



NEPAL ELECTRICITY AUTHORITY

(An Undertaking of Government of Nepal)



Project Management Directorate

**Design, Engineering, Supply, Construction, Installation, Testing,
Commissioning and Operation & Maintenance support of (AC) Solar PV
Power Plants with Battery Energy Storage System at Mugu, Jumla, Dolpa and
Humla districts of the Karnali Province of Nepal**

Invitation for Bids No.: PMD/SASEC(Additional)/KSEP/079/80-01

ADDENDUM - 01

❖ Addendum 01 – A

The following clause will be added to Section 2: Bid Data Sheet

46. Abnormally Low Bids	46.1 An abnormally low bid is one where the bid price, in combination with other elements of the bid, is 20% below the engineer's estimate and appears to be so low that it raises concerns as to the capability of the Bidder to perform the contract for the offered bid price. 46.2 When the offered bid price appears to be abnormally low, the Employer shall undertake a three-step review process as follows: (a) identify abnormally low costs and unit rates by comparing them with the engineer's estimates, other substantially responsive bids, or recently awarded similar contracts (b) clarify and analyze the bidder's resource inputs and pricing, including overheads, contingencies and profit margins, and (c) decide whether to accept or reject the bid. 46.3 With regard to ITB 40.2 (b) above, the Employer will seek a written explanation from the bidder of the reasons for the offered bid price, including a detailed analysis of costs and unit prices, by reference to the scope, proposed methodology, schedule, and allocation of risks and responsibilities. This may also include information regarding the economy of the manufacturing process; the services to be provided, or the construction method to be used; the technical solutions to be adopted; and any exceptionally favorable conditions available to the bidder for the works, equipment or services proposed. 46.4 After examining the explanation given and the detailed price analyses presented by the bidder, the Employer may: 1) accept the bid, if the evidence provided satisfactorily accounts for the low bid price and costs, in which case the bid is not considered abnormally low 2) accept the bid but require that the amount of the performance security be increased at the expense of the bidder to a level sufficient to protect the Employer against financial loss. The amount of the performance security shall generally be not more than 20% of the contract price; or 3) reject the bid if the evidence provided does not satisfactorily account for the low bid price and make a similar determination for the next ranked bid, if required.
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❖ Addendum 01 – B

Under Section 4, Bidding Forms, Technical Proposal, the following form is added: Responsibility Matrix

Form – Responsibility Matrix

In case the bidder is a JV, it must provide a responsibility matrix clearly defining the roles of each partner and the works that would be performed by each partner in delivering the entire project.

Existing Forms under Technical Proposal	Amendments
• Site Organization • Method Statement • Mobilization Schedule • Construction Schedule • Plant • Personnel: ◦ Form PER-1: Proposed Personnel ◦ Form PER-2: Resumé of Proposed Personnel • Equipment • Proposed Subcontractors/Manufacturers for Major Items of Plant and Services • Manufacturer's Authorization • Time Schedule • Functional Guarantee of the Proposed Facilities	• Site Organization • Method Statement • Responsibility Matrix • Mobilization Schedule • Construction Schedule • Plant • Personnel: ◦ Form PER-1: Proposed Personnel ◦ Form PER-2: Resumé of Proposed Personnel • Equipment • Proposed Subcontractors/Manufacturers for Major Items of Plant and Services • Manufacturer's Authorization • Time Schedule • Functional Guarantee of the Proposed Facilities



❖ Addendum 01 – C

Existing Clauses

Volume I, Section 6, Sub Section 7 Personnel Requirements

Using Form PER - 1 and PER - 2 in Section 4 (Bidding Forms), the Bidder must demonstrate that it has personnel who meet the following requirements:

No.	Position	Required No.	Academic Qualifications	Experience In Similar Work [years]
1	Project Manager	1	Bachelor's in electrical engineering	Overall working experience of 10 years with proven experience of not less than 5 years in Installation of Solar PV Plants / hybrid solar PV plus containerized BESS plant
2	Engineer	(1 at each site)	Bachelor's in engineering	Overall working experience of 5 years with proven experience of not less than 2 years in Installation of Solar PV Plants / hybrid solar PV plus BESS plant
3	Electrical Supervisor	(1 at each site)	Diploma in Electrical Engineering	1 year of experience in solar PV plus BESS system engineering construction and installation works
4	Civil Supervisor	(1 at each site)	Diploma in Civil Engineering	1 year of experience in solar PV plus BESS system engineering construction and installation works
5	Health Safety and Environment (HSE) Engineer	1	B.E./B. Tech or Equivalent with Specialization / additional qualification in Environment related field	Minimum 3 years of total experience out of which minimum 1 experience in similar works
6	Geotechnical Engineer	1	B.E./B. Tech / M. Tech / M. Sc or Equivalent in Geotechnical Engineering, Geology or equivalent	Minimum 3 years of total experience out of which minimum 1 experience in similar works

Amendments

Volume I, Section 6, Sub Section 7 Personnel Requirements

Using Form PER - 1 and PER - 2 in Section 4 (Bidding Forms), the Bidder must demonstrate that it has personnel who meet the following requirements:

No.	Position	Required No.	Academic Qualifications	Experience In Similar Work [years]
1	Project Manager	1	Bachelor's in electrical engineering	Overall working experience of 10 years with proven experience of not less than 5 years in Installation of Solar PV Plants / hybrid solar PV plus containerized BESS plant
2	Engineer	(1 at each site)	Bachelor's in engineering	Overall working experience of 5 years with proven experience of not less than 2 years in Installation of Solar PV Plants / hybrid solar PV plus BESS plant
3	Electrical Supervisor	(1 at each site)	Diploma in Electrical Engineering	1 year of experience in solar PV plus BESS system engineering construction and installation works
4	Civil Supervisor	(1 at each site)	Diploma in Civil Engineering	1 year of experience in solar PV plus BESS system engineering construction and installation works
5	Health Safety and Environment (HSE) Engineer	1	B.E./B. Tech or Equivalent with Specialization / additional qualification in Environment related field	Minimum 3 years of total experience out of which minimum 1 experience in similar works
6	Geotechnical Engineer	1	B.E./B. Tech / M. Tech / M. Sc or Equivalent in Geotechnical Engineering, Geology or equivalent	Minimum 3 years of total experience out of which minimum 1 experience in similar works

• The contractor's representative shall be a full-time employee of the bidder or



❖ Addendum 01 – D

the lead partner of the JV for at least 1 year prior to the bid submission date - The contractor's representative shall be at the worksite during the contract duration - Failure to comply with this requirement will lead to termination by the employer, as stipulated in the General Conditions of Contract Documents to be submitted to substantiate the employment record of the representative are: Joining letter and last 3 months salary slips	<table><tr><th data-bbox="340 100 363 1340">Existing Clauses</th><th data-bbox="340 720 363 1340">Volume I, Section 9: Contract Forms, Appendix 7: List of documents for review or approval</th><th data-bbox="340 100 363 720">Amendments</th></tr><tr><td data-bbox="363 100 926 720"> Pursuant to GCC Subclause 20.3.1, the Contractor shall prepare, or cause its Subcontractor to prepare, and present to the Project Manager in accordance with the requirements of GCC Subclause 18.2 (Program of Performance), the following documents for (A) Approval 1. Work Program 2. Work Procedure 3. Manufacturers, prior to placing of order 4. Design, calculations and drawings of plant and equipment 5. All civil design and drawings 6. Equipment Document- GTP, Sizing Calculation, Type Test Reports and QAP 7. Investigation Reports 8. Operation and Maintenance Manual with checklist to operate and provide timely maintenance including preventive maintenance of all major equipment and civil works. 9. All other documents as specified under section 3.13 of Volume II (Employer's requirement) </td><td data-bbox="363 720 926 1340"> Pursuant to GCC Subclause 20.3.1, the Contractor shall prepare, or cause its Subcontractor to prepare, and present to the Project Manager in accordance with the requirements of GCC Subclause 18.2 (Program of Performance), the following documents for (A) Approval 1. Work Program 2. Work Procedure 3. Manufacturers, prior to placing of order 4. Design, calculations and drawings of plant and equipment 5. 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Transportation Plan: Assessment of searoad/air networks leading upto the four sites (including turning radius and width of roads) and a transportation plan to transport all major and minor equipment to the plant site including but not limited to PV Modules Containers, BESS, PCS, Transformers, PV Inverters, Cables etc. </td><td data-bbox="363 100 926 720"> Pursuant to GCC Subclause 20.3.1, the Contractor shall prepare, or cause its Subcontractor to prepare, and present to the Project Manager in accordance with the requirements of GCC Subclause 18.2 (Program of Performance), the following documents for (A) Approval 1. Work Program 2. Work Procedure 3. Manufacturers, prior to placing of order 4. Design, calculations and drawings of plant and equipment 5. All civil design and drawings 6. Equipment Document- GTP, Sizing Calculation, Type Test Reports and QAP 7. Investigation Reports 8. 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(Handwritten signature)

❖ Addendum 01 – E

	Existing clause	Amendments
Section 2 – BDS – ITB 24.1	For bid submission purposes only, the Employer's address is For Attention: Project Manager, Abhishek Adhikary Karnali Solar Energy Project Project Management Directorate, Nepal Electricity Authority Kharipati, Bhaktapur, Nepal The deadline for bid submission is Date: 20th August 2023 Time: 12:00 PM	For bid submission purposes only, the Employer's address is For Attention: Project Manager, Abhishek Adhikary Karnali Solar Energy Project Project Management Directorate, Nepal Electricity Authority Kharipati, Bhaktapur, Nepal The deadline for bid submission is Date: 4th September 2023 Time: 12:00 PM
Section 2 – BDS – ITB 27.1	The bid opening of Technical Bids shall take place at Room NO. E 111, NEA Training Centre, Kharipati, Bhaktapur, Nepal. For Attention: Karnali Solar Energy Project Project Management Directorate, Nepal Electricity Authority Kharipati, Bhaktapur, Nepal Date: 20th August 2023 Time: 12:30 PM	The bid opening of Technical Bids shall take place at Room NO. E 111, NEA Training Centre, Kharipati, Bhaktapur, Nepal. For Attention: Karnali Solar Energy Project Project Management Directorate, Nepal Electricity Authority Kharipati, Bhaktapur, Nepal Date: 4th September 2023 Time: 12:30 PM

❖ Addendum 01 – F

Section 8. Special Conditions of Contract; The following sub clauses will be added to clause 17. Representatives

17. Representatives	17.3 If the contractor is a joint venture, the majority of the contractor's key personnel, as required under the employer's requirements (Section 6. Personnel Requirements), shall be from the lead partner 17.4 The project manager or contract manager shall require the bidder (in the case of joint ventures, the partner who meets the major requirement of experience in contracts of a similar size and nature) to be the senior employee and to have worked with the firm for at least 1 year prior to the bid submission deadline 17.5 The project manager or the contract manager's representative shall be at the site location during the period of contract implementation. If the person is to be temporarily absent during the period, a suitable replacement shall be temporarily appointed, subject to the engineer's prior consent 17.6 Failure on these requirements will lead to a Notice to Correct and Termination (GCC 42.1) by Employer
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❖ Addendum 01 – G

Existing Clauses	Amendments
Vol 1, Section 3: Evaluation and Qualification Criteria, Sub Section 2.5 Subcontractors	Vol 1, Section 3: Evaluation and Qualification Criteria, Sub Section 2.5 Subcontractors
NOTE: To substantiate the above qualification, Bidder(s) must submit all the necessary documents required to prove the above specified legal status, Valid ISO Certificate, experience certificate, authorization certificates, eligibility requirements (substantiated by end users' certificate) and type test report. The bidder is required to submit the notarized translation of the copy, if the document submitted is in language other than the language used in the bidding document.	NOTE: To substantiate the above qualification, the Bidder(s) must submit all the necessary documents required to prove the above specified legal status, Valid ISO Certificate, experience certificate, authorization certificates, type test report and scan copy of certificate (notarized at any of the bidder's country of origin) from clients (end-user certificates) for all number of projects. The end user's certificates shall be on the end user's original letter head with valid address for correspondence and duly signed by the authorized personnel of the client (end user). The bidder is required to submit the duly notarized (notarized at any of the bidder's country of origin) translation of the copy, if the document submitted is in language other than bidding language.

❖ Addendum 01 – H

Existing Clauses	Amendments
Vol 1, Section 8: Special Conditions of Contract, Sub Section 13: Securities	Vol 1, Section 8: Special Conditions of Contract, Sub Section 13 Securities
13.3.1: The amount of performance security, as a percentage of the Contract Price for the Facility or for the part of the Facility for which a separate Time for Completion is provided, shall be 10% of the contract price.	13.3.1: The amount of performance security, as a percentage of the Contract Price for the Facility or for the part of the Facility for which a separate Time for Completion is provided, shall be 10% of the contract price.
Performance security shall be released only after the expiration of Service Level Agreement period of 3 years.	The performance security will be released to the Contractor without any interest not later than 90 days after the successful completion of the complete SLA period (3 Years) subject to the approval and acceptance of the SLA period deliverables.
The performance security will be released to the Contractor without any interest not later than 90 days after the successful completion of the complete SLA period (3 Years) subject to the approval and acceptance of the SLA period deliverables.	13.3.3: The performance security shall not be reduced on the date of the Operational Acceptance. The performance security shall be as required by the clause 13.3.1 above.
13.3.3 The performance security shall not be reduced on the date of the Operational Acceptance. The performance security as required by the clause 13.3.1 above, shall be valid for period covering entire contract execution period and any extension thereof, and defect liability period (including extended defect liability period) plus one month.	



❖ Addendum 01 – I

Existing Clauses	Amendments
Vol 1, Section 9: Contract Forms, Performance Security Bond This guarantee shall expire no later than the earlier of a) 18 months after our receipt of (i) a copy of the Completion Certificate; or (ii) a registered letter from the Contractor, attaching a copy of the notice to the project manager that the Facilities are ready for commissioning, and stating that 14 days have elapsed from receipt of such notice (or 7 days have elapsed if the notice was a repeated notice) and the project manager has failed to issue a Completion Certificate or inform the Contractor in writing of any defects or deficiencies; or (iii) a registered letter from the Contractor stating that no Completion Certificate has been issued but the Employer is making use of the Facilities; or b) the ____ day of ____, 2__.	Vol 1, Section 9: Contract Forms, Performance Security Bond This guarantee shall expire no later than 90 days after the successful completion of the complete SLA period (3 Years) subject to the approval and acceptance of the SLA period deliverables.

Vol II: Employer's Requirements

❖ Addendum 01 – J

Existing Clauses	Amendments
Section 3.3 BESS, sub section 3.3.1.2 BMS Furthermore, for cooling no fans shall be used. Natural convection to be used to regulate temperature for less noise. Also, the Contractor shall state how the BMS estimates the SOC, and how the SOC measurement system calibrates itself and if any external periodic intervention is required by the employer.	Section 3.3 BESS, sub section 3.3.1.2 BMS The existing clause is removed from the sub section 3.3.1.2

❖ Addendum 01 – K

Existing Clauses	Amendments
Section 3.3 BESS, sub section 3.3.8 Noise Levels The Contractor shall provide for and maintain noise mitigation devices like Noise mufflers at site, if	Section 3.3 BESS, sub section 3.3.8 Noise Levels The Contractor shall provide for and maintain noise mitigation devices like Noise mufflers at site, if




Existing Clauses

required. The contractor must also ensure noise level <1dB at 1m distance.

Amendments

required. The contractor must also ensure noise level <80 dB at 1m distance.

❖ Addendum 01 – L

Existing Clauses

Sub Section 3.2.5.1 General and 3.2.5.7 Technical Concept under section 3.2.5 PV Inverters

The contractor shall use multi-string inverters (inverters with multiple MPPTs) of DC input capacity, not more than 10 kW per MPPT.

Selected PV inverters shall have a maximum nominal AC rating of 50 kVA.

Amendments

Sub Section 3.2.5.1 General and 3.2.5.7 Technical Concept under section 3.2.5 PV Inverters

The contractor shall use multi-string inverters (inverters with multiple MPPTs) of DC input capacity, not more than 15 kW per MPPT.

Selected PV inverters shall have a maximum nominal AC rating of 150 kVA.

❖ Addendum 01 – M

Existing Clauses

Section 3.3, sub section 3.3.2 Power Conditioning System (PCS)

Item	Specification
Type	Indoor self-standing type (Installation inside BESS container)

Amendments

Section 3.3, sub section 3.3.2 Power Conditioning System (PCS)

Item	Specification
Type	Indoor / Outdoor self-standing type (Installation either inside BESS container or outside)

❖ Addendum 01 – N

Existing Clauses

Section 3.3, sub section 3.3.2 Power Conditioning System (PCS)

Item	Specification
Protection	8. Black start capability

Amendments

Section 3.3, sub section 3.3.2 Power Conditioning System (PCS)

Item	Specification
Protection	8. Black start capability (one-click remote black start capability with ability to shorten whole microgrid recovery at minutes level)

❖ Addendum 01 – O

Existing Clauses

Section 3.2.5 PV Inverters, sub section 3.2.5.2 Codes and Standards

Amendments

Section 3.2.5 PV Inverters, sub section 3.2.5.2 Codes and Standards



Existing Clauses

The inverters should be TUV-tested for the required Certificates, CE-marked and in compliance with the applicable standards. Further, the inverter shall be designed, manufactured, and tested in full compliance with the latest edition of the following, but not limited to, standards, codes, rules and regulations:

- DIN / VDE 0126-1-1 Automatic disconnection device between a generator and the public low voltage grid
- DIN EN 50178: Electronic equipment for use in power installations
- DIN EN 50524 Datasheet and nameplate for photovoltaic inverters
- EN 50530: Overall efficiency of photovoltaic inverters
- EN 61000-6-4/A1: Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
- IEC 60146-1-1: Semiconductor converters - General requirements and line-commutated converters - Part 1-1: Specifications of basic requirements
- IEC 60529: Degrees of protection provided by enclosures (IP code)
- IEC 61140: Protection against electric shock - Common aspects for installation and equipment
- IEC 61683: Photovoltaic systems - Power conditioners - Procedure for measuring efficiency
- IEC 61727: Photovoltaic (PV) systems - Characteristic of the utility interface
- IEC 62093: Balance-of-system components for photovoltaic systems - Design qualification natural environments
- IEC 62109-2: Safety of power converters for use in photovoltaic power systems - Part 2: Particular requirements for inverters
- IEC 62116: Testing procedure of islanding prevention measures for utility-interactive photovoltaic inverters
- IEC 61000-6-2: Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
- IEC 61000-6-4: Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
- IEC 61400-21: Harmonics
- 519-2014 - IEEE Recommended Practice and Requirements for Harmonic Control in Electric Power Systems
- IEC 62910 - Utility-interconnected photovoltaic inverters - Test procedure for low voltage ride-through measurements
- IEC 60068-2-1 - an international standard for the environmental testing of electrotechnical products

Amendments

The inverters should be CE-marked and in compliance with the applicable standards.

Required International Certifications: IEC 61727, IEC 62116, IEC 62109-2, IEC 60068-2 & IEC 61683.

The Test Certificates from IEC accredited independent laboratories must be provided. The Inverter must be certified by Certification Body Testing Laboratory (CBTL) or Renewable Energy Testing Laboratory (RETL) or National Certification Body (NCB) or Renewable Energy Certification Body (RECB) enlisted in the IECEE website or IECRE website. The enlisted CBTL or RETL or NCB or RECB must have Scope of Inverter Testing.



Existing Clauses	Amendments
(Cold) • IEC 60068-2-14 - an international standard for the environmental testing of electrotechnical products (Change of temperature) • UL 1741: Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources	

❖ Addendum 01 – P

Existing Clauses	Amendments
Section 3.3.1 Batteries, sub section 3.3.1.1 Standards for Battery Systems The following Code and Standards shall be applicable for the project as shown below	Section 3.3.1 Batteries, sub section 3.3.1.1 Standards for Battery Systems The following Code and Standards shall be applicable for the project as shown below. Alternate standards are acceptable provided the certifying agencies are certified by ISO 17025 and 17065

❖ Addendum 01 – Q

Existing Clauses	Amendments
Section 3.3.2 PCS, sub section 3.3.2.1 Standards for PCS The following code and standards shall be applicable to the project as shown below IEC 62040-1 or IEC 62477-1 General and safety requirement IEEE 1547 Standard for interconnection to grid IEC 61683 Procedure for measuring efficiency IEC 60068-2 (1,2,14,30) Environmental testing IEC 61000-4-2,3,4,6, & 8 EMC IEEE 519 Harmonics CEA, IEC 62910 LVRT and HVRT IEC 60529 IP Test	Section 3.3.2 PCS, sub section 3.3.2.1 Standards for PCS Required International Certifications: IEC 62109, IEC 61000-6-1, IEC 61000-6-3, IEC 61683, IEC 60068-2 (1,2,14,30) & IEC 60529. The Test Certificates from IEC accredited independent laboratories must be provided. The Inverter must be certified by Certification Body Testing Laboratory (CBTL) or Renewable Energy Testing Laboratory (RETL) or National Certification Body (NCB) or Renewable Energy Certification Body (RECB) enlisted in the IECEE website or IECRE website. The enlisted CBTL or RETL or NCB or RECB must have Scope of Inverter Testing.

❖ Addendum 01 – R

Existing Clauses	Amendments
Section 3.2.2 Photovoltaic Modules, sub section 3.2.2.1 General Module efficiency should be more than 20% for effective utilization of land	Section 3.2.2 Photovoltaic Modules, sub section 3.2.2.1 General Module efficiency should be minimum 20% for effective utilization of land

❖ Addendum 01 – S

Existing Clauses	Amendments



Existing Clauses	Amendments
Section 3.3.3 BESS Housing The battery shall preferably be installed in an ISO container next to the control room where the power system main panel and PCMS are located. A pre-wired ISO-Container shall be provided for battery housing.	Section 3.3.3 BESS Housing The battery shall preferably be installed in an ISO container next to the control room where the power system main panel and PCMS are located. A pre-wired ISO-Container shall be provided for battery housing. Both Walk-in and non walk-in type containerized solutions are acceptable for BESS housing subject to verification and approval of design by the employer and appropriate FAT.
Section 3.3.3 BESS Housing The following specifications have to comply: • An intelligent lighting system is installed in the BESS room, corridor aisle and other areas. The lights shall be controlled through motion sensors and turn off / on when there is no occupancy / when there are people.	Section 3.3.3 BESS Housing The following specifications have to comply: • Walk-in BESS Housing Solutions must be equipped with an intelligent lighting system is installed in the BESS room, corridor aisle and other areas. The lights shall be controlled through motion sensors and turn off / on when there is no occupancy / when there are people.

❖ Addendum 01 – T

Existing Clauses	Amendments
Section 3.3 Battery Energy Storage System (BESS) The Contractor shall provide the necessary preparations and required packaging of the system for transportation to the site.	Section 3.3 Battery Energy Storage System (BESS) The Contractor shall provide the necessary preparations and required packaging of the system for transportation to the site. The contractor shall use anti-collision foam and/or any appropriate measures to ensure safe transportation of BESS to the sites.

❖ Addendum 01 – U

Existing Clauses	Amendments
Section 3.2.4 Mounting Structure, sub section 3.2.4.1 General Further, the mounting system shall be certified by UL or an approved testing agency to meet the requirement of UL 2703.	Section 3.2.4 Mounting Structure, sub section 3.2.4.1 General Further, the mounting system shall be certified by UL or an approved testing agency to meet the requirement of UL 2703. Alternate standards are acceptable provided the certifying agencies are certified by ISO 17025 and 17065.



Existing Clauses

Section 2.5 Humla, Sub Section 2.5.1: Location Details

Table: General Information of Humla Site

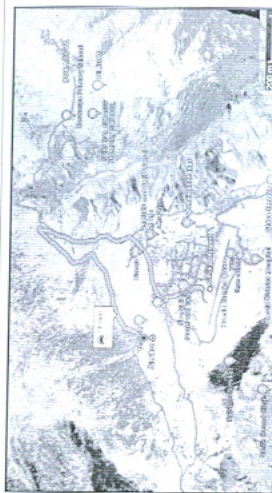
Sl. No.	Site parameters	Details
2	GPS Coordinates	29.9894N, 81.8436E

**Amendments**

Section 2.5 Humla, Sub Section 2.5.1: Location Details

Table: General Information of Humla Site

Sl. No.	Site parameters	Details
2	GPS Coordinates	29.975 N 81.815 E



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❖ Addendum 01 – W

Existing Clauses

Data Sheets for minor items (Page 163)

Data Sheet for MCCB (moulded case circuit breaker)

No.	Description	Unit	Requirements	To be filled by Bidder Data	Note
1	General data				
1.1	Name of Manufacture				
1.2	Country of Manufacture				
1.3	Address of Manufacturer				
2	Construction Data				
2.1	Conductor/Neutral				
2.1.1	Applicable standards		IEC 60228, BS 6380		
2.1.2	Conductor Material		Annealed Copper wires		
2.1.3	Nominal cross-section of each conductor	mm ²			
2.1.4	Neutral Material		Annealed Copper wires		
2.1.5	Nominal cross-section of each Neutral	mm ²			
2.1.6	Number of Cores				
2.2	Conductor/Neutral Insulation				
2.2.1	Applicable standards		BS 5467 BS 7655		
2.2.2	Material		XLPE		
2.2.3	Nominal thickness of insulation	mm			
2.2.4	Minimum average thickness	mm			
2.2.5	Colours		R=Red, S=Yellow, T=Blue, N=Black		
2.2.6	UV-resistant		Yes		
2.3	Binder/separation				
2.3.1	Material		Polystyrene		



Amendments

Data Sheets for minor items (Page 163)

Data Sheet for MCCB (moulded case circuit breaker)

No.	Description	Unit	Requirements	To be filled by Bidder Data	Note
1	General data				
1.1	Name of Manufacture				
1.2	Country of Manufacture				
1.3	Address of Manufacturer				
1.4	Applicable standards				
2	Construction Data				
2.1	Frame Size	Amperes			
2.2	Weight	kg			
2.3	Degree of protection	IP			
3	Electrical data				
3.1	Rated voltage	V	440		
3.2	Nominal operating voltage	V	400		
3.3	Rated Current	Amperes			
3.4	Frequency	Hz	50		
3.5	Number of Poles	Nos			
3.6	Rated Insulation Voltage AC	V			
3.7	Short-Circuit Capacity (kA)	kA			
3.8	Rated impulse Withstand U _{imp}	kV			
3.9	Shunt Tripping Mode		Yes		
4	Supporting Documents				
4.1	All the drawings enclosed		Yes		
4.2	All type test reports enclosed		Yes		

2.3.2	Approximate diameter	mm	
2.4	Inner sheath (bedding)		
2.4.1	Applicable standards		BS 5467
2.4.2	Material		PVC-ST2
2.4.3	Nominal thickness	mm	
2.4.4	Colour		
2.4.5	Approximate diameter	mm	
2.5	Armour		
2.5.1	Applicable standards		BS 5467 BS EN 10257-1
2.5.2	Material		Galvanised steel wires
2.5.3	Number of wires	Nos.	
2.5.4	Nominal diameter of wires	mm	
2.5.5	Shape		Round
2.5.6	Cross section of armour	mm ²	
2.5.7	Tensile strength	N/mm ²	
2.5.8	Min. elongation after break	%	
2.5.9	Approximate diameter	mm	
2.6	Outer sheath		
2.6.1	Applicable standards		BS 5467 BS 7655
2.6.2	Material		PVC-ST2
2.6.3	Nominal thickness	mm	
2.6.4	Minimum thickness	mm	
2.6.5	Resistant to sulphide		Yes
2.6.6	Chloride paraffin free		Yes
2.6.7	Fire retardant		Yes
2.6.8	Length marking at every meter interval		Yes
2.6.9	Test on bobbins as specified		Yes
2.6.10	Colour		Black
2.6.11	Approx. overall diameter of cable	mm	
2.7	Weights		
2.7.1	Complete cable	Kg/m	



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2.7.2	Copper	Kg/m	
2.7.3	Steel	Kg/m	
3	Electrical data		
3.1	Rated voltage (U _{0/U})	kV	0.6/1
3.2	Highest system voltage (U _{max})	kV	1.2
3.3	Frequency	Hz	50
3.4	Power frequency withstand voltage (4 x U ₀)	kV/hrs	2.4
3.5	Maximum capacity		
3.5.1	In ground: soil temperature=40°C, depth=75cm, I _R =1.5mKW		
3.5.1.1	1 cable	Amp	
3.5.1.2	2 cables (d=30cm)	Amp	
3.5.1.3	3 cables (d=30cm)	Amp	
3.5.2	In concrete cable trench/cable room: air=50°C		
3.5.2.1	1 cable trays/racks	Amp	
3.5.2.2	2 to 3 cables trays/racks	Amp	
3.5.2.3	4 to 5 cables trays/racks	Amp	
3.6	Minimum short circuit current of the conductor		
3.6.1	For 0.5 s duration	kA	
3.6.2	For 10 s duration	kA	
3.7	Minimum short circuit current of armouring		
3.7.1	For 10 s duration	kA	
3.8	Maximum permissible continuous conductor temperature	°C	90
3.9	Maximum permissible continuous temperature of cable surface	°C	
3.10	Maximum permissible conductor temperature for 177% of max transmission capacity, assuming maximum 100 max/year and 600 hrs in total (emergency overload)	°C	105
3.11	Maximum permissible short-circuit temperature for welded pressed conductor connections	°C	250



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3.12	Appropriate duration	5	
3.13	Maximum DC conductor resistance at 20°C	Ω/km	
3.14	Maximum AC conductor resistance at 90°C and for cable arrangements as per above	Ω/km	
3.15	Insulation resistance at 20°C	$\mu\Omega/\text{km}$	
3.16	Capacitive reactance	$\mu\text{F}/\text{km}$	
3.17	Inductive reactance	Ω/km	
3.18	Resistance of cable armour at 20°C	Ω/km	
4	Other Data		
4.1	Minimum permissible bending radius D		
4.1.1	in ducts	m	
4.1.2	Laid direct or in air	m	
4.1.3	Adjacent to joints or terminals	m	
4.1.4	Maximum permissible pulling force	kN	
4.1.5	Maximum permissible sidewall pressure to cable at bending point	kN/m	
5	Supporting Documents		
5.1	All the drawings enclosed	Yes	
5.2	All type test reports enclosed	Yes	
5.3	Technical literature enclosed	Yes	

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Existing Clauses	Amendments
Section 3.3 BESS, sub section 3.3.3 BESS Housing The BESS solution shall solve the module series mismatch in the battery, isolate faulty modules separately, and improve the system installation and maintenance security and maintainability. The detailed architecture solution and implementation mode must be provided, and the function must be tested during inspection at factory	Section 3.3 BESS, sub section 3.3.3 BESS Housing The BESS solution shall solve the module series mismatch in the battery, i.e., it should have module-level optimization management function, which would ensure that when one module is fully charged/discharged it will be bypassed with the module optimizer automatically, so that other not fully charged/discharged module can continue charging or discharging. The BESS solution shall also be capable to isolate faulty modules separately, i.e., the faulty battery module shall be automatically isolated without affecting the normal operation of other battery modules, and improve the system installation and maintenance security and maintainability. The detailed architecture solution and implementation mode must be provided, and the function must be tested during inspection at factory



Vol III: Bill of Quantities for four sites at Mugu, Jumla, Dolpa and Humla

❖ Addendum 01 – Y

Existing Clauses

1. JUMLA

Schedule No. 1: Plant and Equipment including Mandatory Spares to be supplied from abroad

Item No.	Item description	Country of origin	Estimated	
			Unit	Quantity
1	2	3	4	5
	Part-A: Employer Assessed Quantities			
PART 1.1	Solar PV Plant, JUMLA			
2	PV inverters with accessories all complete String inverters with multiple MPPTs. DC input not more than 10MWp per MPPT. Minimum euro efficiency 98%. Maximum nominal AC rating of inverter should be 50kVA and maximum DC/AC ratio to be less than 1.1 (As specified at section 6; employer's requirements)		kVA	950

Amendments

1. JUMLA

Schedule No. 1: Plant and Equipment including Mandatory Spares to be supplied from abroad

Item No.	Item description	Country of origin	Estimated	
			Unit	Quantity
1	2	3	4	5
	Part-A: Employer Assessed Quantities			
PART 1.1	Solar PV Plant, JUMLA			
2	PV inverters with accessories all complete String inverters with multiple MPPTs. DC input not more than 15kWp per MPPT. Minimum euro efficiency 98%. Maximum nominal AC rating of inverter should be 150kVA and maximum DC/AC ratio to be less than 1.1 (As specified at section 6; employer's requirements)		kVA	950

(Signature)



2. GAMGADI, MUGU

Schedule No. 1: Plant and Equipment including Mandatory Spares to be supplied from abroad

Item No.	Item description	Country of origin	Estimated	
			Unit	Quantity
1	2	3	4	5
	Part-A: Employer Assessed Quantities			
PART 1.1	Solar PV Plant, GAMGADI			
2	PV inverters with accessories all complete String inverters with multiple MPPTs, DC input not more than 10kWp per MPPT, Minimum euro efficiency 98%, Maximum nominal AC rating of inverter should be 50kVA and maximum DC/AC ratio to be less than 1.1 (As specified at section 6: employer's requirements)		kVA	350

2. GAMGADI, MUGU

Schedule No. 1: Plant and Equipment including Mandatory Spares to be supplied from abroad

Item No.	Item description	Country of origin	Estimated	
			Unit	Quantity
1	2	3	4	5
	Part-A: Employer Assessed Quantities			
PART 1.1	Solar PV Plant, GAMGADI			
2	PV inverters with accessories all complete String inverters with multiple MPPTs, DC input not more than 15kWp per MPPT, Minimum euro efficiency 98%, Maximum nominal AC rating of inverter should be 150kVA and maximum DC/AC ratio to be less than 1.1 (As specified at section 6: employer's requirements)		kVA	350



3. DOLPA

Schedule No. 1. Plant and Equipment including Mandatory Spares to be supplied from abroad

Item No.	Item description	Country of origin	Estimated	
			Unit	Quantity
1	2	3	4	5
	Part-A: Employer Assessed Quantities			
PART 1.1	Solar PV Plant, DOLPA			
2	PV inverters with accessories all complete String inverters with multiple MPPTs, DC input not more than 10kWp per MPPT, Minimum euro efficiency 98%, Maximum nominal AC rating of inverter should be 50kVA and maximum DC/AC ratio to be less than 1.1 (As specified at section 6: employer's requirements)		kVA	620

3. DOLPA

Schedule No. 1. Plant and Equipment including Mandatory Spares to be supplied from abroad

Item No.	Item description	Country of origin	Estimated	
			Unit	Quantity
1	2	3	4	5
	Part-A: Employer Assessed Quantities			
PART 1.1	Solar PV Plant, DOLPA			
2	PV inverters with accessories all complete String inverters with multiple MPPTs, DC input not more than 15kWp per MPPT, Minimum euro efficiency 98%, Maximum nominal AC rating of inverter should be 150kVA and maximum DC/AC ratio to be less than 1.1 (As specified at section 6: employer's requirements)		kVA	620

(Signature)



4. HUMLA

Schedule No. 1: Plant and Equipment including Mandatory Spares to be supplied from abroad

Item No.	Item description	Country of origin	Estimated	
			Unit	Quantity
1	2	3	4	5
	Part-A: Employer Assessed Quantities			
PART 1.1	Solar PV Plant, HUMLA			
2	PV inverters with accessories all complete		kVA	995
	String inverters with multiple MPPTs, DC input not more than 10kWp per MPPT, Minimum euro efficiency 98%, Maximum nominal AC rating of inverter should be 50kVA and maximum DC/AC ratio to be less than 1.1 (As specified at section 6: employer's requirements)			

4. HUMLA

Schedule No. 1: Plant and Equipment including Mandatory Spares to be supplied from abroad

Item No.	Item description	Country of origin	Estimated	
			Unit	Quantity
1	2	3	4	5
	Part-A: Employer Assessed Quantities			
PART 1.1	Solar PV Plant, HUMLA			
2	PV inverters with accessories all complete		kVA	995
	String inverters with multiple MPPTs, DC input not more than 15kWp per MPPT, Minimum euro efficiency 98%, Maximum nominal AC rating of inverter should be 150kVA and maximum DC/AC ratio to be less than 1.1 (As specified at section 6: employer's requirements)			

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❖ Addendum 01 – Z

Existing Clauses	Amendments
Section 3.2.8 CCTV Camera & External Lighting System All lighting equipment shall be LED luminaries. They must comply with IES LM 79-08 and IES LM 80—15 standards.	Section 3.2.8 CCTV Camera & External Lighting System All lighting equipment shall be LED luminaries. They must comply with IES LM 79-08 and IES LM 80—15 standards. Bidders are required to submit certification in accordance with aforementioned IES or Alternate standards provided the certifying agencies are certified by ISO 17025 and 17065.

Addendum 01 – AA

Existing Clauses	Amendments
Section 1.3 Scope of Works The scope of supply, works and services shall cover, but not be limited to the following:	ADD: TRANSPORT OF EQUIPMENT TO SITES: The contractor shall be responsible for the loading, transport, handling and offloading of all equipment and materials from the place of manufacture or supply to sites. The contractor shall be responsible to select and verify the route, mode of transportation and make all necessary arrangement with the appropriate authorities as well as determining any transport restrictions and regulations imposed by the government and other local authorities. All transport packages containing critical units viz solar panels, containers among others shall be provided with sufficient number of electronic impact recorders (on returnable basis) during transportation to measure the magnitude and duration of the impact in all three directions. The acceptance criteria and limits of impact in all three directions which can be withstood by the equipment during transportation and handling shall be submitted by the contractor during detailed engineering. The recording shall commence in the factory and must continue till the units reach sites. The data of electronic impact recorders shall be downloaded at sites and a soft copy of it shall be handed over to the project. Further, contractor shall communicate the interpretation of the data within two weeks from the day of download.

