary design documents and drawings of SCADA and EMS including Plant Monitoring Desk shall be submitted for approval by NLCIL before commencement of supply.
- 2.3.3.11.6 Each PC shall be rugged & robust in nature to operate in a hostile environment. The PC shall have minimum Intel Core i5 processor having 2 X 500 GB HDD with minimum 4 GB RAM. The PC shall also have 21” or higher TFT Colour monitor, DVD Drive with Writer, USB ports, Scroll Mouse and UPS for four (4) hours power back up.
- 2.3.3.11.7 The printer shall be A4 and A3 colour laser type rugged & robust in nature and of reputed make. The printer shall be equipped for printing, scanning, copying and faxing and shall be hooked up to network.
- 2.3.3.11.8 The Data Acquisition System shall perform all measurements and continuous recording of all data required for system operation.
- 2.3.3.11.9 SCADA and EMS shall provide fifteen (15) Minutes daily, monthly and annual average of all parameters.
- 2.3.3.11.10 All data shall be recorded chronologically date wise. The data file should be MS Excel compatible. The data logger shall have internal reliable battery backup and data storage capacity to record all sorts of data simultaneously round the clock. All data shall be stored in a common work sheet chronologically. Representation of monitored data shall be available in graphic mode or in tabulation form. All instantaneous data can be shown in the Computer Screen.
- 2.3.3.11.11 SCADA and EMS shall have feature to be integrated with the local system as well remotely via the web using either a standard modem or a GSM/WIFI modem. The bidder shall provide compatible software and hardware so that data can be transmitted via. standard modem. Plant generation data shall be made available for NLCIL web site for display in NLCIL intranet.
- 2.3.3.11.12 The SCADA and EMS shall enable automatic operation of entire solar PV power plant in all modes, during power generation as well as in non-power generation periods. Final out going breaker will be controlled by SCADA and

EMS in coordination with Energy Management Centre of A & N Electricity Department. SCADA and EMS shall be in addition to proprietary data logging and control system provided by the Contractor and it shall be the responsibility of the Contractor to ensure all system interfacings are properly matched to have an integrated operation from SCADA and EMS.

2.3.3.11.13 The Solar PV Power Plant integrated with Battery Energy Storage System will be requiring interface with the A & N Electricity Department for power export. It is the responsibility of contractor to make provisions in SCADA and EMS to have required networking with A & N Electricity Department. The Contractor shall provide necessary hardware to meet these requirements and their standards.

**2.3.3.12 VOICE AND DATA COMMUNICATION SYSTEM**

2.3.3.12.1 A Voice /Data Communication Network interconnecting all Power Collection sub stations, BESS, Power Export switchyard and voice communication for Security Building and watch-towers etc shall be provided for the Solar PV Power Plant integrated with Battery Energy Storage System with necessary hardware, software and optic fibre cable interface.

2.3.3.12.2 Suitable capacity electronic IP PBX shall be provided at Project Control Room with cable network for IP phones inside the project site building.

2.3.3.12.3 Proposed Voice Communication System Scheme, exchange and phone data sheet, number and location of hand sets, etc., shall be submitted for approval by NLCIL.

**2.3.3.13 FURNITURE**

Adequate and appropriate ergonomically designed furniture of approved make for the Office and SCADA rooms, AC and non AC stores shall be included in the offer. The furniture should be chosen in such a way that it matches with the décor of the rooms. Furniture shall be modular design. The furniture to be included in the scope shall not be limited to the list given below. The type of the furniture proposed to be supplied shall be submitted for approval by NLCIL. After award of contract, Contractor shall arrange to get the modular furniture arrangement as well as furniture types approved by NLCIL before proceeding with the procurement.

Sl.No.	Description of Furniture and Fittings	Quantity
1	Executive steel table with glass top and 3 sliding drawers for office	4 Nos.
2	Height adjustable cushioned chair with arm rest for office	7 Nos.
3	Steel table with 3 sliding drawers for stores	3 Nos.
4	SCADA workstation table (Modular design)	1 Set

5	Computer station chair with hand rest, back and height adjustment	3 Nos.
6	Standard filing Cabinet	3 Nos.
7	Standard steel cupboard	3 Nos.
8	Slotted angle racks for stores	9 Nos.
9	Slotted angle racks for tools and tackles	5 nos.
10	Workers locker (6 compartment design)	3 Nos.

### 2.3.3.14 INSTRUMENTS AND WEATHER MONITORING UNIT (WMU)

2.3.3.14.1 Contractor shall provide all measuring instruments listed below for each site location and with all necessary software & hardware to make it compatible with SCADA and EMS.

1. Pyranometer -2 nos.
2. RTD/Thermister type ambient temperature measuring instrument -2 nos.
3. Wind speed sensor- 1 no.
4. Wind direction sensor -1no.
5. Rain gauge – 1no.
6. Surface temperature sensor- 1 no in each PCSS zone.
7. Data logger – 1no.

2.3.3.14.2 **Pyranometer:** Typical specification for Pyranometers, for measuring incident global solar radiation shall be as follows:

Spectral Response	:	0.31 to 2.8 microns
Sensitivity	:	7-14microvolt/ w/Sq. m
Time response (95%)	:	Max 15 s
Non linearity	:	±0.5%
Tilt error	:	±0.5%.
Zero offset thermal radiation	:	±7 w/m <sup>2</sup>
Zero offset temperature change	:	±2 w/m <sup>2</sup>

Operating temperature range	:	- 40 deg to +80 deg.
Non stability	:	Max $\pm 0.8\%$
Resolution	:	Min + / - 1 W/m <sup>2</sup>
Input Power for Instrument & Peripherals	:	230 VAC (If required)
Output Signal	:	Analogue form which is compatible with the data

- 2.3.3.14.3 If any higher version is required to meet system requirements with the approval of NLCIL the same shall be installed without any extra cost to NLCIL. Each instrument shall be supplied with necessary cables. Calibration certificate with calibration traceability to World Radiation Reference (WRR) or World Radiation Centre (WRC) shall be furnished along with the supply of the instrument.
- 2.3.3.14.4 The signal cable length shall not exceed 20m. Contractor shall provide Instrument manual in hard and soft form.
- 2.3.3.14.5 Bidder shall install two RTD type ambient temperature measuring instruments at suitable places in PV array. Instruments shall have a range of - 4<sup>0</sup> C to 70°C.
- 2.3.3.14.6 **Weather Monitoring Unit:** The WMU shall be an industrial microprocessor based unit capable of collecting weather data from field instruments listed above. Instruments with built in I/O modules and instruments connected through analog – digital converters shall be connected to WMU through suitable data network and shall be programmed to provide weather parameters continuously. WMU shall be programmed to monitor the weather parameters obtained from field instruments constantly to deduct abnormality, especially of Pyronometer and give immediate warning for recalibration of instrument.

## SECTION 2.4

### CIVIL WORKS AND STRUCTURAL STEEL WORKS

#### 2.4.1 GENERAL

- 2.4.1.1 The scope of civil works detailed below is only indicative. Any other civil & structural steel work which is not mentioned or not included here but necessary for the establishment and operation & maintenance of Solar Power Plant shall be included in the scope and borne by the Contractor.
- 2.4.1.2 This specifications document is not exhaustive and the contractor shall be responsible not only for the requirements specified herein but for the correct choice

of materials, for proper fabrication and for the conformity to codes, regulations and legal requirements and for supplying all the documentation of these materials.

2.4.1.3 In General, all civil works shall be carried out as per relevant latest BIS, unless otherwise specified.

2.4.1.4 Minimum grade of RCC work shall be M30 as per IS code.

## **2.4.2 PRELIMINARY WORKS**

### **2.4.2.1 LAND DEVELOPMENT AND SITE PREPARATION**

Land Development activities shall include marking of boundaries with boundary pillars in co-ordination with Andaman & Nicobar Administration Authorities. Removal of trees including roots within the site boundary, vegetation removal and stacking the usable materials within the boundaries for disposal are in the scope of the contractor.

### **2.4.2.2 TOPOGRAPHICAL SURVEY**

Topographical survey for the entire proposed site at a grid interval of 5m in both directions shall be carried out by the contractor. All surveying Northing & Easting co-ordinates shall be based on UTM (Universal Transverse Mercator of respective Zone). After completion of field survey, the contractor shall submit contour layout (contour interval 0.5m) along with spot levels for the total project. The Contractor shall submit all data @ 5m Grid interval in both directions pertaining to the survey to NLCIL in a CD/DVD including all levels & co-ordinates in X-Y-Z format for the entire area.

On completion of field survey work, the contractor shall submit soft copy of Draft Survey report to NLCIL for review. The draft report shall contain all relevant documents and General layout drawing with clear demarcation showing boundary pillars, finished ground levels (FGL) of Array Yard, Power Collection Sub Stations, Power Export Sub Station, building sewage / drainage systems, fencing, approach roads, peripheral roads, internal roads, storm water drains connecting to the nearest Nallah or to the existing storm water drain, culverts, if any, watch towers etc.,

After attending NLCIL's comments if any in the draft report, Six (6) sets of hard copy and one (1) set of soft copy (in DVD/CD in editable AutoCAD format) of the Final Survey report with all relevant drawings shall be submitted to NLCIL for approval. The FGL should be got approved by NLCIL before commencement of work at site.

Levelling and terracing works for the entire power plant area shall have to be done at different levels & slopes based on the natural terrain and requirements. Hence cutting, filling, levelling and other allied works are in the scope of the contractor. The finished ground levels of array yard, sub stations, control room etc., shall be



finalised taking into consideration all formation levels on completion of the above survey work. Based on the contours, drainage system shall have to be designed.

#### 2.4.2.3 **SOIL INVESTIGATION:**

2.4.2.3.1 The Contractor shall carry out sub soil investigation at all locations through a qualified soil consultant to ascertain the soil parameters of the proposed solar power Plant. At the proposed sites, for design purpose, recommended value of Net safe bearing capacity of the soil at a depth of 1.2 m may be taken as 8.00 T/m<sup>2</sup>. This Net Safe Bearing capacity value is indicative only. After award of LOA, the contractor shall have to carry out all necessary soil tests to ascertain actual soil parameters including Net Safe Bearing capacity.

2.4.2.3.2 The scope of sub-soil investigation includes, execution of complete soil exploration including boring according to the site requirement, drilling, collection of undisturbed soil sample where ever possible, otherwise disturbed soil samples, SPT, Electrical Resistivity test, etc., conducting laboratory test of samples to find out the various parameters mainly related to load bearing capacity and settlement, ground water table level, sub soil conditions such as chemical characteristics of soil. The soil test also includes analysis of ground water sample.

2.4.2.3.3 On completion of field and lab test, the contractor has to submit soft copy of Draft Soil investigation report to NLCIL for review. The draft report shall contain data for each borehole, layout drawing showing all test locations (with UTM coordinates), along with recommendation regarding suitable type of foundation for all the structures as well as recommendation for soil improvement, wherever necessary. The report shall include Safe bearing capacity of soil for different types of foundations (Shallow/Pile) based on soil parameters and settlement characteristics defining clearly, how these capacities were arrived at, based on the relevant latest BIS standards.

2.4.2.3.4 After attending NLCIL's comments if any in this regard, the contractor shall submit one (1) soft copy (in the form of DVD/CD) and six (6) hard copies of Final Soil Investigation Report to NLCIL and get them approved, before commencement of foundation designs.

#### 2.4.2.4 **PLANNING AND DESIGN COORDINATION**

The Contractor has to plan and design array yard infrastructure in a proper manner based on the technological as well as functional requirements. Contractor shall develop general layout drawing of array yard, internal roads, peripheral roads & path ways, drainage system, etc ensuring no water logging takes place in the array yard area or near boundaries. The work also includes leveling the entire Plant area and grading to suit the topography of the area. All design & drawings have to be developed based on technical specifications of the tender documents, approved soil investigation report and relevant latest BIS unless otherwise specified. All details for

water supply for module cleaning and the resultant drainage system shall be clearly shown in the detailed drawings.

### **2.4.3 MODULE MOUNTING STRUCTURE**

2.4.3.1 Foundation for Modules Mounting Structures (MMS) can be shallow foundation or driven cast-in-situ Pile/Under reamed pile depending on the soil conditions. While designing the foundations, due consideration shall be given for the self weight of module assembly and maximum wind speed as per latest IS 875-Part-3. The size of the foundation shall be based on design parameters & to prevent liftoff of structure due to wind forces. Minimum pile diameter shall be 300mm. The Grade of concrete for foundation shall be M30. Top of concrete/height of collar for MMS foundation shall be minimum 150mm above FGL. In case of pile foundation, necessary INITIAL TEST (Pullout & Lateral load) for piles – minimum 2 tests at each site shall be done as per latest IS2911(Part-4) and accordingly the depth of pile shall be firmed up. Foundation work of Module Mounting Structure shall commence only, after the proper leveling / grading of the site

2.4.3.2 Seismic parameters Zone & Importance Factor for the project sites shall be based on latest BIS: 1893(Part-1).

2.4.3.3 Members shall be fabricated by cold forming process and shall have minimum yield strength of 345 MPa and shall conform to the physical specifications of ASTM A653 or latest IS 811 or any other relevant international standards. Light gauge structural steel or structural aluminium members can also be proposed subject to approval of NLCIL. Mild steel members with weather protection coating as per ASTM A792M or IS:15961 (latest revision) standard Al-Zn alloy hot dip process with minimum 150 GSM on both sides are acceptable for purlins (structural member connected to modules) with minimum 0.9 mm base metal thickness and yield strength not less than 550 MPa. Inside coating of purlins should be ensured.

1. Fabrication and erection shall be carried out in accordance with latest IS 800 and IS 801.
2. Dimensions of plates, flat bars shall conform to latest IS 1730. The minimum thickness of 2.5mm for MMS column post and minimum 2mm for other members shall be ensured.
3. Bolts, nuts, screws, washers etc... shall be of stainless steel SS 304 of class A2-70 and sizes as per latest relevant BIS provisions. All fasteners shall be provided according to connection design requirement. All bolts shall be tightened with designed torque mechanically.
4. All structural members shall be hot dip galvanized as per IS 4759 or relevant Indian standards and the average coating thickness shall be 80 micron and local coating thickness shall be minimum 70 micron. In case of aluminium, anodized coating as per IS 1868 (AC25) shall be provided.
5. Structural design of MMS structure shall be as per provisions of latest IS 801.

#### 2.4.3.4 Design Parameters and Design Loads:

The structure shall be designed for loads and load combination as per Indian Standards (latest revisions)

- i. Dead load: Dead loads shall be self weight of all the modules, members and fasteners.
- ii. Wind Load: The wind load parameters shall be considered as per latest IS 875 (Part-3).
- iii. Earthquake Load: The MMS structure shall be designed for Seismic forces. Seismic parameters Zone & Importance Factor shall be based on latest BIS: 1893(Part-1).
- iv. Vertical Deflection & Horizontal Sway Limits: The limiting permissible vertical and horizontal deflection for structural steel members shall be as per latest IS 800: 2007.

For fixed/seasonal tilt MMS structure, bidder shall submit STAAD file & design document for approval of MMS drawings. For tracking system, bidder can propose wind tunnel test report/STAAD file & design document for approval of drawings. If bidder is going for wind tunnel test for the design and analysis of solar tracking system following has to be ensured.

- i. It must be done from an institute of reputed (IITs in India).
- ii. If test is done by any reputed international facility the test results must be vetted by any of the IITs in India.
- iii. Bidders must ensure that offered tracker has proven design with wind tunnel test simulating actual site conditions.
- iv. Test results and design must comply Indian codes.
- v. The design shall be shown in STAAD pro for further checking of NLC India Ltd. if asked to do so.

2.4.3.5 The contractor shall prepare array layout to suit their design and plan the total power plant within the available land area without involving any major site modifications.

2.4.3.6 The structure shall be designed for simple mechanical and electrical installation. It shall support Solar PV modules absorb and transfer the mechanical loads to the ground properly. There shall be no requirement of welding or complex machinery at site for installation of module mounting structure to the foundation.

2.4.3.7 The structure shall be designed to allow for easy replacement of any module as well as easy access to the bottom of module by O&M staff.

2.4.3.8 General arrangement of Module mounting structures, array layout, and fabrication drawing shall be submitted to NLCIL along with necessary supporting design documents for approval, before commencement of fabrication/erection.

2.4.3.9 Installation details of the Solar PV modules and the support structures with appropriate diagrams and drawings shall be submitted for approval by NLCIL.

2.4.3.10 All building and other foundation drawings & designs shall be based on Final Soil Investigation Report and to be submitted to NLCIL for approval, before starting the work.

#### **2.4.4 ROADS & PATHWAYS**

2.4.4.1 The roads shall be designed and constructed based on the General layout of the Solar Power Plant. The main approach road from the existing nearest road to the Solar Plant shall be a single lane road, designed to carry the equipments as per relevant specification of IRC along with connecting RCC culverts (M25) wherever required. The approach road, peripheral road & all internal roads are to be designed to suit the Solar Plant layout and shall be of single lane of 3.6 M width. These roads shall be laid with

- a) WBM – using 40 mm BG metal - two layers – each of 135 mm pre-consolidated thick – rolled to 100 mm thick - consolidated thickness totaling to 200 mm which includes dry and wet rolling of each layers, spreading gravel for blindage and consolidation with water, spreading sand/M.sand/quarry dust to a thickness of 3 mm and top rolling and
- b) Top coat – Top finishing coat shall be of Bituminous Topping using 12 mm downgraded metal with consolidated thickness of 20mm and seal coat.

2.4.4.2 All roads shall be provided with 0.60 M wide berm on both sides with 150mm thick well compacted BG boulders/ locally available natural rock boulders and trapezoidal earthen drains as per the approved drainage layout. The area between the solar arrays shall be leveled for carrying panels and materials, modules washing, easy movement during O & M, etc. The layout and details drawing of all roads and culverts (if any) shall be submitted to NLCIL and got approved, before commencement of work.

#### **2.4.5 FENCING & SIGN BOARD**

2.4.5.1 The entire Solar Power Plant array yard shall be provided with 2.1 M high Fencing arrangement using Goose Neck RCC (M30 Grade) Fence Posts of 2.7m length (IS 4996) at a maximum spacing of 2.30 M with strut posts at every 15 M Spacing (maximum) and at corners. The bottom portion of fencing shall be with 1.8 M height PVC coated Chain link Fencing and the top 0.30 M with barbed wire fencing (2 rows & one cross diagonal) which act as anti-climbing device for safety. PVC coated Chain link Fencing & GI Barbed wire shall be of reputed make and shall be got approved before use on works. Fencing details and layout drawings shall be submitted to NLCIL for approval, before commencement of work.

2.4.5.2 Aesthetically designed sign board 2.4 M x 1.5 M shall be provided at the entrance of approach road to Solar Power Plant at each plant site. The sign board shall contain

brief description of the Power Plant. The Signboard shall be made of stainless steel tubular frame with SS steel plate of not less than 3 mm. Necessary SS steel tubular support column with concrete foundation shall be provided. Letters on board shall be designed with proper colour scheme and fluorescent paint system / arrangement. The design & size of the signboard shall have to be befitting the landscaping planned for the main entrance to power Plant. The sign board design and drawing shall be submitted to NLCIL for approval, before the commencement of manufacturing.

#### **2.4.6 SECURITY BUILDING AND GATES**

2.4.6.1 The Security Building shall be provided near the main entrance of each plant /project site. The security building shall be of single storeyed RCC (M 30) framed structure 3m x 3.6 m (inner dimension) with an internal toilet provision for 1.5m x 1.2 m size & front verandah for a minimum width 1.20 m. This building shall generally be constructed as per the relevant specifications laid down for the Project Control Room building. Security building shall be provided with necessary electrical fittings and sanitary items along with adequate sewage disposal system. The design and drawings of security building shall be submitted to NLCIL for approval, before commencement of work.

2.4.6.2 The main entry to each plant/project area shall be provided with a main gate of size 5.00 x 2.40 M and a wicket gate of size 1.20 x 2.40 M (both using MS Structural). RCC (M 30) gate pillars of required size shall be provided at the main entrance. Apart from this main gate, additional gates of size 1.20 x 2.40 M shall be provided at appropriate locations within each project site, wherever necessary. These gates shall be designed aesthetically and the design and drawings of Gates & RCC Pillars shall be submitted to NLCIL for approval, before commencement of manufacturing / construction.

#### **2.4.7 WATCH TOWERS**

Adequate number of Watch towers (using MS Structural) to have coverage of the entire plant/project site shall be provided around the periphery. Watch tower shall be of height 3.50M up to the bottom of the cabin of size 2.00 x 2.00 x 2.40 M. The cabin floor shall be provided with a platform of size 3.20 x 3.20 M, using 6mm thick chequered plate over MS structural framework and the roof shall cover the entire platform area. Cabin roof and sides shall be provided with double skin metal cladding with 60mm thick Poly Urethane Foam (PUF) insulated sandwiched panel. The cabin shall be provided with a steel door of size 0.80 x 1.80M on one side and powder coated aluminium glazed sliding windows of size 1.20 x 1.20 M on all other 3 sides. Minimum 800 mm wide steel staircase with MS handrails on both sides as per requirement shall be provided. Hand rail and toe guards shall be provided for platform around cabin. These watch towers shall be designed and constructed considering the safety and security requirements of the Solar Power Plant. Entire structure of the watch tower shall be provided with proper surface treatment and painting system. Watch towers shall be provided with necessary electrical

arrangements. The location and design drawings of the Watch Towers shall be submitted to NLCIL for approval, before commencement of fabrication.

#### **2.4.8 WATER SUPPLY ARRANGEMENT FOR MODULE WASHING AND DRAINS**

2.4.8.1 Contractor shall provide necessary arrangement for module washing in the Solar Power Plant. This shall include construction of a water storage sump, pump & motor and routing buried ring main system using heavy duty rigid PVC pipe network covering all areas of Solar arrays. Tap off points from the PVC supply pipe network with manual isolating valves shall be provided at number of locations to enable the cleaning of modules using hoses of adequate length. To the extent feasible, the run-off from washing shall be designed to get absorbed in the soil below the solar arrays. Excess water during rains shall be drained through storm water drains built in the Plant area and finally let into the main storm water drain leading to the Nallah. Construction of underground storage sump for module washing system with M30 grade concrete sump or field assembled buried FRP tank are acceptable.

2.4.8.2 The plant storm water drainage system shall be designed taken into account the topography of the plant area, area drainage patterns and intensity of rainfall as per Indian Meteorological data etc. For design of drains, the maximum recorded rainfall intensity shall be considered. All internal drains shall be earthen drain, trapezoidal in section and shall be of sufficient width at the base. Internal road cross over, intersections and the drains near PCSS etc. shall be provided with removable RCC slab covers of adequate thickness and reinforcement.

2.4.8.3 The Contractor shall submit to NLCIL the schematics of the wash water system with location of pump, pipe work and tap off points as well as drains, module washing accessories, etc., for review and approval.

2.4.8.4 The Contractor shall carry out chemical analysis of water independently to ascertain the quality of supplied water and to size any equipment or system required for treatment of raw water for successful operation of Plant for 11 years. Based on chemical analysis of water, if any equipment/system is required for treatment of raw water before it is used for module cleaning and the same shall be submitted to NLCIL for approval.

#### **2.4.9 POWER EXPORT SWITCHYARD AND TOWER LINES.**

##### **2.4.9.1 GENERAL REQUIREMENTS:**

Civil and structural works for the Power Export Switchyard & Tower lines shall be installed as per the technical requirements of Electricity Department, Andaman & Nicobar Administration and CEA norms.

2.4.9.2 The scope of civil works for the PSS includes design, supply of materials and construction of all equipment / tower / mast foundations, cable trenches, earth

pits, and drains. Contractor will co-ordinate and supervises complete civil construction and structural fabrication and erection for correctness as per the requirements indicated in the design inputs.

- 2.4.9.3 All pedestals for towers/equipment will extend to a minimum of 300mm above FGL.
- 2.4.9.4 Supplying and spreading with crushed BG metal comprising of average 40mm (30mm to 50mm) normal size over the entire Switchyard area to 100 mm. thickness (min.).
- 2.4.9.5 The safe touch & step voltage will be achieved considering crushed stone/gravel resistivity for Substation. Beside this if any extension of earth mat outside Sub-Station area is required to achieve safe earth mat design; the same will be within the scope of the Contractor.
- 2.4.9.6 Contractor will submit the design of switchyard foundation and structures with details of load combinations, factor of safety, sag tension basis, etc. to NLCIL for review and approval.
- 2.4.9.7 The scope of civil works detailed above for the switchyard is only indicative. Any other civil & structural steel work which is not mentioned or not included here but necessary for the establishment and operation of 33KV Switchyard for Power evacuation purpose will be included in the scope and borne by the Contractor.
- 2.4.9.8 Cable Trench in Switchyard shall be constructed as per standards including necessary provisions for road crossings.

#### **2.4.10 PROJECT CONTROL ROOM BUILDING:**

##### **2.4.10.1 GENERAL REQUIREMENTS:**

The project Control Room building shall be designed based on topographical survey report & soil testing report, relevant BIS code and National Building Code of India.

The building shall have to house Control room equipments, SCADA & Energy Management system (EMS) panels, LT panels, UPS, DC system-Battery, Battery charger (DC loads required for switchgear), Lighting & Power Distribution Panel etc.,

This building shall also have 20 sq.m. Office Room, AC and Non AC stores, and other building facilities including pantry, separate toilets (Ladies& Gents), necessary water supply & drainage system.

Office, AC stores and Control room equipments, SCADA & Energy Management system (EMS) panels shall be air-conditioned and shall be provided with false ceiling arrangement.

Design details of all the facilities described above shall be submitted to NLCIL for approval before execution.

**2.4.10.2 DESIGN:**

The Power Export Sub Station building shall be designed as RCC framed structure with external staircase as per NBC. A portico with RCC slab for a minimum dimension of 4.5mx3.6m shall also have to be provided at the main entrance. All passages/corridors shall be provided with a minimum width of 2.0 m.

**2.4.10.3 RCC WORK:**

All RCC works shall be of M30 grade.

**Cement:**

Cement of the following Grades shall be used for all works. It shall conform to the following standards.

- 43 Grade OPC IS 8112
- 53 Grade OPC IS 12269
- Portland - Pozzolana Cement IS 1489(Parts 1 & 2)

**Steel Reinforcement:**

All reinforcement steel used shall conform IS 1786 and shall grade Fe 415/ Fe500.

The corrosion resistant steel bars alone shall be used in the concrete. The corrosion resistant steel bars manufactured by SAIL/RINL/TISCO, JINDAL/VSPSAIL /SRMB/ SHYAM/ UDYOG/ TATASTEEL/ PULKIT/ TULSYAN/SURYADEV shall be used.

**Mix Design & Strength of Concrete:**

Before commencement of the concreting works, the Contractor shall get the approval for Mix design. The strength of concrete shall be tested as per latest BIS.

**2.4.10.4 MASONRY WORK:**

Bricks/ solid/hollow blocks used in the works shall conform to relevant IS.

**2.4.10.5 PLASTERING:**

All internal and external surfaces of wall shall have 15 mm thick plastering in CM 1:4. Ceiling plastering shall be 12mm thick in CM 1:3

**2.4.10.6 FLOORING:**

Flooring for stores and HT Switchgear room shall be of cement concrete flooring as per IS 2571. Flooring for office, pantry and SCADA room shall be approved quality vitrified ceramic tile of approved colour and shade, minimum size 600 x600 mm over PCC. Acid resistant tile flooring of 10mm thick conforming to IS4457 shall be provided for Battery room. For pantry room platform, Polished Granite slab of thickness 12 to 16mm shall be used.



2.4.10.7 **ROOFING** - Roof of the Control Room Building shall be sloped Cast-in-situ RCC slab (Grade M 30) treated with waterproofing system. Concrete/ red clay tiles of approved quality, brand shall also have to be provide over the RCC slab.

2.4.10.8 **DOORS & WINDOWS** - Doors, windows and ventilators shall be provided with electro colour dyed (15 micron thickness) aluminium framework with glazing. Minimum size of door shall be 1.2 m x 2.1 m. However for toilets minimum width shall be 0.75 m. All doors of toilet areas shall be FRP frame and FRP shutter. All windows and ventilators of all buildings shall be provided with suitable MS Grill. Doors and windows on external walls of the buildings shall be provided with RCC sunshade over the openings with 300 mm Projection on either side of the openings. Projection of sunshade from the wall shall be minimum 600 mm over window openings, 750 mm over door openings & 1000 mm for rolling shutters (other than at main entrance). The Rolling Shutter shall conform to IS6248 and the size based on functional requirement.

**GLAZING:** All windows and ventilators shall be provided with 4mm thick tinted glass. For aluminum doors, tinted glass of 6 mm thickness shall be used. All glazing work shall conform to relevant BIS.

2.4.10.9 **FALSE CEILING:**

All A/C rooms (including office rooms) shall be provided with false ceiling of suitable type using approved materials. The false ceiling shall be designed aesthetically and shall be from reputed supplier. The false ceiling design & drawings with light fittings shall be submitted by Contractor to NLCIL for approval, before commencement of work.

2.4.10.10 **PAINTING:**

The emulsion paint for both internal & external walls shall be anti-fungal quality of reputed brand suitable for masonry surfaces for the corresponding rainfall zone of Project site. The ceiling & walls of the Battery room shall be painted with epoxy based paint. All painting on masonry or concrete surface shall preferably be applied by roller. If applied by brush then same shall be finished off with roller. All paints shall be of approved make and quality. Minimum 2 finishing coats of paint shall be applied over a coat of primer. For painting on concrete, masonry and plastered surface IS: 2395 shall be followed. For painting on steel work and ferrous metals, relevant BIS shall be followed.

2.4.10.11 **PLINTH PROTECTION:**

Plinth protection to a minimum width of 0.75m with 75mm thick of cement concrete 1:2:4 over 75mm bed of dry brick ballast 40mm nominal size well rammed and

consolidated and grouted with fine sand/M Sand including finishing the top with suitable slope & edge drain.

#### 2.4.10.12 **TOILET & WATER SUPPLY:**

Heavy Duty Rigid PVC pipes of reputed manufacturer and high quality conforming to IS: 4985 shall be used for all water supply and plumbing works in the building. SINTEX make HDPE storage water tank conforming to IS: 12701 shall be provided over the roof for a capacity of minimum 1000 litres with all required pipeline & fittings.

Each toilet shall have the following minimum fittings.

- WC (Western type) of approved colour with seat cover, low level flushing tank, paper holder, health faucet etc.
- Urinal for Gents Toilet
- Wash basin of approved colour with all fittings.
- Mirror with PVC beading
- Stainless steel towel rail with brackets
- Stainless steel soap holder and liquid soap dispenser.
- Stainless steel sink with drain board in the pantry.

The floor finish for washroom, pantry and toilet shall be vitrified anti-slip tiles and Dado glazed ceramic tiles up to 2.1m shall be used.

#### 2.4.10.13 **SEWAGE SYSTEM**

Adequate sewage disposal arrangements shall be provided. The septic tank shall be designed as per NBC guidelines. The outfall of septic tank shall be led to soak-pit of suitable dimensions for dispersion. The drainage system design and construction drawings of sewage piping / septic tank shall be submitted to NLCIL for approval, before commencement of work.

### 2.4.11 **POWER COLLECTION SUB STATION (PCSS)**

#### 2.4.11.1 **GENERAL REQUIREMENTS:**

The PCSS building shall be designed based on topographical survey report & soil testing report, relevant BIS code and National Building Code of India.

The building shall have to house PCUs, HT Switch Gear, Auxiliary power (AC&DC) system and other electronics for communication.

Design details of all the facilities described above shall be submitted to NLCIL for approval before execution.

#### 2.4.11.2 **DESIGN:**

The Power Collection Sub Station building shall be designed as single storey RCC framed structure.

#### 2.4.11.3 **RCC WORK:**

All RCC works shall be of M30 grade.

##### **Cement:**

Cement of the following Grades shall be used for all works. It shall conform to the following standards.

- 43 Grade OPC IS 8112
- 53 Grade OPC IS 12269
- Portland - Pozzolana Cement IS 1489(Parts 1 & 2)

##### **Steel Reinforcement:**

All reinforcement steel used shall conform IS 1786 and shall grade Fe 415/ Fe500.

The corrosion resistant steel bars alone shall be used in the concrete. The corrosion resistant steel bars manufactured by SAIL/RINL/TISCO, JINDAL/VSPSAIL /SRMB/ SHYAM/ UDYOG/ TATASTEEL/ PULKIT/ TULSYAN/SURYADEV shall be used.

##### **Mix Design & Strength of Concrete:**

Before commencement of the concreting works, the Contractor shall get the approval for Mix design. The strength of concrete shall be tested as per latest BIS.

#### 2.4.11.4 **MASONRY WORK:**

Bricks/ solid/hollow blocks used in the works shall conform to relevant IS.

#### 2.4.11.5 **PLASTERING:**

All internal and external surfaces of wall shall have 15 mm thick plastering in CM 1:4. Ceiling plastering shall be 12mm thick in CM 1:3

#### 2.4.11.6 **FLOORING:**

Flooring, including preparation of surface, cleaning etc. shall be of cement concrete flooring as per IS: 2571 with ironite hardener.

2.4.11.7 **ROOFING** - Roof of the Control Room Building shall be sloped Cast-in-situ RCC slab (Grade M 30) treated with waterproofing system. Concrete/ red clay tiles of approved quality, brand shall also have to be provide over the RCC slab.

#### 2.4.11.8 **ROLLING SHUTTER:**

Rolling shutter of push pull type (Hand operated) shall be standard make and shall confirm to IS: 6248 and the size based on functional requirement.

2.4.11.9 **DOORS & WINDOWS** - Doors, windows and ventilators shall be provided with electro colour dyed (15 micron thickness) aluminum framework with glazing. Minimum size of door shall be 1.2 m x 2.1 m.

Doors, rolling shutter and windows on external walls of the buildings shall be provided with RCC sunshade over the openings with 300 mm Projection on either side of the openings. Projection of sunshade from the wall shall be minimum 600 mm over window openings, 750 mm over door openings & 1000 mm for rolling shutters (other than at main entrance)..

**GLAZING:** All windows and ventilators shall be provided with 4mm thick tinted glass. All glazing work shall conform to relevant BIS.

**2.4.10.10 PAINTING:**

The emulsion paint for both internal & external walls shall be anti-fungal quality of reputed brand suitable for masonry surfaces for the corresponding rainfall zone of Project site. All painting on masonry or concrete surface shall preferably be applied by roller. If applied by brush then same shall be finished off with roller. All paints shall be of approved make and quality. Minimum 2 finishing coats of paint shall be applied over a coat of primer. For painting on concrete, masonry and plastered surface IS: 2395 shall be followed. For painting on steel work and ferrous metals, relevant BIS shall be followed.

**2.4.10.11 PLINTH PROTECTION:**

Plinth protection to a minimum width of 075m with 75mm thick of cement concrete 1:2:4 over 75mm bed of dry brick ballast 40mm nominal size well rammed and consolidated and grouted with fine sand/M Sand including finishing the top with suitable slope & edge drain.

**2.4.12 TWO/ FOUR WHEELER SHED:**

The contractor shall provide Two / Four wheeler parking sheds at each project site to house minimum two 4wheelers and ten 2wheelers using MS structural framework with colour coated metal /Galvalume sheet roofing.

## **SECTION 2.5 BATTERY ENERGY STORAGE SYSTEM (BESS)**

The provision for a Battery Energy Storage System (BESS) with the Solar PV Project has been incorporated in the Scheme with the objective of improving the quality of power injected into the grid by Solar PV plants that rely on an intermittent energy resource like Solar radiation and thus, contribute to stable and secure operation of transmission grid. Specifically, the proposed Energy Storage System is intended to be used for PV Power Smoothing application. The utility of BESS for ancillary services including features such as Active Power Regulation services (primary control or Frequency response) etc., shall also be included which is only for demonstrative purpose.

The BESS shall remain connected to the grid as per Central Electricity Authority Technical (standards for connectivity to the grid) regulation 2007 with all latest amendments and its components shall be designed accordingly. BMS shall ensure safe operation and mitigate fire risk. The BESS shall be configured to perform multiple charge discharge cycles.

### 2.5.1 PEAK SMOOTHING:-

The Prime application of BESS shall be smoothing of power output from the Solar PV plant due to fluctuation in solar radiations. Peak smoothing shall be demonstrated within the deployed battery capacity in MW, for above 75% of the instances within the specified assessment window i.e., when a need for response is detected. BESS should respond in a manner that the combined Solar PV and BESS output at the Point of Common Coupling (PCC) targets the 15 minutes moving average value of the Solar PV array output. BESS shall charge and discharge power at appropriate ramp rate such that the smooth power output from the combined BESS and Solar plant is injected into grid.

For the purpose of smoothing assessment, this BESS application shall be carried out for during solar hours every day. The upper and lower SOC for BESS operation shall be set as per the system requirements. The Battery manufacturer’s specification and operating instructions shall be selected in such a way to suit the above requirements. Temporal resolution of the data provided shall be minimum 1 second.

### 2.5.2 The PV smoothing Index Calculation shall be as follows:

Criteria Code	Description	Criteria
M1	Measure/Count of Instances when the BESS is expected to respond for the smoothing application	Count those records in the 10 hour assessment period (Minimum temporal resolution of one second), where BESS is expected to respond
M2	Count of those instances out of M1 when the BESS successfully responded as required	Count of the instances when power output at PCC (Solar PV output + BESS output) lies within +/- 2% of the 15 minutes moving average of Solar PV Power Output
M3	M2/M1	M3=Ratio between M2 and M1
M4	PV Smoothing index, PVS: The metric for Smoothing Assessment	M3 value of above 0.75 shall be acceptable. At least 90% of the days in a Contract year shall have M3 above 0.75

The PV smoothing Index shall be dynamically calculated in the EMS and if it is less than 0.75, then alarm shall be initiated. As per grid operator requirement or under special emergency grid condition requirement the smoothing of solar PV plant output power intermittency. For this, the detailed control logic shall be submitted for NLCIL approval and finalized during detail engineering.

The BESS shall provide energy up to 30 min by providing immediate injection of a large amount of energy for a short duration during the recovery period after any sudden loss of generation within the power rating of BESS for example due to a passing cloud cover.

#### 2.5.3 FREQUENCY REGULATION:-

Frequency regulation provision shall be incorporated in BESS and the contractor shall not consider any additional battery sizing for this application requirement. The BESS shall be able to support grid during very low or high grid frequency by supplying or absorbing power to/from grid. The power support shall be based on power vs frequency droop characteristic for system frequency outside of the pre-defined frequency dead band (say 49.5 to 50.5 Hz). The operation in this mode shall be initiated by detection of low or high grid frequency while the BESS is in any other mode. After normalization of grid frequency to normal operating range, the BESS shall return to the mode in which it was operating at the start of frequency regulation mode. Within the dead band frequency range the BESS do not have to participate for frequency regulation operation. During detail engineering the actual value of dead band frequency range shall be finalized based on CEA grid regulation.

#### 2.5.4 ANTI-ISLANDING MODE:-

The BESS shall have anti-islanding protection as per IEC 62116 or equivalent international standard

- 2.5.5 The digital inputs from Inverters, SMUs, Power Conversion System (PCS) of BESS, Outgoing feeders, grid parameters and using other required inputs, the EMS shall ensure that none of the solar fluctuation and intermittency shall affect the grid parameters. Based on the history of data of various grid parameters available in Port Blair including existing 5 MWp Solar Power Project , the forecast shall be finalised during detailed engineering to achieve the above functions in a coordinated way.
- 2.5.6 Components required to support reactive power shall also be taken into consideration for design of EMS and BESS
- 2.5.7 The critical parameters such as Response time, Discharge duration, Depth of discharge, Frequency of Discharge, Cycle life, round trip cycle efficiency, performance degradation, self discharge characteristics, short time discharge ratings, transient response characteristics, auxiliary systems requirements etc. shall be finalized during detailed engineering to meet system requirements.
- 2.5.8 Simulation studies shall be done for various conditions of Solar Generation, Grid condition and fault conditions during detailed engineering. Necessary documents required for obtaining the grid parameters available with Electricity Department. ANI shall be provided by NLCIL. However it is the contractor's responsibility to carry out simulation studies based on available grid parameters and appropriate assumptions. The simulation results shall be the basis for the design of the system and it shall be submitted for approval by NLCIL and Electricity Department, ANI.

- 2.5.9 The contractor shall submit complete design documents and expected performance of the BESS calculations, drawings, reports and data and other submittals for NLCIL approval during detailed engineering
- 2.5.10 Prior to the dispatch of BESS, a unit part of the system which shall represent the final BESS system to be installed at site, shall be taken into Factory Acceptance Test (FAT). It shall be arranged by the contractor in any test place of convenience in the presence of NLCIL and Electricity Department, ANI authorities. This test is envisaged with an aim to minimize malfunctions during installation at site. The tests that cannot be built during FAT shall be simulated and tested as close as possible in a manner corresponding to the final functioning.
- 2.5.11 Fire protection system (FPS) shall be designed for the BESS in line with NFPA or international norms regulations and CBIP guidelines as applicable and system requirements taking into consideration of the project site at island.
- 2.5.12 Power Conversion System (PCS) for BESS shall have efficient cooling and a more compact housing concept. The housing concept must be a closed-concept with an air-conditioning system or a ventilation system and shall be supplied either in a separate compartment or integrated system. The BESS shall be able to supply power at power factor of 0.95 lead-lag during normal operation and should be able to allow grid power factor until 0.8 lead-lag. During the period of back down/surrender, grid outage conditions, the BESS shall be capable of getting charged from Solar PV Power plant on stand alone basis. .
- 2.5.13 The response of PCS shall be in such a way that it meets the requirements of Energy Management System (EMS) which is in the scope of the contractor as well as Energy Management Centre which is in the scope of Electricity Department, A & N Administration. The Energy Management System (EMS) shall function as the main command centre for the entire plant and receive inputs via SCADA, from Solar PV strings, inverters, HT transformers, Feeders, Battery Management system, Power conversion system, weather monitoring unit, grid parameters etc. the charging and discharging commands shall be issued accordingly.
- 2.5.14 Test certificates and test reports as per IEC 62133, IEC 61959 and IEC 61960 or other international equivalent standards applicable for the battery technology selected shall be submitted by the contractor for NLCIL approval during detailed engineering. All other test certificates and test reports as per international standards and norms for large scale Battery Energy Storage System shall be submitted for NLCIL approval during detail engineering.
- 2.5.15 BESS replacements, repairs, substitutions, maintaining spares and consumables etc., shall be programmed and carried out by the contractor so that the annual guaranteed net energy export is achieved. The tie up arrangements including after sales service support for the entire cycle life of the Battery shall be made by the contractor with Battery supplier and the same shall be submitted to NLCIL.
- 2.5.16 Load banks devices with dummy loads of capacity suitable for a unit part of BESS specially designed for battery discharge testing shall also be a part of BESS maintenance and testing system at project site..

2.5.17 The contractor shall install and integrate minimum 8MWhr with half hour backup. BESS with 2 x 10 MW (AC) Solar Power Plant. The contractor shall install and integrate more capacity to achieve the annual guaranteed net energy export if required without any extra cost to NLCIL.

2.5.18 The BESS shall consists of components but not limited to the following:

- Battery cells /Modules/stacks
- Power Conversion System, Battery Management System, Control panels and HMI interfaces
- Lightning Arrestor, CT, PT, Protective relays, Control and Metering Panel, Surge Protection devices, Filters etc.
- Panels, Switch gears, cables and distribution boards
- Transformers
- Data communication units
- Auxiliary systems and ventilation systems
- Fire Protection system and suppression system, safety equipments
- Container unit
- Mounting structures and Dike structures
- Civil foundation works and platforms as per Battery Manufacturer’s requirement

2.5.19 The contractor shall submit detailed technical particulars, drawings and documents of the above components for NLCIL approval.

2.5.20 BESS PARAMETER:

The following shall be the minimum BESS parameters. Bidder shall submit all technical parameters to assess all BESS functionalities.

<b>S.No</b>	<b>Parameter</b>	<b>Value</b>
1	Installed capacity of BESS	8 MWhr
2	Rated AC power at PCC	16 MW (45 deg C ambient temperature) at 0.95 PF
3	BESS Round trip AC/AC Efficiency at PCC	To be specified by EPC contractor as per their BESS system
4	Depth of Discharge (DOD)	To be specified by EPC contractor as per their BESS System
5	Battery Efficiency (DC-DC round trip)	To be specified by EPC contractor as per their



		BESS System
6	Guaranteed Minimum service life	minimum 11 years (including 1 year PG period and 10 years O&M)
7	Charging rate	To be specified by EPC contractor as per their BESS system
8	Power factor (Measure at PCC)	Four quadrant capability is required. Operating power factor shall be 0.95 lead or lag
9	Response time: It is the time interval between need for response (a command or grid event or Solar Plant power generation event, etc) is detected by the BESS and the time when power as measured at the grid has attained that level. This shall include all intermediate response time of system components	BESS shall have suitable response time to support smooth injection of solar PV plant output power into grid to achieve PVS above 0.75 at least 90% of the days in a Contract year.
10	Positive and Negative Ramp Rate	BESS shall have suitable positive and negative ramp rate to support smooth injection of solar PV plant output power into grid
11	BESS design temperature	0 – 45 degC ambient

**Section 2.6**  
**TESTING, COMMISSIONING, PROVISIONAL TAKEOVER**  
**AND PG TEST**

- 2.6.1 On completion of erection, Contractor shall carry out testing, commissioning, operational checks, instrument and device calibrations, control loop checks, interlock and trip checks, etc, based on a systematically planned procedure. All manufacturers' specific recommendations for testing shall be included. All test results shall be provided to NLCIL for verification and acceptance during commissioning of the entire system.
- 2.6.2 The Contractor shall do clean up of all equipment and area within project site prior to preparing the equipment for trial run and start-up. The start up and commissioning of the entire system shall be executed by the Contractor in a planned coordinated sequence.
- 2.6.3 Power and control cabling shall be done as per approved scheme and in sections, taking adequate precautions against electrical shocks as the solar PV cells are capable of producing power on exposure to light. Necessary covers shall be supplied for covering the solar PV modules during cabling termination works. Safety precautions and manufacturers recommendations shall be strictly followed for BESS testing and commissioning activities.
- 2.6.4 Calibration and commissioning of all instruments and control equipment supplied under this contract shall be executed by the contractor. Hardware required for erection of all instruments and control equipment covered under this contract shall be supplied by the contractor.
- 2.6.5 Pre-commissioning checks, individual loop checks, power initialization, back charging, verification of system functioning, trouble shooting, final solutions to application and / or instrument problems etc., are contractor responsibility. All the required software and hardware changes shall be incorporated as required for successful commissioning to NLCIL's satisfaction. O&M activities from part commissioning up to provisional take over shall be carried out by the contractor at no extra cost to NLCIL. Part commissioning shall be planned in such a way that sub-blocks of Solar PV Plant integrated with sub – blocks of BESS shall be commissioned, interconnected and tuned with grid parameters. On any condition grid power shall not be used for charging BESS, however grid power shall be used for auxiliary system, during unavailability of solar power and BESS discharge power to feed the auxiliaries. The drawl of grid power shall be deducted from the export and the Net Energy Export can be calculated accordingly Energy required for initial charging shall be drawn from Solar PV Power plant.

- 2.6.6 Supply and erect metallic tags on the equipment / instruments and accessories supplied by the Contractor. The tags and connecting wires shall be of stainless steel and the size of the tags shall be adequate to accommodate tag number.
- 2.6.7 Follow up of all the required activities to obtain A&N Administration / Central Electrical Inspectors approval for the installation and carrying out any changes called for by the Inspector at no extra cost to NLCIL.
- 2.6.8 Provisional Take over: On successful completion of commissioning, the Solar PV Power Plant integrated with BESS along with Power Evacuation System shall be Provisionally Taken over with a list of major and minor defects and non conformities prepared jointly by the Purchaser and the Contractor. Differentiation of defects as major and minor shall be jointly discussed and agreed by the Purchaser and Contractor. Upon the completion of commissioning, as soon as practicable, or at such time as may be otherwise agreed to by the parties concerned, the Contractor shall notify in writing to the Purchaser that the entire system is ready for Performance Guarantee Test only after liquidating all the major defects
- 2.6.9 The Provisional Acceptance Certificate (PAC) will be issued after necessary checks of works by NLCIL and the contractor fulfilling all contractual obligations. The plant will be operated and maintained by the contractor for one year from the date of issue of Provisional Acceptance Certificate i.e., Provisional Take Over under full warranty conditions for which no payment will be made for the contractor. Performance Guarantee test period of one year will be concurrent with the warranty period of one year. O&M period for balance 10 years shall commence from the date of Final take over i.e., after successful completion of PG test period for the entire plant and other related conditions and the O&M payment will be made as per corresponding price schedules. No O&M payment will be made for the PG test period/warranty period.
- 2.6.10 **PERFORMANCE GUARANTEE TEST (PG TEST)**

Performance Guarantee Test shall be carried out for the entire system for one year after provisional take over. Guaranteed Net Energy Export in Kwhr from BESS and Solar plant combined measured at 33KV switchyard metering station of the Grid interconnection take off points shall be as per the following table:

<b>Year</b>	<b>Annual Guaranteed Net Energy Export in Kwhr from BESS and Solar plant combined measured at 33KV switchyard metering station of the Grid interconnection take off points</b>
PG Period(one year)	268,64,000
1 <sup>st</sup> year O&M	2,65,95,360
2 <sup>nd</sup> year O&M	2,63,26,720
3 <sup>rd</sup> year O&M	2,60,58,080
4 <sup>th</sup> year O&M	2,57,89,440
5 <sup>th</sup> year O&M	2,55,20,800
6 <sup>th</sup> year O&M	2,52,52,160
7 <sup>th</sup> year O&M	2,49,83,520
8 <sup>th</sup> year O&M	2,47,14,880
9 <sup>th</sup> year O&M	2,44,46,240
10 <sup>th</sup> year O&M	2,41,77,600

The procedure for PG test shall be as follows:

- a) Minimum two nos. (2) calibrated Pyranometers shall be installed by the contractor at project location mutually agreed by the Contractor and NLCIL. The test report for the calibration shall be submitted by the Contractor for approval by NLCIL. The output of these Pyranometers for the PG test period shall be made available at data logger / SCADA and EMS.
- b) "Net Energy Export" shall be recorded in the metering station and shall be taken into account for all contract durations. For this purpose, metering station shall be erected by the contractor as per the requirements of A&N Administration Electricity Department to measure the net energy export. Approval from the Andaman & Nicobar Electricity Administration Authorities in this regard is in the scope of the contractor.
- c) "Base Net Energy Export" for a month is computed by correcting the month wise guaranteed net energy export finalised during detailed engineering in the Annexure-1 with a factor taking into account the actual average global solar insolation measured by the calibrated Pyranometer for the PG period as per sl.no. (a) above. The procedure for computation of "Base Energy Export" is detailed in Annexure-2.
- d) The measured value of net energy export as per sl.no. (b) above shall be compared with the "Base Net Energy Export" for

arriving at the difference in net energy export for the PG period for one year, which shall be reported as + ve (or) -ve.

**If the sum of difference in net energy export for the PG period is (-) ve, there is shortfall in net energy export, based on which the LD for performance will be calculated at the rate and levied as detailed in Annexure -2. No incentive will be paid if there is excess net energy export.**

- e) The month wise target of net energy export for 11 years with respect to the corresponding Global Horizontal Insolation of the project site shall be submitted along with the calculations for NLCIL approval as per **Annexure 1** format during detailed engineering and this shall be considered for the entire contract period for computing the “Base Net Energy Export”.

2.6.11 Following factors shall be considered while computing the “Base Net Energy Export”

- i) Actual insolation level at the project site shall be considered while computing the base net energy export. However, effect due to variation of metrological parameters viz., ambient temperature, wind speed, humidity etc., shall not be considered.
- ii) During the period of grid outage, back down/surrender, the measured global solar insolation (for the period of Grid outage) shall be excluded to calculate average global solar radiation for the PG period.
- iii) During the O&M period due to Battery replacements / substitutions if any shall fall occurs in Annual Net Energy Export in that year/years then the short fall in Annual Net Energy Export shall be limited to maximum three years
- iv) Along with Battery replacements/substitutions to meet the Annual Net Energy Export re-powering of Solar PV modules. If required shall also be included in the scope of work without any extra cost to NLCIL

2.6.12 The contractor shall furnish the following during detailed engineering in relation to **Annexure 1** for NLCIL approval.

- a. The basis, reference standards and calculations used for arriving at the guaranteed month-wise net energy export data.
- b. PV System Design Report with simulation parameters / variants, shading diagrams, production charts, loss diagrams, etc correlating with the above year wise net energy export data.
- c. Guaranteed month-wise net energy export into the grid as per simulation carried out using PVSYST version 5.5 or higher version /Sun simulator/equivalent software for correlating with the guaranteed month-wise net energy export data.

- 2.6.13 The procedure as in 2.6.10 & 2.6.11 shall be followed for the balance 10 years O & M period to calculate the annual net energy export as per annexure 3. For the balance 10 years O&M period, if the sum of difference in annual net energy export for the O & M period is (-) ve, then there is shortfall in net energy export, based on which compensation for shortfall will be calculated at the rate and levied as detailed in Annexure - 3. No incentive will be paid if there is excess net energy export. During 10 years O & M contract period if any repowering of solar PV modules and battery replacement/substitution is required to meet the annual net energy export, the same shall be included in the scope of work without any extra cost to NLCIL.

## **SECTION 2.7**

### **QUALITY ASSURANCE, INSPECTION AND TESTING**

#### **2.7.1 GENERAL**

- 2.7.1.1 The documents related to Manufacturing Quality plan shall be submitted for NLCIL approval.

#### **2.7.2 QUALITY ASSURANCE AND QUALITY CONTROL**

- 2.7.2.1 The Contractor shall submit technical documents along with, comprehensive QA & QC documents proposed to be adopted for this project.
- 2.7.2.2 All major equipments shall be inspected in line with Manufacturing Quality Plan (MQP) issued by OEM.
- 2.7.2.3 No dispatches shall be made by the supplier without obtaining clearance for dispatch from NLCIL. Wherever reworks are involved re-inspections may be conducted and all expenditure towards the same shall be borne by the Contractor.

#### **2.7.3 FIELD INSPECTION & TESTING**

- 2.7.3.1 Field Quality Plans (FQP) shall detail out all the site tests / checks to be carried out during receipt, storage, erection of the equipments. The Contractor shall furnish copies of the erection & commissioning manuals, reference documents and inspection procedure through soft as well as hard copy. In the Field Quality Plans, NLCIL will identify customer hold points (CHP), i.e. test/checks which shall be carried out in presence of NLCIL officials and beyond which the work will not proceed without consent of NLCIL in writing. After FQP finalization and approval, the same shall be submitted in compiled form.

**SECTION – 2.8**  
**SUB VENDORS & SUB CONTRACTORS**

**2.8.1 Sub Vendors**

- i. The Contractor is responsible for performance/guarantee of the complete project including bought out items and outsourced processes. The Contractor shall supply the equipment /Component system from the Sub vendors approved by NLCIL.
- ii. Bidder shall furnish in their bid, the proposed list of sub vendors for each of the bought out items.
- iii. The proposed list of sub vendors furnished by the successful bidder will be finalized before start of detailed engineering.

The categorization of Sub vendors are as follows:

a) **Category – I: Sub vendors accepted:**

The acceptance shall be based on past experience of NLCIL.

b) **Category – II: Sub vendors enlisted for future acceptance:**

Such acceptance shall be based on the various details regarding capacity, capability, and experience etc. of the sub-vendor proposed by the successful bidder. It is the responsibility of successful bidder to get the details and credentials of the sub vendors under category II, compiled and submitted to Purchaser for scrutiny and acceptance. The acceptance criteria are mentioned below. However, Purchaser reserves the right to accept or reject any of the proposed sub vendors based on information available with them.

- iv. The consolidated list of sub vendors under category I and category II shall be made available to the successful bidder before start of detailed engineering.
- v. Purchaser may consider the bidders proposal for inclusion of new sub vendors, if any, during the execution stage for approval, based on the merits, in the overall interest of the Project, after establishing that the sub vendor proposed meets the acceptance criteria specified. However, price advantage if any, arising out of the inclusion of new sub vendor shall be passed on to the purchaser.
- vi. For all other components/equipment/systems which are not figuring in the bought out items list, bidder's standard practice of selecting of vendors may be carried out.
- vii. Acceptance criteria for Sub Vendors:

(a) For all Mechanical, Electrical and Control & Instrumentation:

**1. For Class I Items:**

Bidder to furnish documentary evidence to show that similar or higher capacity component/equipment /system has been supplied by the vendor or their associate/collaborator and the same has been operating satisfactorily for minimum six months as on the original scheduled date of Tender opening. The documentary evidence shall be in the form of Performance certificates furnished by the end user.

**2. For Class II Items:**

Bidder to furnish documentary evidence to show that similar or higher capacity component/equipment /system has been supplied by the vendor or their associate/collaborator. The documentary evidence shall be in the form of Material Receipt Certificate/Site Inspection Report/ Installation or erection report etc. from the end user, site/purchaser premises for having received the material.

**(b) For structural steel :**

1. The structural steel should conform to relevant Indian / International Standards.
2. It should be of reputed make and should have been used in similar construction / infrastructure projects.
3. The Contractor should furnish documentary evidence to prove (1) and (2) above.

**(c)For Cement and reinforcement steel:**

1. It should conform to Indian / International Standard
2. It should be of reputed makes supplied to similar construction/ infrastructure projects
3. The Contractor should furnish documentary evidence to prove (1) and (2) above if required.

**1.8.2 List of Bought out Items for which bidder to propose sub vendors:**

**2.8.2.1 Class I items:**

Sl.No	Equipment list for Class I items	Sub Vendor name
1	Power Conditioning Unit	
2	Array junction Box/Combiner Box with String Monitoring Unit	
3	HT Oil filled Power Transformer	
4	HT indoor switchgear	



5	HT CT	
6	HT PT	
7	UPS	
8	33 KV outdoor breaker	
9	33 KV outdoor CT	
10	33 KV outdoor PT	
11	Surge Arrestor	
12	Isolator	
13	LT Transformer	
14	HT cables	
15	LT power cables/Control Cables	
16	DC Cables	
17	SCADA	
18	Energy Management System	
19	Solar PV Modules	
20	Battery cells(Modules)	
21	Battery Management System	
22	Power Conversion System for BESS	

**2.8.2.2 Class II items:**

<b>Sl No</b>	<b>Equipment list for Class II items</b>	<b>Sub Vendor name</b>
1	DC isolator	
2	DC contactor	
3	Numeric Relays	
4	ABT Energy Meter with software	
5	Surge Protection device for SMU	
6	Cable termination kits	
7	LED lamp fixtures for indoor	
8	Flood light fittings with LED for outdoor	
9	Fire protection system	
10	Fire detection alarm panel	
11	HVAC	

**2.8.3 Acceptance Criteria for approval of Sub Contractors for erection works.**

For Mechanical, Civil, Electrical and Control & Instrumentation erection works are as follows:

In case the bidder is engaging a sub contractor for Mechanical, Civil, Electrical and Control & Instrumentation erection works, documentary evidence shall be furnished in the form of contract award copy and performance certificate (End user's certificate) to show that similar works were carried out and the job has been completed satisfactorily by the sub contractor as on the original scheduled date of

Tender opening and approval shall be obtained from Purchaser, prior to engaging them for Mechanical, Civil, Electrical and Control & Instrumentation erection works.

## **SECTION 2.9**

### **OPERATION AND MAINTENANCE (O&M)**

#### **2.9.1 GENERAL**

- 2.9.1.1 The Bidder shall carry out O&M activities for the entire System including its associated civil structures, roads, Power export Switchyard and control room buildings, Security of the plant Buildings, Garden etc. The O & M activities also includes the entire power evacuation system comprising of UG Cables, transmission lines of grid take off points of the existing 33kV feeders connection point, gantries and allied equipments up to the terminal point of connectivity for a period of 11 years including one year warranty.
- 2.9.1.2 Operation work includes day-to-day operation of the entire system. The responsibility of ensuring uninterrupted operation of the entire system lies with the contractor or else it will attract penalty/loss of compensation as per relevant clauses of the specification.
- 2.9.1.3 The contractor shall furnish proposed maintenance (preventive) schedule for the operation and maintenance of the entire system for NLCIL approval. As the O&M contract period is for 11 years including warranty period, the long term maintenance/replacement schedule indicating the unit replacement of parts/equipments, if any, shall also be furnished considering the life of such parts/equipments. Equipment overhaul schedule indicating the loss of generation during such periods, if any, and the proposed catch up plans for maintaining the scheduled/committed generation shall also be furnished.
- 2.9.1.4 The maintenance staff for the Entire System shall be available at all times in the plant premises.
- 2.9.1.5 The Contractor shall maintain attendance register for all their staff deployed for carrying out jobs on regular basis and shall be produced for verification on demand by authorized personnel of NLCIL.
- 2.9.1.6 The Contractor shall ensure that all safety measures are taken at the site to avoid the accidents to his employees or his sub Contractor employees.
- 2.9.1.7 In order to ensure longevity, safety of the core equipment and optimum performance of the system, the Contractor shall use only genuine spares of high quality standards.

2.9.1.8 The O & M charges as per price schedule are inclusive of replacement of parts/equipments, systems, spares, consumables, etc.

## **2.9.2 SCOPE**

2.9.2.1 The Contractor shall provide his operation and maintenance staff for the entire system for day-to-day operation and maintenance. The operation and maintenance personnel shall be qualified, certified by competent authorities and well trained so that they can handle any type of operational hazards quickly and timely. The responsibility of providing suitable Personal Protection Equipments rests solely with the contractor.

2.9.2.2 The security of the entire plant area shall rest with the contractor, till final take over by NLCIL after completion of the contract period.

2.9.2.3 The maintenance personnel shall be in a position to check and test all the equipments regularly, so that, preventive maintenance, could be taken well in advance to save any equipment from damage. Abnormal behaviour of any equipment shall be brought to the notice of NLCIL not later than 2 hours for taking appropriate action.

2.9.2.4 All repairing & replacement works are to be completed by the Contractor within reasonable time from the time of occurrence of fault or defect. If it is not possible to set right the equipment within reasonable time, the Contractor shall notify NLCIL indicating nature of fault & cause of damage etc. within 12 hours from the time of occurrence of the fault.

2.9.2.5 During operation and maintenance, if there is any loss or damage to any component of the power plant and the BESS due to miss-management/ miss-handling or due to any other reasons, what so ever, the Contractor shall be responsible for immediate replacement / rectification of the same. The damaged component may be repaired, if it is understood after examination that performance of the components shall not be degraded after repairing, otherwise the defective components shall have to be replaced by new one without any extra cost to NLCIL.

2.9.2.6 The scope of maintenance work shall include the following:

2.9.2.6.1 Regular operation and maintenance of the entire System and submission of daily performance to NLCIL. The Contractor shall maintain log book in this respect to clearly record the date of checking & comments for action taken etc.

2.9.2.6.2 The scope of operation and maintenance includes all equipments/accessories of the entire system and proper records of operation of the entire System shall be kept as per direction of NLCIL.

- 2.9.2.6.3 Cleaning of the entire areas, buildings, array yard, electrical panels, containers etc. shall be carried out on regular basis.
- 2.9.2.6.4 Normal and preventive maintenance of the entire system shall be carried out on regular basis.
- 2.9.2.6.5 Keeping & recording daily log sheet as per approved format shall be maintained after commissioning of the entire system.
- 2.9.2.6.6 Under no circumstances, the contractor shall run the system in such a way that will damage the grid.
- 2.9.2.6.7 The contractor shall submit monthly Performance report of entire system indicating net energy export data as per approved format within three days of the following month. The reporting shall also include any mismatch or abnormality in the performance of the system based on SCADA and EMC details for review. Day to day coordination with A & N Administration Electricity department and submitting reports, details required by them shall also under the scope of the O & M contract.
- 2.9.2.6.8 The Contractor shall preserve all recorded data in both hard copy and soft copy format and shall submit to NLCIL every month.
- 2.9.2.6.9 The Contractor shall develop & maintain gardens, which shall be developed by the Contractor himself as per landscaping including daily watering and manuring as and when necessary and on regular basis.
- 2.9.2.6.10 During operation and maintenance period, the Contractor shall refill the fire extinguishers as per manufacturer's recommendation before expiry.

### **2.9.3 TOOLS AND TACKLES**

- 2.9.3.1 Tools and tackles is not a supply item. A list of tools and tackles which are required for O & M of the entire system shall be maintained by the contractor for use during the O & M period. The contractor shall maintain all regular/special O&M tools apart from the tools and tackles.
- 2.9.3.2 Such special tools used by the contractor during operation and maintenance period shall be handed over to NLCIL at the time of completion of 11 years O&M period including warranty period.

### **2.9.4 TESTING INSTRUMENTS FOR ELECTRICAL & ELECTRONICS**

- 2.9.4.1 The Contractor shall provide all details of onsite testing instruments / equipments. Details of equipment / instrument, make, numbers, range, accuracy, etc shall be furnished to NLCIL

### **2.9.5 SCOPE OF CIVIL MAINTENANCE**

- 2.9.5.1 Cleaning of surface drain, sewerage line, drainage outfall, down pipes, soil pipes, water pipe lines.
- 2.9.5.2 Repairs, replacements, cleaning of all joineries etc as and when necessary shall be carried out by the contractor.
- 2.9.5.3 Repairing or replacement, whatever necessary, of doors, window fixtures, toilet accessories, etc in control room and other buildings as and when necessary.
- 2.9.5.4 Cleaning & maintaining of power plant area clearing all weeds, leaves and other wood rejects. Vegetation removal inside the power plant and also vegetation removal & cutting of trees/branches en route the transmission lines of the power evacuation system up to Grid Connecting substation on periodical basis as directed by NLCIL.
- 2.9.5.5 Painting of iron parts of array structures posts once in a year.
- 2.9.5.6 Painting of the buildings, structures/PCSS, Security room, fencing posts, gates, transmission towers, and extension bays etc once in two years.
- 2.9.5.7 All minor repair maintenance in case of buildings and all other structures as and when required as per the instructions of Project Manager/NLCIL.
- 2.9.6 **OTHERS**
- 2.9.6.1 Any Electrical /Civil maintenance work which are not mentioned or included here but necessary for the entire life of the project shall be carried out by the Contractor.

**ANNEXURE – 1**

**Guaranteed Month-wise Net Energy Export at metering station of 33KV switchyard outgoing feeders.**

Sl.No.	Month	Estimated monthly average Global Solar Insolation on horizontal plane (kWh / m <sup>2</sup> / Day)	Guaranteed Net Energy Export during O&M			
			PG test period (1 <sup>st</sup> Year) (kWh)	2 <sup>nd</sup> Year (kWh)	3 <sup>rd</sup> Year (kWh)	4 <sup>th</sup> Year (kWh)
			Annual Guaranteed Net Energy Export in Kwhr of the smoothed Power from BESS and Solar plant combined measured at 33KV switchyard metering station of the Grid interconnection take off points	Annual Guaranteed Net Energy Export in Kwhr of the smoothed Power from BESS and Solar plant combined measured at 33KV switchyard metering station of the Grid interconnection take off points	Annual Guaranteed Net Energy Export in Kwhr of the smoothed Power from BESS and Solar plant combined measured at 33KV switchyard metering station of the Grid interconnection take off points	Annual Guaranteed Net Energy Export in Kwhr of the smoothed Power from BESS and Solar plant combined measured at 33KV switchyard metering station of the Grid interconnection take off points
1	January	5.65				
2	February	6.47				
3	March	6.83				
4	April	6.65				
5	May	5.08				
6	June	4.38				
7	July	4.45				
8	August	4.45				
9	September	4.64				
10	October	4.99				
11	November	4.86				
12	December	5.19				
	Annual	-				

Sl.No.	Month	Estimated monthly average Global Solar Insolation on horizontal plane (kWh / m <sup>2</sup> / Day)	Guaranteed Net Energy Export during O&M			
			5 <sup>th</sup> Year (kWh)	6 <sup>th</sup> Year (kWh)	7 <sup>th</sup> Year (kWh)	8 <sup>th</sup> Year (kWh)
			Annual Guaranteed Net Energy Export in Kwhr of the smoothed Power from BESS and Solar plant combined measured at 33KV switchyard metering station of the Grid interconnection take off points	Annual Guaranteed Net Energy Export in Kwhr of the smoothed Power from BESS and Solar plant combined measured at 33KV switchyard metering station of the Grid interconnection take off points	Annual Guaranteed Net Energy Export in Kwhr of the smoothed Power from BESS and Solar plant combined measured at 33KV switchyard metering station of the Grid interconnection take off points	Annual Guaranteed Net Energy Export in Kwhr of the smoothed Power from BESS and Solar plant combined measured at 33KV switchyard metering station of the Grid interconnection take off points
1	January					
2	February					
3	March					
4	April					
5	May					
6	June					
7	July					
8	August					
9	September					
10	October					
11	November					
12	December					
	Annual	-				

Sl.No.	Month	Estimated monthly average Global Solar Insolation on horizontal plane (kWh / m <sup>2</sup> / Day)	Guaranteed Net Energy Export during O&M			
			9th Year (kWh)	10th Year (kWh)	11th Year (kWh)	
			Annual Guaranteed Net Energy Export in Kwhr of the smoothed Power from BESS and Solar plant combined measured at 33KV switchyard metering station of the Grid interconnection take off points	Annual Guaranteed Net Energy Export in Kwhr of the smoothed Power from BESS and Solar plant combined measured at 33KV switchyard metering station of the Grid interconnection take off points	Annual Guaranteed Net Energy Export in Kwhr of the smoothed Power from BESS and Solar plant combined measured at 33KV switchyard metering station of the Grid interconnection take off points	
1	January					
2	February					
3	March					
4	April					
5	May					
6	June					
7	July					
8	August					
9	September					
10	October					
11	November					
12	December					
	Annual	-				



**Note for Annexure -1:**

- 1) The basis and reference standards used for arriving at these data shall be furnished.
- 2) PV Syst Calculations, Design Report with simulation parameters / variants, shading diagrams, production charts, loss diagrams, etc. shall be furnished correlating with the above month wise Guaranteed Net Energy Export data.
- 3) Design Report calculations and parameters of BESS shall be furnished correlating with the above month wise Guaranteed Net Energy Export data of the smoothed power from BESS and Solar Plant combined, measured at 33KV switchyard metering station of the Grid interconnection take off points .

**ANNEXURE 2**  
**COMPUTATION OF SHORTFALL IN NET ENERGY EXPORT (for PG test period)**

Sl. No.	Month/ Day/Time	Estimated monthly average Global Solar Insolation on horizontal plane (kWh / m <sup>2</sup> / Day)  (a)	Guaranteed Net Energy Export in Kwhr of the smoothened power from BESS + solar combined measured at 33KV switchyard metering station of the Grid interconnection take off points  (b)	Measured average Global Solar Radiation on the horizontal surface during PG period at site by Pyrometer  kWh / m <sup>2</sup> / day  (c)	Measured Net Energy Export in Kwhr of the smoothened power from BESS+ solar combined measured at 33KV switchyard metering station of the Grid interconnection take off points  (d)	Base Net Energy Export at metering stations of 33KV switchyard outgoing feeders in kWh  (e) = (b) x (c)/(a)	Difference in Net energy export in KWhr for the PG period,  report as + ve (or) -ve  (f)=(d)-(e)
1	Jan	5.65					
2	Feb	6.47					
3	Mar	6.83					
4	April	6.65					
5	May	5.08					
6	Jun	4.38					
7	Jul	4.45					
8	Aug	4.45					
9	Sep	4.64					
10	Oct	4.99					
11	Nov	4.86					
12	Dec	5.19					
<b>Annual</b>		-					

**Note for Annexure - 2: (for PG test period)**

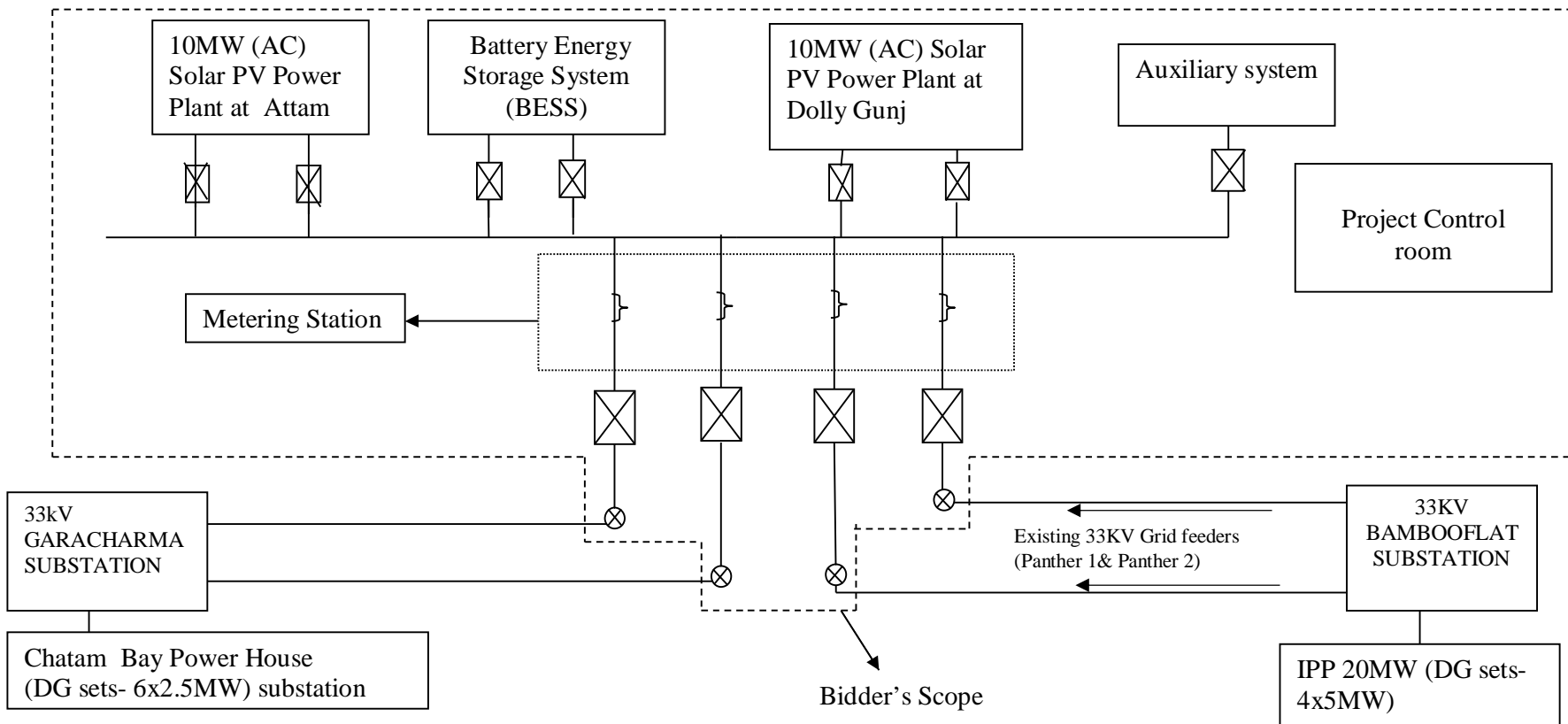
1. The measured Net Energy export shall be calculated by adding all the net export values of the billing meters installed in the 33 KV Power Export switchyard outgoing feeders.
2. If sum (f) is negative (-), there is shortfall in annual guaranteed Net Energy export during solar hours for PG test period
  - I. Short fall in Net Energy export for PG test period (Annually) : \_\_\_\_\_kWh
  - II. LD for shortfall in net energy export for PG test period : Rs. \_\_\_\_\_Per kWh
  - III. Total Penalty payable : Rs. \_\_\_\_\_ Item (i) x Item (ii)

**ANNEXURE 3**  
**COMPUTATION OF NET ENERGY EXPORT DURING O & M PERIOD**

Sl.  No.	Month/ Day/Time	Estimated monthly average Global Solar Insolation on horizontal plane (kWh / m <sup>2</sup> / Day)	Guaranteed Net Energy Export in Kwhr of the smoothened power from solar + BESS combined measured at 33KV switchyard metering station of the Grid interconnection take off points	Measured average Global Solar Radiation on the horizontal surface during PG period at site by Pyranometer	Measured Net Energy Export in Kwhr of the smoothened power from solar + BESS combined measured at 33KV switchyard metering station of the Grid interconnection take off points	Base Net Energy Export at metering stations of 33KV switchyard outgoing feeders in kWh.	Difference in Net energy export in KWhr for the PG period,
		(a)	(b)	kWh / m <sup>2</sup> / day  (c)	(d)	(e) = (b) x (c)/(a)	report as + ve (or) -ve  (f)=(d)-(e)
1	Jan						
2	Feb						
3	Mar						
4	April						
5	May						
6	Jun						
7	Jul						
8	Aug						
9	Sep						
10	Oct						
11	Nov						
12	Dec						
<b>Annual</b>		-					


**Note for Annexure 3 (For balance 10 years O & M period):**

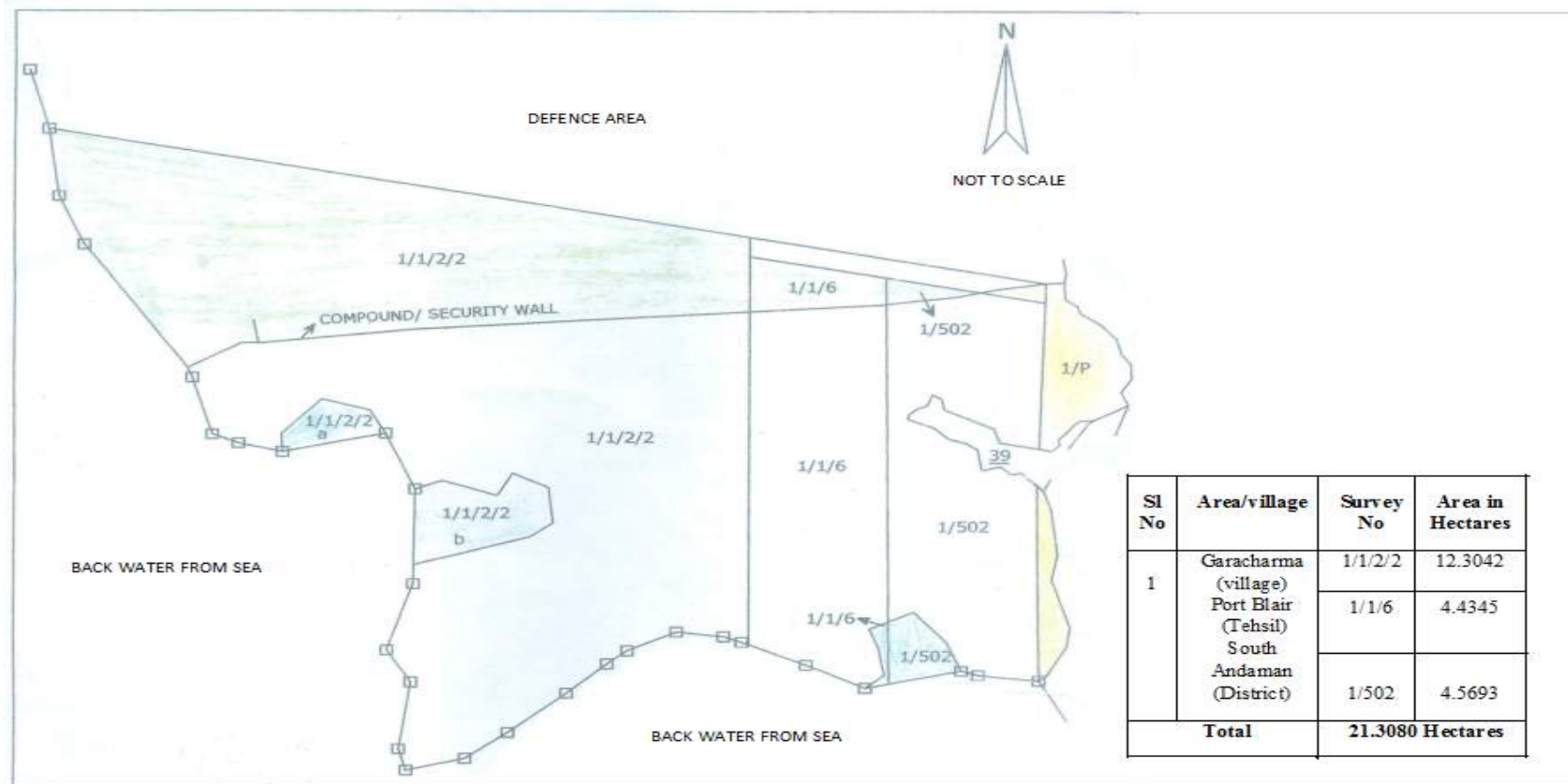
1. The measured Net Energy export shall be calculated by adding all the net export values of the billing meters installed in the 33 KV Power Export switchyard outgoing feeders.
2. If sum (f) is negative (-), there is shortfall in annual guaranteed Net Energy export for balance 10 years O & M period.
  - I. Short fall in Net Energy export for O & M period (Annually) : \_\_\_\_\_kWh
  - II. Compensation for shortfall in net energy export for O & M period : Rs. \_\_\_\_\_Per kWh
  - III. Total Compensation payable : Rs. \_\_\_\_\_ Item (i) x Item (ii)
3. During the O & M period due to Battery replacements/substitutions if any short fall in sum (f) occurs, the corresponding penalty as per 3(iii) shall be deducted in that year/years. If the above shortfall is compensated in the subsequent years Annual Net Energy Export (which shall be limited to maximum three years), then the corresponding amount of compensation shall be returned in the corresponding subsequent years




Note: 1. This block diagram is tentative and for tender purpose only.

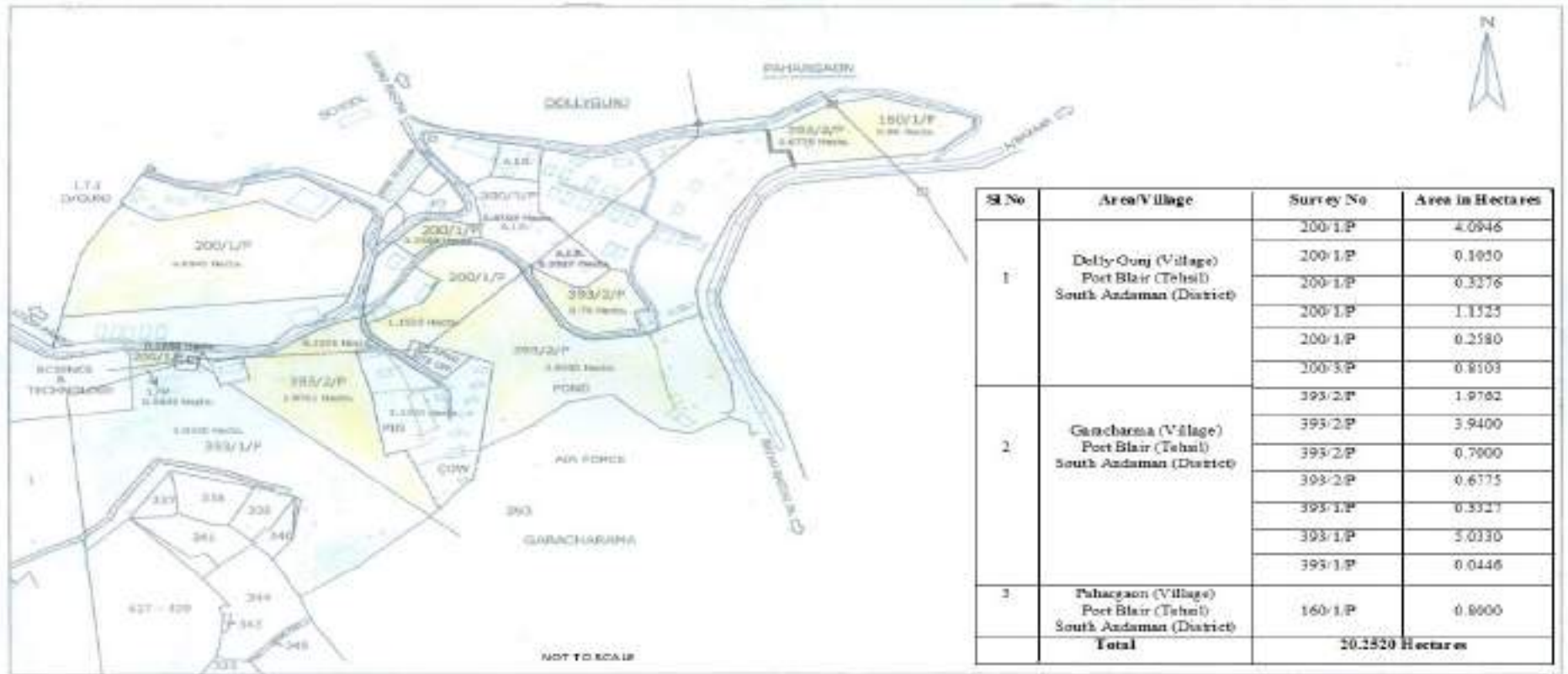
2. The entire scheme shall be finalised during detailed engineering to suit Grid/system requirement as per contract conditions.

	PROJECT: 2X10MW (AC) SOLAR PV PROJECT INTEGRATED WITH 8MWhr BESS, AT ATTAM PAHAD AND DOLLY GUNJ, PORT BLAIR, SOUTH ANDAMN	Title	Drawing No	Rev No: 00
		General Block Diagram	NLCIL/PBD/Andaman/01	Date: 02.03.2018




**FOR TENDER PURPOSE ONLY**

<p>NLC India Limited</p> 	<p>PROJECT: 2X10MW (AC) SOLAR PV PROJECT INTEGRATED WITH 8MWHr BESS, AT ATTAM PAHAD AND DOLLY GUNJ, PORT BLAIR, SOUTH ANDAMN</p>	Title	Drawing number	Rev No:00
		Attam Pahad Site map	NLCIL/PBD/Andaman/02	Date: 02.03.2018



FOR TENDER PURPOSE ONLY

 <p>NLC India Limited</p>	<p>PROJECT: 2X10MW (AC) SOLAR PV PROJECT INTEGRATED WITH 8MWhr BESS, AT ATTAM PAHAD AND DOLLY GUNJ, PORT BLAIR, SOUTH ANDAMN</p>	Title	Drawing number	Rev No:00
		Dolly Gunj Site map	NLCIL/PBD/Andaman/03	Date: 02.03.2018