



**BIDDING DOCUMENTS
FOR
PROCUREMENT OF SERVICES**

**(This document is to be followed for below
mentioned tender works)**

Tender:

**SUPPLY & INSTALLATION OF SOLAR POWER SYSTEM FOR ALLERGY CENTER
NIH, STABLE AND CMLT BOYS HOSTEL**

2025-26



**NATIONAL INSTITUTE OF HEALTH
ISLAMABAD**



NATIONAL INSTITUTE OF HEALTH ISLAMABAD

1. These terms and conditions are applicable for the SUPPLY & INSTALLATION OF SOLAR POWER SYSTEM FOR ALLERGY CENTER NIH, STABLE AND CMLT BOYS HOSTEL at the National Institute of Health, Islamabad.
2. These terms and conditions are in harmony with PPRA rules.
3. This process follows Single stage Two envelope procedure as per PPRA.
4. No tender will be considered after the due date and time. Unsealed tenders will not be accepted.

TERMS & CONDITIONS:

BIDDING DOCUMENTS FOR SUPPLY & INSTALLATION OF SOLAR POWER SYSTEM FOR ALLERGY CENTER NIH, STABLE AND CMLT BOYS HOSTEL.

National Institute of Health (NIH), Islamabad (hereinafter referred to as "NIH"), invites sealed bids from eligible contractors/operators based on single stage two envelope procedure (PPRA) for the Supply & Installation of Solar Power System For Allergy Center NIH, Stable And CMLT Boys Hostel.

Sr no	Subject	Details
1	Employer	National Insittute of Health, Islamabad
2	Employer's Representative	MSD, NIH
3	Bid purchase Venue, Cost and Procedure	SINGLE STAGE TWO ENVELOPE PROCEDURE AS PER PPRA. DATE OF OPENING AS PER ADVERTISEMENT Office of DDO, Finance Division of this Institute. Price of the bidding documents is Rs.1000/- (Rupees one thousand



		only) per set. A request on company's letterhead is required with cash amount/payorder to be submitted. This advertisement is also available on PPRA website at www.ppra.org.pk . This bid is also available on EPADS system. It is mandatory that Bid is to be submitted on EPADS.
4	Terms and Conditions	All terms and conditions are to be duly signed by the bidder and submitted with the bid. Bid will not be accepted without authorized signature and stamp on terms and conditions which ensures compliance with the TORs in the future and TORs will be made part of the contract.
5	Pre-bid Meeting	16.03.2026 at 11.30 a.m
6	Pre-bid meeting Venue	Conference Room, NIH, Islamabad
7	Minutes of Pre-bid meeting and issuance of MOM	Within 5 days of Pre-bid meeting
8	Purchase of Bid Last Date	31.03.2026 at 11.00 a.m
9	Amount of Bid Security	A Bidder is required to deposit, along with its Bid, a bid security of Rs.300,000/- (Rupees three lac Only) (the " Bid Security "), refundable not later than 60 (sixty) days from the Bid Due Date, except in the case of the Qualified Bidder whose Bid Security shall be retained till award of the contract. The Bidders will have an option to provide



		Bid Security in the form of a demand draft or payment order acceptable to the Client.
10	Bid submission Instructions	<p>The Bidder shall also clearly indicate the name and address of the Bidder. In addition, the Bid Due Date should be indicated on the right hand top corner of each of the envelopes.</p> <p>Each envelope shall be addressed to:</p> <ul style="list-style-type: none">- Director Purchase and Procurement National Institute of Health, Chak Shahzad, Islamabad. Ph. 051-9255239- Email: purchasement@yahoo.com <p>If the envelopes are not sealed and marked as instructed above, the Client assumes no responsibility for the misplacement or premature opening of the contents of the Bid submitted and consequent losses, if any, suffered by the Bidder. Bids submitted by fax, telex, telegram or e-mail shall not be entertained and shall be rejected.</p> <p><u>Bids are to be submitted on EPADS and in Hardform.</u></p>
11	Bid Submission Instructions (Detailed)	<p>Bid needs to be submitted in soft form on EPADs and also in Hard form till provided on advertisement.</p> <p>Late submissions will not be entertained. NIH reserves the right to verify all information provided by bidders. Incomplete or falsified submissions will lead to disqualification. All expenses related to the preparation and</p>



		<p>submission of bids is the responsibility of the bidder. The supplier/contractor shall have to obey all the instructions issued to him from time to time by the CEO, NIH, Islamabad or his authorized officer in connection with contract. The CEO, NIH is the final authority to decide any dispute and problem if any during contract period and thereafter, the decision of the Chief Executive Officer shall be final and binding on the supplier/contractor. Any other clarification, if required, can be obtained from Purchase & Procurement Department of this Institute. Conditional or incomplete tenders will not be accepted. The tender of those bidders whose bid found unrealistic will not be considered. No Bidder shall submit more than one Bid for the Project. A Bidder bidding individually shall not be entitled to submit another bid. Bidders are expected to carry out their own surveys, investigations and other detailed examination of the Project before submitting feasibility, proposals along with their Bids.</p>
12	Bid Submission Venue	The bids, prepared in accordance with the instructions in the bidding documents, must reach at National Institute of Health, Chak Shahzad, Islamabad in the office of Director Purchase & Procurement.
13.	Bid submission Date & Time	31.03.2026 at 11.00 a.m
14	Bid opening Date and Time	31.03.2026 at 11.30 a.m



15	Bid opening Venue	Conference Room, NIH, Islamabad
16	Bid Rejection	<p>PPRA rules will be followed accordingly. Notwithstanding anything contained in this bidding documents, the Employer reserves the right to reject any Bid and to annul the Bidding Process and reject all Bids at any time without any liability or any obligation for such acceptance, rejection or annulment, and without assigning any reasons thereof. In the event that the Employer rejects or annuls all the Bids, it may, in its discretion, invite all eligible Bidders to submit fresh Bids hereunder.</p> <p>The Employer reserves the right not to proceed with the Bidding Process at any time, without notice or liability, and to reject any Bid without assigning any reasons.</p>
17	Performance Security	<p>10% performance security is to be submitted by a successful bidder within 7 days of issuance of letter of intent in the name of Executive Director, National Institute of Health, Islamabad. No other negotiable document except Bank draft/ Call deposit/Bank guarantee will be accepted. Any Previous security will not be considered for this tender. Validity of performance security should be till 30 days after completion date of project. Performance security will be returned after completion of project satisfactorily.</p>
18	Defect Liability Period	<p>Retention money of 5% will be deducted from the final bill which will be returned after completion of DLP (Defect</p>



		liability period). DLP is 12 months for this project.
19	Bid Validity Period	210 Days
20	Time of Completion	120 Days
21	<p style="text-align: center;"><u>Technical Evaluation Criteria (Mandatory Requirements)</u></p> <p>All bidders must submit proof of:</p> <ol style="list-style-type: none">i. Registration: Bidders must be registered entities and provide proof of registration with relevant authorities in Pakistan i.e. FBR (Federal) NTN active status on the date of opening of bid and FBR (Federal) STRN active status on the date of opening of bidii. Bidder must attach a cover letter with the bid containing details of content of the bid.iii. SECP, Registrar of firms, etc. Registration of the firmiv. Bid Securityv. Contract must have valid firm/business registered with FBR on the same name which is shown on the FBR portal.vi. Bids on the individual's name will be rejected.vii. An Affidavit on Rs. 100/- stamp paper duly attested by Notary public, that the firm will provide original/ genuine and brand-new products and not the substandard, poor quality, fake/ counterfeited products / items. Undertaking that firm will provide after sale service for a period of one year.viii. Must have office setup and support center in	



	<p>Islamabad/Rawalpindi. Affidavit for after sales local support in the installation city.</p> <p>ix. Bidder should have authorized distributor / Dealership Certificate where applicable.</p> <p>x. List of previous clients with installed system of 50KW or above showing relevant experience and satisfactory report (completion certificate, purchase orders etc.) in last 2 Years.</p> <p>xi. Bank statement for the past two years showing annual turnover of at least 25 Million. Account should be on company's name either sole proprietor or other forms of Companies.</p> <p>xii. The Bidder shall submit its audited financial statement and bank statement for the last two years. The submitted audited statement and bank statement shall be evaluated to gauge the financial strength of the company/firm/consortium to take up the assignment for execution.</p> <p>xiii. Complete set of technical information, description data, literature and drawings as required in accordance with Annex-II. This will include but not be limited to the following:</p> <p>(I) A sufficient number of drawings, installation layout, catalogues, illustrations and such other information as are necessary to illustrate clearly the significant characteristics such as general construction dimensions and other relevant information about the Goods/Services to be provided.</p> <p>(II) Detail of equipment with capacity</p> <p>(III) Projected Energy output (kWh/day, kWh/month & kWh/year) from installed system.</p> <p>(IV) European, USA, Canadian, Chinese brands or equivalent are accepted for Panels and controller</p> <p>xiv. An affidavit claiming the warranty period of equipment and of total system. (explicitly mention the warranty period of solar modules,</p>
--	--



	<p>inverter and total system by bidder).</p> <p>xv. <u>An affidavit must be provided in which contractor has mentioned that the firm has never been blacklisted from any government or private institution and contractor accepts all terms and conditons and contractor will not go to any litigation against NIH in any case.</u></p> <p>xvi. <u>Registration with PEC in C-4 or above category.</u></p> <p>xvii. In case any of the above criteria are not met, bid will not be considered.</p>															
22	<p style="text-align: center;"><u>Technical Evaluation Criteria (Scoring)</u></p> <table border="1" data-bbox="342 888 1425 1818"> <thead> <tr> <th data-bbox="342 888 483 974">Sr. No.</th> <th data-bbox="483 888 1224 974">Description</th> <th data-bbox="1224 888 1425 974">Marks</th> </tr> </thead> <tbody> <tr> <td data-bbox="342 974 483 1199">1</td> <td data-bbox="483 974 1224 1199">Specific relevant experience of company / firm / on similar nature projects will secure following marks on successfully completion: - Projects of Rs. 50 million = 10 Projects of Rs. 100 million = 20 03 projects of 50 KW or above each = 10</td> <td data-bbox="1224 974 1425 1199">30</td> </tr> <tr> <td data-bbox="342 1199 483 1346">2</td> <td data-bbox="483 1199 1224 1346">02 Completed projects of 100KW or above in last two years = 05 Marks 02 Completed Projects of 150 KW and above in last two years = 10 Marks</td> <td data-bbox="1224 1199 1425 1346">10</td> </tr> <tr> <td data-bbox="342 1346 483 1566">3</td> <td data-bbox="483 1346 1224 1566">Quality of work after installation support (of atleast 1 year). Bidders must provide list of 02 customers where projects of 50 KW & above have been delivered along with certificate of satisfactory services provision. (Each service installation will earn 5 marks)</td> <td data-bbox="1224 1346 1425 1566">10</td> </tr> <tr> <td data-bbox="342 1566 483 1818">4</td> <td data-bbox="483 1566 1224 1818">Proposed Team along with CVs with relevant qualification & Experience for each of the applying lot ● 1 Professional Engineer with B.Sc. / BE in Electrical/Mechanical or equivalent/Relevant filed (10 marks for engineer with 10 years or above experience) ● 1 Associate Engineer with DAE (5 marks for</td> <td data-bbox="1224 1566 1425 1818">15</td> </tr> </tbody> </table>	Sr. No.	Description	Marks	1	Specific relevant experience of company / firm / on similar nature projects will secure following marks on successfully completion: - Projects of Rs. 50 million = 10 Projects of Rs. 100 million = 20 03 projects of 50 KW or above each = 10	30	2	02 Completed projects of 100KW or above in last two years = 05 Marks 02 Completed Projects of 150 KW and above in last two years = 10 Marks	10	3	Quality of work after installation support (of atleast 1 year). Bidders must provide list of 02 customers where projects of 50 KW & above have been delivered along with certificate of satisfactory services provision. (Each service installation will earn 5 marks)	10	4	Proposed Team along with CVs with relevant qualification & Experience for each of the applying lot ● 1 Professional Engineer with B.Sc. / BE in Electrical/Mechanical or equivalent/Relevant filed (10 marks for engineer with 10 years or above experience) ● 1 Associate Engineer with DAE (5 marks for	15
Sr. No.	Description	Marks														
1	Specific relevant experience of company / firm / on similar nature projects will secure following marks on successfully completion: - Projects of Rs. 50 million = 10 Projects of Rs. 100 million = 20 03 projects of 50 KW or above each = 10	30														
2	02 Completed projects of 100KW or above in last two years = 05 Marks 02 Completed Projects of 150 KW and above in last two years = 10 Marks	10														
3	Quality of work after installation support (of atleast 1 year). Bidders must provide list of 02 customers where projects of 50 KW & above have been delivered along with certificate of satisfactory services provision. (Each service installation will earn 5 marks)	10														
4	Proposed Team along with CVs with relevant qualification & Experience for each of the applying lot ● 1 Professional Engineer with B.Sc. / BE in Electrical/Mechanical or equivalent/Relevant filed (10 marks for engineer with 10 years or above experience) ● 1 Associate Engineer with DAE (5 marks for	15														



		engineer with 10 years or above experience)	
		Financial Position (Bank Statement for period 01.01.25 to 31.12.2025) 05 marks for Turnover up to 10.0 million 10 marks for Turnover up to 15.00 million 15 marks for Turnover up to 20.0 million & above	15
5		Project completion and after sales support plan (where services of 1 year or above after installation has been provided) for 03 projects of 50 KW or above.	20
		Total	100
Only the Bids securing minimum 70% marks would be declared technically qualified/accepted.			
23	Standards: The goods supplied under this Contract shall conform to the standards mentioned in the Technical Specifications		
24	<u>Clarification of Bid</u>		
	<p>i. Bidders requiring any clarification on the bidding documents may notify the Employer in writing or by fax and e-mail. The Employer shall endeavor to respond to the queries by letter or e-mail. The Employer will forward all the queries and its responses thereto, to all Bidders without identifying the source of queries.</p> <p>ii. The Employer shall endeavor to respond to the questions raised or clarifications sought by the Bidders. However, the Employer reserves the right not to respond to any question or provide any clarification, in its sole discretion, and nothing in this Clause shall be taken or read as compelling or requiring the Employer to respond to any question or to provide any clarification.</p> <p>iii. The Employer may also on its own motion, if deemed necessary, issue interpretations and clarifications to all Bidders. All clarifications and interpretations issued by the Employer shall be deemed to be part of the Bidding Documents. Verbal</p>		



	<p>clarifications and information given by Employer or its employees or representatives shall not in any way or manner be binding on the Employer.</p> <p>iv. At any time prior to the Bid Due Date, the Employer may, for any reason, whether at its own initiative or in response to clarifications requested by a Bidder, modify the RFP by the issuance of Addenda. Any Addendum issued hereunder will be in writing and shall be sent to all the Bidders.</p> <p>v. In order to afford the Bidders a reasonable time for taking an Addendum into account, or for any other reason, the Employer may, in its sole discretion, extend the Bid Due Date.</p>
PARTICULAR CONDITIONS OF CONTRACT	
25	<p style="text-align: center;"><u>Responsibility of Successful Bidder</u></p> <p>i. Contract between both parties must adhere to terms and conditions, PPRA and ensuring compliance with applicable laws.</p> <p>ii. Obtaining and maintaining necessary permits from NIH, Islamabad.</p> <p>iii. The Contractor shall use the area only for the purpose specified in the agreement i.e. for Supply and Installation of Solar Power System and it should be within ethical, moral, legal and social bounds and should not violate Code of conduct as per federal government rules.</p> <p>iv. Contractor will not go for any litigation.</p> <p>v. NIH will be entitled at its discretion, to claim liquidated damages up to 0.05% of bid amount per day in case of delayed works. In case of extension of time, updated performance security with</p>



		<p>extended date may be submitted.</p> <p>vi. In case failure to complete the works, Work order will be cancelled with forfeiture of 10% performance security money. The case will also be put to PPRA for BLACK LISTING to take part in the tender competition for supply of store to NIH in future. This action will publicized for general awareness of other Government and Semi Government Departments/PPRA website.</p>
26	Financial Bid	<p>i. The contract will be awarded to the highest evaluated responsive bidder offering the lowest price, provided all other terms and conditions are met and mandatory requirements are fulfilled and technically qualified.</p> <p>ii. NIH reserves the right to reject any or all bids as per PPRA rules.</p> <p>iii. The Chief Executive Officer, NIH is not bound to issue work order against all work items of BOQs mentioned in the tender form. He may issue work order either for less or more quantity as per requirement of the concerned departments.</p> <p>iv. Quoted rates must be exclusive GST. A copy of the sales tax registration certificate must be enclosed. In case of any escalation in rates of the item(s) during the period of contract, NIH, Islamabad will not be liable on this account and the consultant is bound to complete the supply in any case.</p> <p>v. Contract will be awarded on the basis of total lowest price by adding the cost of all the items in BOQs.</p>



27	Termination of Contract	All works should be completed within Time of completion Specified in clause 1, and failure to complete the work within mentioned time-period without proper justification can result in termination of contract. In this case performance security money of supplier/consultant will be forfeited and firm will be Black Listed to take part in the tender competition for supply to NIH in future. This action will be publicized for general awareness of the Government and Semi Government Departments.		
28	General Guidelines	1	Total PV Capacity	60 KWP for Allergy Centre
		2	Total PV Capacity	10KWP for Stable
		3	Total PV Capacity	30KWP for CMLT Boys Hostel
		4	Total Inverter Capacity	60KW for Allergy Center 10KW For Stable 30KW for CMLT Boys Hostel
		5	Net metering	All dealings, licensing and payments regarding issuance of net metering license shall be bidder's responsibility including change of energy meter, IESCO/Other department NOCs , NEPRA License and its fees etc.
		6	Transportation	Bidder's responsibility
		7	Labor, equipment delivery	All labor and project execution equipment shall be provided by bidder
		8	Completion timeline	Installation within 6-8 weeks after the issuance of Contract/PO, net metering file to be submitted within one week after completion.



		9	Payment Terms	<ul style="list-style-type: none"> ● 40 % after delivery of complete material on site ● 35% after successful commissioning of project including all licenses etc. ● 15% after one month of successful operation, including Net Metering, etc. ● 5% shall be released after two electricity billing cycles and active net metering is reflected in the bills and upon issuance of satisfaction note / project completion certificate by the technical committee. ● 5% remaining amount will be DLP that will be released after completion of DLP period as mentioned in the preceding terms and conditions. 	
29	ANNEXURES	<ul style="list-style-type: none"> - Annex I – Bill of Quantities - Annex II – Technical Specifications 			

30. All the bidders are informed that according to Section-3 S.No. 22A (b) contained in Schedule-1 to Stamp Act-1899 regarding procurement of store and material, in case of agreement made or entered in to by a contractor agency or organization set up or controlled by



the federal or the Provincial Govt. Stamp Duty @ Rupees twenty five paisa for every one hundred rupees or part thereof of the amount by the Finance Division of this Institute.

31. Contract will be made on Stamp Paper (no-judicial) for Rs.100/- only beyond the amount of Rs.10.00 Million or technicality involved.

32. If the bidder fails to supply/complete the work within stipulated time period, then 1% demurrage charges monthly will be deducted from their bill.

33. All firms are directed to quote their bids/rates on online portal EPADS as well as original bid/rates must be submitted in hard form in Purchase and procurement department, otherwise bid will not be entertained. Contractor must be registered with PPRA EPADS portal.

**Director
Purchase & Procurement**

ACCEPTANCE CERTIFICATE BY THE BIDDER

We have read the contents of the terms and conditions (from S.No.1-33) carefully for participating in the tender of NIH Islamabad and accepted & agreed to abide by all terms and conditions prescribed above in case our tender is accepted.

Date: _____

Place: _____

Signature of Tenderer: _____

Address: _____

Seal of firm: _____

Phone No.: _____

Fax No/Mobile No.: _____



FORM OF CONTRACT AGREEMENT (Annex-A)

THIS CONTRACT AGREEMENT (hereinafter called the “Agreement”) made on the _____ day of _____ 2026 between **National Institute of Health** (hereinafter called the “Employer”) of the one part and _____ (hereinafter called the “Consultant”) of the other part.

WHEREAS the Employer is desirous that certain Works, viz _____ should be executed by the Consultant and has accepted a Bid by the Consultant for the execution and completion of such Works and the remedying of any defects therein.

NOW this Agreement witnesseth as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the terms and Conditions of Contract hereinafter referred to.
2. The following documents after incorporating addenda, if any except those parts relating to Instructions to Bidders, shall be deemed to form and be read and construed as part of this Agreement, viz:
 - (a) The Letter of Acceptance of Bid
 - (b) Terms and Conditions duly signed by Employer and Successful Bidder
3. In consideration of the payments to be made by the Employer to the Consultant as hereinafter mentioned, the Consultant hereby covenants with the Employer to execute and complete the Works and remedy defects therein in conformity and in all respects within the provisions of the Contract.
4. The Employer hereby covenants to pay the Consultant, in consideration of the execution and completion of the Works as per provisions of the Contract, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS WHEREOF the parties hereto have caused this Contract Agreement to be executed on the day, month and year first before written in accordance with their respective laws.

Signature of the Contactor

Signature of the Employer



FINANCIAL BID

Table-I: Summary of Bid Price

Sr. No.	Description	Unit	Qty	Total lump-sum Bid Price in PKR (in words and figures)
1	Supply, Installation / Commissioning of Solar Power Energy System, 60 KW, On-Grid System with Net Metering for Allergy Center (Based on Turn-key basis, with 20 years warranty for solar panels and 05 years warranty period for allied equipment.	Job	01	
2	Supply, Installation / Commissioning of Solar Power Energy System, 10 KW, On-Grid System with Net Metering for Stable (Based on Turn-key basis, with 20 years warranty for solar panels and 05 years warranty period for allied equipment.	Job	01	
3	Supply, Installation / Commissioning of Solar Power Energy System, 30 KW, On-Grid System with Net Metering for CMLT Boys Hostel (Based on Turn-key basis, with 20 years warranty for solar panels and 05 years warranty period for allied equipment.	Job	01	

Table-II: Total Lump-Sum Price/Package

Sr. No.	Description	Unit	Qty	Total lump-sum Bid Price in PKR (in words and figures)
I.	Supply, Installation / Commissioning of Solar Power Energy System, 60 KW, 10 KW & 30 KW, On Grid System with Net-Metering (separately for each of 3 systems) (Based on Turnkey basis, with 20 years warranty for solar panels and 05 years warranty period for allied	Job	01	



1	<p>equipment (as mentioned in Technical Specifications Section Annex-II), comprising following essential equipment/services:</p> <ul style="list-style-type: none">a) Solar PV Modulesb) Grid Inverterc) Elevated Mounting Structure & Civil works Wiring & Protection Equipment etc.(AC, DC, earthing, lightning protection and surge arresters)d) Installation, Testing & Commissioninge) Net Meteringf) NEPRA Licensing Fees <p>II. Annual Operation & Maintenance Cost (1 Year)</p> <p>III. After sales services of 01 Year.</p> <p>Note: Vendors may visit the sites for survey/assessment as per their need. All the details/technical description is mentioned in Annex-II which must be followed in all respects.</p>			
---	---	--	--	--

- a) Currency: Pakistani Rupees
- b) Rates must be exclusive GST.
- c) Any other rate or mis-printing or wrong input of rates will be considered as it is and will not be changed afterwards and bid will be rejected if filled rates are not understandable.
- d) Table-I prices (Sr. 1-3) will be summed in Table-II and the prices of both tables will be compatible with each other.

No. of quoted items

Value of quoted items

Fix Earnest Money

Signature of authorized person: _____

Seal of Company/firm: _____

Date: _____



Annex-I: Bill of Quantities

The technical proposals must provide the following details at a minimum.

BOQ

Sr. #	Description of Items	Capacity	Unit	Quantity
1	PV modules, Minimum Capacity, not less than 500Wp	KW		
2	Grid Tied Inverter, KW	KW		
Allied Material				
Bidders are requested to VISIT the site for exact measurements				
3	PV Mounting Structures, with complete fixing equipment.	-		
4	PV -Cable 1C x 6sq mm, CU/PVC/FLEX	-	Mtr	
5	Depends on inverters	-	Mtr	
6	Earthing-Cable 1C x 4 Sqmm, CU/PVC/FLEX (Green)	-	Mtr	
7	Cable Tray, 100 x 50 mm with 4 inch stand	-	Mtr	
8	DC Fuse Box with Surge Protection & PV string isolated fuses 1000 V DC for String Protection, Lightning Protection			
9	MCB 4P Between AC LT side and inverter	-	Nos	1
10	Installation Material	-		
Installation, Testing & Commissioning				
11	Installation, Testing & Commissioning of Solar System, Services	-	Job	1

Note: Design and installation layout of system to be submitted along with this BOQ



Annex-II: Technical Specifications

General System Description

The system shall be designed and sized as per the site requirements and shall consist of mainly the following:

- I. Solar Photovoltaic panels
- II. Grid Tied Inverters
- III. PV mounting Structure
- IV. Cables and other accessories
- V. Protection Systems
- VI. Surge Arrestors
- VII. Lighting Protection System
- VIII. Net Metering

I. Solar Photovoltaic panels

Parameters	Minimum Specifications Required
Module Make	Tier 1, Brand should be verifiable
PV Module Type	Mono-Perc (Component Rating >500 Watts)
Cell Quality	A Grade (verifiable) Flash Test Report Required
Module Efficiency	≥21% or higher
Operating Temperature	-40°C to +85 °C
Temperature Coefficient (Pmax)	-0.4% / o C or less
Certification	IEC 61215, IEC 61730, IEC61701 or equivalent
Junction Box	IP 6, 66 , 68 with bypass Diode
Cable	Min. 4 mm ² (IEC)
Connectors	MC4 or compatible weatherproof
Front Cover	3.2 mm prism type tempered glass or higher
Product and Performance Warranty	Product and performance Warranty for 20 Years (≥ 80% at year 20)

II. Grid Tied Inverter:

Parameters	Minimum Specifications Required
Inverter Make	Brand should be verifiable (EU/USA/China origin), Qualifying the given international standards
Inverter Type	Grid/Genset synchronized Pure Sine wave.



Inverter Size (KW)	60 KW, 10 KW & 30 KW or as per site requirement
Grid/ Generator Synchronization	On grid inverters are only synchronize with grid when grid supply are off, solar system shut down itself
Output Voltage Range	230VAC/400 VAC \pm 5%
Solar Panel to Inverter Ratio	1:1
IP Rating/ Dust Proofing	Preferred IP 65 (IEC 60529)/ outdoor use
Frequency	50Hz
Max. efficiency/Euro-eta	98% or above
Protections	<ul style="list-style-type: none"> ● Short Circuiting ● Surge Protection ● PV reverse polarity protection ● Anti-Islanding Protection ● Leakage current protection ● High Insulation Input Input <ul style="list-style-type: none"> ● Over voltage(PV) (if built-in) ● Harmonics Filter Output Output <ul style="list-style-type: none"> ● Over voltage (AC)
Operating Temperature	0 to 50oC
Humidity	10 ~90%RH
Performance guarantee	5 years Replacement of inverter 10 years equipment life guarantee
Termination Required	At LT Side
Input Voltage Range	150 to 800V or above, as per design (depend upon the selected design)
Max Input Voltage Range	1000 V dc
Power Factor	0.8 leading/lagging
Display	Screen for parameters display, LCD/Wifi+App
Applicable Standards and Compliances	UL1741, UL1699B, UL1998, IEEE1547, CSA C22.2 #107.1-01, FCC Class A, ANRE 30, AS 4777, BDEW 2008, C10/11:2012, CE, CEI 0-16, CEI O-21, EN 50438:2013*, G59/3, IEC 60068-2-x, IEC 61727, IEC 62109-1/2, IEC 62116, MEA 2013, NBR 16149, NEN EN 50438, NRS 097-2-1, PEA 2013, PPC, RD 1699/413, RD 661/2007, Res. N° 7:2013, S14777, TOR D4, TR 3.2.2, UTE C15- 712-1, VDE 0126-1-1, VDE-AR-N 4105, VFR 2014 Or equaling with supporting documents



Installation of Inverters	At suitable available place, as per the instruction of the Engineer in-charge.
Fault Detection	Remote fault detection supported
Data Analysis	Remote Data collection supported, Online data access through portal
Parameters Modification	Remote parameter modifications supported

III. PV Mounting Structure:

Should specify structure design (in Technical Proposal) before evaluation of tender by conducting pre survey of available space. Proper mounting needs to be designed according to the installation area. All proposed structures should comply with the standards and requirements below.

Description	Requirements
Mounting Structure	Preferably Elevated Structure (should confirm this in survey and mention in technical proposal)
Structure Material	Mild steel Galvanized / Aluminum or equivalent material more than 15 years of proven life. Nuts & bolts should be of SS
Wind Loading	Must provide SAP report and stability certificate from structure engineer before time of execution Mounting system should be able to allow air circulation for cooling in high temperature and withstand wind speed of 150 Km/hour at 3 sec gust
Angle adjustment mounting structure	Angle adjustment should be in accordance to specifications for Islamabad. Manual Seasonal adjustments options should be available on flat roofs structures
Material surface protection	Mounting structure should be Galvanized not less than 90 microns (Hot dip Steel). (or follow Applicable Standards)
Civil Work	Ground slope should be maintained properly to allow access water drainage. The Civil Design should comply with the ACI Code/ IBC Codes. All the required civil work must be included. SAP analysis report of civil work should be Submitted

IV. Cabliq

- a. All exposed wiring (with the possible exception of the module interconnects) must be covered in conduits/duct. Wiring through roofing, walls and other structures must be protected through the



- use of bushings. Wiring through roofing must form a waterproof seal (applicable for wiring only).
- b. For conduit and duct flexible PVC material with suitable size must be used, so that 1/2 spaces in a conduit should be empty.
 - c. All wiring shall be color coded as per IEC standards and labeled at termination point.
 - d. No conduit or fitting shall be attached directly to hatch or any other non-supportive surface
 - e. Especially avoid installing the conduit direct over the roof; there must be distance not less than 2 inches between the roof surface and conduit/duct.
 - f. Cables must be joined by the use of Junction boxes, screw-connectors, and block connectors, MC4 or equaling connectors must be used for PV joints.
 - g. All wires must be terminated with proper end sleeves and wire thimbles with different colors for positive and negative polarity.
 - h. Calculation must support following or equaling standards
 - i .BS 7671:2008, IEE Wiring Regulations 17th Edition, IEC 60364:2001, IEC 62124 ed 1, sec 8.3
 - i. Size, voltage grade and manufacturer name should be printed on every cable with brand name
 - j. Wires (in-case of trenching should be buried under 2 feet and should be covered with conduit of suitable strength).
 - k. Cable voltage drop specifications are as followed that must be verified through software simulation/ Calculations.

Item	Requirements
PV to JB and JB to inverter	Stranded and flexible 99.9 % pure copper fire resistive insulation (Stranded) All exposed cables must be UV resistive. Voltage drop (node to node) should not be more than 1%
Grid/LV, DB to Inverter	99.9 % pure copper fire resistive insulation (Stranded) Voltage drop (node to node) not be more than 1 %

V. Protection Systems:



Required System Protection	Surge Arresters Lightening Protection DC over voltage protection Short circuit Protection Fuse/Breaker Protection. AC & DC disconnect
Protection Class	IP 66 or IP 67

VI. Surge Arrestors:

Parameters	Min. Specifications Required
Discharge current (I max)	min. 20kA (8/20 u sec.)
Impulse current (I imp)	min. 25kA (10/350u sec.)
Response time	≤50 n sec
Leakage current	≤ 1m A
Dielectric strength	2000 V AC @ 1 minute
Protection Class	Class 2(Type2) minimum
Discharge voltage	1000 V DC or 1200 VDC (Line to earth) or above(matching the size of inverter)
Ingress Protection	Minimum IP20 (placed in IP 65 Box along with other protections)
Short circuit withstand capacity	min. 30kA
Presence	On all MPP inputs of inverters

VII. Lightning Protection:

Parameters	Min. Specifications Required
Recommended method for Calculation	Rolling sphere method to ensure total insulation from lightning strike.
Air termination rod material	99 % Copper
Air termination rod Length	As per design
Earthing Pit	1 Ohm or as per net metering standards 99 % Pure copper plate/ rod
Air termination rod diameter	As per design
Cable for structure	4 mm ² or higher, 99.99% pure copper (strip or single conductor)
Cable for interconnecting/Grounding metal structure	6 mm ² or higher, 99.99% pure copper
Insulated Spacer	As per design
Cable Bracket	As per design
Stand – Fang Fix System	As per design



Compliance	ICE 62305-3 (EN62305-3) IEC 62305-3 (EN 62305-3) DIN VDE 0151 and DIN 18014
------------	---

VIII. Net Metering:

- a. Bidder must submit the certificate of Installers Service Providers for Net Metering minimum up to 250 KW under Category ARE V2.
- b. Bidder should submit the work schedule to complete the entire project including the net metering work.
- c. Bidder should also provide undertaking for completion of the Net metering work
The following outcome is expected:
 - d. Generation data must be logged and available for future access.
 - a. Data from weather station must also be integrated with the PC.
 - b. Generation data must be logged and secured off line with time tracks.
 - c. Data from the inverter shall also be logged and displayed on the software or GUI.
 - d. Alarms/alerts and timely notification of key performance indicators
 - e. Daily, Monthly, quarterly, and yearly reporting of deviations from the expected output should be displayed.