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|-----------------------------------------------------------------------------------|--------------------------------------|----------|------------------|
|  | Pre- Qualification Requirement (PQR) | Doc. No. | REG2021-20210253 |
|                                                                                   |                                      | Part     | 02/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no   | 00               |

**BIDDER SHALL SUBMIT BELOW PRE-QUALIFICATION REQUIREMENTS FORMAT, DULY FILLED-IN, SPECIFYING RESPECTIVE PAGE NUMBER AGAINST EACH REQUIREMENT AND FURNISH RELEVANT DOCUMENT IN THEIR OFFER.**

| SL. No | PRE QUALIFICATION REQUIREMENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Bidders claim in respect of fulfilling the PQR Criteria |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| A      | Assessment of capacity of Bidder to execute the work: Documentary evidence of similar projects executed by the Bidder, including certification and present contact details of client representative.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                         |
| B      | <p><b>Technical:</b></p> <p>Bidder must have achieved the following criteria of</p> <ol style="list-style-type: none"> <li>1) B1 and one of B4, B5, B6 during last 7 years as per the details hereunder.</li> </ol> <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> <li>2) B2 &amp; B3 and one of B4, B5, B6 during last &amp; years as per the details hereunder.</li> </ol> <p>B1: Vendor should have executed installation and commissioning works of BOS items for minimum cumulative of 5 MWp solar photovoltaic power plants in India, with individual single grid interactive solar plant of 0.5 MW and above (not Roof-Mounted).</p> <p>"B2: Vendor should have executed installation &amp; commissioning works of 2.5 MVA Power Transformer and above<br/>AND<br/>B3: Vendor should have executed laying and termination of cables of 11KV and above"</p> <p>"Should have executed,</p> <p>B4: Three similar Works jobs of value not less than Rs. 87.35 Lakhs each.</p> <p style="text-align: center;">OR</p> <p>B5: Two similar Works jobs of value not less than Rs. 109.19 lakhs each.</p> <p style="text-align: center;">OR</p> <p>B6: One similar Works jobs of value not less than Rs. 174.70 lakhs"</p> |                                                         |

Signature and seal of Bidder

|                                                                                   |                                      |          |                  |
|-----------------------------------------------------------------------------------|--------------------------------------|----------|------------------|
|  | Pre- Qualification Requirement (PQR) | Doc. No. | REG2021-20210253 |
|                                                                                   |                                      | Part     | 02/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no   | 00               |

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>C</b> | <b>Financial Criteria</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>1</b> | <p><b>Turnover:</b></p> <p>The Average annual financial turnover during last three years ending <b>31<sup>st</sup> March 2021</b> should be minimum <b>65.51 Lakh</b> Bidder have to submit audited balance sheet &amp; profit and loss account of last three financial years.</p> <p>Bidder shall submit audited accounts (balance sheets and profit &amp; loss account) in support of this.</p> <p>In case audited financial statements have not been submitted for all the three years as indicated above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years i.e. total divided by three.</p> |  |
| <b>2</b> | <p><b>Net worth:</b></p> <p>Net worth of the Bidder based on the latest Audited Accounts as furnished for 'B1' above should be positive</p> <p>Net Worth = Equity plus General reserves (Free Reserves) minus Accumulated losses.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| <b>3</b> | <p><b>Profit:</b></p> <p>Bidder must have earned cash profit in any one of the three Financial Years as applicable in the last three years defined in B1 above based on latest Audited Accounts. Profit shall be NET profit (PAT +Non cash expenditure viz. depreciation) earned during any one of the three financial years as in 'C-1' above</p>                                                                                                                                                                                                                                                                                                                                 |  |
| <b>D</b> | <p><b>Earnest Money Deposit (EMD)</b></p> <p>EMD Value Rs. 4,36,735/- (Rupees Four Lakh Thirty six thousands, Seven hundred thirty four only)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |

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|-----------------------------------------------------------------------------------|--------------------------------------|----------|------------------|
|  | Pre- Qualification Requirement (PQR) | Doc. No. | REG2021-20210253 |
|                                                                                   |                                      | Part     | 02/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no   | 00               |

### **Explanatory Notes for PQR**

- For PQR above the word 'Executed' means the bidder should have achieved the Technical Criteria, specified in the PQR (as in 'B' above), even if the total contract has not been completed or closed.  
(The Bidder shall submit the work completion certificate issued by Customer / Contractor.)
- If the Qualifying work is executed in the last seven years' period, as specified above, even if it has been started earlier, the same will also be considered meeting the qualifying requirements.
- Time period for achievement of the 'Technical' criteria of PQR (as in 'B' above) will be the last 7 years ending on the 'latest date' of Bid submission
- The word '**Similar Works**' means "
  - Electrical works mainly mentioned in B2 and B3.
  - Or
  - Supply of Balance of system and Installation & commissioning of Ground mounted system".
- Relevant documents, meeting above requirements at B & C, shall be submitted by bidders.
- The bidder can be a company under Companies Act, 1956 or Partnership firm or Proprietor firm.
- Audited financial statements have to be submitted for all the three years as indicated against C-1 above. They should also submit latest Income Tax return for FY mentioned in criteria C1.
- If the financial statement is not required to be audited statutorily, then instead of audited financial statements, financial statements are required to be certified by the Chartered Accountant.

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|-----------------------------------------------------------------------------------|-------------------------------------|------------|----------------------|
|  | NIT Terms & Condition               | Doc. No.   | REG2021-20210253     |
|                                                                                   |                                     | Part 01/05 | NIT Term & Condition |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group) | Rev no     | 00                   |

### NIT Terms & Condition

1. **Price basis:** Firm i.e. from date of Work Order.
2. **Supply, installation & commissioning and trial run and O&M:**
  - a. Successful bidder will complete the supply, installation and commissioning work as per scope within **120 Days** from the date of Work order.
  - b. After successful Installation & Commissioning, bidder will have to perform Trial run for **07 days**.
  - c. O&M period will be started after successful acceptance of the Trial Run by BHEL/Customer. O&M period is 60 Months.

### 3. **Payment terms:**

#### 3.1:- **Supply, Installation & Commissioning:-**

The payment shall be made by BHEL in the following manner:

Each line item of BOQ of price bid has been divided into either of the three categories:

- i. Cat. 1 : Only Supply (Code -S)
- ii. Cat. 2 : Supply & Installation, T&C (Code - S&I)
- iii. Cat. 3 : Only Installation, Testing & Commissioning (Code - I)

#### a) **Supply Part:**

- i. **80%** of the PO value of supply portion of BoS shall be released (Cat.1) upon completion of supply. Receipt of material in Good condition and submission of MDCC (Materials Dispatch certificate), Test/Inspection report & Certificate shall be submitted along with invoice for the payment.
- ii. **On completion of Installation: Balance 20 %** of the supply portion shall be released.

#### b) **Installation & commissioning of system and successful training & Handing over Part: On Installation, Testing & Commissioning**

- i. 90% of the PO value of Installation and supply Portion of BoS shall be released (Cat. 2 & Cat.3) upon completion of Installation and commissioning. Installation and commissioning certificated issued by BHEL/Customer site in-charge shall be submitted along with invoice for the payment.
- ii. On handing over of the site balance 10% of the Cat.2 and Cat.3 items shall be released.

|                                                                                               |                                     |               |                      |
|-----------------------------------------------------------------------------------------------|-------------------------------------|---------------|----------------------|
| <br>Rudrapur | NIT Terms & Condition               | Doc. No.      | REG2021-20210253     |
|                                                                                               |                                     | Part<br>01/05 | NIT Term & Condition |
|                                                                                               | GROUP : REG(Renewable Energy Group) | Rev no        | 00                   |

**Table: Summary of payment terms**

| Sl. No | Category    | Payment terms |     |              |
|--------|-------------|---------------|-----|--------------|
|        |             | Supply        | I&C | Handing Over |
| 1      | Cat-1 (S)   | 80%           | 20% | -            |
| 2      | Cat-2 (S&I) | -             | 90% | 10%          |
| 3      | Cat-3 (I)   | -             | 90% | 10%          |

**Following documents are required for processing the running bills:**

- Invoice - 01 original for buyer + 03 extra.
- Duly filled and stamped RA bill format WAM 6.
- LR/GR/Material Receipt copy
- List of all tools and tackles with calibration certificates.
- Test Reports of all BoS supplied by the Bidder and warranty card.
- Closure of BHEL raised quality punch points( along with Final Bills)
- For Final Bill Commissioning report, Handover certificate & training certificate
- Details of payment of PF and ESI of labours.
- Progress Schedule

**Please ref chapter VIII payment in REG2021-20210253 Part-04/05 of SCC for Running bill and measurement book.**

**3.2: - Operation and Maintenance: -**

5% of the work order value shall be paid to the successful bidder on quarterly basis on submission of the following documents:

- Invoice - 01 original for buyer + 03 extra.
- Duly filled and stamped RA bill format WAM 6.
- Monthly O&M report duly signed by BHEL/Customer
- List of all tools and tackles with calibration certificates.
- Details of payment of PF and ESI of labours.
- Copy of Maintenance register , Monthly Generation report, Cleaning report as per the attached format available in this tender, O&M report dully signed by the Customer/BHEL representative.

In the above manner, total 100% payment shall be released in 20 instalments (4 quarters/year x 5 years). Payment shall be processed within 45 days from the date of receipt of Invoice along with relevant documents at BHEL-Rudrapur. Payment shall be released only when proof of doing maintenance for the quarter has been made available.

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|-----------------------------------------------------------------------------------|-------------------------------------|------------|----------------------|
|  | NIT Terms & Condition               | Doc. No.   | REG2021-20210253     |
|                                                                                   |                                     | Part 01/05 | NIT Term & Condition |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group) | Rev no     | 00                   |

**Note:**

5% GST on 70% of the gross value of the work order and for remaining (30%) value GST shall be 18%.

As per 31<sup>st</sup> meeting of GST Council, Council has recommended that in all such cases, the 70% of the gross value shall be deemed as the value of supply of said goods attracting 5% rate and the remaining portion (30%) of the aggregate value of such EPC contract shall be deemed as the value of supply of taxable service attracting standard GST rate.

However, any changes in the GST rate with respect to Solar EPC shall be applicable as per Govt. Norms.

**Please ref chapter VIII payment in REG2021-20210253 Part-04/05 of SCC for Running bill and measurement book**

- 4. Earnest Money Deposit:** EMD to be necessarily submitted (whether or not registered as MSME). This is to be ensured in line with provisions of "works contract". EMD Values shall be as per PQR.

All details related to submission of EMD has been given in **REG2021-20210253 / Part-05/05** in **Chapter 01, Clause 7 (page 4/41)** of **GCC** in form of pay order or demand draft payable at Rudrapur or NEFT/RTGS to BHEL office in favor of BHEL along with Offer.

- 5. Security Deposit:**

**5.1: - Supply, Installation & Commissioning: -**

**Security Deposit (SD) amount shall be 5% of the Contract value (Including O&M Value). This will have to be deposited by the successful bidder within a week of award of work (minimum 50% SD amount, as per GCC).**

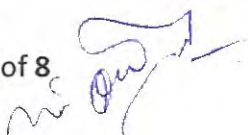
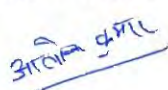
Complete details regarding submission of security deposit has been given in **GCC (REG2021-20210253 / Part-05/05)** in **Chapter 01, Clause 8 (page 5/41)**.

**Return of Security Deposit:** Security Deposit shall be refunded/Bank Guarantee(s) released to the Contractor along with the 'Final Bill except O&M' after deducting all expenses / other amounts due to BHEL under the contract / other contracts entered into with them by BHEL. **(REG2021-20210253 / Part-05/05)** in **Chapter 01, Clause 9 (page 6/41)**.

**5.2: - Operation and Maintenance: -**

**Security Deposit (SD) amount shall be 5% of the O&M Value. This will have to be deposited by the successful bidder before release of 5 % SD as per clause 5.1.**

Signature and seal of Bidder

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|-----------------------------------------------------------------------------------|-------------------------------------|----------|----------------------|
|  | NIT Terms & Condition               | Doc. No. | REG2021-20210253     |
|                                                                                   |                                     | Part     | NIT Term & Condition |
|                                                                                   |                                     | 01/05    |                      |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group) | Rev no   | 00                   |

**Return of Security Deposit:** Security Deposit shall be refunded/Bank Guarantee(s) released to the Contractor along with the 'Final Bill for O&M' after deducting all expenses / other amounts due to BHEL under the contract / other contracts entered into with them by BHEL. **(REG2021-20210253 / Part-05/05) in Chapter 01, Clause 9 (page 6/41).**

#### 6. Contract Performance Bank Guarantee:

The successful bidder will have to submit contract performance Bank Guarantee (CPBG) to BHEL within 10 days from 'final bill except O&M' so that final bill mentioned in clause 5.1 can be processed and Security money can be released.

The performance bank Guarantee of 3% of WO value has to be valid for warranty period of 05 years from the date of handing over of system with a claim period of 6 months. The Bank Guarantee towards Performance Guarantee will be released after completion of warranty period.

The CPBG may be furnished in any one of the following forms:

- Bank Guarantee from Scheduled Banks/ Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL
- Fixed Deposit Receipt issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL)
- Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL)

(Note: BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith)

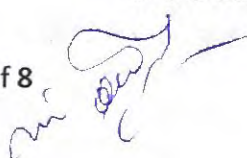
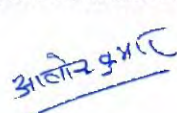
The CPBG shall not carry any interest.

In case, CPBG is not submitted by the bidder within 10 days from final bill and neither any commitment is received for submission in the next 10 days' time also – then BHEL will be hold Security deposit as a CPBG for 1 years as mentioned above.

#### 7. Risk Purchase Clause:

If the supplier fails to deliver the services within the stipulated period mentioned in the work order, BHEL shall be entitled to terminate the contract and to order the same or the best and the nearest available substitute from elsewhere at the risk and cost of

Signature and seal of Bidder

|                                                                                   |                                     |               |                      |
|-----------------------------------------------------------------------------------|-------------------------------------|---------------|----------------------|
|  | NIT Terms & Condition               | Doc. No.      | REG2021-20210253     |
|                                                                                   |                                     | Part<br>01/05 | NIT Term & Condition |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group) | Rev no        | 00                   |

the seller either the whole or any part of the goods/Services. In case of deviation or non-acceptance of Risk Purchase clause, offer shall be liable for rejection. **Risk & Cost Amount payable by Supplier or recoveries in-lieu of Risk Purchase may be recovered from supplier by encashing/invoking Bank Guarantee, Security Deposits available with BHEL against the same or any other contract or may be adjusted against dues available in the form of bills payable to supplier by BHEL against the same or any other purchase orders/contracts/work orders etc. placed on the supplier by any unit/region etc. of BHEL or through any other legal remedy available to BHEL.**

#### **Risk and Cost against Balance Work:**

$$\text{Risk \& Cost Amount} = [(A-B) + (A \times H/100)]$$

Where,

A= Value of Balance scope of Work/ Supply (\*) as per rates of new contract

B= Value of Balance scope of Work/ Supply (\*) as per rates of old contract being paid to the contractor/ supplier at the time of termination of contract i.e. inclusive of PVC & ORC, if any.

H = Overhead Factor to be taken as 5

In case (A-B) is less than 0 (zero), value of (A-B) shall be taken as 0 (zero).

#### **\*(Balance scope of work/ supply)**

Difference of Contract Quantities and Executed Quantities as on the date of issue of Letter for 'Termination of Contract', shall be taken as balance scope of Work/ Supply for calculating risk & cost amount.

Contract quantities are the quantities as per original contract. If, Contract has been amended, quantities as per amended Contract shall be considered as Contract Quantities.

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Signature and seal of Bidder

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|-----------------------------------------------------------------------------------|-------------------------------------|---------------|----------------------|
|  | NIT Terms & Condition               | Doc. No.      | REG2021-20210253     |
|                                                                                   |                                     | Part<br>01/05 | NIT Term & Condition |
|                                                                                   | GROUP : REG(Renewable Energy Group) | Rev no        | 00                   |

## 8. GST Rate

Bidder(s) to ensure following while quoting: -

- To mention relevant HSN/ SAC Code for each item quoted by him.
- To mention GST registration number in the name of bidder in the quotation and to attach self-attested copy of GST Registration.

### Loading by BHEL

The offers of those bidder(s) who are not registered with GST, their offers will be loaded by BHEL with applicable GST (as applicable) for the items quoted by such bidder(s).

### Post- award

The successful bidder (s) under the tender required to ensure following: -

- Should raise invoice as per the applicable GST Act/ Rules as amended from time to time with all the required details under relevant act/rules. The required details shall be clear and legible on the invoice. MSME Vendors, may send a draft sample of Invoice to be raised on BHEL in advance for the review and approval by BHEL.
- A declaration on letter head duly signed by authorized signatory shall be furnished by bidder (s) to BHEL that they shall upload all relevant particulars on GSTN network/ portal alongwith details of any credit note( as intimated by BHEL from time to time) in timely manner and shall discharge tax liability on invoices raised to BHEL in timely manner to enable BHEL to take input credit in timely manner against invoice raised by them . In the event of delayed submission, submission of wrong data in returns or non-payment of GST they shall compensate BHEL for any loss of Input credit alongwith interest thereon which is generally SBI PLR plus 6% (as being charged by BHEL).
- In case of multiple Invoice Numbering System by Vendor, the Invoice No. which is linked/ uploaded on GSTN network should be clearly highlighted and separately informed to concerned officials of BHEL.

### Payment of GST

As BHEL, evaluates offers of the bidder(s) on the basis of Total Landed Cost to BHEL and Input Credit of GST being passed on by Bidder(s) to BHEL is reduced while working out Landed Cost by BHEL. Hence, it is the responsibility of Bidder(s) to take utmost

*आपका धन्यवाद*

Signature and seal of Bidder

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|-----------------------------------------------------------------------------------|-------------------------------------|------------|----------------------|
|  | NIT Terms & Condition               | Doc. No.   | REG2021-20210253     |
|                                                                                   |                                     | Part 01/05 | NIT Term & Condition |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group) | Rev no     | 00                   |

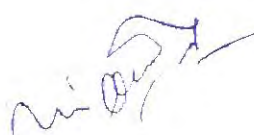
care on his part to ensure that Input Credit is smoothly availed by BHEL for GST charged by them.

The payment made by BHEL towards GST charged in Invoice by the bidder(s), shall be treated as advance until input credit is finally availed by BHEL.

In case, BHEL finds at any stage that BHEL is denied input credit on GST charged by bidder(s) due to fault/ omission of bidder, the loss of input credit so incurred by BHEL should be compensated by the bidder(s) to BHEL alongwith interest and penalty.

The decision of BHEL regarding fault/ omissions made by bidder(s) in following GST provision resulting loss of input credit to BHEL, will be final and binding on Vendor

**Note: Non-acceptance/non-submission of any of the above requirements will render the offer liable for rejection.**


Signature and seal of Bidder

|                                                                                   |                                     |               |                      |
|-----------------------------------------------------------------------------------|-------------------------------------|---------------|----------------------|
|  | NIT Terms & Condition               | Doc. No.      | REG2021-20210253     |
|                                                                                   |                                     | Part<br>01/05 | NIT Term & Condition |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group) | Rev no        | 00                   |

### DECLARATION BY THE BIDDER

I/We ..... (Hereinafter referred to as Bidder) being desirous of participating for tender, having fully understood the scope of tender and having carefully noted all the terms and conditions, specifications etc. as mentioned in the tender document (**REG2021-20210253, REV 00**) do hereby declare that-

1. The Bidder is fully aware of all the requirements of the tender document (**REG2021-20210253, REV 00**) and agrees with all provisions of the tender document and accepts all risks, responsibilities and obligations directly or indirectly connected with the performance of the tender.
2. The Bidder is fully aware of all the relevant information for proper execution of the proposed scope of work, with respect to the proposed place of works/ site, its local environment, approach road and connectivity etc. and is well acquainted with actual and other prevailing working conditions, availability of required materials and labour etc. at site.
3. The Bidder is capable of executing and completing the work as required in the tender and is financially solvent and sound to execute the tendered work. The Bidder is sufficiently experienced and competent to perform the contract to the satisfaction of BHEL The Bidder gives the assurance to execute the tendered work as per specifications, terms and conditions of the tender on award of work.
4. The Bidder has no collusion with other Bidders, any employee of BHEL or with any other person or firm in the preparation of the tender.
5. The Bidder has not been influenced by any statement or promises by BHEL or any of its employees but only by the tender document.
6. The Bidder is familiar with all general and special laws, acts, ordinances, rules and regulations of the Municipal, District, State and Central Government that may affect the work, its performance or personnel employed therein.
7. The Bidder has never been debarred from similar type of work by any Government undertaking /Department. (An undertaking on Stamp paper in this regard shall have to be submitted)
8. The Bidder accepts that the earnest money may be absolutely forfeited by BHEL if the Bidder fails to sign the contract or to undertake the work within stipulated time.
9. All the information and the statements submitted with the tender are true.

|                                                                                   |                    |                                      |            |                    |      |             |
|-----------------------------------------------------------------------------------|--------------------|--------------------------------------|------------|--------------------|------|-------------|
|  | FIELD QUALITY PLAN |                                      |            |                    | No:  | 44012102010 |
|                                                                                   | Project:           | 6.5 MWp Ground Mounted Solar         | Customer : | NALANDA UNIVERSITY | Rev  | 01          |
|                                                                                   | Rudrapur           | GROUP : Renewable Energy Group (REG) |            |                    | Date | 06.08.2021  |

## FIELD QUALITY PLAN

|     |            |              |             |               |                         |
|-----|------------|--------------|-------------|---------------|-------------------------|
|     |            |              |             |               |                         |
|     |            |              |             |               |                         |
|     |            |              |             |               |                         |
| 01  | 06.08.2021 | Ajay Baghel  | Alok Kumar  | Ayan Debbarma | Revised as per comments |
| 00  | 21.04.2021 | Aditya Khati | Ajay Baghel | Ayan Debbarma |                         |
| Rev | Date       | Altered      | Checked     | Approved      | Note                    |

BHEL CFP Rudrapur

21/07

|                                                                                   |                                      |                              |            |                    |      |             |
|-----------------------------------------------------------------------------------|--------------------------------------|------------------------------|------------|--------------------|------|-------------|
|  | FIELD QUALITY PLAN                   |                              |            |                    | No:  | 44012102010 |
|                                                                                   | Project:                             | 6.5 MWp Ground Mounted Solar | Customer : | NALANDA UNIVERSITY | Rev  | 01          |
| Rudrapur                                                                          | GROUP : Renewable Energy Group (REG) |                              |            |                    | Date | 06.08.2021  |

### Index

| Sl. No | Item                     | Drawing/Document No.       | Rev | No Of Pages |
|--------|--------------------------|----------------------------|-----|-------------|
| 1      | Authorization for checks |                            | 01  | 01          |
| 2      | Statement of Checks      |                            | 01  | 01          |
| 3      | SPV Module               | FQP/GMS/SSPV/NU            | 01  | 02          |
| 4      | Solar String Inverter    | FQP/GMS/STRING INVERTER/NU | 01  | 01          |
| 5      | Cable                    | FQP/GMS/CABLE/NU           | 01  | 01          |
| 6      | ACDB & LT Panel          | FQP/GMS/ACDB/NU            | 01  | 01          |
| 7      | Earthing                 | FQP/GMS/EARTHING/NU        | 01  | 01          |

2/2

|                                                                                   |                    |                                      |            |                    |      |             |
|-----------------------------------------------------------------------------------|--------------------|--------------------------------------|------------|--------------------|------|-------------|
|  | FIELD QUALITY PLAN |                                      |            |                    | No:  | 44012102010 |
|                                                                                   | Project:           | 6.5 MWp Ground Mounted Solar         | Customer : | NALANDA UNIVERSITY | Rev  | 01          |
|                                                                                   | Rudrapur           | GROUP : Renewable Energy Group (REG) |            |                    | Date | 06.08.2021  |

### Authorization of Checks

| Category of Check                                                                                                                          | Inspection Authority | Witness Authority | Nonconformity (if any) Disposition Authority | Accepting Authority |
|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------|----------------------------------------------|---------------------|
| <b>A'</b><br>(Customer Hold Point)                                                                                                         | BHEL Engineer        | NU/OE/TP          | BHEL ENGG Centre / HOS (Quality): BHEL CFP   | NU/OE               |
| <b>B'</b><br>(Formal intimation Engineer shall be forwarded by BHEL. Check shall commence at notified time whether parties show-up or not) | BHEL Engineer        | NU/OE/TP          | BHEL ENGG Centre / HOS (Quality): BHEL CFP   | NU/OE               |
| <b>C'</b>                                                                                                                                  | BHEL Engineer        | BHEL Engineer     | BHEL ENGG Centre / HOS (Quality): BHEL CFP   | BHEL                |

#### Abbreviations used:

HOS - Head of Section  
OE- Owner's Engineer  
NU- Nalanda University  
TP- Third Party

#### Note:

1. Nonconformity Disposition authority for all categories of checks shall be as under:  
Product nonconformities: BHEL Engineering Centre. Process/ System nonconformities: Head (Quality): BHEL, CFP.
2. Wherever log sheet is not called for, suitable record shall be maintained in protocol / Site register.
3. In case of nonconformity, accepting authority will consider the solution for the nonconformity as proposed by the Nonconformity Disposition Authority before acceptance, and such solution shall be reflected in the log sheets/protocols.
4. Quantum of check shall be 100% for all characteristics unless otherwise mentioned specifically in Field Quality Plan/ reference documents.
5. Only authorized persons with proper safety gears to enter construction area.

*Signature*

|                                                                                   |                                      |                              |            |                    |      |             |
|-----------------------------------------------------------------------------------|--------------------------------------|------------------------------|------------|--------------------|------|-------------|
|  | FIELD QUALITY PLAN                   |                              |            |                    | No:  | 44012102010 |
|                                                                                   | Project:                             | 6.5 MWp Ground Mounted Solar | Customer : | NALANDA UNIVERSITY | Rev  | 01          |
| Rudrapur                                                                          | GROUP : Renewable Energy Group (REG) |                              |            |                    | Date | 06.08.2021  |

## STATEMENT OF CHECKS

**System:** GROUND MOUNTED SOLAR SYSTEM  
**Sub-System:** SPV MODULES, SOLAR STRING INVERTER, CABLE, ACDB & LT PANEL, AND EARTHING

### NOTES:

- Abbreviations used  
 Type of Checks:  
**V-** Visual,  
**V&E-** Visual and Electrical,  
**E-** Electrical  
**P-** Physically,  
**SL-** Spirit Level  
**M-** Measurement
- Latest revision of Standards & Specification shall apply.
- Gauges and measuring Instruments, with valid calibration only shall be used
- Format of record identified with "tick" (✓) mark in column no. 'D\*' shall be essentially included in QA documentation.

77  
8/10/21

| <div>BHARAT HEAVY ELECTRICALS LIMITED<br/>CFP- RUDRAPUR</div> |                                          | FIELD QUALITY PLAN<br>FOR SPV MODULES<br>STATEMENTS OF CHECKS |                       |                |                                   |                                                                        |                                                                         |                        |    |               |  |       | FQP NO.: FQP/GMS/SSPV/NU<br>BHFL Doc. NO. : 44012102010 |         |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------------------------|-----------------------|----------------|-----------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------|----|---------------|--|-------|---------------------------------------------------------|---------|--|
| SYSTEM: GROUND MOUNTED SOLAR SYSTEM                                                                                                              |                                          | SUB-SYSTEM: SPV MODULES                                       |                       |                |                                   |                                                                        |                                                                         | TOTAL SHEETS: 02       |    | REV. NO. : 01 |  | AREA: |                                                         | REMARKS |  |
| SL NO.                                                                                                                                           | CHARACTERISTICS / ITEM                   | TYPE OF CHECK                                                 | INSTRUMENT            | CLASS OF CHECK | QUANTUM/<br>FREQUENCY<br>OF CHECK | REFERENCE DOCUMENT                                                     | ACCEPTANCE STANDARD                                                     | FORMAT OF RECORD       |    |               |  |       |                                                         |         |  |
| 1                                                                                                                                                | 2                                        | 3                                                             | 4                     | 5              | 6                                 | 7                                                                      | 8                                                                       | 9                      | D* | 10            |  |       |                                                         |         |  |
| A                                                                                                                                                | Material Receipt and Unloading           |                                                               |                       |                |                                   |                                                                        |                                                                         |                        |    |               |  |       |                                                         |         |  |
| A.01                                                                                                                                             | Unloading From Truck                     | V                                                             | Hydra Crane           | C              | 100%                              |                                                                        | Use proper material handling equipment                                  | Logbook/ Site register |    |               |  |       |                                                         |         |  |
| A.02                                                                                                                                             | Verification of qty and identification   | V                                                             | Visual                | B              | 100%                              | Dispatch Clearance certificate                                         | Correlation of the received with delivery challan/packing list          | Site Material register |    |               |  |       |                                                         |         |  |
| A.03                                                                                                                                             | Reporting of damage/missing items        | V                                                             | Visual                | C              | 100%                              |                                                                        | Delivery Challan / Packing List                                         | Site Material register |    |               |  |       |                                                         |         |  |
| B                                                                                                                                                | Shifting                                 |                                                               |                       |                |                                   |                                                                        |                                                                         |                        |    |               |  |       |                                                         |         |  |
| B.01                                                                                                                                             | Shifting of modules                      | V                                                             | Hydra Crane/ Manually | C              | 100%                              |                                                                        | Use proper material handling equipment                                  | Logbook/ Site register |    |               |  |       |                                                         |         |  |
| B.02                                                                                                                                             | Storage Space                            | V                                                             | Visual                | B              | 100%                              |                                                                        | Storage space should be enough for manual and hydra movements           | Logbook/ Site register |    |               |  |       |                                                         |         |  |
| B.03                                                                                                                                             | Pallet Stack Height                      | V                                                             | Visual                | C              | 100%                              | Maximum Stack Height 2 pallets                                         | Maximum stack Height 2 pallets                                          | Logbook/ Site register |    |               |  |       |                                                         |         |  |
| C                                                                                                                                                | Pre-Erection                             |                                                               |                       |                |                                   |                                                                        |                                                                         |                        |    |               |  |       |                                                         |         |  |
| C.01                                                                                                                                             | Document availability                    | V                                                             | Visual                | C              | 100%                              | Approved layout drawing/data sheet                                     | NU/VSC/TP approved layout drawing/data sheet                            | MoM/ e-mails           |    |               |  |       |                                                         |         |  |
| C.02                                                                                                                                             | Civil work & MMS Structure               | V                                                             | Visual                | B              | 10%                               | NU/VSC/TP Approved drawings/data Sheet                                 | Check the completion of MMS foundation and completion of MMS assembly   | Logbook/ Site register |    |               |  |       |                                                         |         |  |
| C.03                                                                                                                                             | Fixing hardware availability             | V                                                             | Visual                | C              | 100%                              | Manufacturer Installations Manual/ VSC /NU approved Drawing/data sheet | Manufacturer Installations Manual / VSC /NU approved Drawing/data sheet | Logbook/ Site register |    |               |  |       |                                                         |         |  |
| C.04                                                                                                                                             | Unpacking of pallets and module handling | V                                                             | Visual                | C              | 100%                              |                                                                        | Manually shifted at the allotted location.                              | Logbook/ Site register |    |               |  |       |                                                         |         |  |

27/12/20

|  <b>BHARAT HEAVY ELECTRICALS LIMITED</b><br>CFP- RUDRAPUR |                                          |       | <b>FIELD QUALITY PLAN</b><br><b>FOR SPV MODULES</b><br><b>STATEMENTS OF CHECKS</b> |            |                             |                                                                                                                                                                    |                                                                                                                                                                                                                                                                                        |                        | FQP NO.: FQP/GMS/SPV/NU<br>BHEL Doc. NO.: 44012102010 |    |
|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-------|------------------------------------------------------------------------------------|------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------|----|
| SYSTEM: GROUND MOUNTED SOLAR SYSTEM                                                                                                          |                                          |       | SUB-SYSTEM: SPV MODULES                                                            |            |                             |                                                                                                                                                                    |                                                                                                                                                                                                                                                                                        |                        | REV. NO.: 01                                          |    |
| CHARACTERISTICS / ITEM                                                                                                                       |                                          |       | CLASS OF CHECK                                                                     |            | QUANTUM/ FREQUENCY OF CHECK |                                                                                                                                                                    | REFERENCE DOCUMENT                                                                                                                                                                                                                                                                     |                        | ACCEPTANCE STANDARD                                   |    |
| SL NO.                                                                                                                                       |                                          |       | TYPE OF CHECK                                                                      | INSTRUMENT |                             |                                                                                                                                                                    |                                                                                                                                                                                                                                                                                        |                        |                                                       |    |
| 1                                                                                                                                            | 2                                        | 3     | 4                                                                                  | 5          | 6                           | 7                                                                                                                                                                  | 8                                                                                                                                                                                                                                                                                      | 9                      | D*                                                    | 10 |
| D                                                                                                                                            | Erection                                 |       |                                                                                    |            |                             |                                                                                                                                                                    |                                                                                                                                                                                                                                                                                        |                        |                                                       |    |
| D.01                                                                                                                                         | Fixing of modules to MMS using Fasteners | V     | Manually/<br>Torque<br>wrench                                                      | B          | 10%                         | Manufacturer Installations<br>Manual/ NU/VSC/TP<br>approved PV module data<br>sheet.                                                                               | 1) Each module should be supported on the MMS<br>2) Each Module should be mounted with Fasteners on MMS at 4 locations<br>1) Ensure right Polarity.<br>2) Number of modules in series loop should match SLD<br>3) No loose Connection allowed. No Short Circuiting of modules allowed. | Logbook/ Site register |                                                       |    |
| D.02                                                                                                                                         | Module series wiring                     | V     | Manually                                                                           | B          | 10%                         | Approved SLD /Data sheet by NU/VSC/TP                                                                                                                              |                                                                                                                                                                                                                                                                                        | Logbook/ Site register |                                                       |    |
| D.03                                                                                                                                         | Grounding                                | V & E | Manually                                                                           | B          | 100%                        | Each individual module frame should be grounded through the Fasteners connecting PV module to MMS and subsequent earthing by using Suitable Size Cu Wires/GI Strip | NU/VSC/TP approved layout drawing                                                                                                                                                                                                                                                      | Logbook/ Site register |                                                       |    |
| E                                                                                                                                            | Pre Commissioning                        |       |                                                                                    |            |                             |                                                                                                                                                                    |                                                                                                                                                                                                                                                                                        |                        |                                                       |    |
| E.01                                                                                                                                         | Voc measurement                          | E     | Megger/IR<br>Tester/<br>Clamp meter                                                | B          | 10%                         | Approved data sheet by NU/VSC/TP                                                                                                                                   | 1) String Voc Should match with SLD requirement and data sheet<br>2) No reverse polarity allowed                                                                                                                                                                                       | Joint Protocol         |                                                       |    |

21/07/20



BHARAT HEAVY ELECTRICALS LIMITED  
CIP- RUDRAPUR

FIELD QUALITY PLAN  
FOR SOLAR STRING INVERTER  
STATEMENTS OF CHECKS

FOP NO.: FOP/6MS/STRING INVERTER/NU  
BHEL Doc NO.: 440210010  
REV. NO.: 01  
TOTAL SHEETS: 01

| SYSTEM: GROUND MOUNTED SOLAR SYSTEM      |                                                                                                            |               | SUB-SYSTEM: SOLAR STRING INVERTER |                |                              |                                                                        | REFERENCE DOCUMENT                                                                                                                                  |                                |    | ACCEPTANCE STANDARD | FORMAT OF RECORD |  | REMARKS |
|------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------|-----------------------------------|----------------|------------------------------|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----|---------------------|------------------|--|---------|
| Sl. NO.                                  | CHARACTERISTICS / ITEM                                                                                     | TYPE OF CHECK | INSTRUMENT                        | CLASS OF CHECK | QUANTUM / FREQUENCY OF CHECK |                                                                        |                                                                                                                                                     |                                |    |                     |                  |  |         |
| 1                                        | 2                                                                                                          | 3             | 4                                 | 5              | 6                            | 7                                                                      | 8                                                                                                                                                   | 9                              | 10 |                     |                  |  |         |
| <b>A Material Receipt and Unloading</b>  |                                                                                                            |               |                                   |                |                              |                                                                        |                                                                                                                                                     |                                |    |                     |                  |  |         |
| A.01                                     | Unloading From Truck                                                                                       | V             | Manually/<br>Hydra Crane          | C              | 100%                         | Manufacturers instruction Manual                                       | Use proper material handling equipment with proper safety precautions.                                                                              | Log book/Site register         |    |                     |                  |  |         |
| A.02                                     | Verification of qty and specification & identification                                                     | V             | Visual                            | B              | 100%                         | Purchase order, delivery challan, packing list & dispatch certificate. | Correlation of the lot received with purchase order, delivery challan & packing list.                                                               | Site material register         |    |                     |                  |  |         |
| A.03                                     | Packing inspection                                                                                         | V             | Visual                            | C              | 100%                         | Manufacturers instruction Manual                                       | Package should be in good condition i.e. without breakage or visual defects. Should not be in opened condition.                                     | Site material register         |    |                     |                  |  |         |
| A.04                                     | Reporting of damage/missing items                                                                          | V             | Visual                            | C              | 100%                         | Delivery challan & packing list.                                       | Delivery challan/Packing List.                                                                                                                      | Site material register/e-mails |    |                     |                  |  |         |
| <b>B Storage of Inverters</b>            |                                                                                                            |               |                                   |                |                              |                                                                        |                                                                                                                                                     |                                |    |                     |                  |  |         |
| B.01                                     | Storage space                                                                                              | V             | Visual                            | B              | 100%                         | Manufacturer installation manual                                       | All inverters must be placed indoor.                                                                                                                | Site material register         |    |                     |                  |  |         |
| B.02                                     | Handling and Movement                                                                                      | V             | Manual/ Hydra Crane               | C              | 100%                         | Manufacturer installation manual                                       | Handle in such a way which avoid direct mechanical hit with sharp objects and also store in such a way that easy material movement access possible. | Site material register         |    |                     |                  |  |         |
| <b>C Pre-installation &amp; checking</b> |                                                                                                            |               |                                   |                |                              |                                                                        |                                                                                                                                                     |                                |    |                     |                  |  |         |
| C.01                                     | Document availability/ tools availability                                                                  | V             | Manually                          | C              | 100%                         | NU/VSC Approved Drawing /Manufacturer's instruction Manual             | Document availability/tools availability                                                                                                            | Log book/Site register         |    |                     |                  |  |         |
| <b>D Installation</b>                    |                                                                                                            |               |                                   |                |                              |                                                                        |                                                                                                                                                     |                                |    |                     |                  |  |         |
| D.01                                     | Fix the inverter mounting plate on the stand with nut and bolts and tighten properly                       | V             | Screw driver set/ Drill machine   | B              | 10%                          | Manufacturer's instruction manual                                      | As per Manufacturer's installation manual                                                                                                           | Log book/Site register         |    |                     |                  |  |         |
| D.02                                     | Unfasten the string inverter manually and position the inverter in place on the stand                      | V             | Manually                          | B              | 10%                          | Manufacturer's instruction manual                                      | As per Manufacturer's installation manual                                                                                                           | Log book/Site register         |    |                     |                  |  |         |
| D.03                                     | All DC power input connections, AC power output connections & communications as per manufacturer manual.   | V             | Manually                          | B              | 10%                          | Manufacturer's instruction manual                                      | Cable size as per Manufacturer's instruction manual/BHEL Approved drawings.                                                                         | Log book/Site register         |    |                     |                  |  |         |
| D.04                                     | All earthing connections should be as per refer manufacturer manual.                                       | V             | Manually                          | B              | 10%                          | Manufacturer's instruction manual                                      | As per Manufacturer's installation manual                                                                                                           | Log book/Site register         |    |                     |                  |  |         |
| <b>E Pre-Commissioning</b>               |                                                                                                            |               |                                   |                |                              |                                                                        |                                                                                                                                                     |                                |    |                     |                  |  |         |
| E.01                                     | Ensure that all the cables connections are properly tightened.                                             | V             | Manually                          | B              | 10%                          | Manufacturer's instruction manual                                      | As per Manufacturer's installation manual                                                                                                           | Log book/Site register         |    |                     |                  |  |         |
| E.02                                     | Check rating of source and the cable terminations.                                                         | V             | Manually                          | B              | 10%                          | Manufacturer's instruction manual                                      | As per Manufacturer's installation manual                                                                                                           | Log book/Site register         |    |                     |                  |  |         |
| E.03                                     | All DC output power conductors from inverter to external transformer are properly sequenced and tightened. | V             | Manually                          | B              | 10%                          | Manufacturer's instruction manual                                      | As per Manufacturer's installation manual                                                                                                           | Log book/Site register         |    |                     |                  |  |         |
| E.04                                     | Check IR/IV                                                                                                | E             | Megger/IR Tester                  | B              | 10%                          | Manufacturer's installation manual                                     | As per Manufacturer's installation manual                                                                                                           | Joint Protocol                 |    |                     |                  |  |         |

8/10/22

| BHARAT HEAVY ELECTRICALS LIMITED<br>CFP- RUDRAPUR |                                                                                 |               |                        | FIELD QUALITY PLAN<br>FOR SOLAR CABLE<br>STATEMENTS OF CHECKS |                             |                                                                |                                                                                                                                                         |                                 |    |                             |         | FQP NO.: FQP/GMS/CABLE/NU<br>BHEL Doc. NO.: 44012102010<br>REV. NO.: 01<br>TOTAL SHEETS: 01 |  |  |  |
|---------------------------------------------------|---------------------------------------------------------------------------------|---------------|------------------------|---------------------------------------------------------------|-----------------------------|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----|-----------------------------|---------|---------------------------------------------------------------------------------------------|--|--|--|
| SYSTEM: GROUND MOUNTED SOLAR SYSTEM               |                                                                                 |               |                        | SUB-SYSTEM: CABLE                                             |                             |                                                                |                                                                                                                                                         |                                 |    |                             |         |                                                                                             |  |  |  |
| SL NO.                                            | CHARACTERISTICS / ITEM                                                          | TYPE OF CHECK | INSTRUMENT             | CLASS OF CHECK                                                | QUANTUM/ FREQUENCY OF CHECK | REFERENCE DOCUMENT                                             | ACCEPTANCE STANDARD                                                                                                                                     | FORMAT OF RECORD                |    |                             | REMARKS |                                                                                             |  |  |  |
| 1                                                 | 2                                                                               | 3             | 4                      | 5                                                             | 6                           | 7                                                              | 8                                                                                                                                                       | 9                               | D* | 10                          |         |                                                                                             |  |  |  |
| A Material Receipt and Unloading                  |                                                                                 |               |                        |                                                               |                             |                                                                |                                                                                                                                                         |                                 |    |                             |         |                                                                                             |  |  |  |
| A.01                                              | Unloading From Truck                                                            | V             | Manually/ Hydra Crane  | C                                                             | 100%                        |                                                                | Use Proper Material handling equipment                                                                                                                  | Site Material register          |    |                             |         |                                                                                             |  |  |  |
| A.02                                              | Verification of qty and identification                                          | V             | Visual                 | C                                                             | 100%                        | Delivery Challan /Packing List dispatch certificate(DC)        |                                                                                                                                                         | Site Material register          |    |                             |         |                                                                                             |  |  |  |
| A.03                                              | Packing inspection                                                              | V             | Visual                 | C                                                             | 100%                        |                                                                | Cable spools should be in good condition i.e. without breakage of visual defects should not in opened condition.                                        | Site Material register          |    |                             |         |                                                                                             |  |  |  |
| A.04                                              | Reporting of damage/missing items                                               | V             | Visual                 | C                                                             | 100%                        |                                                                | Delivery Challan /Packing List /DC                                                                                                                      | Site Material register/ e-mails |    |                             |         |                                                                                             |  |  |  |
| B Storage of Cables                               |                                                                                 |               |                        |                                                               |                             |                                                                |                                                                                                                                                         |                                 |    |                             |         |                                                                                             |  |  |  |
| B.01                                              | Movement to required location                                                   | V             | Manually / Hydra Crane | C                                                             | 100%                        |                                                                | Use Proper Material handling equipment                                                                                                                  | Site Material register          |    |                             |         |                                                                                             |  |  |  |
| B.02                                              | Storage space                                                                   | V             | Manually               | C                                                             | 100%                        |                                                                | The storage area should be non flooded, All cables preferably store on original spools itself.                                                          | Site Material register          |    | Storage space should be dry |         |                                                                                             |  |  |  |
| B.03                                              | Handling and Movement                                                           | V             | Manually/ Hydra Crane  | C                                                             | 100%                        |                                                                | Cable Store in such a way which avoid direct mechanical hit with sharp objects and also store in such a way that easy material movement access possible | Site Material register          |    |                             |         |                                                                                             |  |  |  |
| C Pre-Erection                                    |                                                                                 |               |                        |                                                               |                             |                                                                |                                                                                                                                                         |                                 |    |                             |         |                                                                                             |  |  |  |
| C.01                                              | Document availability                                                           | V             | Manually               | C                                                             | 100%                        | NU/VSC/TP approved Layout drawings/cable schedule              | NU/VSC/TP approved Layout drawings/cable schedule                                                                                                       | Log book/Site register          |    |                             |         |                                                                                             |  |  |  |
| C.02                                              | Continuity                                                                      | E             | Multimeter             | B                                                             | 10%                         | BHEL Spec                                                      | Continuity should be checked through out cable before usage                                                                                             | Log book/Site register          |    |                             |         |                                                                                             |  |  |  |
| D Erection                                        |                                                                                 |               |                        |                                                               |                             |                                                                |                                                                                                                                                         |                                 |    |                             |         |                                                                                             |  |  |  |
| D.01                                              | PV Cable erection, solar DC connector assembly and Solar PV module wiring       | V             | Manually               | C                                                             | 100%                        | NU/VSC/TP approved Layout drawings                             | As per NU/VSC/TP approved Layout drawings                                                                                                               | Log book/Site register          |    |                             |         |                                                                                             |  |  |  |
| D.02                                              | IR test on cable from PV array to string inverter (between conductor and earth) | E             | Megger/IR Tester       | B                                                             | 100%                        | Manufacturer installation manual/ NU/MECON/VSC/TP requirements | Manufacturer installation manual/ NU/MECON/VSC/TP requirements                                                                                          | Joint Protocol                  |    |                             |         |                                                                                             |  |  |  |

21.07.22

| BHARAT HEAVY ELECTRICALS LIMITED<br>CFP- RUDRAPUR |                                                           |               | FIELD QUALITY PLAN<br>FOR ACDB & LT PANEL<br>STATEMENTS OF CHECKS |                |                             |                                                                                                                   |                                                                                                                                  |                        | FQP NO.: FQP/GMS/ACDB/NU<br>BHEL Doc. NO.: 44012102010<br>REV. NO.: 01<br>TOTAL SHEETS: 01 |         |
|---------------------------------------------------|-----------------------------------------------------------|---------------|-------------------------------------------------------------------|----------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------|---------|
| SYSTEM: GROUND MOUNTED SOLAR SYSTEM               |                                                           |               | SUB-SYSTEM: ACDB & LT PANEL                                       |                |                             |                                                                                                                   |                                                                                                                                  |                        | AREA:                                                                                      |         |
| SL NO.                                            | CHARACTERISTICS / ITEM                                    | TYPE OF CHECK | INSTRUMENT                                                        | CLASS OF CHECK | QUANTUM/ FREQUENCY OF CHECK | REFERENCE DOCUMENT                                                                                                | ACCEPTANCE STANDARD                                                                                                              | FORMAT OF RECORD       |                                                                                            | REMARKS |
| 1                                                 | 2                                                         | 3             | 4                                                                 | 5              | 6                           | 7                                                                                                                 | 8                                                                                                                                | 9                      | 10                                                                                         |         |
| <b>A Material Receipt and Unloading</b>           |                                                           |               |                                                                   |                |                             |                                                                                                                   |                                                                                                                                  |                        |                                                                                            |         |
| A.01                                              | Unloading From Truck                                      | P             | Manually/<br>Hydra Crane                                          | C              | 100%                        |                                                                                                                   | Use proper material handling equipment with proper safety precautions.                                                           | Site Material Register |                                                                                            |         |
| A.02                                              | Verification of qty and identification                    | P             | Visual                                                            | C              | 100%                        | Material must be carefully unpacked & checked lot received with Delivery Challan/packing list/ Dispatch Clearance | Lot Quantity should match packing list/Challan                                                                                   | Site Material Register |                                                                                            |         |
| A.03                                              | Reporting of damage/missing items.                        | V             | Visual                                                            | C              | 100%                        | BHEL approved drawing/ Data Sheet                                                                                 | Delivery challan/packing list                                                                                                    | Site Material Register |                                                                                            |         |
| <b>B Storage of ACDB</b>                          |                                                           |               |                                                                   |                |                             |                                                                                                                   |                                                                                                                                  |                        |                                                                                            |         |
| B.01                                              | Movement to outdoor storage space                         | V             | V                                                                 | C              | 100%                        |                                                                                                                   | Use Proper Material handling equipment                                                                                           | Site Material Register |                                                                                            |         |
| B.02                                              | Storage space                                             | V             | V                                                                 | C              | 100%                        |                                                                                                                   | The storage area should be non flooded. All ACDB & LT Panel should be stored vertically. Check the positioning of the equipment. | Site Material Register |                                                                                            |         |
| B.03                                              | Handling and Movement                                     | V             | V                                                                 | C              | 100%                        |                                                                                                                   | Store in such a way that easy material movement/ equipment movement access possible                                              | Site Material Register |                                                                                            |         |
| <b>C Shifting of ACDB &amp; Metering board</b>    |                                                           |               |                                                                   |                |                             |                                                                                                                   |                                                                                                                                  |                        |                                                                                            |         |
| C.01                                              | Movement to required location                             | P             | Manually                                                          | B              | 100%                        | NU/VSC/TP approved drawing layout drawings                                                                        | Use proper material handling equipment with proper safety precautions.                                                           | Log book/Site register |                                                                                            |         |
| C.02                                              | Handling                                                  | P             | V                                                                 | C              | 100%                        | NU/VSC/TP approved drawing layout drawings                                                                        | It should be kept vertically & check the positioning of the panel & board to avoid stresses.                                     | Log book/Site register |                                                                                            |         |
| <b>D Pre-Installation</b>                         |                                                           |               |                                                                   |                |                             |                                                                                                                   |                                                                                                                                  |                        |                                                                                            |         |
| D.01                                              | Ensure availability of all related documents/tools        | P             | Manually                                                          | C              | 100%                        | Manufacturer installation manual                                                                                  | Manufacturer installation manual                                                                                                 | Log book/Site register |                                                                                            |         |
| D.02                                              | Front availability (Foundation readiness/Frame readiness) | P             | Manually                                                          | B              | 100%                        | NU/VSC/TP approved drawing                                                                                        | NU/VSC/TP approved drawing                                                                                                       | Log book/Site register |                                                                                            |         |
| <b>E Installation Check</b>                       |                                                           |               |                                                                   |                |                             |                                                                                                                   |                                                                                                                                  |                        |                                                                                            |         |
| E.01                                              | Check Alignment                                           | SL            | Manually                                                          | B              | 100%                        | NU/VSC/TP approved drawing                                                                                        | NU/VSC/TP approved drawing                                                                                                       | Log book/Site register |                                                                                            |         |
| E.02                                              | Check tightness of bus bar/ all other connection          | V             | Manually                                                          | B              | 10%                         | NU/VSC/TP approved drawing approved drawing                                                                       | NU/VSC/TP approved drawing                                                                                                       | Log book/Site register |                                                                                            |         |
| E.03                                              | Check Earthing                                            | E             | Megger                                                            | B              | 100%                        | NU/VSC/TP approved drawing approved drawing                                                                       | NU/VSC/TP approved drawing                                                                                                       | Log book/Site register |                                                                                            |         |

Q.107

| BHARAT HEAVY ELECTRICALS LIMITED<br>CFP- RUDRAPUR |                                                                                                                                                                                         | FIELD QUALITY PLAN<br>FOR EARTHING<br>STATEMENTS OF CHECKS |                               |                |                                   |                                                                              |                                                                        |                           |     |                       |  | FQP NO.: FQP/GMS/EARTHING/NU<br>BH&EL Doc. NO.: 44012102010<br>REV. NO.: 01<br>TOTAL SHEET: 01 |  |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-------------------------------|----------------|-----------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------|-----|-----------------------|--|------------------------------------------------------------------------------------------------|--|
| SYSTEM: GROUND MOUNTED SOLAR SYSTEM               |                                                                                                                                                                                         | SUB-SYSTEM: EARTHING SYSTEM                                |                               |                |                                   |                                                                              |                                                                        |                           |     |                       |  | AREA:                                                                                          |  |
| SL NO.                                            | CHARACTERISTICS / ITEM                                                                                                                                                                  | TYPE OF CHECK                                              | INSTRUMENT                    | CLASS OF CHECK | QUANTUM/<br>FREQUENCY<br>OF CHECK | REFERENCE<br>DOCUMENT                                                        | ACCEPTANCE STANDARD                                                    | FORMAT OF RECORD          |     | REMARKS               |  |                                                                                                |  |
| 1                                                 | 2                                                                                                                                                                                       | 3                                                          | 4                             | 5              | 6                                 | 7                                                                            | 8                                                                      | 9                         | * D | 10                    |  |                                                                                                |  |
| A RECEIPT AND STORAGE                             |                                                                                                                                                                                         |                                                            |                               |                |                                   |                                                                              |                                                                        |                           |     |                       |  |                                                                                                |  |
| A.01                                              | EARTHING MATERIAL                                                                                                                                                                       | V                                                          | Manually                      | C              | 100%                              | DELIVERY CHALLAN/<br>BH&EL SPECS.                                            | DELIVERY CHALLAN/ BH&EL<br>SPECS.                                      | Site Material<br>Register |     |                       |  |                                                                                                |  |
| A.02                                              | PROPER STORAGE                                                                                                                                                                          | V                                                          | Manually                      | C              | 100%                              | PROPER STACKING                                                              | PROPER STACKING                                                        | Site Material<br>Register |     |                       |  |                                                                                                |  |
| B PRE ERECTION                                    |                                                                                                                                                                                         |                                                            |                               |                |                                   |                                                                              |                                                                        |                           |     |                       |  |                                                                                                |  |
| B.01                                              | CHECK FOR DAMAGE TO THE MATERIAL                                                                                                                                                        | V                                                          | Manually                      | C              | 100%                              | FREE FROM<br>DAMAGE/ RUST/<br>CORROSION                                      | FREE FROM DAMAGE/ RUST/<br>CORROSION                                   | Site Material<br>Register |     |                       |  |                                                                                                |  |
| B.02                                              | EARTHING OF METALLIC FRAME OF ALL ELECTRICAL<br>EQUIPMENT & STRUCTURES                                                                                                                  | V                                                          | Manually                      | B              | 100%                              | BH&EL TECH. SPECS.                                                           | BH&EL TECH. SPECS.                                                     | Log book/Site<br>register |     |                       |  |                                                                                                |  |
| B.03                                              | APPLICATION OF PROTECTIVE PAINTING ON EQUIPMENT<br>BOLTED CONNECTION                                                                                                                    | V                                                          | Manually                      | B              | 100%                              | BH&EL TECH. SPECS.                                                           | PAINTING WITH ANTI<br>CORROSIVE PAINT/<br>COMPOUND                     | Log book/Site<br>register |     |                       |  |                                                                                                |  |
| B.04                                              | CONNECTION BETWEEN EQUIPMENT EARTHING LEADS &<br>BETWEEN EARTHING CONDUCTOR SHALL BE OF WELDED<br>TYPE. CHECK WELDING SLAG HAS BEEN REMOVED<br>BEFORE APPLICATION OF PROTECTIVE COATING | V                                                          | Manually                      | B              | 100%                              | WELDS IS TO BE<br>TREATED WITH RED<br>LEAD COUPOUND &<br>BITUMEN<br>COMPOUND | WELDS IS TO BE TREATED WITH<br>RED LEAD COUPOUND &<br>BITUMEN COMPOUND | Log book/Site<br>register |     |                       |  |                                                                                                |  |
| B.05                                              | RESISTANCE OF JOINTS                                                                                                                                                                    | E                                                          | Megger                        | B              | 100%                              | AS PER STANDARD                                                              | AS PER STANDARD                                                        | Log book/Site<br>register |     |                       |  |                                                                                                |  |
| B.06                                              | EARTHING CONDUCTORS BURIED & EMBEDDED                                                                                                                                                   | V                                                          | Manually                      | B              | 100%                              | BH&EL LAY OUT DRGS<br>& BH&EL TECH. SPECS                                    | BH&EL LAY OUT DRGS & BH&EL<br>TECH. SPECS                              | Log book/Site<br>register |     |                       |  |                                                                                                |  |
| B.07                                              | EARTHING PITS ARE PROPERLY PREPARED FOR<br>ELECTRODES                                                                                                                                   | V                                                          | Manually                      | B              | 100%                              | IS:3043/ BH&EL TECH.<br>SPECS.                                               | IS:3043/ BH&EL TECH. SPECS.                                            | Log book/Site<br>register |     | Approved by NU/VSC/TP |  |                                                                                                |  |
| B.08                                              | CLAMPING / SUPPORT OF EARTHING CONDUCTORS<br>ALONG WALL, COLUMN ETC.                                                                                                                    | V                                                          | Manually                      | C              | 100%                              | BH&EL TECH. SPECS.                                                           | ONE METER IN CASE OF<br>WELDING / 750MM IN CASE OF<br>CLEAT SUPPORT    | Log book/Site<br>register |     |                       |  |                                                                                                |  |
| C TESTING                                         |                                                                                                                                                                                         |                                                            |                               |                |                                   |                                                                              |                                                                        |                           |     |                       |  |                                                                                                |  |
| C.01                                              | CONTINUITY OF EARTH CONDUCTORS & EFFICIENCY OF<br>ALL BONDS & JOINTS CHECKING                                                                                                           | E                                                          | Megger                        | A              | 100%                              | IS:3043                                                                      | IS:3043                                                                | Log book/Site<br>register |     |                       |  |                                                                                                |  |
| C.02                                              | EARTH RESISTANCE OF TREATED EARTH PIT ONLY                                                                                                                                              | E                                                          | Earth<br>Resistance<br>Tester | A              | 100%                              | IS:3043                                                                      | IS:3043                                                                | Joint Protocol            |     |                       |  |                                                                                                |  |

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|-----------------------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
| <br>Rudrapur | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                               |                                      | Part      | 05/05            |
|                                                                                               | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

### Index

| Sl. No | DESCRIPTION                                                                            | Chapter    | Page No |
|--------|----------------------------------------------------------------------------------------|------------|---------|
| 1      | General Instruction to Bidders                                                         | Chapter-1  | 2-8     |
| 2      | Definition                                                                             | Chapter-2  | 9-11    |
| 3      | Law Governing the Contract and Court Jurisdiction                                      | Chapter-3  | 12      |
| 4      | Issue of Notice                                                                        | Chapter-4  | 13      |
| 5      | Use of land                                                                            | Chapter-5  | 14      |
| 6      | Commencement of Work                                                                   | Chapter-6  | 15      |
| 7      | Measurement of Work and Mode of Payment                                                | Chapter-7  | 16-17   |
| 8      | Rights of BHEL                                                                         | Chapter-8  | 18-21   |
| 9      | Liquidated Damages/Penalty/Compensation for Delay                                      | Chapter-9  | 22      |
| 10     | Responsibilities of the contractor in respect of local laws, employment of workers etc | Chapter-10 | 23-26   |
| 11     | Progress monitoring, monthly review and performance evaluation                         | Chapter-11 | 27      |
| 12     | Time of Completion                                                                     | Chapter-12 | 28      |
| 13     | Extension of Time for Completion                                                       | Chapter-13 | 29      |
| 14     | Extra Works                                                                            | Chapter-14 | 30-31   |
| 15     | Supplementary Items                                                                    | Chapter-15 | 32      |
| 16     | Insurance                                                                              | Chapter-16 | 33      |
| 17     | Strikes & lockout                                                                      | Chapter-17 | 34      |
| 18     | Force majeure                                                                          | Chapter-18 | 35      |
| 19     | Arbitration & conciliation                                                             | Chapter-19 | 36-37   |
| 20     | Closing of contracts                                                                   | Chapter-20 | 38      |
| 21     | Suspension of business dealings                                                        | Chapter-21 | 39-40   |
| 22     | Other issues                                                                           | Chapter-22 | 41      |

|                                                                                   |                                      |           |                  |
|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
|                                                                                   | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## **Chapter 01**

### **GENERAL INSTRUCTION TO BIDDERS**

#### **1. DISPATCH INSTRUCTION**

- 1.1. The General Conditions of Contract form part of the Tender specifications. **All pages of the tender documents shall be duly signed, stamped and submitted along with the offer in token of complete acceptance thereof.** The information furnished shall be complete by itself. The Bidder is required to furnish all the details and other documents as required in the following pages.
- 1.2. Bidders are advised to study all the tender documents carefully. Any submission of tender by the Bidder shall be deemed to have been done after careful study and examination of the tender documents and with the full understanding of the implications thereof. Should the Bidders have any doubt about the meaning of any portion of the Tender Specification or find discrepancies or omissions in the drawings or the tender documents issued are incomplete or shall require clarification on any of the technical aspect, the scope of work etc., he shall at once, contact the authority inviting the tender well in time (so as not to affect last date of submission) for clarification before the submission of the tender. Bidder's request for clarifications shall be with reference to Sections and Clause numbers given in the tender documents. The specifications and terms and conditions shall be deemed to have been accepted by the Bidder in his offer. Noncompliance with any of the requirements and instructions of the tender enquiry may result in the rejection of the tender.

#### **2. SUBMISSION OF TENDERS**

- 2.1. The Bidders must submit their tenders to Officer inviting tender as per instructions in the NIT
- Offer shall be submitted online in e-procurement portal.
  - No other mode of offer submission shall be acceptable & shall be rejected.
- Note:** Party can review & revise their submitted offers till due date & time of submission
- 2.2. The tenders received after the specified time of their submission are treated as late tenders and shall not be considered under any circumstances.
- 2.3. Tenders shall be opened by authorized officer of BHEL as specified in the NIT.
- 2.4. Bidders are supposed to be well acquainted with the actual working and other prevalent conditions at different regions for which bids are being submitted. No claim will be entertained later on the grounds of lack of knowledge of any of the conditions.

|                                                                                   |                                      |           |                  |
|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

### 3. LANGUAGE

- 3.1. The Bidder shall quote the rates in English language and international numerals. These rates shall be entered in figures as well as in words. For the purpose of the tenders, the metric system of units shall be used.
- 3.2. All entries in the tender shall either be typed or written legibly in ink. Erasing and over-writing is not permitted and may render such tenders liable for rejection. All cancellations and insertions shall be duly attested by the Bidder.

### 4. PRICE DISCREPANCY:

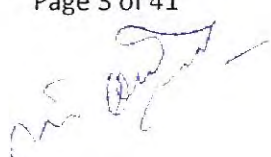
- 4.1. All prices to be quoted strictly in the Price Bid formats only. Amount/Percentage etc. should NOT be quoted anywhere in the Technical or Commercial Offer. Otherwise the offer may be rejected.
- 4.2. When the rate quoted by the contractor in figures and words tallies but the amount is not worked out correctly, the rate quoted by the contractor shall be taken as correct and not the amount.
- 4.3. In case of lumpsum price, if there is any difference between the amount in figures and in words, the amount quoted by the bidder in words shall be taken as correct.

### 5. QUALIFICATION OF BIDDERS

- 5.1. Only Bidders who fulfil the required prequalification criteria forming part of the NIT are expected to quote for this work.
- 5.2. Offers from Bidders who are under suspension (banned) by any Unit/Region/Division of BHEL shall not be considered.
- 5.3. Offers from Bidders who do not comply with the latest guidelines of Ministry/Commissions of Govt of India shall not be considered.

### 6. EVALUATION OF BIDS

- 6.1. Technical Bids submitted by the Bidder will be opened first and evaluated for fulfilling the Qualification criteria and other conditions in NIT/Tender documents, based on documentary evidences submitted along with the offer.




|                                                                                   |                                      |           |                  |
|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

6.2. Price Bids of unqualified bidders shall not be opened. Reasons for rejection shall be intimated in due course after issue of LOI/LOA to successful bidder and receipt of unqualified acceptance from the successful bidder.

## 7. **EARNEST MONEY DEPOSIT (As applicable)**

7.1. Every tender must be accompanied by the prescribed amount of Earnest Money Deposit (EMD) in the manner described herein.

7.2. EMD shall be furnished along with the offer in full as per the amount indicated in the Special Conditions of Contract.

7.3. EMD may be paid in following manner:

- Cash (as permissible under Income Tax Act) OR by Pay order or Demand Draft or Banker's Cheque in favour of 'Bharat Heavy Electricals Limited' and payable at Regional Hq issuing the tender.
- EMD can also be accepted in the form of FDR issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL)
- EMD amount in excess of ₹ 2 lakh may also be accepted in the form of BG.
- No other form of EMD remittance shall be acceptable to BHEL.

7.4. EMD by the bidder will be forfeited as per Tender Documents if:

- After opening the tender, the bidder revokes his tender within the validity period or increases his earlier quoted rates.
- The bidder does not commence the work within the period as per LOI/Contract. In case the LOI / contract is silent in this regard then within 15 days after award of contract.

7.5. EMD shall not carry any interest.

7.6. In the case of unsuccessful bidders, the Earnest Money will be refunded to them within a reasonable time (30 days) after acceptance of award by successful Bidder.

7.7. If the EMD is NOT submitted along with the offer – the Bidders's offer shall not be evaluated.

|                                                                                   |                                      |           |                  |
|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## 8. SECURITY DEPOSIT (As applicable)

8.1. Upon acceptance of Tender, Work order shall be finalized with the successful Bidder(s).

8.2. The security Deposit should be furnished before start of the work by the contractor.

8.3. Security Deposit should be submitted towards fulfilment of any obligations in terms of the provisions of the contract. **The total amount of Security Deposit will be 5% of the contract value.** EMD of the successful Bidder shall be converted and adjusted towards the required amount of Security Deposit.

8.4. Security deposit can also be recovered at the rate of 10% from the running bills. However, in such cases at least 50% of the Security Deposit should be deposited in any form as prescribed below, before start of the work and the balance 50% may be recovered from the running bills.

8.5. The balance amount of Security Deposit (after adjustment of EMD as SD) should be furnished before start of the work by the contractor.

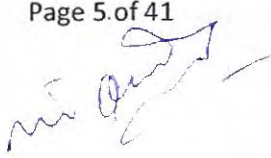
8.6. Security Deposit may be furnished in any one of the following forms:

- Cash (as permissible under the Income Tax Act)
- Pay Order / Demand Draft in favour of BHEL.
- Local cheques of scheduled banks, subject to realization.
- Electronic Fund Transfer in favour of BHEL.
- Bank Guarantee from Scheduled Banks/ Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL
- Fixed Deposit Receipt issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL)
- Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL)

(Note: BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith)

8.7. The Security Deposit shall not carry any interest.

8.8. In case the value of work exceeds / reduces from the awarded / accepted value, the Security Deposit shall be correspondingly enhanced / reduced as given below:




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|-----------------------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
| <br>Rudrapur | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                               |                                      | Part      | 05/05            |
|                                                                                               | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

- The enhanced part of the Security Deposit shall be immediately deposited by the Contractor or adjusted against payments due to the Contractor.
- The validity of Bank Guarantees towards Security Deposit shall be initially upto the completion period as stipulated in the Letter of Intent / Award + 3 months, and the same shall be kept valid by proper renewal till the acceptance of Final Bills of the Contractor, by BHEL.
- BHEL reserves the right of forfeiture of Security Deposit in addition to other claims and penalties in the event of the Contractor's failure to fulfill any of the contractual obligations or in the event of termination of contract as per terms and conditions of contract. BHEL reserves the right to set off the Security Deposit against any claims of other contracts with BHEL.
- The recoveries made from running bills (cash deduction towards balance SD amount) can be released against submission of equivalent Bank Guarantee in acceptable form, but only once, before completion of work, with the approval of the authority competent to award the work.

#### 8.9. POINTS TO BE NOTED IN CASE BANK GUARANTEES ARE SUBMITTED FOR EMD/SD

Where ever Bank Guarantees are to be furnished/submitted by the contractor, the following shall be complied with

- Bank Guarantees shall be from Scheduled Banks / Public Financial Institutions as defined in the Companies Act.
- The Bank Guarantees shall be as per prescribed formats
- It is the responsibility of the bidder to get the Bank Guarantees revalidated/extended for the required period, as per the advice of BHEL. BHEL shall not be liable for issue of any reminders regarding expiry of the Bank Guarantees.
- In case the Bank Guarantees are not extended before the expiry date, BHEL reserves the right to invoke the same by informing the concerned Bank in writing, without any advance notice/communication to the concerned bidder.
- Bidders to note that any corrections to Bank Guarantees shall be done by the issuing Bank, only through an amendment in an appropriate non judicial stamp paper.
- The Original Bank Guarantee shall be sent directly by the Bank to BHEL under Registered Post (Acknowledgement Due), addressed to the Subcontracting Department of the respective Region.

#### 9. RETURN OF SECURITY DEPOSIT

Security Deposit shall be refunded/Bank Guarantee(s) released to the Contractor along with the 'Final Bill' after deducting all expenses / other amounts due to BHEL under the contract / other contracts entered into with them by BHEL.

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

#### **10. VALIDITY OF OFFER**

The rates in the Tender shall be kept open for acceptance for a minimum period of **THREE MONTHS** from latest due date of offer submission (including extension, if any).

#### **11. EXECUTION OF CONTRACT AGREEMENT**

The successful Bidder's responsibility under this contract commences from the date of issue of the Letter of Intent by Bharat Heavy Electricals Limited. The Bidder shall submit an unqualified acceptance to the Letter of Intent/Award within the period stipulated therein. The successful Bidder shall be required to execute an agreement in the prescribed form, with BHEL, within a reasonable time after the acceptance of the Letter of Intent / Award and in any case before releasing the first running bill. The contract agreement shall be signed by a person duly authorized / empowered by the Bidder. The expenses for preparation of agreement document shall be borne by BHEL. Format of the contract agreement can be provided before bid submission if required.

#### **12. REJECTION OF TENDER AND OTHER CONDITIONS**

**12.1.** Conditional tenders, unsolicited tenders, tenders which are incomplete or not in the form specified or defective or have been materially altered or not in accordance with the tender conditions, specifications etc., are liable to be rejected.

**12.2.** Tenders are liable to be rejected in case of unsatisfactory performance of the Bidder with BHEL, or Bidder under suspension (hold / banning / delisted) by any unit/ region/ division of BHEL or Bidders who do not comply with the latest guidelines of Ministry / Commissions of Govt of India. BHEL reserves the right to reject a bidder in case it is observed that they are overloaded and may not be in a position to execute this job as per the required schedule. The decision of BHEL will be final in this regard.

**12.3.** If a Bidder who is a proprietor expires after the submission of his tender or after the acceptance of his tender, BHEL may at their discretion, cancel such tender. If a partner of a firm expires after the submission of tender or after the acceptance of the tender, BHEL may then cancel such tender at their discretion, unless the firm retains its character.

**12.4.** BHEL will not be bound by any Power of Attorney granted by changes in the composition of the firm made subsequent to the execution of the contract. They may, however, recognise such power of Attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the contractor concerned.

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

**12.5.** If the Bidder deliberately gives wrong information in his tender, BHEL reserves the right to reject such tender at any stage or to cancel the contract if awarded and forfeit the Earnest Money / Security Deposit/any other money due.

**12.6.** Canvassing in any form in connection with the tenders submitted by the Bidder shall make his offer liable to rejection.

**12.7.** The successful Bidder should not sub-contract part or complete work detailed in the tender specification undertaken by him without written permission of BHEL's Construction Manager/Site Incharge. The Bidder is solely responsible to BHEL for the work awarded to him.

**12.8.** The Tender submitted by a techno commercially qualified Bidder shall become the property of BHEL who shall be under no obligation to return the same to the bidder. However unopened price bids and late tenders shall be returned to the bidders

**12.9.** BHEL shall not be liable for any expenses incurred by the bidder in the preparation of the tender irrespective of whether the tender is accepted or not.

|                                                                                   |                                      |           |                  |
|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## **CHAPTER-2**

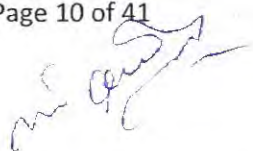
### **DEFINITION:**

The following terms shall have the meaning hereby assigned to them except where the context otherwise requires

- 1.1. BHEL shall mean Bharat Heavy Electricals Limited (of the respective CFP- Rudrapur inviting the Tender), a company registered under Indian Companies Act 1956, with its Registered Office at BHEL HOUSE, SIRI FORT, NEW DELHI – 110 049, or its CFP- Rudrapur or its Authorized Officers or its Site Engineers or other employees authorized to deal with any matters with which these persons are concerned on its behalf.
- 1.2. "EXECUTIVE DIRECTOR" or 'GROUP GENERAL MANAGER' or "GENERAL MANAGER (Incharge)" or "GENERAL MANAGER" shall mean the Officer in Administrative charge of the CFP-Rudrapur.
- 1.3. "COMPETENT AUTHORITY" shall mean Executive Director or Group General Manager or General Manager (Incharge) or General Manager or BHEL Officers who are empowered to act on behalf of the Executive Director or General Manager (Incharge) or General Manager of BHEL.
- 1.4. "ENGINEER" or "ENGINEER IN CHARGE" shall mean an Officer of BHEL as may be duly appointed and authorized by BHEL to act as "Engineer" on his behalf for the purpose of the Contract, to perform the duty set forth in this General Conditions of Contract and other Contract documents. The term also includes 'CONSTRUCTION MANAGER' or 'SITE INCHARGE' as well as Officers at Site or at the Headquarters of the CFP-Rudrapur.
- 1.5. "SITE" shall mean the places or place at which the plants / equipments are to be erected and services are to be performed as per the specification of this Tender.
- 1.6. "CLIENT OF BHEL" or "CUSTOMER" shall mean the project authorities with whom BHEL has entered into a contract for supply of equipments or provision of services.
- 1.7. "CONTRACTOR" shall mean the successful Bidder/Bidder who is awarded the Contract and shall include the Contractor's successors, heirs, executors, administrators and permitted assigns.
- 1.8. "CONTRACT" or "CONTRACT DOCUMENT" shall mean and include the Agreement of Work Order, the accepted appendices of Rates, Schedules, Quantities if any, General Conditions of Contract, Special Conditions of Contract, Instructions to the Bidders, Drawings, Technical Specifications, the Special Specifications if any, the Tender documents, subsequent amendments mutually agreed upon and the Letter of Intent /Acceptance issued by BHEL. Any conditions or terms stipulated by the contractor in the tender documents or subsequent letters shall not form part of the contract unless, specifically accepted in writing by BHEL in the Letter of Intent/Award and incorporated in the agreement.

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

- 1.9. "GENERAL CONDITIONS OF CONTRACT" shall mean the 'Instructions to Bidders' and 'General Conditions of Contract' pertaining to the work for which above tenders have been called for.
- 1.10. "TENDER SPECIFICATION" or "TENDER" or "TENDER DOCUMENTS" shall mean General Conditions, Common Conditions, Special Conditions, Price Bid, Rate Schedule, Technical Specifications, Appendices, Annexures, Corrigendum, Amendments, Forms, procedures, Site information, etc and drawings/documents pertaining to the work for which the Bidders are required to submit their offers. Individual specification number will be assigned to each Tender Specification.
- 1.11. "LETTER OF INTENT" shall mean the intimation by a Letter/Fax/email to the Bidder that the tender has been accepted in accordance with provisions contained in the letter. The responsibility of the contractor commences from the date of issue of this letter and all terms and conditions of the contract are applicable from this date.
- 1.12. "COMPLETION TIME" shall mean the period by 'date/month' specified in the 'Letter of Intent/Award' or date mutually agreed upon for handing over of the intended scope of work, the erected equipment/plant which are found acceptable by the Engineer, being of required standard and conforming to the specifications of the Contract.
- 1.13. "PLANT" shall mean and cannote the entire assembly of the plant and equipments covered by the contract.
- 1.14. "EQUIPMENT" shall mean equipment, machineries, materials, structural, electrical and other components of the plant covered by the contract.
- 1.15. "TESTS" shall mean and include such test or tests to be carried out on the part of the contractor as are prescribed in the contract or considered necessary by BHEL, in order to ascertain the quality, workmanship, performance and efficiency of the contractor or part thereof.
- 1.16. "APPROVED", "DIRECTED" or "INSTRUCTED" shall mean approved, directed or instructed by BHEL.
- 1.17. "WORK or CONTRACT WORK" shall mean and include supply of all categories of labour, specified consumables, tools and tackles and Plants required for complete and satisfactory site transportation, handling, stacking, storing, erecting, testing and commissioning of the equipments to the entire satisfaction of BHEL.
- 1.18. "SINGULAR AND PLURALS ETC" words carrying singular number shall also include plural and vice versa, where the context so requires. Words imparting the masculine Gender shall be taken to include the feminine Gender and words imparting persons shall include any Company or Associations or Body of Individuals, whether incorporated or not.
- 1.19. "HEADING" – The heading in these General Conditions are solely for the purpose of facilitating reference and shall not be deemed to be part thereof or be taken as instructions thereof or of the contract.




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|-----------------------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
| <br>Rudrapur | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                               |                                      | Part      | 05/05            |
|                                                                                               | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

- 1.20. "MONTH" shall mean calendar month unless otherwise specified in the Tender.
- 1.21. Day' or 'Days' unless herein otherwise expressly defined shall mean calendar day or days of twenty four (24) hours each. A week shall mean continuous period of seven (7) days.
- 1.22. "COMMISSIONING" shall mean the synchronization testing and achieving functional operation of the Equipment with associated system after all initial adjustments, trials, cleaning, re-assembly required at site if any, have been completed and Equipment with associated system is ready for taking into service.
- 1.23. "WRITING" shall include any manuscript type written or hand written or printed statement or electronically transmitted messages, under the signature or seal or transmittal of BHEL.
- 1.24. "TEMPORARY WORK" shall mean all temporary works for every kind required in or for the execution, completion, maintenance of the work.
- 1.25. 'CONTRACT PRICE' or 'CONTRACT VALUE' shall mean the sum mentioned in the LOI/LOA/Contract Agreement subject to such additions there to or deductions there from as may be made under provisions hereinafter contained
- 1.26. "COMMENCEMENT DATE" or "START DATE" shall mean the commencement/start of work at Site as per terms defined in the Tender.
- 1.27. "SHORT CLOSING" or "FORE CLOSING" of Contract shall mean the premature closing of contract, for reasons not attributable to the contractor and mutually agreed between BHEL and the contractor.
- 1.28. "TERMINATION" of Contract shall mean the pre mature closing of contract due to reasons as mentioned in the contract.
- 1.29. "DE MOBILISATION" shall mean the temporary winding up of Site establishment by Contractor leading to suspension of works temporarily for reasons not attributable to the contractor.
- 1.30. "RE MOBILISATION" shall mean the resumption of work with all resources required for the work after demobilization.

|                                                                                   |                                      |           |                  |
|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

### **CHAPTER-3**

#### **LAW GOVERNING THE CONTRACT AND COURT JURISDICTION**

The contract shall be governed by the Law for the time being in force in the Republic of India. The Civil Court having original Civil Jurisdiction at Rudrapur, Udham Singh Nagar, Uttarakhand shall alone have exclusive jurisdiction in regard to all claims in respect of the Contract. No other Civil Court shall have jurisdiction in case of any dispute, under this contract.

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

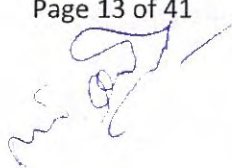
#### **CHAPTER-4** **ISSUE OF NOTICE**

##### **1.1. Service of notice on contractor**

Any notice to be given to the Contractor under the terms of the contract shall be served by sending the same **by Registered Post / Speed Post to** or leaving the same at the Contractor's last known address of the principal place of business (or in the event of the contractor being a company, to or at its Registered Office). In case of change of address, the notice shall be served at changed address as notified in writing by the Contractor to BHEL. Such posting or leaving of the notice shall be deemed to be good service of such notice and the time mentioned to the condition for doing any act after notice shall be reckoned from the date so mentioned in such notice.

##### **1.2. Service of notice on BHEL**

Any notice to be given to BHEL in-charge / Region under the terms of the Contract shall be served by sending the same by post to or leaving the same at BHEL address or changed address as notified in writing by BHEL to the Contractor

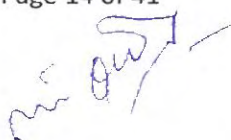


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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## **CHAPTER-5**

### **USE OF LAND**

No land belonging to BHEL or their Customer under temporary possession of BHEL shall be occupied by the contractor without written permission of BHEL.

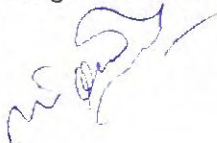


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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## **CHAPTER-6**

### **COMMENCEMENT OF WORK**

- 1.1. The contractor shall commence the work as per the time indicated in the Letter of Intent/Award from BHEL and shall proceed with the same with due expedition without delay.
- 1.2. If the contractor fails to start the work within stipulated time as per LOI/ LOA or as intimated by BHEL, then BHEL at its sole discretion will have the right to cancel the contract. The Earnest Money and/or Security Deposit with BHEL will stand forfeited without any further reference to him without prejudice to any and all of BHEL's other rights and remedies in this regard.
- 1.3. All the work shall be carried out under the direction and to the satisfaction of BHEL.

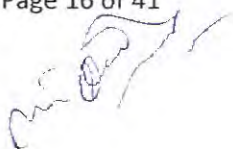


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|-----------------------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
| <br>Rudrapur | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                               |                                      | Part      | 05/05            |
|                                                                                               | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## **CHAPTER-7**

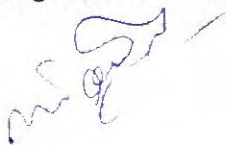
### **MEASUREMENT OF WORK AND MODE OF PAYMENT:**

- 1.1. All payments due to the contractors shall be made by e-mode only, unless otherwise found operationally difficult for reasons to be recorded in writing.
- 1.2. For progress running bill payments: - The Contractor shall present detailed measurement sheets in triplicate, duly indicating all relevant details based on technical documents and connected drawings for work done during the month/period under various categories in line with terms of payment as per contract. The basis of arriving at the quantities, weights shall be relevant documents and drawings released by BHEL. These measurement sheets shall be prepared jointly with BHEL Engineers and signed by both the parties.
- 1.3. These measurement sheets will be checked by BHEL Engineer and quantities and percentage eligible for payment under various groups shall be decided by BHEL Engineer. The abstract of quantities and percentage so arrived at based on the terms of payment shall be entered in Measurement Book and signed by both the parties.
- 1.4. Based on the above quantities, contractor shall prepare the bills in prescribed format and work out the financial value. These will be entered in Measurement Book and signed by both the parties. Payment shall be made by BHEL after effecting the recoveries due from the contractor.
- 1.5. All recoveries due from the contractor for the month/period shall be effected in full from the corresponding running bills unless specific approval from the competent authorities is obtained to the contrary.
- 1.6. Measurement shall be restricted to that portion of work for which it is required to ascertain the financial liability of BHEL under this contract.
- 1.7. The measurement shall be taken jointly by persons duly authorized on the part of BHEL and by the Contractor.
- 1.8. The Contractor shall bear the expenditure involved if any, in making the measurements and testing of materials to be used/used in the work. The contractor shall, without extra charges, provide all the assistance with appliances and other things necessary for measurement.



|                                                                                   |                                      |           |                  |
|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

- 1.9. If at any time due to any reason whatsoever, it becomes necessary to re-measure the work done in full or in part, the expenses towards such re measurements shall be borne by the contractor unless such re measurements are warranted solely for reasons not attributable to contractor.
- 1.10. Passing of bills covered by such measurements does not amount to acceptance of the completion of the work measured. Any left out work has to be completed, if pointed out at a later date by BHEL.
- 1.11. Final measurement bill shall be prepared in the final bill format prescribed for the purpose based on the certificate issued by BHEL Engineer that entire works as stipulated in tender specification has been completed in all respects to the entire satisfaction of BHEL. Contractor shall give unqualified "No Claim" Certificate. All the tools and tackles loaned to him should be returned in satisfactory condition to BHEL. The abstract of final quantities and financial values shall also be entered in the Measurement Books and signed by both parties to the contract. The Final Bill shall be prepared and paid within a reasonable time after completion of work.
- 1.12. Quantity mentioned in BOQ is a lump sum quantity. Payment shall be made based on actual measurement done after completion of work. Variation of +10% change in BOQ Quantity (on overall value basis) is acceptable. Bidder to take prior approval from BHEL-CFP for this variation clause.



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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## **CHAPTER-8**

### **RIGHTS OF BHEL**

- 1.1. BHEL reserves the following rights in respect of this contract during the original contract period or its extensions if any, as per the provisions of the contract, without entitling the contractor for any compensation.
- 1.2. To withdraw any portion of work and/or to restrict/alter quantum of work as indicated in the contract during the progress of work and get it done through other agencies to suit BHEL's commitment to its customer or in case BHEL decides to advance the date of completion due to other emergent reasons/ BHEL's obligation to its customer.
- 1.3. To terminate the contract or withdraw portion of work and get it done through other agency, at the risk and cost of the contractor after due notice of a period of 14 days' by BHEL in any of the following cases:
  - a) Contractor's poor progress of the work vis-à-vis execution timeline as stipulated in the Contract, backlog attributable to contractor including unexecuted portion of work does not appear to be executable within balance available period considering its performance of execution.
  - b) Withdrawal from or abandonment of the work by contractor before completion of the work as per contract.
  - c) Non-completion of work by the Contractor within scheduled completion period as per Contract or as extended from time to time, for the reasons attributable to the contractor.
  - d) Termination of Contract on account of any other reason (s) attributable to Contractor.
  - e) Assignment, transfer, subletting of Contract without BHEL's written permission.
  - f) Non-compliance to any contractual condition or any other default attributable to Contractor.

#### **Risk & Cost Amount against Balance Work:**

Risk & Cost amount against balance work shall be calculated as follows:

$$\text{Risk \& Cost Amount} = [(A-B) + (A \times H/100)]$$

Where,

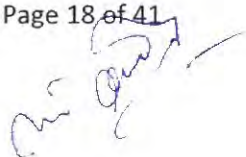
A= Value of Balance scope of Work (\*) as per rates of new contract

B= Value of Balance scope of Work (\*) as per rates of old contract being paid to the contractor at the time of termination of contract i.e. inclusive of PVC & ORC, if any.

H = Overhead Factor to be taken as 5

In case (A-B) is less than 0 (zero), value of (A-B) shall be taken as 0 (zero).

\* Balance scope of work (in case of termination of contract):



|                                                                                               |                                      |           |                  |
|-----------------------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
| <br>Rudrapur | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                               |                                      | Part      | 05/05            |
|                                                                                               | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

Difference of Contract Quantities and Executed Quantities as on the date of issue of Letter for 'Termination of Contract', shall be taken as balance scope of Work for calculating risk & cost amount.

Contract quantities are the quantities as per original contract. If, Contract has been amended, quantities as per amended Contract shall be considered as Contract Quantities.

Items for which total quantities to be executed have exceeded the Contract Quantities based on drawings issued to contractor from time to time till issue of Termination letter, then for these items total Quantities as per issued drawings would be deemed to be contract quantities.

Substitute/ extra items whose rates have already been approved would form part of contract quantities for this purpose. Substitute/ extra items which have been executed but rates have not been approved, would also form part of contract quantities for this purpose and rates of such items shall be determined in line with contractual provisions.

However, increase in quantities on account of additional scope in new tender shall not be considered for this purpose.

**NOTE:** Incase portion of work is being withdrawn at risk & cost of contractor instead of termination of contract, contract quantities pertaining to portion of work withdrawn shall be considered as 'Balance scope of work' for calculating Risk & Cost amount.

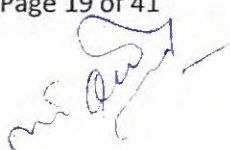
**LD against delay in executed work in case of Termination of Contract:**

LD against delay in executed work shall be calculated in line with relevant LD clause of the contract, for the delay attributable to contractor. For limiting the maximum value of LD, contract value shall be taken as Executed Value of work till termination of contract.

Method for calculation of "LD against delay in executed work in case of termination of contract" is given below.

- Let the time period from scheduled date of start of work till termination of contract excluding the period of Hold (if any) not attributable to contractor = T1
- Let the value of executed work till the time of termination of contract = X
- Let the Total Executable Value of work for which inputs/fronts were made available to contractor and were planned for execution till termination of contract = Y
- Delay in executed work attributable to contractor i.e.  $T2 = [1 - (X/Y)] \times T1$
- LD shall be calculated in line with LD clause of the Contract for the delay attributable to contractor taking "X" as Contract Value and "T2" as period of delay attributable to contractor.

- 1.3.1.** In case Contractor fails to deploy the resources as per requirement, BHEL can deploy own/hired/otherwise arranged resources at the risk and cost of the contractor and recover the expenses incurred from the dues payable to



|                                                                                   |                                      |           |                  |
|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

contractor. Recoveries shall be actual expenses incurred plus 5% overheads or as defined in TCC.

#### 1.4. Recoveries arising out of Risk & Cost and LD or any other recoveries due from Contractor

Following sequence shall be applicable for recoveries from contractor:

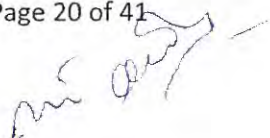
- Dues available in the form of Bills payable to contractor, SD, BGs against the same contract.
- Demand notice for deposit of balance recovery amount shall be sent to contractor, if funds are insufficient to effect complete recovery against dues indicated in (a) above.
- If contractor fails to deposit the balance amount to be recovered within the period as prescribed in demand notice, following action shall be taken for balance recovery:
  - Dues payable to contractor against other contracts in the same Region shall be considered for recovery.
  - If recovery cannot be made out of dues payable to the contractor as above, balance amount to be recovered, shall be informed to other Regions/Units for making recovery from the Unpaid Bills/Running Bills/SD/BGs/Final Bills of contractor.
  - In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against contractor.

1.5. To terminate the contract or to restrict the quantum of work and pay for the portion of work executed in case BHEL's contract with their customer are terminated for any reason, as per mutual agreement.

1.6. To effect recovery from any amounts due to the contractor under this or any other contract or in any other form, the moneys BHEL is statutorily forced to pay to anybody, due to contractor's failure to fulfill any of his obligations. BHEL shall levy overheads of 5% on all such payments along with interest as defined elsewhere in the GCC.

1.7. While every endeavor will be made by BHEL to this end, they cannot guarantee uninterrupted work due to conditions beyond their control. The Contractor will not be normally entitled for any compensation/extra payment on this account unless otherwise specified elsewhere in the contract.

1.8. In case the execution of works comes to a complete halt or reaches a stage wherein worthwhile works cannot be executed and there is no possibility of commencement of work for a period of not less than One month, due to reasons not attributable to the contractor and other than Force Majeure conditions, BHEL may consider permitting the contractor to de mobilize forthwith and re mobilize at an agreed future date. Cost of such demobilization/remobilization shall be mutually agreed. The duration of



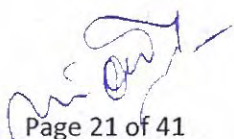
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|-----------------------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
| <br>Rudrapur | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                               |                                      | Part      | 05/05            |
|                                                                                               | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

contract/time extension shall accordingly get modified suitably. In case of any conflict, BHEL decision in this regard shall be final and binding on the contractor.

1.9. In the unforeseen event of inordinate delay in receipt of materials, drawings, fronts, etc, due to which inordinate discontinuity of work is anticipated, BHEL on its own or contractor's request at its discretion may consider to short close the contract in following cases:

- The balance works are minor vis a vis the scope of work envisaged as per the contract.
- There has been no significant work in past 3 months OR no significant work is expected in next 3 months (due to reasons beyond the control of BHEL)
- The balance works cannot be done within a reasonable period of time as they are dependent on unit shut down or on other facilities of customer or any other reasons not attributable to the contractor.
- Work does not start within six months of LOI/ LOA date.

At the point of requesting for short closure, contractor shall establish that he has completed all works possible of completion and he is not able to proceed with the balance works due to constraints beyond his control. In such a case, the estimated value of the unexecuted portion of work (or estimated value of services to be provided for carrying out milestone/stage payments like Trial Operation/PG Test, etc) as mutually agreed, shall however be reduced from the final contract value.

  
Page 21 of 41

Signature and seal of Bidder

|                                                                                               |                                      |           |                  |
|-----------------------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
| <br>Rudrapur | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                               |                                      | Part      | 05/05            |
|                                                                                               | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## CHAPTER-9

### **LIQUIDATED DAMAGES/PENALTY/COMPENSATION FOR DELAY**

If the contractor fails to maintain the required progress of work which results in delay in the completion of the work as per the contractual completion period, BHEL shall have the right to impose Liquidated Damage/Penalty/Compensation for delay of work with maximum rate @**1%(one percent)** per month of delay to be computed on per day basis based on the quantum damage suffered due to stated delay on the part of contractor.

Provided always that the total amount of compensation for delay to be paid under this condition shall not exceed **10% (Ten Percent)** of the accepted RFP/Tendered/Offered value of work. For this purpose, the period of delay shall be the delay attributable to the Contractor for the completion of work as per contract. Contract Value for this purpose, shall be the final executed value exclusive of ORC, Extra Works executed on Man-day rate basis, Supplementary/ Additional Items and PVC.

For Completion schedule of the project please refer NIT terms of the tender.

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|-----------------------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
| <br>Rudrapur | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                               |                                      | Part      | 05/05            |
|                                                                                               | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## **CHAPTER-10**

### **RESPONSIBILITIES OF THE CONTRACTOR IN RESPECT OF LOCAL LAWS, EMPLOYMENT OF WORKERS ETC.**

The following are the responsibilities of the contractor in respect of observance of local laws, employment of personnel, payment of taxes etc. The subcontractor shall fully indemnify BHEL against any claims of whatsoever nature arising due to the failure of the contractor in discharging any of his responsibilities hereunder:

- 1.1. As far as possible, Unskilled Workers shall be engaged from the local areas in which the work is being executed.
- 1.2. The contractor at all times during the continuance of this contract shall, in all his dealings with local labour for the time being employed on or in connection with the work, have due regard to all local festivals and religious and other customs.
- 1.3. The contractor shall comply with all applicable State and Central Laws, Statutory Rules, Regulations, Notifications, etc. such as Payment of Wages Act, Minimum Wages Act, Workmen Compensation Act, Employer's Liability Act, Industrial Disputes Act, Employers Provident Act, Employees State Insurance Scheme, Contract Labour (Regulation and Abolition) Act, 1970, Payment of Bonus & Gratuity Act, Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996, The Building and Other Construction Workers' Welfare Cess Act, 1996 and other Acts, Rules, and Regulations for labour/workers as applicable and as may be enacted by the State Government and Central Govt. during the tenure of the Contract and having force or jurisdiction at Site. The Contractor shall also comply with provisions of and give all such notices to the local Governing Body, Police and other relevant Authorities as may be required by the Law.
- 1.4. The Contractor shall obtain independent License under the Contract Labour (Regulations and Abolition) Act, 1970 for engaging contract labour as required from the concerned Authorities based on the certificate (Form- V) issued by the Principal Employer/Customer.
- 1.5. The contractor shall pay and bear all taxes, fees, license charges, Cess, duties, deposits, tolls, royalties, commission or other charges which may be leviable on account of his operations in executing the contract.
- 1.6. BHEL would pay the inspection fees and Registration fees of Electrical Inspectorate, all other arrangements for site visits periodically by the Inspectorate to site, Inspection certificate etc. will have to be made by contractor. However, BHEL will not make any

*[Handwritten Signature]*

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|-----------------------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
| <br>Rudrapur | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                               |                                      | Part      | 05/05            |
|                                                                                               | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

payment to the Inspectorate in connection with contractor's Electricians qualification tests etc.

- 1.7. Contractor shall be responsible for provision of Health and Sanitary arrangements (more particularly described in Contract Labour Regulation & Abolition Act), Safety precautions etc. as may be required for safe and satisfactory execution of contract.
- 1.8. The contractor shall be responsible for proper accommodation including adequate medical facilities for personnel employed by him.
- 1.9. The contractor shall be responsible for the proper behavior and observance of all regulations by the staff employed by him.
- 1.10. The contractor shall ensure that no damage is caused to any person/property of other parties working at site. If any such damage is caused, it is responsibility of the contractor to make good the losses or compensate for the same.
- 1.11. All the properties/equipments/components of BHEL/their Client loaned with or without deposit to the contractor in connection with the contract shall remain properties of BHEL/their Client.
- 1.12. In case the contractor is required to undertake any work outside the scope of this contract, the rates payable shall be those mutually agreed upon if the item rates are not mentioned in existing contract
- 1.13. Any delay in completion of works/or non achievement of periodical targets due to the reasons attributable to the contractor, the same may have to be compensated by the contractor either by increasing manpower and resources or by working extra hours and/or by working more than one shift. All these are to be carried out by the contractor at no extra cost.
- 1.14. The contractor shall arrange, coordinate his work in such a manner as to cause no hindrance to other agencies working in the same premises.
- 1.15. All safety rules and codes applied by the Client/BHEL at site shall be observed by the contractor without exception. The contractor shall be responsible for the safety of the equipment/material and works to be performed by him and shall maintain all light, fencing guards, slings etc. or other protection necessary for the purpose. Contractor shall also take such additional precautions as may be indicated from time to time by the Engineer with a view to prevent pilferage, accidents, fire hazards. Due precautions shall be taken against fire hazards and atmospheric conditions.

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

The contractor shall arrange for such safety devices as are necessary for such type of work and carry out the requisite site tests of handling equipment, lifting tools, tackles etc. as per prescribed standards and practices.

Contractor has to ensure the implementation of Health, Safety and Environment (HSE) requirements as per directions given by BHEL/Customer. The contractor has to assist in HSE audit by BHEL/Customer and submit compliance Report. The contractor has to generate and submit record/reports as per HSE plan/activities as per instruction of BHEL/Customer.

**1.16.** The contractor will be directly responsible for payment of wages to his workmen. A pay roll sheet giving all the payments given to the workers and duly signed by the contractor's representative should be furnished to BHEL site for record purpose, if so called for.

Contractor shall create awareness amongst their workforce by helping & encouraging in opening bank accounts and to encourage them to adopt digital mode of transactions. While releasing wages/ salary to their workers/ supervisors/ staff, Contractor shall comply with the GOI's guidelines for maximizing such transactions through Non-Cash / digital means.

**1.17.** In case of any class of work for which there is no such specification as laid down in the contract, such work shall be carried out in accordance with the instructions and requirements of the Engineer.

**1.18.** Also, no idle charges will be admissible in the event of any stoppage caused in the work resulting in contractor's labour and Tools & Plants being rendered idle due to any reason at any time.

**1.19.** The contractor shall take all reasonable care to protect the materials and work till such time the plant/equipment has been taken over by BHEL or their Client whichever is earlier.

**1.20.** The contractor shall not stop the work or abandon the site for whatsoever reason of dispute, excepting force majeure conditions. All such problems/disputes shall be separately discussed and settled without affecting the progress of work. Such stoppage or abandonment shall be treated as breach of contract and dealt with accordingly

**1.21.** The contractor shall keep the area of work clean and shall remove the debris etc. while executing day-to-day work. Upon completion of work, the contractor shall remove from the vicinity of work, all scrap, packing materials, rubbish, unused and other materials and deposit them in places specified by the Engineer. The contractor will also demolish all the hutments, sheds, offices, etc. constructed and used by him and shall clean the debris. In the event of his failure to do so, the same will be arranged to be done by the Engineer and the expenses recovered from the contractor.




|                                                                                   |                                      |           |                  |
|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

- 1.22. The contractor shall execute the work in the most substantial and workman like manner in the stipulated time. Accuracy of work and timely execution shall be the essence of this contract. The contractor shall be responsible to ensure that the quality, assembly and workmanship conform to the dimensions and clearance given in the drawings and/ or as per the instructions of the Engineer.

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|-----------------------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
| <br>Rudrapur | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                               |                                      | Part      | 05/05            |
|                                                                                               | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## **CHAPTER-11**

### **PROGRESS MONITORING, MONTHLY REVIEW AND PERFORMANCE EVALUATION**

- 1.1. A detailed plan/ programme for completion of the contractual scope of work as per the time schedule given in the contract shall be jointly agreed between BHEL and Contractor, before commencement of work. The above programme shall be supported by month wise deployment of resources viz Manpower, T&P, Consumables, etc. Progress will be reviewed periodically (Daily/Weekly/Monthly) vis a vis this jointly agreed programme. The Contractor shall submit periodical progress reports (Monthly) and other reports/information including manpower, consumables, T&P mobilization etc as desired by BHEL.
- 1.2. The burden of proof that the causes leading to any shortfall is not due to any reasons attributable to the contractor is on the contractor himself. Contractor will ensure that prior information is given by them to BHEL regarding reason for delay, if any which is shortfalls attributable to (i) Contractor, (ii) Force Majeure Conditions, and (iii) BHEL
- 1.3. Performance of the Contractor shall be assessed as per prescribed formats and shall form the basis for 'Annual/Overall Performance Evaluation' of the Contractor and also for 'Assessment of Capacity of Bidder' for Tenders where the Contractor is a bidder. BHEL reserves the right to revise the evaluation formats during the course of execution of the works.

|                                                                                   |                                      |           |                  |
|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## **CHAPTER-12**

### **TIME OF COMPLETION**

- 1.1. The time schedule shall be as prescribed in the Contract. The time for completion shall be reckoned from the date of commencement of work at Site as certified by BHEL Engineers
- 1.2. The entire work shall be completed by the contractor within the time schedule or within such extended periods of time as may be allowed by BHEL.

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

### **CHAPTER-13**

#### **EXTENSION OF TIME FOR COMPLETION**

- 1.1. If the completion of work as detailed in the scope of work gets delayed beyond the contract period, the contractor shall request for an extension of the contract and BHEL at its discretion may extend the Contract.
- 1.2. If any 'Time extension' is granted to the contractor to facilitate continuation of work and completion of contract, due to backlog attributable to the contractor alone, then it shall be without prejudice to the rights of BHEL to impose penalty/LD for the delays attributable to the contractor, in addition to any other actions BHEL may wish to take at the risk and cost of contractor.
- 1.3. A joint program shall be drawn for the balance amount of work to be completed during the period of 'Time Extension', along with matching resources (with weightages) to be deployed by the contractor as per specified format.
- 1.4. During the period of 'Time extension', contractor shall maintain their resources as per mutually agreed program.
- 1.5. At the end of total work completion as certified by BHEL Engineer, and upon analysis of the total delay, the portion of time extensions attributable to (i) Contractor, (ii) Force majeure conditions, and (iii) BHEL, shall be worked out and shall be considered to be exhausted in the same order. The total period of time extensions shall be the sum of (i), (ii) and (iii) above and shall be equal to period between the scheduled date of completion and the actual date of completion of contract. LD shall be imposed/levied for the portion of time extensions attributable to contractor and recoverable from the dues payable to the contractor.

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## **CHAPTER-14**

### **EXTRA WORKS**

- 1.1. All rectifications / modifications, revamping, and reworks required for any reasons not due to the fault of the contractor, or needed due to any change in deviation from drawings and design of equipments, operation / maintenance requirements, mismatching, or due to damages in transit, storage and erection / commissioning, and other allied works which are not very specifically indicated in the drawings, but are found essential for satisfactory completion of the work, will be considered as extra works.
- 1.2. Extra works arising on account of the contractor's fault, irrespective of time consumed in rectification of the damage / loss, will have to be carried out by the contractor free of cost. Under such circumstances, any material and consumable required for this purpose will also have to be arranged by the contractor at his cost.
- 1.3. All the extra work should be carried out by a separately identifiable gang, without affecting routine activities. Daily log sheets in the pro-forma prescribed by BHEL should be maintained and shall be signed by the contractor's representative and BHEL engineer. No claim for extra work will be considered / entertained in the absence of the said supporting documents i.e. daily log sheets. Signing of log sheets by BHEL engineer does not necessarily mean the acceptance of such works as extra works.
- 1.4. BHEL retains the right to award or not to award any of the major repair / rework / modification / rectification / fabrication works to the contractor, at their discretion without assigning any reason for the same.
- 1.5. After eligibility of extra works is established and finally accepted by BHEL engineer / designer, payment will be released on competent authority's approval at the following rate.

#### **1.6. MAN-HOUR RATE FOR ELIGIBLE EXTRA WORKS:**

Single composite average labour man-hour rate, including overtime if any, supervision, use of tools and tackles and other site expenses and incidentals, consumables for carrying out any minor rework / repairs / rectification / modification / fabrication as certified by site as may arise during the course of erection, testing, commissioning or extra works arising out of transit, storage and erection damages, payment, if found due will be at Rs 100/- per man hour.

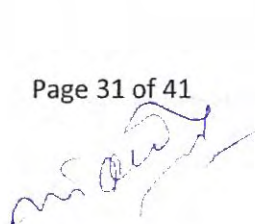
The above composite labour man hour rate towards extra works shall remain firm and not subject to any variation during execution of the work. PVC will not be applicable

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

for extra works. Rate revision, Over Run Charges/compensation etc will not be applicable due to extra works.

**1.7. Extra Works for Civil Packages** shall be regulated as follows

- a) Rates for Extra Works arising due to (1) non availability of BOQ (Rate Schedule), OR (2) change in Specifications of materials/works (3) rectification/modification/dismantling & re-erecting etc due to no fault of Contractor, shall be in the order of the following:
  - i. Item rates are to be derived from similar nature of items in the BOQ (Rate Schedule) with applicable escalation derived from All India Consumer Price Index for Whole Sale Commodities.
  - ii. As per CPWD-DSR-2018 (or latest edition) with applicable escalation derived from All India Consumer price Index for Whole Sale Commodities, OR, Notification issued by the office of CPWD for 'Cost Index' in that Region where the project is being executed, whichever is less
  - iii. Item rates are to be worked out on the basis of prevailing market rates mutually agreed between BHEL and Contractor, plus 15% towards Contractor's overheads and profit.
- b) PVC and ORC will not applicable be for (a) above.





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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
|                                                                                   | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## **CHAPTER-15**

### **SUPPLEMENTARY ITEMS**

#### **1.1. For NON Civil Works**

Supplementary items are items/works required for completion of entire work but not specified in the scope of work. Subject to certification of such items/works as supplementary items by BHEL Engineer, rates shall be derived on the basis of any one of the following on mutual agreement:

- a) Based on percentage breakup/rates indicated for similar/nearby items
- b) In case (a) above does not exist, then BHEL/site may derive the percentage breakup/rates to suit the type of work.

#### **1.2. For Civil Works**

- a) Rates for Supplementary Works/Additional Works arising out due to additions/alterations in the original scope of works as per contract subject to certification of BHEL Engineer shall be worked out as under:
  - i. Item rates which are available in existing BOQ (Rate Schedule) shall be operated with applicable escalation derived from All India Consumer Price Index for Whole Sale Commodities
  - ii. Items of works which are not available in existing BOQ shall be operated as an 'Extra Works' and rate shall be derived as per **Relevant clause**
- b) Execution of Supplementary Works/Additional Works through the Contractor shall be at the sole discretion of BHEL, and shall be considered as part of executed contract value for the purpose of Quantity Variation as per **Relevant clause**
- c) BHEL Engineer's decision regarding fixing the rate as above is final and binding on the contractor.
- d) PVC and ORC will not be applicable for (a) above.

|                                                                                   |                                      |           |                  |
|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## **CHAPTER-16**

### **INSURANCE**

- 1.1. BHEL/their customer shall arrange for insuring the materials/properties of BHEL/customer covering the risks during transit, storage, erection and commissioning.
- 1.2. It is the sole responsibility of the contractor to insure his materials, equipments, workmen, etc. against accidents and injury while at work and to pay compensation, if any, to workmen as per Workmen's compensation Act. The work will be carried out in a protected area and all the rules and regulations of the client /BHEL in the area of project which are in force from time to time will have to be followed by the contractor.
- 1.3. If due to negligence and or non-observation of safety and other precautions by the contractors, any accident/injury occurs to the property / manpower belong to third party, the contractor shall have to pay necessary compensation and other expense, if so decided by the appropriate authorities.
- 1.4. The contractor will take necessary precautions and due care to protect the material, while in his custody from any damage/ loss due to theft or otherwise till the same is taken over by BHEL or customer. For lodging / processing of insurance claim the contractor will submit necessary documents. BHEL will recover the loss including the deductible franchise from the contractor, in case the damage / loss is due to carelessness / negligence on the part of the contractor. In case of any theft of material under contractor's custody, matter shall be reported to police by the contractor immediately and copy of FIR and subsequently police investigation report shall be submitted to BHEL for taking up with insurance. However this will not relieve the contractor of his contractual obligation for the material in his custody.

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|-----------------------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
| <br>Rudrapur | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                               |                                      | Part      | 05/05            |
|                                                                                               | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## **CHAPTER-17**

### **STRIKES & LOCKOUT**

- 1.1. The contractor will be fully responsible for all disputes and other issues connected with his labour. In the event of the contractor's labour resorting to strike or the Contractor resorting to lockout and if the strike or lockout declared is not settled within a period of one month, BHEL shall have the right to get the work executed through any other agencies and the cost so incurred by BHEL shall be deducted from the Contractor's bills.
- 1.2. For all purposes whatsoever, the employees of the contractor shall not be deemed to be in the employment of BHEL

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## **CHAPTER-18**

### **FORCE MAJEURE**

- 1.1. "Force Majeure" shall mean any event beyond the reasonable control of the parties including but not limited to fire, flood, earthquake or other acts of God, war, riots, civil war and restraints of Governing States, as the case may be, and which is unavoidable notwithstanding the reasonable care of the party affected. The following events are explicitly excluded from Force Majeure and are solely the responsibilities of the non-performing party:
- a. any strike, work-to-rule action, go-slow or similar labour difficulty
  - b. late delivery of equipment or material (unless caused by Force Majeure event)
  - c. economic hardship.
- 1.2. If either party is prevented, hindered or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within 15 (fifteen) days after the occurrence of such event.
- 1.3. The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered or delayed. The Time for Completion shall be extended by a period of time equal to period of delay caused due to such Force Majeure event.
- 1.4. Delay or non-performance by either party hereto caused by the occurrence of any event of Force Majeure shall not
- Constitute a default or breach of the Contract.
  - Give rise to any claim for damages or additional cost or expense occasioned thereby, if and to the extent that such delay or non-performance is caused by the occurrence of an event of Force Majeure

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|-----------------------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
| <br>Rudrapur | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                               |                                      | Part      | 05/05            |
|                                                                                               | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## **CHAPTER-19**

### **ARBITRATION & CONCILIATION**

#### **1.1. ARBITRATION**

**1.1.1.** In case amicable settlement is not reached in the event of any dispute or difference arising out of the execution of the Contract or the respective rights and liabilities of the parties or in relation to interpretation of any provision by the Contractor in any manner touching upon the Contract, such dispute or difference shall (except as to any matters, the decision of which is specifically provided for therein) be referred to the sole arbitration of the arbitrator appointed by BHEL / In charge(Rudrapur).

The award of the Arbitrator shall be binding upon the parties to the dispute subject as aforesaid, the provisions of Arbitration and Reconciliation Act 1996 (India) or statutory modifications or reenactments thereof and the rules made there under and for the time being in force shall apply to the arbitration proceedings under this clause. The venue of the arbitration shall be the place from which the contract is issued or such other place as the Arbitrator at his discretion may determine

**1.1.2.** In case of Contract with Public Sector Enterprise (PSE) or a Government Department, the following shall be applicable:

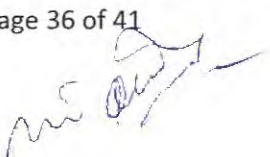
In the event of any dispute or difference relating to the interpretation and application of the provisions of the Contract, such dispute or difference shall be referred to by either party to the arbitration of one of the arbitrators in the department of public enterprises. The award of the arbitrator shall be binding upon the parties to the dispute, provided, however, any party aggrieved by such award may make further reference for setting aside or revision of the award to the Law Secretary, Department of Legal Affairs, Ministry of Law and Justice, Government of India. Upon such reference the dispute shall be decided by the Law Secretary or the Special Secretary or Additional Secretary when so authorized by the Law Secretary, whose decision shall bind the parties hereto finally and conclusively.

**1.1.3.** The cost of arbitration shall be borne equally by the parties.

**1.1.4.** Work under the contract shall be continued during the arbitration proceedings

#### **1.2. CONCILIATION**

If at any time (whether before, during or after the arbitral or judicial proceedings), any Disputes (which term shall mean and include any dispute, difference, question or disagreement arising in connection with construction, meaning, operation, effect,




|                                                                                   |                                      |           |                  |
|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

interpretation or breach of the agreement, contract), which the Parties are unable to settle mutually, arise inter-se the Parties, the same may, be referred by either party to Conciliation to be conducted through Independent Experts Committee (IEC) to be appointed by competent authority of BHEL from the BHEL Panel of Conciliators.

**Notes:**

- No serving or a retired employee of BHEL/ Administrative Ministry of BHEL shall be included in the BHEL Panel of Conciliators.
- Any other person(s) can be appointed as Conciliator(s) who is/ are mutually agreeable to both the parties from outside the BHEL Panel of Conciliators.

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|-----------------------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
| <br>Rudrapur | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                               |                                      | Part      | 05/05            |
|                                                                                               | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## **CHAPTER-20**

### **CLOSING OF CONTRACTS**

The Contract shall be considered completed and closed upon completion of all contractual obligations and settlement of Final Bill or completion of Guarantee period whichever is later. Upon closing of Contract, BHEL shall issue a completion certificate as per standard format, based on specific request of Contractor.

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## **CHAPTER-21**

### **SUSPENSION OF BUSINESS DEALINGS**

- 1.1. BHEL reserves the right to take action against Contractors who either fail to perform or Bidders /Contractor who indulge in malpractices, by suspending business dealings with them in line with BHEL guidelines issued from time to time.
- 1.2. Suspension could be in the form of 'Hold', 'De-listing' or 'Banning' a contractor.
- 1.3. A bidder may be put on HOLD for a period of 6 months, for future tenders for specific works on the basis of one or more of the following reasons:
  - a) Bidder does not honor his own offer or any of its conditions within the validity period.
  - b) Bidder fails to respond against three consecutive enquires of BHEL.
  - c) After placement of order, Bidder fails to execute a contract.
  - d) Bidder fails to settle sundry debt account, for which he is legitimately liable, within one year of its occurrence.
  - e) Bidder's performance rating falls below 60% in specific category (as per BHEL guidelines of performance evaluation)
  - f) Bidder works are under strike/ lockout for a long period.
- 1.4. A Bidder may be de-listed from the list of registered Bidders of the region for a period of 1 year on the basis of one or more of the following reasons: -
  - a) Bidder tampers with tendering procedure affecting ordering process or commits any misconduct which is contrary to business ethics.
  - b) Bidder has substituted, damaged, failed to return, short returned or unauthorized disposed of materials/ documents/ drawings/ tools etc of BHEL.
  - c) Bidder no longer has the technical staff, equipment, financial resources etc. required to execute the orders/ contracts.
- 1.5. A Bidder can be banned from doing any business with all Units of BHEL for a period of 3 years on the basis of one or more of the following reasons:
  - a) Bidder is found to be responsible for submitting fake/ false/ forged documents, certificates, or information prejudicial to BHEL's interest.
  - b) In spite of warnings, the Bidder persistently violates or circumvents the provisions of labour laws/ regulations/ rules and other statutory requirements.
  - c) Bidder is found to be involved in cartel formation
  - d) The Bidder has indulged in malpractices or misconduct such as bribery, corruption and fraud, pilferage etc which are contrary to business ethics.
  - e) The Bidder is found guilty by any court of law for criminal activity/ offences involving moral turpitude in relation to business dealings.

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
|                                                                                   | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

- f) The Bidder is declared bankrupt, insolvent, has wound up or been dissolved; i.e ceases to exist for all practical purposes.
- g) ) Bidder is found to have obtained Official Company information/ documentation by questionable means.
- h) Communication is received from the administrative Ministry of BHEL to ban the Bidder from business dealings.

- 1.6. Contracts already entered with a contractor before the date of issue of order of 'HOLD' or 'DE-LISTING' shall not be affected.
- 1.7. All existing contracts with a 'BANNED' contractor shall normally be short closed.
- 1.8. Once the order for suspension is passed, existing offers/new offers of the contractor shall not be entertained
- 1.9. The above guidelines are not exhaustive but enunciate broad principles governing action against contractors

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | General Conditions of Contract (GCC) | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 05/05            |
| Rudrapur                                                                          | GROUP : REG(Renewable Energy Group)  | Rev no    | 00               |

## **CHAPTER-22**

### **OTHER ISSUES**

- 1.1. Value of Non judicial Stamp Paper for Bank Guarantees and for Contract Agreement shall be not less than Rs 100/- unless otherwise required under relevant statutes.
- 1.2. In case of any conflict between the General Conditions of Contract and Special Conditions of Contract, provisions contained in the Special Conditions of Contract shall prevail.
- 1.3. BHEL may not insist for signing of Contract Agreements in respect of low value and short time period contracts on case to case basis based on BHEL's own discretion like providing services for Hot water flushing, Chemical Cleaning, Transportation, etc.

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | TECHNICAL SPECIFICATION              | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 03/05            |
| Rudrapur                                                                          | GROUP : REG (RENEWABLE ENERGY GROUP) | Rev no    | 00               |

**Annexure 1**

**DEVIATION SHEET**

| S.No. | Technical Deviation | Remarks |
|-------|---------------------|---------|
|       |                     |         |

**Note:-** Technical Deviation(s) mentioned anywhere in the offer except "Deviation Sheet" shall not be accepted & will not be considered for the evaluation of offer.




Signature and seal of Bidder

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|-----------------------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
| <br>Rudrapur | TECHNICAL SPECIFICATION              | Doc. No:- | REG2021-20210253 |
|                                                                                               |                                      | Part      | 03/05            |
|                                                                                               | GROUP : REG (RENEWABLE ENERGY GROUP) | Rev no    | 00               |

## Annexure 2

### LIST OF MAKE FOR THE MATERIAL

| S. No. | Item Description                    | Make                                                                                                                                                                                                                                                            |
|--------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | Mounting Structure                  | Tata Steel/ Jindal Steel / TISCO / RINL / Asian OR any other PSU, GoI fulfilling the technical requirement and approved supplier for CPSU (Tranche-II) Phase-II Scheme being run by the SECI and recognised by the MNRE.                                        |
| 2      | String Monitoring Boxes             | Trinity Touch/Hensel/VNT/ Fairwood/ Spillsberg/ Eaton Salaris / Statcon /Machine Pulse OR any other PSU, GoI fulfilling the technical requirement and approved supplier for CPSU (Tranche-II) Phase-II Scheme being run by the SECI and recognised by the MNRE. |
| 3      | TTA LT Panels including switchgears | ABB / Schneider / Siemens / L&T OR any other PSU, GoI fulfilling the technical requirement and approved supplier for CPSU (Tranche-II) Phase-II Scheme being run by the SECI and recognised by the MNRE.                                                        |
| 4      | Control Relay                       | ABB/Siemens/Schneider/L&T OR any other PSU, GoI fulfilling the technical requirement and approved supplier for CPSU (Tranche-II) Phase-II Scheme being run by the SECI and recognised by the MNRE.                                                              |
| 5      | Meter                               | Secure / Schneider / L&T / HPL OR any other PSU, GoI fulfilling the technical requirement and approved supplier for CPSU (Tranche-II) Phase-II Scheme being run by the SECI and recognised by the MNRE.                                                         |
| 6      | CABLES                              | DC Cable: Polycab/KEI/Ravin/Lapp/ Apar / Havells<br>AC Cable: Polycab/KEI/Ravin/Lapp/Havells / RR Kables                                                                                                                                                        |
| 7      | Lightning Arrester                  | Erico / LPI / Cape / OBO / DEHN                                                                                                                                                                                                                                 |
| 8      | SPD                                 | DEHN / Cape / OBO / Socomech                                                                                                                                                                                                                                    |
| 9      | Connectors                          | MultiContact/ Amphenol/ Koyo/ Bizlink / Elcon / Stsubi                                                                                                                                                                                                          |
| 10     | Earthing Material                   | JMV/ Protech Or other reputed make                                                                                                                                                                                                                              |
| 11     | IP based CCTV                       | Honeywell/Bosch / Sony OR any other PSU, GoI fulfilling the technical requirement and approved supplier for CPSU (Tranche-II) Phase-II Scheme being run by the SECI and recognised by the MNRE.                                                                 |
| 12     | Fire Extinguisher                   | Safex/Ceasefire/Vintex/Unicare fire safety or any other reputed equivalent.                                                                                                                                                                                     |

Signature and seal of Bidder

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | TECHNICAL SPECIFICATION              | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 03/05            |
|                                                                                   | GROUP : REG (RENEWABLE ENERGY GROUP) | Rev no    | 00               |

### Annexure 3

#### Bill of Quantity

| Sl. No  | Name of Work                                                                                                                                                                                                                                     | S/I/O | Unit       | Qty   |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------|-------|
| (A)     | <b>Supply, installation, testing &amp; commissioning:-</b>                                                                                                                                                                                       |       |            |       |
| 1       | <b>Installation &amp; commissioning of BHEL supplied items :</b>                                                                                                                                                                                 |       |            |       |
| 1(a)    | PV Modules with required nos of SS 304 nuts, bolts & washers as per Technical spec                                                                                                                                                               | I     | Nos        | 20000 |
| 1(b)    | Optimizer (4:1) with MC-4 connectors                                                                                                                                                                                                             | I     | Nos        | 5000  |
| 1(c)    | Inverter & Accessories (50kVA- 200kVA)                                                                                                                                                                                                           | I     | Nos        | 50    |
| 1(d)    | <b>Erection of Module Mounting Structure</b> with necessary SS 304 nuts , bolts & washers, as per <b>drg No-24012100001, Rev 01</b> , tightening to required torque, drilling holes in case of any mismatch, all complete as per Technical spec. | I     | Per Module | 20000 |
| 2       | <b>ACDB supply &amp; installation</b>                                                                                                                                                                                                            |       |            |       |
| 2(a)    | Supply of ACDB/ACCB (50kVA-200kVA)                                                                                                                                                                                                               | S     | Nos        | 50    |
| 2(b)    | ACDB/ACCB (50kVA-200kVA)                                                                                                                                                                                                                         | I     | Nos        | 50    |
| 3       | <b>DC cabling</b>                                                                                                                                                                                                                                |       |            |       |
| 3(a)    | Supply of DC cable (4sqmm)                                                                                                                                                                                                                       | S     | RMT        | 55000 |
| 3(b)    | DC cable Laying through conduit pipe/ cable tray as per requirement - 8x4 Sq mm DC                                                                                                                                                               | I     | RMT        | 6875  |
| 4       | <b>AC power Cabling (From Inverter to ACDB)</b>                                                                                                                                                                                                  |       |            |       |
| 4(a)    | Supply of PVC sheathed XLPE copper conductor unarmoured 4core power cable of 1.1 KV grade of following size                                                                                                                                      |       |            |       |
| 4 a (i) | 16 Sqmm to 35 Sqmm                                                                                                                                                                                                                               | S     | RMT        | 55    |
| 4a (ii) | Above 35 Sqmm to 95 Sqmm                                                                                                                                                                                                                         | S     | RMT        | 55    |

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | TECHNICAL SPECIFICATION              | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 03/05            |
| Rudrapur                                                                          | GROUP : REG (RENEWABLE ENERGY GROUP) | Rev no    | 00               |

|       |                                                                                                                                                                                                                                                          |   |     |      |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-----|------|
| 4(b)  | Laying and fixing of PVC sheathed XLPE copper conductor unarmoured 4core power cable of 1.1 KV grade of following size (including supply of accessories such as lugs, gland).                                                                            |   |     |      |
| 4(b1) | 16 Sqmm to 35 Sqmm                                                                                                                                                                                                                                       | I | RMT | 55   |
| 4(b2) | Above 35 Sqmm to 95 Sqmm                                                                                                                                                                                                                                 | I | RMT | 55   |
| 5     | <b>AC LT power Cabling (From ACDB to LT Panel)</b>                                                                                                                                                                                                       |   |     |      |
| 5(a)  | Supply of PVC sheathed / XLPE, Armoured Aluminium conductor 4 core power cable of 1.1 KV grade of following size                                                                                                                                         |   |     |      |
|       | Above 95 Sqmm to 185 Sqmm                                                                                                                                                                                                                                | S | RMT | 3000 |
| 5(b)  | Laying of PVC sheathed / XLPE, Armoured Aluminium conductor 4 core power cable of 1.1 KV grade of following size direct in ground including excavation of trench up to 1m, sand cushioning, protective covering and refilling the trench etc as required |   |     |      |
|       | Above 95 Sqmm to 185 Sqmm                                                                                                                                                                                                                                | I | RMT | 3000 |
| 6     | <b>AC LT power bus duct (From LT Panel to Transformer)</b>                                                                                                                                                                                               |   |     |      |
| 6(a)  | Busduct - 3200A                                                                                                                                                                                                                                          | S | RMT | 12   |
| 6(b)  | Busduct - 3200A                                                                                                                                                                                                                                          | I | RMT | 12   |
| 7     | <b>AC - HT (11kV) 3Core power cabling from Transformer to HT Panel</b>                                                                                                                                                                                   |   |     |      |
| 7(a)  | Supply of PVC insulated and PVC sheathed / XLPE, 3core Armoured Aluminium conductor power cable of 11 kV grade of following size                                                                                                                         |   |     |      |
|       | Above 35 Sqmm to 95 Sqmm                                                                                                                                                                                                                                 | S | RMT | 900  |
| 7(b)  | Laying of PVC insulated and PVC sheathed / XLPE, Armoured power cable of 11 KV grade of following size direct in ground including excavation, sand cushioning, protective covering and refilling the trench etc as required                              |   |     |      |
|       | Above 35 Sqmm to 95 Sqmm                                                                                                                                                                                                                                 | I | RMT | 900  |

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | TECHNICAL SPECIFICATION              | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 03/05            |
| Rudrapur                                                                          | GROUP : REG (RENEWABLE ENERGY GROUP) | Rev no    | 00               |

|       |                                                                                                                                                                                                                                                                                                                                                                         |     |      |      |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|------|
| 8     | <b>Supply &amp; Installation of Conduits along with all accessories for cable laying</b>                                                                                                                                                                                                                                                                                |     |      |      |
|       | Supplying and fixing of following sizes of medium class HDPE/uPVC conduit along with accessories in surface/recess including jointing with all bends, adhesives etc., cutting the wall and making good the same in case of recessed conduit as required.                                                                                                                |     |      |      |
| 8(a)  | 50 mm                                                                                                                                                                                                                                                                                                                                                                   | S&I | RMT  | 3000 |
| 9     | <b>Supply &amp; Installation of GI cable tray, including jointing, welding, bending &amp; applying cold galvanised paint at welding locations , all complete as per drgs &amp; tech. spec.</b>                                                                                                                                                                          |     |      |      |
| 9(a)  | up to 35sqmm                                                                                                                                                                                                                                                                                                                                                            | S&I | RMT  | 700  |
| 9(b)  | above 35sqmm upto 95sqmm                                                                                                                                                                                                                                                                                                                                                | S&I | RMT  | 700  |
| 9(c)  | above 95sqmm                                                                                                                                                                                                                                                                                                                                                            | S&I | RMT  | 600  |
| 10    | <b>Supply and installation of Earthing Strips</b>                                                                                                                                                                                                                                                                                                                       |     |      |      |
| 10(a) | 25x5 mm GI Strip                                                                                                                                                                                                                                                                                                                                                        | S&I | RMT  | 1500 |
| 10(b) | Earthing Wire (Green 2.5 Sqmm)                                                                                                                                                                                                                                                                                                                                          | S&I | RMT  | 2000 |
| 11    | <b>Construction of Earth Pits with 300 thk alternate layers of charcoal &amp; salt, including exacation, back filling, 75 dia 3 m long tapered GI pipe with holes at regular intervals at right angles to each other, and testing megger value as per design, including all material, cost of consumables etc. as per drawings &amp; technical specs, all complete.</b> |     |      |      |
| 11(a) | For chemical Earthing / Conductor Earthing (Pipe) ( as per Approved Documents)                                                                                                                                                                                                                                                                                          | S&I | Nos. | 70   |
| 12    | <b>Integration of Power</b>                                                                                                                                                                                                                                                                                                                                             |     |      |      |
| 12(a) | Supply of LT Panel having rating of (415 volt, 3200 Amp, 2000kVA)                                                                                                                                                                                                                                                                                                       | S   | No   | 3    |



21/01/22

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|  | TECHNICAL SPECIFICATION              | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 03/05            |
| Rudrapur                                                                          | GROUP : REG (RENEWABLE ENERGY GROUP) | Rev no    | 00               |

|            |                                                                                                                                                                                                                    |     |     |    |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----|
| 12(b)      | Installation & commissioning of LT panel having rating of (415 volt, 3200 Amp, 2000kVA) including termination of incoming & outgoing cables/busduct etc, including all material consumables etc.                   | I   | No. | 3  |
| <b>13</b>  | <b>Supply &amp; Installation of :-</b>                                                                                                                                                                             |     |     |    |
| 13(a)      | Rating board / Name Plate                                                                                                                                                                                          | S&I | No. | 14 |
| 13(b)      | Display board                                                                                                                                                                                                      | S&I | No. | 2  |
| 13(c)      | Danger Board                                                                                                                                                                                                       | S&I | No. | 60 |
| <b>14</b>  | <b>Fire fighting System</b>                                                                                                                                                                                        |     |     |    |
| 14(a)      | Portable Fire extinguisher                                                                                                                                                                                         | S&I | Set | 10 |
| 14(b)      | Fire Bucket set                                                                                                                                                                                                    | S&I | Set | 6  |
| <b>15</b>  | <b>Lightning Protection</b>                                                                                                                                                                                        |     |     |    |
| 15(a)      | Lightning Arrestor - ESE type                                                                                                                                                                                      | S&I | Nos | 6  |
| 15(b)      | Event Counter                                                                                                                                                                                                      | S&I | Nos | 6  |
| 15(c)      | Mast (10 meter long)                                                                                                                                                                                               | S&I | Nos | 6  |
| 15(d)      | Earthing strip (Cu 20 X 3)                                                                                                                                                                                         | S&I | RMT | 80 |
| 15(e)      | Earthing pit (Cu plate type 600 X 600 X 3.15)                                                                                                                                                                      | S&I | Set | 12 |
| <b>16</b>  | <b>Supply &amp; installation of Surveillance System</b>                                                                                                                                                            |     |     |    |
| 16(a)      | CCTV based including mounting accessories, cables, storage devices, etc as per technical specification                                                                                                             | S&I | Set | 1  |
| <b>17</b>  | <b>Net Metering including supply &amp; installation of net meters, gross meters, CT, and items &amp; accessories alongwith liaising with all related local / Govt authorities to get their approval.</b>           | S&I | Set | 1  |
| <b>(B)</b> | <b>Civil Work:-</b>                                                                                                                                                                                                |     |     |    |
| <b>1</b>   | <b>Construction of foundation for inverter, ACDB, LT panel, etc. with all materials, with necessary formwork, mixing, placing &amp; compaction &amp; curing of concrete, all complete as per drgs. &amp; spec.</b> |     |     |    |
| 1(a)       | RCC / PCC M20 (1:1.5:3)                                                                                                                                                                                            | S&I | Cum | 30 |

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | TECHNICAL SPECIFICATION              | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 03/05            |
|                                                                                   | GROUP : REG (RENEWABLE ENERGY GROUP) | Rev no    | 00               |

|            |                                                                                                                                                                                                             |   |       |    |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------|----|
| <b>2</b>   | <b>Earth Work:-</b>                                                                                                                                                                                         |   |       |    |
| 2(a)       | Excavation of earth                                                                                                                                                                                         | I | Cum   | 30 |
| 2(b)       | Back filling / disposal of surplus earth                                                                                                                                                                    | I | Cum   | 30 |
| <b>(C)</b> | <b>Operation &amp; Maintenance</b>                                                                                                                                                                          |   |       |    |
| <b>1</b>   | <b>Comprehensive Operation &amp; maintenance of plant for 5 years, after commissioning &amp; handing over (including deputation of 1 Engineer + 1 Supervisor + 2 Electricians), as per Technical Specs,</b> | O | Month | 60 |

31/5/22



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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | TECHNICAL SPECIFICATION              | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 03/05            |
| Rudrapur                                                                          | GROUP : REG (RENEWABLE ENERGY GROUP) | Rev no    | 00               |

#### Annexure 4

### **QUALITY CERTIFICATION, STANDARDS AND TESTING FOR GRID-CONNECTED SOLAR PV SYSTEMS/POWER PLANTS**

Quality certification and standards for grid-connected solar PV systems are essential for the successful mass-scale implementation of this technology. It is also imperative to put in place an efficient and rigorous monitoring mechanism, adherence to these standards. Hence, all components of grid-connected solar PV system/ plant must conform to the relevant standards and certifications given below:

#### **Solar PV Modules/Panels**

|                                     |                                                                                                                                         |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| IEC 61215/ IS 14286                 | Design Qualification and Type Approval for Crystalline Silicon Terrestrial Photovoltaic (PV) Modules                                    |
| IEC 61701                           | Salt Mist Corrosion Testing of Photovoltaic (PV) Modules                                                                                |
| IEC 61853- Part 1/ IS 16170: Part 1 | Photovoltaic (PV) module performance testing and energy rating –: Irradiance and temperature performance measurements, and power rating |
| IEC 62716                           | Photovoltaic (PV) Modules – Ammonia (NH <sub>3</sub> ) Corrosion Testing (As per the site condition like dairies, toilets)              |
| IEC 61730-1,2                       | Photovoltaic (PV) Module Safety Qualification – Part 1: Requirements for Construction, Part 2: Requirements for Testing                 |

#### **Solar PV Inverters**

|                                               |                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IEC 62109-1, IEC 62109-2                      | Safety of power converters for use in photovoltaic power systems –<br><br>Part 1: General requirements, and Safety of power converters for use in photovoltaic power systems<br><br>Part 2: Particular requirements for inverters. Safety compliance (Protection degree IP 65 for outdoor mounting, IP 54 for indoor mounting) |
| IEC/IS 61683 (as applicable)                  | Photovoltaic Systems – Power conditioners: Procedure for Measuring Efficiency (10%, 25%, 50%, 75% & 90-100% Loading Conditions)                                                                                                                                                                                                |
| IEC 62116/ UL 1741/ IEEE 1547 (as applicable) | Utility-interconnected Photovoltaic Inverters - Test Procedure of Islanding Prevention Measures                                                                                                                                                                                                                                |

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | TECHNICAL SPECIFICATION              | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 03/05            |
| Rudrapur                                                                          | GROUP : REG (RENEWABLE ENERGY GROUP) | Rev no    | 00               |

|                                            |                                                                                  |
|--------------------------------------------|----------------------------------------------------------------------------------|
| IEC 60255-27                               | Measuring relays and protection equipment – Part 27: Product safety requirements |
| IEC 60068-2 / IEC 62093<br>(as applicable) | Environmental Testing of PV System – Power Conditioners and Inverters            |

#### Fuses

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IS/IEC 60947 (Part 1, 2 & 3), EN 50521 | General safety requirements for connectors, switches, circuit breakers (AC/DC):<br>a) Low-voltage Switchgear and Control-gear, Part 1: General rules<br>b) Low-Voltage Switchgear and Control-gear, Part 2: Circuit Breakers<br>c) Low-voltage switchgear and Control-gear, Part 3: Switches, disconnections, switch-disconnections and fuse-combination units<br>d) EN 50521: Connectors for photovoltaic systems – Safety requirements and tests |
| IEC 60269-6                            | Low-voltage fuses - Part 6: Supplementary requirements for fuse-links for the protection of solar photovoltaic energy systems                                                                                                                                                                                                                                                                                                                      |

#### Surge Arrestors

|                                 |                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| BFC 17-102:2011                 | Lightening Protection Standard                                                                                                                  |
| IEC 60364-5-53/IS 15086-5 (SPD) | Electrical installations of buildings - Part 5-53: Selection and erection of electrical equipment - Isolation, switching and control            |
| IEC 61643- 11:2011              | Low-voltage surge protective devices - Part 11: Surge protective devices connected to low-voltage power systems - Requirements and test methods |

#### Earthing /Lightning

|                  |                                                                                                                                                                                                                                                                                                                                                                  |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IS3034/IEC 62561 | IEC 62561-1<br>Lightning protection system components (LPSC) - Part 1: Requirements for connection components<br>IEC 62561-2<br>Lightning protection system components (LPSC) - Part 2: Requirements for conductors and earth electrodes<br>IEC 62561-7<br>Lightning protection system components (LPSC) - Part 7: Requirements for earthing enhancing compounds |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

#### Junction Boxes

|           |                                                               |
|-----------|---------------------------------------------------------------|
| IEC 60529 | Junction boxes and solar panel terminal boxes shall be of the |
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|  | TECHNICAL SPECIFICATION              | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 03/05            |
| Rudrapur                                                                          | GROUP : REG (RENEWABLE ENERGY GROUP) | Rev no    | 00               |

|  |                                                                                                |
|--|------------------------------------------------------------------------------------------------|
|  | thermo-plastic type with IP 65 protection for outdoor use, and IP 54 protection for indoor use |
|--|------------------------------------------------------------------------------------------------|

#### Energy Meter

|                                     |                                                                                                                                 |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| IS 16444 or as specified by DISCOMs | A.C. Static direct connected watt-hour Smart Meter Class 1 and 2 — Specification (with Import & Export/Net energy measurements) |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|

#### Solar PV Roof Mounting Structure

|                 |                                     |
|-----------------|-------------------------------------|
| IS 2062/IS 4759 | Material for the structure mounting |
|-----------------|-------------------------------------|

|              |                                                                                                                                       |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------|
| • IS : 4237  | General requirements for switch gear and control gear for voltage not exceeding 4100V.                                                |
| • IS : 375   | Switchgear bus-bars, main connection and auxiliary wiring, marking and arrangement.                                                   |
| • IS : 2147  | Degree of protection provided by enclosures for low voltage switch gear and control gear.                                             |
| • IS : 8197  | Terminal marking for electrical measuring instrument and their accessories.                                                           |
| • IS : 2557  | Danger notice plates                                                                                                                  |
| • IS : 2516  | Specification for AC circuit breaker                                                                                                  |
| • IS : 1818  | Specification for AC isolator and earthing switch.                                                                                    |
| • IS : 3072  | Code of practice for installation and maintenance of switchgear.                                                                      |
| • IS : 8623  | Specification for factory built as symbolize of switch gear and control gear for voltage up to and including 4100V. A.C.& 1200V. D.C. |
| • IS : 8828  | Miniature Circuit Breaker                                                                                                             |
| • IS : 4064  | Fuse switch and switch fuse unit.                                                                                                     |
| • IS : 9224  | HRC fuse unit.                                                                                                                        |
| • IS : 2705  | Current transformer                                                                                                                   |
| • IS : 3155  | Voltage transformer                                                                                                                   |
| • IS : 3231  | Electrical relay for protection                                                                                                       |
| • IS : 1248  | Indicating instrument                                                                                                                 |
| • IS : 722   | Integrating instrument                                                                                                                |
| • IS : 6875  | Control switches & push buttons                                                                                                       |
| • IS : 2959  | Auxiliary contactor.                                                                                                                  |
| • IS : 1822  | AC motor starters of voltage not exceeding 4100V                                                                                      |
| • IS : 13947 | Switch Board General Requirement                                                                                                      |

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|-----------------------------------------------------------------------------------|--------------------------------------|-----------|------------------|
|  | TECHNICAL SPECIFICATION              | Doc. No:- | REG2021-20210253 |
|                                                                                   |                                      | Part      | 03/05            |
| Rudrapur                                                                          | GROUP : REG (RENEWABLE ENERGY GROUP) | Rev no    | 00               |

|                                         |                                      |
|-----------------------------------------|--------------------------------------|
| • IS:7098 (Part-1)                      | for XLPE Cables.                     |
| • IS:8130 (Part-1)                      | for Conductor.                       |
| • IS: 5831 (Part-1)                     | for Sheath.                          |
| • IS:7098 (Part-2)/ IEC: 60502 (Part-2) | for Inner & Outer Sheath.            |
| • IS: 3975 /7098 / IEC: 60502 (Part-2)  | for armour.                          |
| • IS: 7098 /10810 / IEC: 60502 (Part-2) | for Electrical & Mechanical Testing. |
| • IS: 10418                             | for packaging.                       |

#### DC Cable

|                             |
|-----------------------------|
| EN:50618                    |
| IEC: 60228                  |
| TUV 2Pfg 1169/08.2007 PV1 F |
| EN: 50268-2 / IEC: 61034-2  |
| IEC: 60332-1-2              |
| IEC: 60754-1                |





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### PV MODULE DETAIL

| MAKE              | SIZE (MM) | Pitch—(Hor)mm | Pitch—(Ver)mm |
|-------------------|-----------|---------------|---------------|
| BHEL— 325 Wp(DCR) | 1965x986  | 956           | 1200          |

| GENERAL TOLERANCES                                                      |                                                                           |
|-------------------------------------------------------------------------|---------------------------------------------------------------------------|
| 1                                                                       | Fit Security: 1/2, 2 mm                                                   |
| 2                                                                       | CD of Slot: 1/2, 2 mm                                                     |
| 3                                                                       | CD of Hole: 1/2, 2 mm                                                     |
| 4                                                                       | Hole Dia: <10 mm: 1/0.4 mm<br>>10 mm: 1/0.5 mm                            |
| 5                                                                       | Slot Dimensions: 1/0.3 mm<br>>10 mm: <30 mm: 1/0.8 mm<br>>30 mm: 1/1.0 mm |
| No positive tolerance is permitted in PF module mounting slots on pins. |                                                                           |
| 6                                                                       | Length: 1/1.3 mm (in)                                                     |
| 7                                                                       | Section Geometry: As per § 8.11                                           |
| 8                                                                       | Straightness: ±1/1000 of length both axis<br>(As per § 8.11)              |
| 9                                                                       | Angular tolerance: ±2 degrees                                             |
| 10                                                                      | Thickness: 0.05 mm to 1 mm                                                |

NOTES: (This note has to be read alongwith the Bill of material).

1. DIMENSIONS FOR COLD ROLLED STEEL SHEET/PANELS, SETTINGS SHALL BE IN ACCORDANCE WITH IS 806.
2. DIMENSIONS OF PARTS, THAT SHALL MATCH CONFORM TO IS 1020.
3. THE CORRECTION SHALL BE CARRIED OUT IN ACCORDANCE WITH IS 5600 AND IS 8040.
4. ALL MEMBERS TO BE HOT DIP GALVANIZED IN ACCORDANCE WITH IS 5209-1950 AND IS 4759. THE MINIMUM GALVANIZING THICKNESS TO BE MAINTAINED SHALL BE 150 GM/SQ.M.
5. THE SPECIFICATION OF THE COLLUMN SIZE (EXTENSION OF 750X400) IS AS PER IS 8000 WITH MINIMUM OF 50KNOMCS OR EQUIVALENT WEIGHT 810 GRM/SQ.M.
6. NO WELDING ON ANY MEMBER.
7. GENERAL ASSEMBLY TOLERANCE  $\pm 1/8"$ .
8. GENERAL ASSEMBLY TOLERANCE  $\pm 1/8"$ .
9. REMOVE ALL SHARP AND BURR EDGES.
10. REMOVE ALL SHARP AND BURR EDGES.

SIDE VIEW FOR 10° TILT  
PV MODULE

SIDE VIEW FOR 25° TILT  
PV MODULE

SIDE VIEW FOR 35° TILT  
PV MODULE

## GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. DO NOT SCALE THE DRAWING ONLY WRITTEN DIMENSIONS TO BE READ.

[illegible]

|                                   |                      |              |            |
|-----------------------------------|----------------------|--------------|------------|
| BHARAT HEAVY ELECTRICALS LTD      |                      | CARD CODE    | -          |
| RUDRAPUR                          |                      | NO. OF SLOTS | 02         |
| G.A. of Module Mounting Structure |                      | SHT NO       | 02         |
| SCALE                             | ORIGIN / ENQUIRY NO. | DRAWING NO.  | 2401210000 |
|                                   | -                    |              |            |

**SIZE -A2**