



Institute of  
Business Administration  
Karachi

*Leadership and Ideas for Tomorrow*

**BIDDING DOCUMENT**

**FOR**

**SUPPLY, CONSTRUCTION, INSTALLATION AND**

**COMMISSIONING OF 750 KW<sub>p</sub> ON-GRID SOLAR POWER SYSTEM**

**ROOF, CAR & BUS PORT MOUNTED**

**AT**

**INSTITUTE OF BUSINESS ADMINISTRATION KARACHI (MAIN CAMPUS)**

**VOLUME -1**

**General & Special Conditions of Contract**

**JULY 2020**



Hi-Tech Engineering Company  
Al-Fatah Chamber CC Area, KCHS Block 7/8 Near Old Duty Free Shop  
Sh-E-Faisal, Karachi, Pakistan  
Phone # 021-32361355 Mobile No. 0321-8909096 E-mail:  
info@hec-engg.com www.hec-engg.com

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## **1. PREAMBLE**

### **1.1. NAME OF JOB**

Design, Supply, Installation, Testing and Commissioning (DSITC) on Grid- Tie Basis of 750 KWp solar power plant at INSTITUTE OF BUSINESS ADMINISTRATION IBA KARACHI MAIN CAMPUS KARACHI UNIVERSITY ENCLAVE .

### **1.2. ABOUT THE CLIENT**

INSTITUTE OF BUSINESS ADMINISTRATION KARACHI is a pioneer business and most reputable business institute in Pakistan. It comprises of Two Campuses namely

- a) City Campus situated at Garden Road Saddar Karachi comprises 3.5 Acres
- b) Main Campus at Karachi university Enclave comprises of about 23.0 Acres.

As a good corporate citizen and in furtherance of its commitment towards renewable energy obligation, IBA is planning for installation of a 750 KWp Solar Power Plant inside its premise in Main Campus with the added intent of promoting Government of Pakistan's "Make-it-Environment Friendly Pakistan " initiative.

In first Phase IBA has planned to install 750 KWp Grid Tied Solar Plant at its Main Campus.

### **1.3. GENERAL SCOPE OF WORK**

i. Bids are invited for Design, supply, installation, testing, commissioning (SITC) contract (CMC) of minimum 750 KWp Solar Power Plant project on BOQ rate basis. ***The maximum annual generation of power shall not be below 1140 MWh/year*** (to be measured at feeder at substation i.e. grid end). The annual average solar insolation level at IBA is to be considered from the published data by NASA / AEDB.

ii. The general scope of work under this Contract involves design, engineering, supply, transportation, shifting, installation, testing, commissioning, construction & maintenance up to One year of the grid-connected solar photovoltaic power plant and evacuation of power into the allocated feeder of electrical substations. The scope comprises design, Supply, installation of SPV modules, support structures, junction boxes, grid-tied inverters, meters, control panel, power conditioning, hookup with substation feeder, isolation transformers, interconnections, wires, cables, bus bars, plant lighting system, remote monitoring and control hardware and software, protective devices, safety equipment and systems, drainage, cleaning system, etc. as per drawing & design approved.

#### **1.4. LOCATION OF SOLAR PLANT**

1.5 INSTITUTE OF BUSINESS ADMINISTRATION KARACHI IBA has identified a few potential CAR PORT, BUS PORT Mounted and Roof Top areas for installation of SPV Panels IN ITS MAIN CAMPUS AT KARACHI UNIVERSITY ENCLAVE .

#### **1.6 EXECUTING AUTHORITY**

Project department of INSTITUTE OF BUSINESS ADMINISTRATION IBA will be the executing authority. Registrar IBA or his sub delegated authority shall be the Engineer In Charge (EIC) of the project. All post-order technical correspondence shall be addressed to the EIC.

#### **1.6 DISCLAIMER:**

The site data , drawings provided by Institute of Business Administration Karachi are indicative only and vendor should mandatorily visit the plant location and verify the site conditions independently prior to his participation in the bidding process (and prior to any design and engineering). Vendor/ Bidder shall check the space availability, wind speed, safety aspects as well as feasibility of the implementation of the offered technology and technical specifications of the tender. All specifications mentioned in this tender indicates minimum technical requirement. During the pre-bid meeting, vendor may propose alternate specifications or design though the final acceptance of the same rests with Institute of Business administration Karachi. The vendor / Bidder shall be solely responsible for feasibility of the plant to meet the performance parameters of the tender.

#### **1.7 PRE-BID MEETING**

i. A pre-bid meeting will be held at IBA Site and the interested vendors should visit and participate in the pre-bid meeting for first hand information & data collection and full understanding of the system.

ii. During the pre-bid meeting, vendor may propose alternate specifications or design, deviations, exclusions, additional detailing. Bidder is advised to mail the queries and deviations prior to attending the meeting. The final acceptance of such changes same rests with IBA. Such correspondence may be published and made known to other bidders through IBA website or through tender portal.

iii. IBA reserves the right to ignore queries raised by any participant of the pre-bid meeting subsequently unless same is linked to the earlier pre-queries & responses or is linked to any resultant corrigendum to the tender.

### **Document Control Sheet & Important dates**

Tender Reference No.	
Name of Organization	Institute of Business Administration Karachi
Tender Type (Open/Limited/EOI/Auction/Single)	Limited to Prequalified vendors
Tender Category (Services/Goods/works)	Works
Type/Form of Contract (Work/Supply/ Auction/Service/Buy/Empanelment/Sell)	Buy
Payment Mode (Online/Offline)	(Online on IBA prescribed Form / Offline)

Date of Issue/Publishing	October 23, 2020
Document Download/Sale Start Date	October 23, 2020
Pre-Bid Meeting	November 6, 2020
Document Download/Sale End Date	November 19, 2020
Last Date and Time for Submission of Bids	November 20, 2020, 3:00 PM
Place of Submission & Opening of Bids	Project Office, IBA Main Campus
Date and Time of Opening of Bids	November 20, 2020, 3:30 PM

**Pre-bid Meeting will be held on November 6, 2020 at 3:00 PM in the office of Senior Manager Contract (Project), IBA Main Campus.**

## **INVITATION FOR BIDS**

## NOTICE INVITING TENDER ( NIT )

**Institute of Business Administration IBA ( The Employer ) has arranged fund for the Project/Scheme cited above with Scope, Estimated Cost and other details are as under:-**

**(1) Scope: Supply, Construction, Installation, & Commissioning of 750 kW<sub>p</sub>, On-Grid Roof , Car Port & Bus Port Mounted Solar Power System at Institute of Business Administration Main Campus Main Campus Karachi.**

**(2) Location : IBA Main Campus at Karachi University Enclave Karachi**

**( 3 ) Project Period: 12 (Twelve) Months**

### **Eligible Bidders**

Bidding is open to only pre-qualified contractors duly registered by the Pakistan Engineering Council (PEC) in category C4 of the Works and CE-01, CE-10, EE-03, EE-04, EE-05, EE-10, ME-06 & EE-11 (Solar Energy) and relevant Tax Authorities & AEDB under relevant category..

**Bidding documents:** *Bidding Process shall be Single Stage Two Envelope.* Interested Prequalified firms/contractors can obtain the Bidding documents from the address mentioned below on payment of non-refundable fee of PKR 5000/- (Rupees Five Thousand only) in the form of Pay Order or Bank draft from any Schedule Bank of Pakistan in Favor of Institute of Business Administration (IBA) Karachi .

**Dead line of Issuance of Documents:** Documents will be issued to Prequalified firms from October 23, 2020 during working hours till November 19, 2020.

**Dead line of Submissions:** Bidding Documents duly filled and attached with relevant certificates must reach on the address given on or before November 20, 2020 upto 3.00 PM In Two (2) Copies. One Original and One Copy Sealed and clearly marked.

All inquiries/applications/documents should be addressed to the following: -

Address : Senior Manager Contracts Project Department

Institute of Business Administration IBA Karachi Main Campus University Road, Karachi, Telephone No 111-422-422, Ext: 2517, Mobile # 0321-8230724, E-mail : [nmalik@iba.edu.pk](mailto:nmalik@iba.edu.pk), WebSite: [www.iba.edu.pk](http://www.iba.edu.pk), Focal Person: Mr. Nasimul Haque Malik, Sr. Manager Contracts

Bid should must be accompanied by a bid security equivalent to 1% of the total Bidding cost in the shape of Pay Order / Demand Draft or a Bank Guarantee in favor of Institute of Business Administration Karachi IBA from any schedule Bank of Pakistan.

Bids shall be opened at 3.30 PM on the same day at same venue in the presence of bidders / authorized representatives who choose to attend the proceeding.

**Procuring Agency (IBA)** may reject any or all applications subject to the relevant provisions of Sindh Public Procurement Rules SPPR 2010 amended 2019. Applicants / Bidders will be informed, in due course, of the result of the Bids Technical & Financial evaluation.

## **INSTRUCTIONS TO BIDDERS**



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## **INSTRUCTION TO BIDDER**

### **IB.1 Scope of Bid**

- 1.1 Procuring agency as defined in the bidding data hereinafter called “the procuring agency” wishes to receive bids for the construction and completion of works as described in these bidding documents, and summarized in the bidding data hereinafter referred to as the “Works”.
- 1.2 The successful bidder will be expected to complete the works within the time specified in Appendix-A to Bid.

### **IB.2 Source of Funds**

- 2.1 Procuring agency has received/allocated/] applied for loan/grant/ Federal/ Provincial/Local Government funds from the source(s) indicated in the bidding data in various currencies towards the cost of the project /scheme specified in the bidding data, and it is intended that part of the proceeds of this loan/grant/funds will be applied to eligible payments under the contract for which these bidding documents are issued.

### **IB-3**

#### **Eligible Bidders**

- 3.1 This Invitation for Bids is open to all interested bidders who are eligible under provisions of Sindh Public Procurement Rules as mentioned below and the criteria given in the Notice Inviting Tender (NIT)/ Bidding Document.

Firms and individuals, national or international, may be allowed to bid for any project where international competitive bidding is feasible. Any conditions for participation shall be limited to those that are essential to ensure the bidder's capability to fulfill the contract in question.

- (a) Bidders may be excluded if;
  - (i) as a matter of law or official regulations, commercial relations are prohibited with the bidder's country by the federal government in case of ICB, or
  - (ii) a firm is blacklisted/ debarred by the procuring agency and the matter has been reported to the Authority, subject to Rule 30 of Sindh Public Procurement Rules 2010.
- (b) Government-owned enterprises or institutions may participate only if they can establish that they are;
  - (i) legally and financially autonomous, and
  - (ii) operate under commercial law.

Provided that where government-owned universities or research centers in the country are of a unique and exceptional nature, and their participation is critical to project implementation, they may be allowed to participate; and

Bidders shall include all those contractors who are registered or incorporated in Pakistan, irrespective of the nationality of their owners and professional staff, or

(c) Bidders are:-

- (i) Pre-qualified with procuring agency for particular project/scheme;
- (ii) Registered with Pakistan Engineering Council in particular category and discipline,
- (iii) Registered with relevant tax authorities (income/sales tax, wherever applicable)

#### **IB.4 One Bid per Bidder**

- 4.1 Each bidder shall submit only one bid either by himself, or as a partner in a joint venture. A bidder who submits or participates in more than one bid (other than alternatives pursuant to Clause IB.16) will be disqualified.

#### **IB.5 Cost of Bidding**

- 5.1 The bidders shall bear all costs associated with the preparation and submission of their respective bids, and the procuring agency will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

#### **IB.6 Site Visit**

- 6.1 The bidders are advised to visit and examine the site of works and its surroundings and obtain all information that may be necessary for preparing the bid and entering into a contract for construction of the works. All cost in this respect shall be at the bidder's own expense.
- 6.2 The bidders and any of their personnel or agents will be granted permission by the procuring agency to enter upon his premises and lands for the purpose of such inspection, but only upon the express condition that the bidders, their personnel and agents, will release and indemnify the procuring agency, his personnel and agents from and against all liability in respect thereof and will be responsible for death or personal injury, loss of or damage to property and any other loss, damage, costs and expenses incurred as a result of such inspection.

## **B. BIDDING DOCUMENTS**

### **IB.7 Contents of Bidding Documents**

7.1 The bidding documents, in addition to invitation for bids, are those stated below and should be read in conjunction with any addenda issued in accordance with Clause IB.9.

- a. Instructions to Bidders.
- b. Bidding Data.
- c. General Conditions of Contract, Part-I (GCC).
- d. Special Conditions of Contract, Part-II (SCC)
- e. Specifications.
- f. Form of Bid and Appendices to Bid.
- g. Bill of Quantities (Appendix-D to Bid).
- h. Form of Bid Security.
- i. Form of Contract Agreement.
- j. Forms of Performance Security, Mobilization Advance Guarantee, Integrity Pact and Indenture bond for secured advance.
- k. Drawings.

7.2 The bidders are expected to examine carefully the contents of all the above documents. Failure to comply with the requirements of bid submission will be at the bidder's own risk. Pursuant to Clause IB.26, bids which are not substantially responsive to the requirements of the BD will be rejected.

### **IB.8 Clarification of Bidding Documents :**

Any interested bidder requiring any clarification(s) in respect of the bidding documents may notify the procuring agency in writing at the procuring agency's address indicated in the Invitation for Bids/NIT. Procuring agency will respond to any request for clarification provided they are received at least five calendar days prior to the date of opening of bid. Provided that any clarification in response to query by any bidder; shall be communicated to all parties who have obtained bidding documents

### **IB.9 Addendum/Modification of Bidding Documents:**

9.1 At any time prior to the deadline for submission of bids, the procuring agency may, for any reason, whether at his own initiative or in response to a clarification requested by a interested bidder, modify the bidding documents by issuing addendum.

9.2 Any addendum thus issued shall be part of the bidding documents pursuant to sub- clause IB 7.1 hereof and shall be communicated in

writing to all bidders. Interested bidders shall acknowledge receipt of each addendum in writing to the procuring agency.

9.3 To afford bidders reasonable time in which to take an addendum into account in preparing their bids, the procuring agency may extend the deadline for submission of bids in accordance with IB.20

## **C. PREPARATION OF BIDS**

### **IB.10 Language of Bid**

10.1 The bid and all correspondence and documents related to the bid exchanged by a bidder and the procuring agency shall be in the language stipulated in the bidding data and Special Conditions of the Contract. Supporting documents and printed literature furnished by the bidders may be in any other language provided the same are accompanied by an accurate translation of the relevant parts in the bid language, in which case, for purposes of evaluation of the bid, the translation in bid language shall prevail.

### **IB.11 Documents Accompanying the Bid**

#### **11.1 *Each bidder shall:***

- (a) Submit a written authorization on the letterhead of the bidding firm, authorizing the signatory of the bid to act for and on behalf of the bidder;
- (b) Update the information indicated and listed in the bidding data and previously submitted with the application for prequalification, and continue to meet the minimum criteria set out in the prequalification documents, which as a minimum, would include the following :
  - (i) Evidence of access to financial resources along with average annual construction turnover;
  - (ii) Financial predictions for the current year and the following two years, including the effect of known commitments;
  - (iii) Work commitments since prequalification;
  - (iv) Current litigation information; and
  - (v) Availability of critical equipment. And
- (c) furnish a technical proposal taking into account the various Appendices to Bid specially the following:

***Appendix-E to Bid***

*Proposed Construction Schedule*

***Appendix-F to Bid***

*Method of Performing the Work*

***Appendix-G to Bid***

*List of Major Equipment*

***Appendix-K to Bid***

*Organization Chart for Supervisory Staff*

and other pertinent information such as mobilization programme etc;

- 11.2 Bids submitted by a joint venture of two (2) or more firms shall comply with the following requirements:
- (a) one of the joint venture partners shall be nominated as being in charge; and this authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the joint venture partners;
  - (b) the bid, and in case of a successful bid, the Form of Contract Agreement shall be signed by the authorized partner so as to be legally binding on all partners;
  - (c) the partner-in-charge shall always be duly authorized to deal with the procuring agency regarding all matters related with and/or incidental to the execution of works as per the terms and Conditions of Contract and in this regard to incur any and all liabilities, receive instructions, give binding undertakings and receive payments on behalf of the joint venture;
  - (d) all partners of the joint venture shall at all times and under all circumstances be liable jointly and severally for the execution of the contract in accordance with the contract terms and a statement to this effect shall be included in the authorization mentioned under Sub-Para (a) above as well as in the Form of Bid and in the Form of Contract Agreement (in case of a successful bid);
  - (e) a copy of the agreement entered into by the joint venture partners shall be submitted with the bid stating the conditions under which it will function, its period of duration, the persons authorized to represent and obligate it and which persons will be directly responsible for due performance of the contract and can give valid receipts on behalf of the joint venture, the proportionate participation of the several firms forming the joint venture, and any other information necessary to permit a full appraisal of its functioning. No amendments / modifications whatsoever in the joint venture agreement shall be agreed to between the joint venture partners without prior written consent of the procuring agency;
  - (f) submission of an alternative Letter of Intent to execute a Joint Venture Agreement shall be mandatory.
- 11.3 Bidders shall also submit proposals of work methods and schedule, in sufficient detail to demonstrate the adequacy of the bidders' proposals to meet the technical specifications and the completion time referred to sub- clause IB 1.2 hereof.

## **IB.12 Bid Prices**

- 12.1 Unless stated otherwise in the bidding documents, the contract shall be for the whole of the works as described in IB 1.1 hereof, based on the unit rates or prices submitted by the bidder or percentage quoted above or below on the rates of Composite Schedule of Rates (CSR), as the case may be.
- 12.2 The bidders shall fill in rates and prices for all items of the works described in the Bill of Quantities. *Items against which no rate or price is entered by a bidder will not be paid for by the procuring agency when executed and shall be deemed to be covered by rates and prices for other items in the Bill of Quantities.* In case of Composite Schedule of Rates, if the bidder fails to mention the percentage above or below, it shall be deemed to be at par with the rates of Composite Schedule of Rates.
- 12.3 The bid price submitted by the contractor shall include all rates and prices including the taxes. All duties, taxes and other levies payable by the contractor under the contract, or for any other cause during the currency of the execution of the work or otherwise specified in the contract as on the date seven days prior to the deadline for submission of bids.

Additional / reduced duties, taxes and levies due to subsequent additions or changes in legislation shall be reimbursed / deducted as per Sub-Clause 13.7 of the General Conditions of Contract Part-I.

- 12.4 The rates and prices quoted by the bidders are subject to adjustment during the performance of the contract in accordance with the provisions of Clause 13.7 of GCC. The bidders shall furnish the prescribed information for the price adjustment formulae in Appendix-C to Bid, and shall submit with their bids such other supporting information as required under the said Clause. Adjustment in prices quoted by bidders shall be allowed as per Sub-Para 4(ii) of Section C of Instructions to bidders and bidding data.

## **IB.13 Currencies of Bid and Payment**

- 13.1 The unit rates and the prices shall be quoted by the bidder entirely in Pak rupees. A bidder expecting to incur expenditures in other currencies for inputs to the works supplied from outside the procuring agency's country (referred to as the "Foreign Currency Requirements") shall indicate the same in Appendix-B to Bid. The proportion of the bid price (excluding Provisional Sums) needed by him for the payment of such Foreign Currency Requirements either (i) entirely in the currency of the bidder's home country or, (ii) at the bidder's option, entirely in Pak



rupees provided always that a bidder expecting to incur expenditures in a currency or currencies other than those stated in (i) and (ii) above for a portion of the foreign currency requirements, and wishing to be paid accordingly, shall indicate the respective portions in the bid.

13.2 The rates of exchange to be used by the bidder for currency conversion shall be the selling rates published and authorized by the State Bank of Pakistan prevailing on the date, 07 (seven) days prior to the deadline for submission of bids. For the purpose of payments, the exchange rates used in bid preparation shall apply for the duration of the contract.

#### **IB.14 Bid Validity**

14.1 Bids shall remain valid for the period stipulated in the bidding data from the date of opening of bid specified in clause IB.23.

14.2 In exceptional circumstances, prior to expiry of the original, the procuring agency may request the bidders to extend the period of validity for a specified additional period, which shall not be for more than one third of the original period of bid validity. The request and the responses thereto, shall be made in writing. A bidder may refuse the request without the forfeiture of the bid security. In case, a bidder agreed to the request, shall not be required or permitted to modify the bid, but will be required to extend the validity of the bid security for the period of the extension, and in compliance with Clause IB.15 in all respects.

#### **IB.15 Bid Security**

15.1 Each bidder shall furnish, as part of the bid, a bid security in the amount stipulated in the bidding data in Pak Rupees or an equivalent amount in a freely convertible currency.

15.2 The bid security shall be at the option of the bidder, in the form of deposit at call, Pay order or a bank guarantee issued by a Scheduled Bank in Pakistan or from a foreign bank duly counter guaranteed by a Scheduled Bank in Pakistan in favour of the procuring agency, which should commensurate with the bid validity period. The bank guarantee for bid security shall be acceptable in the manner as provided at Annexure BS-1

15.3 Any bid not accompanied by an acceptable bid security shall be rejected by the procuring agency as non-responsive.

15.4 Bid security shall be released to the unsuccessful bidders once the contract has been signed with the successful bidder or the validity period has expired.

15.5 The bid security of the successful bidder shall be returned when the bidder has furnished the required Performance Security and signed the Contract Agreement.

15.6 The bid security may be forfeited:

- (a) if the bidder withdraws his bid except as provided in sub- clause IB 22.1;
- (b) if the bidder does not accept the correction of his bid price pursuant to sub- clause IB 27.2 hereof; or
- (c) In the case of successful bidder, if he fails within the specified time limit to:
  - (i) furnish the required Performance Security; or
  - (ii) sign the Contract Agreement.

#### **IB.16 Alternate Proposals/Bids**

16.1 Each bidder shall submit only one bid either by himself, or as a member of a joint venture, until and unless they have been requested or permitted for alternative bid, then he has to purchase separate bidding documents and alternate bid shall be treated as separate bid.

16.2 Alternate proposals are allowed only for procurement of works where technical complexity is involved and more than one designs or technical solutions are being offered. Two stage two envelope bidding procedure will be appropriate when alternate proposal is required.

16.3 Alternate bid(s) shall contain (a) relevant design calculations; (b) technical specifications; (c) proposed construction methodology; and (d) any other relevant details / conditions, provided that the total sum entered on the Form of Bid shall be that which represents complete compliance with the bidding documents.

#### **IB.17 Pre-Bid Meeting**

17.1 Procuring agency may, on his own motion or at the request of any bidder, hold a pre bid meeting to clarify issues and to answer any questions on matters related to the bidding documents. The date, time and venue of pre-bid meeting, if convened, shall be communicated to all bidders. All bidders or their authorized representatives shall be invited to attend such a pre-bid meeting at their own expense.

17.2 The bidders are requested to submit questions, if any, in writing so as to reach the Procuring agency not later than seven (7) days before the proposed pre-bid meeting.

- 17.3 Minutes of the pre-bid meeting, including the text of the questions raised and the replies given, will be transmitted without delay to all bidders.

Any modification of the bidding documents listed in sub- clause IB 7.1 hereof, which may become necessary as a result of the pre-bid meeting shall be made by the procuring agency exclusively through the issue of an Addendum pursuant to Clause IB.9 and not through the minutes of the pre-bid meeting.

- 17.4 Absence at the pre-bid meeting will not be a cause for disqualification of a bidder.

#### **IB.18 Format and Signing of Bid**

- 18.1 Bidders are particularly directed that the amount entered on the Form of Bid shall be for performing the contract strictly in accordance with the bidding documents.

- 18.2 All appendices to bid are to be properly completed and signed.

- 18.3 Alteration is not to be made neither in the form of bid nor in the Appendices thereto except in filling up the blanks as directed. If any such alterations be made or if these instructions be not fully complied with, the bid may be rejected.

- 18.4 Each bidder shall prepare by filling out the forms without alterations and shall provide an original copy along with photocopies as per the requirement of the procuring agency specified in the bidding data. The original as well as copies of the document shall be clearly marked as "ORIGINAL" and „COPY", as the case may be. If there is any discrepancy between original and copy (ies) then the original shall prevail.

- 18.5 The original and all copies of the bid shall be typed or written in indelible ink (in the case of copies, Photostats are also acceptable) and shall be signed by a person(s) duly authorized to sign on behalf of the bidder pursuant to sub- clause IB 11.1(a) hereof. All pages of the bid shall be initialed and stamped by the person(s) signing the bid.

- 18.6 The bid shall contain no alterations, omissions or additions, except to comply with instructions issued by the procuring agency, or as are necessary to correct errors made by the bidder. Such corrections shall be initialed by the person(s) signing the bid.

- 18.7 Bidders shall indicate in the space provided in the Form of Bid their full and proper postal addresses at which notices may be legally served on them and to which all correspondence in connection with their bids and

the contract is to be sent.

- 18.8 Bidders should retain a copy of the bidding documents as their file copy.

## **D. SUBMISSION OF BIDS**

### **IB.19 Sealing and Marking of Bids**

19.1 Each bidder shall submit his bid as under:

- (a) ORIGINAL and One COPIES of the bid shall be separately sealed and put in separate envelopes and marked as such.
- (b) The envelopes containing the ORIGINAL and COPIES shall be put in one sealed envelope and addressed as given in sub – clause IB 19.2 hereof.

19.2 The inner and outer envelopes shall:

- (a) be addressed to the procuring agency at the address provided in the bidding data;
- (b) bear the name and identification number of the contract as defined in the bidding data; and
- (c) provide a warning not to open before the time and date for bid opening, as specified in the bidding data.

19.3 In addition to the identification required in sub- clause IB 19.2 hereof, the inner envelope shall indicate the name and postal address of the bidder to enable the bid to be returned unopened in case it is declared “late” pursuant to Clause IB.21

19.4 If the outer envelope is not sealed and marked as above, the procuring agency will assume no responsibility for the misplacement or premature opening of the Bid.

### **IB.20 Deadline for Submission of Bids**

- 20.1 (a) Bids must be received by the procuring agency at the address specified not later than the time and date stipulated in the bidding data,

(b) Bids with charges payable will not be accepted, nor will arrangements be undertaken to collect the bids from any delivery point other than that specified above. Bidders shall bear all expenses incurred in the preparation and delivery of bids. No claims shall be entertained for refund of such expenses,

(c) Where delivery of a bid is by mail and the bidder wishes to receive an acknowledgment of receipt of such bid, he shall make a request for such acknowledgment in a separate letter attached to but not included in the sealed bid package,

(d) Upon request, acknowledgment of receipt of bids will be provided to those making delivery in person or by messenger.

20.2 The Procuring Agency may, at its discretion, extend the deadline for submission of bids by issuing an amendment in accordance with IB 09. In such case, all rights and obligations of the procuring agency and the bidders shall remain the same as mentioned in the original deadline.

#### **IB.21 Late Bids**

(a) any bid received by the procuring agency after the deadline for submission of bids prescribed in to clause IB 20 shall be returned unopened to such bidder.

(b) delays in the mail, person in transit, or delivery of a bid to the wrong office shall not be accepted as an excuse for failure to deliver a bid at the proper place and time. It shall be the bidder's responsibility to submit the bid in time.

#### **IB.22 Modification, Substitution and Withdrawal of Bids**

22.1 Any bidder may modify, substitute or withdraw his bid after bid submission provided that the modification, substitution or written notice of withdrawal is received by the procuring agency prior to the deadline for submission of bids.

22.2 The modification, substitution, or notice for withdrawal of any bid shall be prepared, sealed, marked and delivered in accordance with the provisions of Clause IB.19 with the outer and inner envelopes additionally marked "MODIFICATION", "SUBSTITUTION" or "WITHDRAWAL" as appropriate.

22.3 No bid may be modified by a bidder after the deadline for submission of bids except in accordance with to sub - clauses IB 22.1 and IB 27.2.

- 22.4 Withdrawal of a bid during the interval between the deadlines for submission of bids and the expiration of the period of bid validity specified in the Form of Bid may result in forfeiture of the bid security in pursuance to clause IB 15.

## **E. BID OPENING AND EVALUATION.**

### **IB.23 Bid Opening**

- 23.1 Procuring agency will open the bids, including withdrawals, substitution and modifications made pursuant to Clause IB.22, in the presence of bidders' representatives who choose to attend, at the time, date and location stipulated in the bidding data. The bidders or their representatives who are in attendance shall sign an attendance sheet.
- 23.2 Envelopes marked "MODIFICATION", "SUBSTITUTION" or "WITHDRAWAL" shall be opened and read out first. Bids for which an acceptable notice of withdrawal has been submitted pursuant to clause IB.22 shall not be opened.
- 23.3 Procuring agency shall read aloud the name of the bidder, total bid price and price of any Alternate Proposal(s), if any, discounts, bid modifications, substitution and withdrawals, the presence or absence of bid security, and such other details as the procuring agency may consider appropriate, and total amount of each bid, and of any alternative bids if they have been requested or permitted, shall be read aloud and recorded when opened.
- 23.4 Procuring Agency shall prepare minutes of the bid opening, including the information disclosed to those present in accordance with the sub-clause IB.23.3.

### **IB.24 Process to be Confidential.**

- 24.1 Information relating to the examination, clarification, evaluation and comparison of bid and recommendations for the award of a contract shall not be disclosed to bidders or any other person not officially concerned with such process before the announcement of bid evaluation report in accordance with the requirements of Rule 45, which states that Procuring agencies shall announce the results of bid evaluation in the form of a report giving reasons for acceptance or rejection of bids. The report shall be hoisted on website of authority and that of procuring agency if it website exists and intimated to all bidders at least seven (7) days prior to the award of contract. The announcement to all bidders will include table(s) comprising read out prices, discounted prices, price adjustments made, final evaluated prices and recommendations against

all the bids evaluated. Any effort by a bidder to influence the procuring agency's processing of bids or award.

Decisions may result in the rejection of such bidder's bid. Whereas, any bidder feeling aggrieved, may lodge a written complaint as per Rule 31; however mere fact of lodging a complaint shall not warrant suspension of the procurement process.

#### **IB.25 Clarification of Bid**

- 25.1 To assist in the examination, evaluation and comparison of bids, the procuring agency may, at its discretion, ask any bidder for clarification of the bid, including breakdowns of unit rates. The request for clarification and the response shall be in writing but no change in the price or substance of the bid shall be sought, offered or permitted except as required to confirm the correction of arithmetic errors discovered by the procuring agency in the evaluation of the bids in accordance with clause IB 28.

#### **IB.26 Examination of Bids and Determination of Responsiveness**

- 26.1 Prior to the detailed evaluation of bids, the procuring agency will determine whether the bidder fulfills all codal requirements of eligibility criteria given in the tender notice such as registration with tax authorities, registration with PEC (where applicable), turnover statement, experience statement, and any other condition mentioned in the NIT and bidding document. If the bidder does not fulfill any of these conditions, it shall not be evaluated further.
- 26.2 Once found to be fulfilling the eligibility criteria, as mentioned in sub-clause 26.1, the bids of eligible bidders will be evaluated for technical responsiveness as per specification and criteria given in the bidding documents. Technical and financial evaluations may be carried out in accordance with single stage-single one envelope, single stage-two envelopes, two stage or two stage-two envelopes bidding procedures, depending on the selection procedure adopted by the procuring agency.
- 26.3 A bid will be considered technically responsive if it (i) has been properly signed; (ii) is accompanied by the required bid security; and (iii) conforms to all the terms, conditions and specifications of the bidding documents, without material deviation or reservation. A material deviation or reservation is one (i) which affect in any substantial way the scope, quality or performance of the works; (ii) which limits in any substantial way, inconsistent with the bidding documents, the procuring agency's rights or the bidder's obligations under the contract; or (iii) adoption/rectification whereof would affect unfairly the competitive position of other bidders presenting substantially responsive bids.

26.4 If a bid has major deviations to the commercial requirements and technical specifications will be considered technically non responsive. As a general rule, major deviations are those that if accepted, would not fulfill the purposes for which the bid is requested, or would prevent a fair comparison or affect the ranking of the bids that are compliant with the bidding documents.

**(A). Major (material) Deviations include:-**

- (i) has been not properly signed;
- (ii) is not accompanied by the bid security of required amount and manner;
- (iii) stipulating price adjustment when fixed price bids were called for;
- (iv) failing to respond to specifications;
- (v) failing to comply with Mile-stones/Critical dates provided in Bidding Documents;
- (vi) sub-contracting contrary to the Conditions of Contract specified in Bidding Documents;
- (vii) refusing to bear important responsibilities and liabilities allocated in the Bidding Documents, such as performance guarantees and insurance coverage;
- (viii) taking exception to critical provisions such as applicable law, taxes and duties and dispute resolution procedures;
- (ix) a material deviation or reservation is one :
  - (a) which affect in any substantial way the scope, quality or performance of the works;
  - (b) adoption/rectification whereof would affect unfairly the competitive position of other bidders presenting substantially responsive bids.

**(B) Minor Deviations**

Bids that offer deviations acceptable to the Procuring Agency and which can be assigned a monetary value may be considered substantially responsive at least as to the issue of fairness. This value would however be added as an adjustment for evaluation purposes only during the detailed evaluation process.

26.5 If a bid is not substantially responsive, it will be rejected by the procuring agency, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

**IB.27 Correction of Errors before Financial Evaluation**

27.1 Bids determined to be substantially responsive will be checked by the procuring agency for any arithmetic errors. Errors will be corrected by the procuring agency as follows:



(a) where there is a discrepancy between the amounts in figures and in words, the amount in words will govern; and

(b) where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern, unless in the opinion of the procuring agency there is an obviously gross misplacement of the decimal point in the unit rate, in which case the line item total as quoted will govern and the unit rate will be corrected.

27.2 The amount stated in the Form of Bid will be adjusted by the procuring agency in accordance with the above procedure for the correction of errors and with the concurrence of the bidders. The amount thus corrected shall be considered as binding upon the bidder. If the bidder does not accept the corrected bid price, his bid will be rejected, and the bid security shall be forfeited in accordance with sub- clause IB 15.6(b) hereof.

#### **IB.28 Financial Evaluation and Comparison of Bids**

28.1 The procuring agency will evaluate and compare only the Bids determined to be substantially responsive in accordance with clause IB 26.

28.2 In evaluating the Bids, the procuring agency will determine for each bid the evaluated bid price by adjusting the bid price as follows:

- (a) making any correction for errors pursuant to clause IB 27;
- (b) excluding provisional sums (if any), for contingencies in the Summary Bill of Quantities, but including competitively priced Day work; and
- (c) making an appropriate adjustment for any other acceptable variation or deviation.

28.3 The estimated effect of the price adjustment provisions of the conditions of contract, applied over the period of execution of the contract, shall not be taken into account in bid evaluation.

28.4 If the bid of the successful bidder is seriously unbalanced in relation to the procuring agency's estimate of the cost of work to be performed under the contract, the procuring agency may require the bidder to produce detailed price analyses for any or all items of the Bill of Quantities to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the procuring agency may require that the amount of the Performance Security set forth in clause IB.32 be increased at the expense of the successful bidder to a level sufficient to protect the procuring agency against financial loss in the event of default of the successful bidder under the contract.

28.5 Bidders may be excluded if involved in “**Corrupt and Fraudulent Practices**” means either one or any combination of the practices given below SPP Rule2(q);

(i) “**Coercive Practice**” means any impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence the actions of a party to achieve a wrongful gain or to cause a wrongful loss to another party;

(ii) “**Collusive Practice**” means any arrangement between two or more parties to the procurement process or contract execution, designed to achieve with or without the knowledge of the procuring agency to establish prices at artificial, noncompetitive levels for any wrongful gain;

(iii) “**Corrupt Practice**” means the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence the acts of another party for wrongful gain;

(iv) “**Fraudulent Practice**” means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;

(v) “**Obstructive Practice**” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in a procurement process, or affect the execution of a contract or deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements before investigators in order to materially impede an investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or acts intended to materially impede the exercise of inspection and audit rights provided for under the Rules.

## **28.6 Evaluation Report**

After the completion of evaluation process, as described in clauses IB 27 and IB 28, the procuring agency shall announce the results of bid evaluation in the form of report (available on the website of the authority) giving reasons for acceptance and rejection of bid. The report shall be hoisted on website of the authority and that of procuring agencies if its website exists and intimated to all bidders at least seven (7) days prior to the award of contract.

## **F. AWARD OF CONTRACT**

### **IB.29 Award**

29.1 Subject to clauses IB 30 and IB 34 and provision of the rule: The procuring agency shall award the contract to the bidder whose bid has been determined to be substantially responsive to the bidding documents, and who has offered the lowest evaluated bid, but not necessarily the lowest

submitted price, within the original or extended period of bid validity. Provided that such bidder has been determined to be eligible in accordance with the provisions of clause IB 03 and qualify pursuant to sub clause IB 29.2.

- 29.2** Procuring agency, at any stage of the bid evaluation, having credible reasons for or having *prima facie* evidence of any deficiency(ies) in contractor's capacities, may require the contractor to provide information concerning their professional, technical, financial, legal or managerial competence whether already pre-qualified or not for the said project.

Provided, that such qualification shall only be laid down after recording reasons thereof, in writing. They shall form part of the records of that bid evaluation report.

**IB.30 Procuring Agency's Right to reject all Bids or Annul/Cancellation the Bidding Process**

Notwithstanding clause IB 29 and provision of the rule:

- (1) A procuring agency reserves may cancel the bidding process at any time prior to the acceptance of a bid or proposal;
- (2) The procuring agency shall incur no liability towards bidders solely by virtue of its invoking sub –rule (1);
- (3) Intimation of the cancellation of bidding process shall be given promptly to all bidders and bid security shall be returned along with such intimation; (4) The procuring agency shall, upon request by any of the bidders, communicate to such bidder, grounds for cancellation of the bidding process, but is not required to justify such grounds.

**IB.31. Notification/Publication of the Award of Contract**

- 31.1 Prior to expiry of the period of bid validity, including extension, prescribed by the procuring agency, the procuring agency shall notify the successful bidder in writing ("Letter of Acceptance") that his bid has been accepted. This letter shall mention the sum which the procuring agency will pay to the contractor in consideration of the execution and completion of the works by the contractor as prescribed by the contract (hereinafter and in the conditions of contract called the "Contract Price").
- 31.2 No negotiation with the bidder having evaluated as lowest responsive or any other bidder shall be permitted, however, procuring agency may hold meetings to clarify any item in the bid evaluation report.

31.3 The notification of award and its acceptance by the bidder will constitute the formation of the contract, binding the procuring agency and the bidder till signing of the formal Contract Agreement.

31.4 Upon furnishing by the successful bidder of a Performance Security and signing of the contract, the procuring agency will promptly notify the

name of the successful bidder to all bidders and return their bid securities accordingly.

31.5 Within seven days of the award of contract, procuring agency shall publish on the website of the Authority and on its own website, if such a

website exists, the results of the bidding process, identify the bid through procurement identifying numbers, and the following information:

- (1) Evaluation Report;
- (2) Form of Contract and letter of Award;
- (3) Bill of Quantities or Schedule of Requirement.

#### **31.6 Debriefing**

(a) A bidder may ask the procuring agency for reasons for non acceptance of his bid and may request for a debriefing meeting and procuring agency shall give him the reasons for such non acceptance, either in writing or by holding a debriefing meeting with such a bidder.

(b) The requesting bidder shall bear all the costs of attending such a debriefing.

#### **IB.32 Performance Security**

32.1 The successful bidder shall furnish to the procuring agency a Performance Security in the form of pay order or demand draft or bank guarantee, and the amount stipulated in the bidding data and the Conditions of Contract within a period of 28 days after the receipt of Letter of Acceptance.

32.2 Failure of the successful bidder to comply with the requirements of Sub-clause IB.32.1 or clauses IB 33 or IB 35 shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security.

32.3 Validity of performance security shall extend at least ninety days beyond the date of completion of contract, or as mentioned in the bidding data to cover defects liability period or maintenance period subject to final acceptance by the procuring agency.

### **IB.33 Signing of Contract Agreement**

- 33.1 Within 14 days from the date of furnishing of acceptable Performance Security under the Conditions of Contract, the procuring agency will send the successful bidder the Contract Agreement in the form provided in the bidding documents, incorporating all agreements between the parties.
- 33.2 The formal Agreement between the procuring agency and the successful bidder shall be executed within 14 days of the receipt of the Contract Agreement by the successful bidder from the procuring agency.
- 33.3 A procurement contract shall come into force when the procuring agency requires signs contract, the date on which the signatures of both the procuring agency and the successful bidder are affixed to the written contract. Such affixing of signatures shall take place within the time prescribed in the bidding documents.

Provided that the procuring agency may reduce the maximum time limit for signing of contract, as and when required, and shall be mentioned in the bidding documents.

### **33.4 Stamp Duty.**

The formal Agreement between the Procuring Agency and the successful bidder shall be duly stamped at rate of 0.35% of bid price (updated from time to time) stated in Letter of Acceptance

### **IB.34 General Performance of the Bidders**

Procuring agency may in case of consistent poor performance of the contractor and his failure to remedy the underperforming contract may take such action as may be deemed appropriate under the circumstances of the case including the rescinding the contract and/or black listing of such contractor and debarring him from participation in future bidding process.

### **IB.35 Integrity Pact**

The bidder shall sign and stamp the Integrity Pact provided at Appendix-L to the bidding documents for all Provincial/Local Government procurement contracts exceeding Rupees ten million. Failure to provide such Integrity Pact shall make the bidder non-responsive.

### **IB.36 Instructions not Part of Contract**

Bids shall be prepared and submitted in accordance with these Instructions which are provided to assist bidders in preparing their bids, and do not constitute part of the bid or the Contract Documents.

### **IB.37 Arbitration**

Any dispute that is not amicably resolved shall be finally settled, unless otherwise specified in the Contract, under the Arbitration Act 1940 updated from time to time and would be held anywhere in the Province of Sindh at the discretion of procuring agency.

## **G – Additional Instructions**

### **IB- 38 Contract Documents**

The Documents which will be included in the contract are listed in the form of contract Agreement set out in these bidding documents.

### **IB- 39 Sufficiency of Bid**

Each bidder shall satisfy himself before bidding as to the correctness and sufficiency of his bid and the rates and prices entered in the schedule of Prices. Except insofar as it is otherwise expressly provided in the contract, the rates and prices entered in the schedule of Prices shall cover all his obligations under the contract and all matters and things necessary for the proper completion of the works

### **IB- 40 Bidder to Inform Himself**

The bidder is advised to obtain himself at his own cost and responsibility all information that may be necessary for preparing the bid and entering into a contract for execution of the works. This shall include but not be limited to the following :

- a) Inquiries on Pakistani Income Tax / Sales Tax
- b) Inquiries on Customs duties and other import taxes, to the concerned authorities of customs and Excise Department.
- c) Information regarding port clearance facilities, loading, unloading facilities, storage facilities, transportation and congestion at Pakistan Ports.

## **BIDDING DATA**

<b>S. No</b>	<b>Conditions</b>	<b>Ref GCC</b>	<b>Data</b>
<b>1</b>	Name of Procuring Agency	1.1	<i>Institute of Business Administration IBA KARACHI</i>
<b>2</b>	Name of Project	1.2	Supply, Construction, Installation, & Commissioning of 750 kW <sub>P</sub> , On-Grid Roof , Car Port & Bus Port Mounted Solar Power System at Institute of Business Administration Main Campus Karachi
<b>3</b>	Funding Source	2.1	IBA Arrangement
<b>4</b>	Time limit for Clarification	8.1	<i>Not later than 5 working days prior to date of opening of Bids</i>
<b>5</b>	Bid Language	10.1	English
<b>6</b>	Pre-Qualification information updated	11.1 (a)	<i>(i) Evidence of access to financial resources, (ii) latest status of financial resources commitment for two years (including the current year), (iii) works awarded during the interim period, (iv) availability of essential critical equipment, and (v) information about litigation presently in process</i>
<b>7</b>	Furnish Company Profile	11.1 (b)	Company Profile in single stage single envelope:
<b>8</b>	Bid Validity Period	14.1	Ninety (90 ) Days
<b>9</b>	Bid Security	15.1	1% of the Bid quoted Amount in Form of Pay Order, Bank Draft or Bank Guarantee by a Schedule Bank of Pakistan in Favor of "IBA Karachi"
<b>10</b>	Venue, time, and date of the pre-Bid meeting:	17.1	Pre-bid Meeting will be held on November 6, 2020 at 3:00 PM in the office of Senior Manager Contract (Project), IBA Main Campus.
<b>11</b>	Number of copies of the bid to be completed and returned:	18.4	One Original and One Photo Copy duly signed and sealed.



<b>12</b>	Procuring Agency's address for the purpose of bid submission	19.2 (a)	PROJECT OFFICE, NBP Building, IBA MAIN CAMPUS UNIVERSITY ROAD KARACHI
<b>13</b>	Name and Identification Number of the Contract	19.2 (b)	Supply, Construction, Installation, & Commissioning of 750 kW <sub>P</sub> , On-Grid Roof , Car Port & Bus Port Mounted Solar Power System at Institute of Business Administration Main Campus Karachi
<b>14</b>	Deadline for submission of bids:	20.1(a)	November 20, 2020 at 3:00 PM
<b>15</b>	Venue, time, and date of bid opening:	20.1 (b)	PROJECT OFFICE, NBP Building, IBA MAIN CAMPUS UNIVERSITY ROAD KARACHI November 20, 2020 at 3:30 PM
<b>16</b>	Standard form and amount of Performance Security acceptable to the procuring agency:	32.1	5% of the Amount as per Letter of Acceptance in Form of Pay Order, Bank Draft or Bank Guarantee by a Schedule Bank of Pakistan in Favor of "IBA Karachi"
<b>17</b>	Stamp Duty	32.3	0.35% will be paid by successful bidder as stamp duty. [% will depend upon the rules]

**FORM OF BID  
AND APPENDICES TO BID**

**FORM OF BID ( LETTER OF OFFER )****SUPPLY, CONSTRUCTION, INSTALLATION AND COMMISSIONING OF 750 KW<sub>p</sub>  
ON-GRID SOLAR POWER SYSTEM ROOF MOUNTED, CAR & BUS PORT  
MOUNTED AT INSTITUTE OF BUSINESS ADMINISTRATION KARACHI (MAIN  
CAMPUS)**

To:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

1. Having examined the bidding documents including Instructions to Bidders, Bidding Data, and Conditions of Contract, Specifications, Drawings and Bill of Quantities and Addenda Nos. \_\_\_\_\_ for the execution of the above-named work, we/I, the undersigned, offer to execute and complete the work and remedy any defects therein in conformity with the Conditions of Contract, Specifications, Drawings, Bill of Quantities and Addenda for the sum of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_) or such other sum as may be ascertained in accordance with the said conditions.
2. We/I understand that all the Appendices attached hereto form part of this bid.
3. As security for due performance of the undertakings and obligations of this bid, we/I submit herewith a bid security in the amount of Rupees \_\_\_\_\_ (Rs. \_\_\_\_\_) drawn in your favour or made payable to procuring agency and valid for a period of \_\_\_\_\_ days beginning from the date, bid is opened.
4. We/I undertake, if our bid is accepted, to commence the works and to complete the whole of the works comprised in the contract within the time stated in Appendix-A to Bid.
5. We/I agree to abide by this bid for the period of \_\_\_\_\_ days from the date fixed for opening the same and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
6. Unless and until a formal Agreement is prepared and executed, this bid, together with your written acceptance thereof, shall constitute a binding contract between us.

7. We do hereby declare that the bid is made without any collusion, comparison of figures or arrangement with any other bidder for the works.

We understand that you are not bound to accept the lowest or any bid you may receive.

9. We undertake, if our/my bid is accepted, to execute the Performance Security referred to in Clause 10 of Conditions of Contract for the due performance of the Contract.

10. We confirm, if our bid is accepted, that all partners of the joint venture shall be liable jointly and severally for the execution of the Contract and the composition or the constitution of the joint venture shall not be altered without the prior consent of the procuring agency. *(Please delete this in case of Bid form a single bidder)*

in the capacity of \_\_\_\_\_ duly authorized to sign Bids for and on behalf of

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_\_

Signature: \_\_\_\_\_

\_\_\_\_\_  
(Name of Bidder in Block Capitals)  
(Seal)

Address: \_\_\_\_\_

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

Witness:

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Occupation: \_\_\_\_\_

**Appendix A to  
Instructions to Bidders  
NAME OF ELIGIBLE COUNTRIES**

[User to list down the Name of eligible countries as per Clause 2 of Instructions to Bidders]

All Countries having diplomatic & Trade relation with Pakistan are Eligible

**Appendix B to  
Instructions to Bidders  
EVIDENCE OF BIDDER'S CAPABILITY**

[Note: Bidders to provide the following information with the bid separately and indicate herein its references where this information is available.]

Sr.No.	Information to be Supplied	Bid References
1	Name of bidder, business address and country of incorporation	
2	Type of firm whether individually owned, partnership, corporation or joint venture and the names of its owners or partners.	
3	The annual reports or qualification statements giving general description of the firm, sort of business carried out, balance sheets, profit and loss statements, turn over and business done by the firm, duly authenticated, for the last three (3) years. Audited Balance Sheets for the preceding 3 years and projected assets and liabilities for the next 2 years shall be provided.	
4	Location and address of manufacturing facilities.	
5	Full description of factories owned and the annual manufacturing capacities of various items made therein.	
6	Details of the factory or factories where the offered equipment is proposed to be manufactured. This description should include the facilities and capacities of the particular factories including testing facilities and the processes used in manufacturing and testing. Where parts or components are purchased from outside, the details of equipment purchased and the names and experience record of the supplier.	
7	Detailed description of the quality control testing and research facilities. If the equipment is manufactured under license, the name of the licensor and details of the licensing arrangements, such as the duration of the license, the facilities provided to the bidder by the licensor and whether future improvements are available or not etc. A copy of the license agreement may be attached	
8	Names, qualifications and experience of the key technical personnel.	
9	The time since the manufacturer has been in this business and the time since he has been doing work of similar nature.	
10	<p>The time since the particular equipment offered has been manufactured and the time for which it has been in service. The manufacturer shall have the following experience.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>(List the equipment and experience required)</p>	



## **STANDARD FORMS**



## STANDARD FORMS

Page No.

Standard Forms include the following:

- Form of Bid Security  
(Bank Guarantee)
- Form of Contract Agreement
- Form of Performance Security  
(Bank Guarantee)
- Form of Bank Guarantee/Bond for Advance Payment

(Note: Standard Forms provided in this document for securities are to be issued by a bank. In case the bidder chooses to issue a bond for accompanying his bid or performance of contract or receipt of advance, the relevant format shall be tailored accordingly without changing the spirit of the Forms of securities).

## FORM OF BID SECURITY (Bank Guarantee)

Guarantee No. \_\_\_\_\_

Executed on \_\_\_\_\_

Expiry date \_\_\_\_\_

[Letter by the Guarantor to the Employer]

Name of Guarantor (Bank) with address: \_\_\_\_\_

Name of Principal (Bidder) with address: \_\_\_\_\_

Penal Sum of Security (express in words and figures): \_\_\_\_\_

Bid Reference No. \_\_\_\_\_ Date of Bid \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bid and at the request of the said Principal, we the Guarantor above-named are held and firmly bound unto the \_\_\_\_\_, (hereinafter called The "Employer") in the sum stated above, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has submitted the accompanying Bid numbered and dated as above for

\_\_\_\_\_ (Particulars of Bid) to the said Employer;  
and

WHEREAS, the Employer has required as a condition for considering the said Bid that the Principal furnishes a Bid Security in the above said sum to the Employer, conditioned as under:

- (1) that the Bid Security shall remain valid for a period 28 days beyond the period of validity of the Bid;
- (2) that in the event of;
  - (a) the Principal withdraws his Bid during the period of validity of Bid, or
  - (b) the Principal does not accept the correction of his Bid Price, pursuant to Sub Clause 24.2 of Instructions to Bidders, or
  - (c) failure of the successful bidder to
    - (i) furnish the required Performance Security, in accordance with Clause 34 of Instructions to Bidders, or
    - (ii) sign the proposed Contract Agreement, in accordance with Clause 35 of Instructions to Bidders,

then the entire sum be paid immediately to the said Employer as liquidated damages and not as penalty for the successful bidder's failure to perform.

NOW THEREFORE, if the successful bidder shall, within the period specified therefor, on the prescribed form presented to him for signature enter into a formal Contract with the said Employer in accordance with his Bid as accepted and furnish within twenty eight (28) days of his being requested to do so, a Performance Security with good and sufficient surety , as may be required, upon the form prescribed by the said Employer for the faithful performance and proper fulfilment of the said Contract or in the event of non-withdrawal of the said Bid within the time specified for its validity then this obligation shall be void and of no effect, but otherwise to remain in full force and effect.

PROVIDED THAT the Guarantor shall forthwith pay to the Employer the said sum stated above upon first written demand of the Employer without cavil or argument and without requiring the Employer to prove or to show grounds or reasons for such demand notice of which shall be sent by the Employer by registered post duly addressed to the Guarantor at its address given above.

PROVIDED ALSO THAT the Employer shall be the sole and final judge for deciding whether the Principal has duly performed his obligations to sign the Contract Agreement and to furnish the requisite Performance Security within the time stated above, or has defaulted in fulfilling said requirements and the Guarantor shall pay without objection the sum stated above upon first written demand from the Employer forthwith and without any reference to the Principal or any other person.

\_\_\_\_\_ IN  
Guarantor (Bank)

Witness: \_\_\_\_\_ Signature  
WITNESS WHEREOF, the above bounden Guarantor has executed the instrument under its seal on the date indicated above, the name and seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

_____	_____
1. _____	Name _____
	Title _____
Corporate Secretary (Seal)	
2. _____	_____
_____	_____
(Name, Title & Address)	Corporate Guarantor (Seal)

## FORM OF CONTRACT AGREEMENT

THIS CONTRACT AGREEMENT (hereinafter called the "Agreement") made on the \_\_\_\_\_ day of \_\_\_\_\_ (month) 20\_\_\_\_ between \_\_\_\_\_ (hereafter called the "Employer") of the one part and \_\_\_\_\_ (hereafter called the "Contractor") of the other part.

WHEREAS the Employer is desirous that certain Works, viz \_\_\_\_\_ should be executed by the Contractor and has accepted a Bid by the Contractor 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 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 Contract Agreement
  - (b) The Letter of Acceptance
  - (c) The completed Form of Bid
  - (d) The Preamble to Conditions of Contract
  - (e) The Particular Conditions of Contract
  - (f) The General Conditions of Contract
  - (g) The priced Schedule of Prices
  - (h) The completed Schedules to Bid
  - (i) The Specifications
  - (j) The Drawings
3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy defects therein in conformity and in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor, 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

\_\_\_\_\_  
(Seal)

Signature of the Employer

\_\_\_\_\_  
(Seal)

Signed, Sealed and Delivered in the presence of:

Witness:

\_\_\_\_\_

(Name, Title and Address)

Witness:

\_\_\_\_\_

(Name, Title and Address)

## FORM OF PERFORMANCE SECURITY (Bank Guarantee)

Guarantee No. \_\_\_\_\_

Executed on \_\_\_\_\_

Expiry date \_\_\_\_\_

[Letter by the Guarantor to the Employer]

Name of Guarantor (Bank) with address: \_\_\_\_\_

Name of Principal (Contractor) with address: \_\_\_\_\_

\_\_\_\_\_  
Penal Sum of Security (express in words and figures) \_\_\_\_\_

\_\_\_\_ Letter of Acceptance No. \_\_\_\_\_ Dated \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bidding Documents and above said Letter of Acceptance (hereinafter called the Documents) and at the request of the said Principal we, the Guarantor above named, are held and firmly bound unto the \_\_\_\_\_ (hereinafter called the Employer) in the penal sum of the amount stated above for the payment of which sum well and truly to be made to the said Employer, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has accepted the Employer's above said Letter of Acceptance for \_\_\_\_\_  
\_\_\_\_\_ (Name of Contract) for the \_\_\_\_\_

\_\_\_\_\_ (Name of Project).

NOW THEREFORE, if the Principal (Contractor) shall well and truly perform and fulfill all the undertakings, covenants, terms and conditions of the said Documents during the original terms of the said Documents and any extensions thereof that may be granted by the Employer, with or without notice to the Guarantor, which notice is, hereby, waived and shall also well and truly perform and fulfill all the undertakings, covenants terms and conditions of the Contract and of any and all modifications of said Documents that may hereafter be made, notice of which modifications to the Guarantor being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue till all requirements of Clause 30, Defects after Taking Over, of Conditions of Contract are fulfilled.

Our total liability under this Guarantee is limited to the sum stated above and it is a condition of any liability attaching to us under this Guarantee that the claim for payment in writing shall be received by us within the validity period of this Guarantee, failing which we shall be discharged of our liability, if any, under this Guarantee.

We, \_\_\_\_\_ (the Guarantor), waiving all objections and defences under the Contract, do hereby irrevocably and independently guarantee to pay to the Employer without delay upon the Employer's first written demand without cavil or arguments and without requiring the Employer to prove or to show grounds or reasons for such demand any sum or sums up to the amount stated above, against the Employer's written declaration that the Principal has refused or failed to perform the obligations under the

Contract which payment will be effected by the Guarantor to Employer's designated Bank & Account Number.

PROVIDED ALSO THAT the Employer shall be the sole and final judge for deciding whether the Principal (Contractor) has duly performed his obligations under the Contract or has defaulted in fulfilling said obligations and the Guarantor shall pay without objection any sum or sums up to the amount stated above upon first written demand from the Employer forthwith and without any reference to the Principal or any other person.

IN WITNESS WHEREOF, the above-bounden Guarantor has executed this Instrument under its seal on the date indicated above, the name and corporate seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

		_____ Guarantor (Bank)
Witness:		
1. _____		Signature _____
_____		Name _____
Corporate Secretary (Seal)		Title _____
2. _____		
_____		_____
Name, Title & Address		Corporate Guarantor (Seal)

## FORM OF BANK GUARANTEE/BOND FOR ADVANCE PAYMENT

Guarantee No. \_\_\_\_\_  
Executed on \_\_\_\_\_  
Expiry date \_\_\_\_\_

[Letter by the Guarantor to the Employer]

WHEREAS the \_\_\_\_\_ (hereinafter  
called the Employer) has entered into a Contract for \_\_\_\_\_  
\_\_\_\_\_ (Particulars of Contract), with  
\_\_\_\_\_ (hereinafter called the Contractor).

AND WHEREAS the Employer has agreed to advance to the Contractor, at the Contractor's request, an amount of Rupees \_\_\_\_\_ (Rs. \_\_\_\_\_) which amount shall be advanced to the Contractor as per provisions of the Contract.

AND WHEREAS the Employer has asked the Contractor to furnish Guarantee to secure advance payment for performance of his obligations under the said Contract.

AND WHEREAS \_\_\_\_\_ (Bank)  
(hereinafter called the Guarantor) at the request of the Contractor and in consideration of the Employer agreeing to make the above advance to the Contractor, has agreed to furnish the said Guarantee.

NOW THEREFORE the Guarantor hereby guarantees that the Contractor shall use the advance for the purpose of above mentioned Contract and if he fails, and commits default in fulfillment of any of his obligations for which the advance payment is made, the Guarantor shall be liable to the Employer for payment not exceeding the aforementioned amount.

Notice in writing of any default, of which the Employer shall be the sole and final judge, as aforesaid, on the part of the Contractor, shall be given by the Employer to the Guarantor, and on such first written demand payment shall be made by the Guarantor of all sums then due under this Guarantee without any reference to the Contractor and without any objection.

This guarantee shall come into force as soon as the advance payment has been credited to the account of the Contractor.

This guarantee shall expire not later than \_\_\_\_\_ by which date we must have received any claims by registered letter, telegram, telex or telefax.

It is understood that you will return this Guarantee to us on expiry or after settlement of the total amount to be claimed hereunder.

\_\_\_\_\_  
Guarantor (Bank)



Witness:

1. \_\_\_\_\_

\_\_\_\_\_  
Corporate Secretary (Seal)

2. \_\_\_\_\_

\_\_\_\_\_  
Name, Title & Address

Signature \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

\_\_\_\_\_  
Corporate Guarantor (Seal)

## PREAMBLE TO CONDITIONS OF CONTRACT

### Date Of Commencement

Sub-Clause 1.1.1.(i)

The date for commencement of the Works is the date **“Fifteen days after issuance of Letter of Acceptance ( LOA ) “**

### Defect Liability Period

Sub-Clause 1.1.11

**The Defect Liability Period is 365 days after issuance of Completion Certificate**

### The Employer

Sub-Clause 1.1.12.

**“INSTITUTE OF BUSINESS ADMINISTRATION IBA KARACHI”**     **Tele : 111-422-422**  
**www.iba.edu.pk**

### The Engineer

Sub-Clause 1.1.15.

**M/S HI-Tech Engineering Company Al Fath Chamber CC Area KCHS Block 7/8 Near Old Du**  
**Free Shop Shahrah-e- Faisal Karachi www.hec-eng.com**

**Project Manager : Project Department IBA Shall be the Project Manager www.iba.edu.pk**

### Time for Completion

Sub-Clause 1.1.35.

12 ( Twelve ) Months days from the Commencement Date.

### Warranty Period

Sub-Clause 1.1.40.

- |       |                                       |                                      |
|-------|---------------------------------------|--------------------------------------|
| (i)   | For PV Module                         | <b>25 Years Performance Warranty</b> |
| (ii)  | For Grid- Tied Inverter               | <b>5 Years Performance Warranty</b>  |
| (iii) | For MMS ( Module Mounting Structure ) | <b>25 Years Performance Warranty</b> |

### Engineer's Duties

Sub-Clause 2.1

**& Authorities**     Amount of Variation Order in emergency is ( +/- ) 2% of the Contract Price

### Confirmation in Writing

Sub-Clause 2.6

If the Contractor shall require the confirmation it shall be notified to the Engineer within 14 Days.

- (i)     Engineer shall confirm the decision/instruction within 14 days.

### Ruling Language

Sub-Clause 5.1.

The version in English language (ruling language) shall prevail.

<b>Day to Day Communications</b>	<b>English</b>	Sub-Clause 5.2.
<b>As-Built Drawings</b>		Sub-Clause 6.10
	As-Built drawings shall be provided to the Engineer within 28 days from the date of issue of Taking Over Certificate.	
<b>General Obligations</b>		Sub-Clause 8.1
	Detail of Erection and Testing Equipment and Maintenance Tools is given herein below:	
<b>Programme to be Furnished</b>		Sub-Clause 12.1.
	The Programme must be submitted in the form of Bar Chart Prima Vera	
<b>Electricity Water, Gas and Other Services</b>		Sub-Clause 14.3.
	Supplies on the Site are:	
	a. Electricity: To be Provided on charge	
	b . Water : To be Provided on charge	
	c. Gas : <b>Not Provided</b>	
	d. Other : <b>Not Provided</b>	
<b>Employer's Equipment</b>		Sub-Clause 14.4.
	The following Employer's equipment is available for use by the Contractor under the Employer's operation: <b>None</b>	
<b>Working Hours</b>		Sub-Clause 18.3.
	The normal working hours are as per labour laws of Pakistan	
<b>Time for Completion</b>		Sub-Clause 25.1
	12 ( Twelve ) Months from commencement date.	
<b>Place of the Project :</b>		
	(i) <b>IBA Main Campus Karachi University</b>	
<b>Earlier Completion</b>		Sub-Clause 26.3
(i) Amount of Bonus per day	<b>Nil</b>	
(ii) Max. Amount of Bonus	<b>Nil</b>	
<b>Delay in Completion</b>		Sub-Clause 27.1.
Failure to meet the Time for Completion entitles the Employer to reduction in Contract Price as follows:		
Percentage per day 0.10 % Per Day x No. of days Maximum 10 % of the Project Tender Cost		

**Prolonged Delay**

Sub-Clause

27.2.

Maximum amount recoverable from the Contractor by the Employer

20 %

**Terms of Payment**

Sub-Clause 33.1.

In addition to the provisions under Clause 33, the terms of payment shall be as stated in Particular Conditions of Contract.

**Min Amount of Interim Payment Certificate**

Sub-Clause 33.2

Total amount of Contract As per LOA /Total Period of Contract in Months /2

**Payment Period**

Sub Clause 33.5

(I ) Period of Payment by Employer to Contractor 20 Days after joint verified by employer and Contractor and submission of Duly verified bill to Finance office

(ii ) Period of Final Certificate of Payment : 56 Days after issuance of the Completion Certificate and final payment certificate jointly verified.

**Payment in Foreign Currencies**

Sub Clause 35.1

**Payment in Foreign Currencies****Not Applicable****Insurance of Works**

Sub-Clause 43.1.

The deductible limits in the insurance cover of the Works shall not exceed Full replacement value of such works and temporary works+15 % additional to cover additional expenses.

Sub-Clause 43.1.(a)

The additional risks to be insured are:

As per PCC

**Third Party**

Sub-Clause 43.3.

**Liability** The amount of insurance against third party liability taken out by t Contractor shall not be less than: 500,000 for Property damage and Rs 500000 for personnel injury/death per occurrence with number occurrence with number of occurrence un- limited.

**Payment on**

Sub-Clause 46.3.

**Termination for Employer's** The additional amount payable by the Employer on termination shall r exceed:

**Default** *The actual work executed.*

<b>Labour, Materials and Transport</b>	The method of calculating adjustments for changes in costs shall be: (The user may extract the formula from Clause 70.1 PCC of the PEC Civil Works documents and with reference to PEC documents “Standard Guidelines and Formula for Price Adjustment”)	Sub-Clause 47.1.
<b>Notices to Employer and Engineer</b>	The address of the Employer for notices is: <b>Institute of Business Administration ( IBA ) Karachi</b> The address of the Engineer for notices is: HI- Tech Engineering Co. Al Fateh Chamber CC Area, KCH Block 7/8 Near Old Duty Free Shop Shahrah-e- Faisal Karachi Ph. 021-37361355	Sub-Clause 49.2.
<b>Disputes &amp; Arbitration</b>	Venue of Arbitration _Karachi Pakistan.	Sub-Clause 50.4
<b>Applicable Law</b>	The applicable law is Arbitration Act 1940 and the rules made thereunder and /or any statutory modification thereof	Sub-Clause 51.1.
<b>Procedural Law for Arbitration</b>	The procedural law for arbitration is Arbitration Act 1940	Sub-Clause 51.2.
<b>Language and Place of Arbitration</b>	The language of arbitration is English language. The place of arbitration is Karachi	Sub-Clause 51.3.

## **GENERAL CONDITIONS OF CONTRACT**

## **[Notes on the Conditions of Contract**

The Conditions of Contract comprise two parts:

### **(a) General Conditions of Contract**

### **(b) Particular Conditions of Contract**

Over the years, a number of “model” General Conditions of Contract have evolved. The one used in these Standard Bidding Documents was prepared by the International Federation of Consulting Engineers (Federation Internationale des Ingenieurs-Conseils, or FIDIC), and is commonly known as the FIDIC Conditions of Contract. (The used version is the 1987 edition, reprinted in 1988 with editorial amendments.)

The FIDIC Conditions of Contract have been prepared for an ad measurement (unit price or unit rate) type of contract, and cannot be used without major modifications for other types of contract, such as lump sum, turnkey, or target cost contracts.

The standard text of the General Conditions of Contract chosen must be retained intact to facilitate its reading and interpretation by bidders and its review by the Employer. Any amendments and additions to the General Conditions, specific to the contract in hand, should be introduced in the Particular Conditions of Contract.

The use of standard conditions of contract for all electrical/mechanical Works will ensure comprehensiveness of coverage, better balance of rights or obligations between Employer and Contractor, general acceptability of its provisions, and savings in time and cost for bid preparation and review, leading to more economic prices.

The FIDIC Conditions of Contract are copyrighted and may not be copied, faxed, or reproduced. Without taking any responsibility of its being accurate, Pakistan Engineering Council with prior consent of FIDIC Secretariat, has reproduced herein the FIDIC General Conditions of Contract for reference purpose only which cannot be used by the users for preparing their bidding documents. The bidding document may include a purchased copy, the cost of which can be retrieved as part of the selling price of the bidding document.

Alternatively, the FIDIC Conditions of Contract can be referred to in the bidding documents, and the bidders are advised to obtain copies directly from FIDIC.\*

\* Add the following text if the bidding documents, as issued, do not include a copy:

“Copies of the FIDIC Conditions of Contract can be obtained from:

FIDIC Secretariat

P.O. Box 86

1000 Lausanne 12

Switzerland

[fidic.pub@fidic.org](mailto:fidic.pub@fidic.org) – [FIDIC.org/bookshop](http://FIDIC.org/bookshop)]

## **PART-II: PARTICULAR CONDITIONS OF CONTRACT**

**(Mandatory Provisions- not to be amended/substituted except where indicated  
by PEC)**



## **PART-II: PARTICULAR CONDITIONS OF CONTRACT**

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## **PART-II: PARTICULAR CONDITIONS OF CONTRACT**

### **1.1 Definitions**

The text of Sub-Clause 1.1.1 is deleted and substituted by the following:

**“Commencement Date”** means the date specified in the Preamble to Conditions of Contract.

The text of Sub-Clause 1.1.2 is deleted and substituted by the following:

**“Conditions”** means the Preamble to Conditions of Contract, General Conditions of Contract and Particular Conditions of Contract.

Sub-Clause 1.1.3

At the end of Sub-Clause the following is added:

*“Any subsequent document mutually agreed and signed by the Employer and the Contractor, shall be the part of the Contract.”*

The text of Sub-Clause 1.1.5 is deleted and substituted by the following:

**“Contract Price”** means the sum stated in the Letter of Acceptance as payable to the Contractor for the execution and completion of the Works subject to such additions thereto or deductions therefrom as may be made under the provisions hereinafter contained and remedying of any defects therein in accordance with the provisions of the Contract.”

Sub-Clause 1.1.11

*The Defects Liability Period is the period mentioned in the Preamble to Conditions of Contract.*

Sub-Clause 1.1.15

The following is added at the end of Sub-Clause:

*“or any other competent person appointed by the Employer as his replacement.”*

Sub-Clause 1.1.23

The following paragraph is added:

*The word “Goods” is synonymous with “Plant.”*

The text of Sub-Clause 1.1.27 is deleted and substituted by the following:

*“Schedule of Prices” means the completed and priced Schedule of Prices, or any part or individual schedule thereof, submitted by the Contractor with his Bid or revised and mutually agreed and forming a part of the Contract documents.*

Sub-Clause 1.1.33 (148)

*The word “Tender” is synonymous with the word “Bid” and the word “Tender Documents” with the word “Bidding Documents”.*

The following Sub-Clauses are added:

*“1.1.38 “Month” means calendar month according to Gregorian calendar.*

*1.1.39 “Operation and Maintenance Manuals” has the meaning described in Sub-Clause 6.6.*

1.1.40 *“Warranty Certificate” means the certificate against specified goods/equipment, for the period mentioned in the Preamble to Conditions of Contract, to be issued by the Contractor that the goods/equipment supplied under the Contract are new, unused and incorporate all recent improvements in design and materials unless provided otherwise in the Contract and that the Contractor will be responsible for making good or replacing any defective goods/equipment during the Warranty Period specified in the Preamble to Conditions of Contract which should commence after expiry of Defect Liability Period.*

Sub-Clause 1.1.41

The word “Part II” stated in FIDIC Conditions of Contract is synonymous with the word *“Particular Conditions of Contract”*.

Sub-Clause 1.6 Cost, Overhead Charges and Profit

The last sentence “Any profit \_\_\_\_\_ stated in the Preamble” is deleted and substituted by the following:

*“Any profit entitlement shall be added to cost at the percentage stated in the Bid and agreed in the Contract Agreement.”*

Sub-Clause 2.1 Engineer’s Duties

The text of Sub-Clause 2.1 is deleted and substituted by the following:

*“The Engineer shall carry out the duties specified in the Contract.*

The Engineer may exercise the authority attributable to the Engineer as specified in or necessarily to be implied from the Contract. The Engineer is required to obtain the specific approval of the Employer before carrying out his duties in accordance with the following Clauses of General Conditions of Contract:

- (a) approval of Subcontractor under Sub-Clause 4.1,
- (b) certifying additional sums under Sub-Clause 5.4,
- (c) certifying additional costs under Sub-Clauses 11.3 & 12.3,
- (d) certifying any cost under Sub-Clause 14.6,
- (e) approval of extension of time under Clause 26,
- (f) issuing a Taking–Over Certificate under Sub-Clause 29,
- (g) issuing a Defects Liability Certificate under Sub-Clause 30.11,
- (h) issuing a Variation Order under Clause 31,
- (i) fixing rates or prices under Clauses 31 and 34,
- (j) certifying additional costs under Sub-Clause 44.5 and
- (k) certifying additional costs under Sub-Clause 47.2;

Except for such variations pursuant to Sub-Clause 31.1 of the GCC which may be necessary in an emergency affecting safety of life, the works or of adjoining property.”

Except as expressly stated in the Contract the Engineer shall have no authority to relieve the Contractor of any of his obligations under this Contract.” (149)

#### Sub-Clause 2.6 Confirmation in Writing

*(i) In line 3 after the words “undue delay” the following is added: “but not after the number of days mentioned in the Preamble to Conditions of Contract from the instruction or decision.”*

*(ii) At the end of Sub-Clause 2.6, the following is added:*

*“The Engineer shall confirm or otherwise within the period mentioned in the Preamble to Conditions of Contract from the receipt of requirement(s) from the Contractor.”*

#### Sub-Clause 2.7 Disputing Engineer’s Decisions and Instructions

The following text is deleted:

“If either party ..... in accordance with the Contract.”

#### Sub-Clause 2.8 Replacement of Engineer

The text of Sub-Clause 2.8 is deleted and substituted by the following:

“If the Employer intends to replace the Engineer, the Employer shall, not less than 14 days before the intended date of replacement, give notice to the Contractor, of the name, address and relevant experience of the intended replacement Engineer. The Employer shall not replace the Engineer with a person against whom the Contractor raises reasonable objection by notice to the Employer, with supporting particulars.”

#### Sub-Clause 2.9 Engineer Not Liable

Sub-Clause 2.9 is added as follows:

*“Approval, reviews and inspection by the Engineer of any part of the Works does not relieve the Contractor from his sole responsibility and liability for the supply of remaining materials and equipment for the Works and parts thereof and complete the remaining erection works and testing and commissioning in accordance with the Contract and neither the Engineer’s authority to act nor any decision made by him in good faith as provided for under this Contract whether to exercise or not to exercise such authority shall give rise to any duty or responsibility of the Engineer to the Contractor, any Subcontractor, any of their representatives or employees or any other person performing any of the works. However the Contractor shall be compensated if any loss/damage is occurred due to the decision of the Engineer.”*

#### Sub-Clause 4.2 No Contractual Relation between Subcontractor and the Employer

Sub-Clause 4.2 is added as follows:

Nothing contained in the Contract Documents shall create any contractual relation between any Subcontractor and the Employer.

#### Sub-Clause 5.3 Priority of Contract Documents (150)

Sub-Clause 5.3 is deleted and substituted by the following:

*“Unless otherwise provided in the Contract the priority of the Contract Documents shall be as follows:*

- 1. The Contract Agreement (if completed)*
- 2. The Letter of Acceptance*
- 3. The completed Form of Bid*
- 4. Preamble to Conditions of Contract*
- 5. The Particular Conditions of Contract*
- 6. The General Conditions of Contract*
- 7. The priced Schedule of Prices*
- 8. The completed Schedules to Bid*
- 9. The Specifications*
- 10. The Drawings*
- 11. ....(Any other document)*

In case of discrepancies between drawings, those of larger scale shall govern unless they are superseded by drawing(s) of a later date regardless of scale. All drawings and specifications shall be interpreted in conformity with the Contract Agreement and these conditions.”

*Sub-Clause 5.4 Documents Mutually Explanatory*

*The text appearing in the last line after the words “the Contract Price” is deleted.*

*Sub-Clause 6.2 Consequences of Disapproval of Contractor's Drawings*

*Full stop is deleted and the following words are added at the end of Sub-Clause:*

*“for the approval of the Engineer. However, the Contractor shall not be entitled for time extension on this account.”*

*Sub-Clause 6.6. Operation and Maintenance Manuals*

*Paras 2&3 are deleted and the following text is added at the end of Para 1 of Sub-Clause:*

*“The Operation and Maintenance Manuals shall include full instructions for the operation, servicing and maintenance of the Plant, not only during the period of the Contractor's liability but more particularly during its operating life.*

*The directions shall be set out simply, clearly and systematically. This may be divided into two volumes if desirable, one for operation and the second for servicing and maintenance (in sub-volumes for major items of Plant).*

*The operational data shall include a complete physical and functional description of the Plant (in sub-volumes for major items of Plant) and step-by-step procedures for inspection, checking and adjustments for proper operation of the Plant.*

*The maintenance data shall include complete instructions for routine checks, servicing, maintenance and repair of all parts and for dismantling, handling and re-assembly of all*

*equipment, sub-assemblies and all separate components. The (151) maintenance data shall also include where possible parts catalogues. The lists shall provide all necessary information for identifying the parts and for re-ordering the parts including name of part, part number and catalogue references where applicable, name of manufacturer, size, capacity and other characteristics .*

*General arrangements, single line diagrams and detailed drawings shall be provided for ready reference in the operation and maintenance instructions.*

*The manuals shall be printed on ISO paper size A4 (210x297 mm) with offset or equivalent printing strongly bound in a durable stiff cover bearing the title in approved legend. Drawings shall be folded or reduced to 297 mm height. All volumes shall bear on the spine an approved shortened version of the title.*

*The Contractor shall submit three draft copies for approval of the Engineer prior to producing finished volumes.*

*The Contractor shall provide ten (10) copies of the approved Operation and Maintenance Manuals prior to Taking Over by the Employer. Supplementary Operation and Maintenance Manual shall be provided by the Contractor, if required, to incorporate changes resulting from experience during the operation and maintenance period. The work shall not be considered to be completed for the purpose of taking over until such manual and drawings have been supplied to the Employer.”*

#### **Sub-Clause 6.9 Manufacturing Drawings**

*The words “Unless otherwise specified in Part-II” are deleted and the following is added at the end of Sub-Clause:*

*“However, the Contractor is required to disclose to the Engineer or the Employer any confidential information necessary to justify the reliability, the efficiency and the operation and maintenance of the Plant supplied by him.”*

#### **Sub-Clause 6.10 “As-Built” Drawings**

*The following new Sub-Clause is added:*

*The Contractor shall furnish to the Engineer six (6) copies and one (1) reproducible of approved quality of all “As-Built” drawings within the period mentioned in the Preamble to Conditions of Contract.*

#### **Sub-Clause 8.1 General Obligations**

*The text of Sub-Clause 8.1 is deleted and substituted by the following:*

*“(a) The Contractor shall commence the work on the date specified in the Preamble to Conditions of Contract and shall proceed with the same with due expedition and without delay.*

*(b) The Contractor shall, in accordance with the Contract, with due care and diligence, complete the Works and test and commission the Plant and carry out the Works within the*



*Time for Completion. The Contractor shall also provide all necessary Contractor's Equipment, superintendence, labour and except as stated hereinbelow, all necessary facilities therefor.* (152) The Employer will permit use of the Erection, Testing Equipment and Maintenance Tools as stated in the Preamble to Conditions of Contract.

*The above facilities shall be provided at no cost to the Contractor but he shall procure at his cost all required consumable materials and any other items necessary for the proper execution of the Works. These shall be properly used and maintained by the Contractor and returned to the Employer upon handing over of the Works in good condition, fair wear and tear excepted. In case of any damage, loss or theft, the items shall be replaced by the Contractor at his own cost."*

#### Sub-Clause 10.1 Performance Security

Sub-Clause 10.1 is deleted and substituted by the following:

*"The Contractor shall provide a Performance Security in the prescribed Form annexed to these Documents. The said Security shall be furnished by the Contractor within 28 days after the receipt of Letter of Acceptance. The Performance Security shall be of an amount equal to 5 percent of the Contract Price in the currency (ies) of the Contract at the option of the bidder, in the form of Bank Guarantee from any Scheduled Bank in Pakistan or from a bank located outside Pakistan duly counter-guaranteed by a Scheduled Bank in Pakistan."*

*The cost of complying with the requirements of this Sub-Clause shall be borne by the Contractor."*

#### Sub-Clause 10.3 Claims under Performance Security

Sub-Clause 10.3 is deleted in its entirety.

The following Sub Clause is added:

#### Sub-Clause 10.4 Performance Security Binding on Variations and Changes

*"The Performance Security shall be binding irrespective of variations and changes in the quantities of the Works or extensions in completion time of the Works, which are granted or agreed upon under the provisions of the Contract."*

#### Sub-Clause 12.1 Programme to be Furnished

Sub-Clause 12.1(a) is deleted and substituted by the following:

*"(a) the order in which the Contractor proposes to carry out the Works (including preliminaries, required material ordering, delivery to Site, erection and rectifications work, testing, commissioning and taking-over by the Employer). The programme shall also include the following:*

- (i) Employment of local and expatriate labour of various categories,*
- (ii) Local material procurement,*
- (iii) Material imports, if any."*

(153) In Sub-Clause 12.1(c)(iv) the words “any import licenses” are deleted.

#### Sub-Clause 12.4 Monthly Progress Report

The following Sub-Clause 12.4 is added:

“During the period of the Contract, the Contractor shall submit six sets of report to the Engineer not later than the 8th day of each month, including:

- (i) a construction schedule indicating the progress achieved during the preceding month;
- (ii) description of all work carried out since the last report;
- (iii) description of the work planned for the next forty two days sufficiently detailed to enable the Engineer to determine his programme of inspection and testing;
- (iv) summary of daily job record for the preceding month; and
- (v) colour photographs to illustrate progress.

#### Sub-Clause 12.5 Daily Job Record

The following Sub Clause 12.5 is added:

*“During the period of the Contract, the Contractor shall keep a daily record of the work progress, which shall be made available to the Engineer as and when requested.*

*The daily record shall include particulars of weather conditions, number of men working, in different categories, deliveries of materials, quantity, location and assignment of equipment.”*

#### Sub-Clause 13.1 Contractor's Representative

At the end of the Sub-Clause the following is added:

*“The Contractor's Representative shall be a competent and skilled person approved by the Engineer (which approval may at any time be withdrawn) and who shall be present on the Site during all working hours. He shall be fluent in the English language. He shall not be transferred from the Site without the consent of the Engineer. The Contractor's Representative shall be a Registered/Professional engineer as defined in the Pakistan Engineering Council Act 1975 (V of 1976).”*

#### Sub-Clause 13.3 Language Ability of Superintending Staff of Contractor

The following Sub-Clause 13.3 is added: (154) “A reasonable proportion of the Contractor's superintending staff shall have a working knowledge of the English language.”

#### Sub-Clause 13.4 Employment of Local Personnel

The following Sub-Clause 13.4 is added:

*“The Contractor shall, to the extent practicable and reasonable, employ staff and labour from sources within Pakistan.”*

#### Sub-Clause 14.1 Contractor's Equipment

*Replace the word “or” at the end of Sub-paragraph (a) by the word “and” and insert the following at the end of Sub-paragraph(b):*

*“which shall not be unreasonably withheld.”*

#### Sub-Clause 14.2 Safety Precautions

At the end of the Sub-Clause the following is added:

*“In order to provide for the safety, health and welfare of persons, and for prevention of damage of any kind, all operations for the purposes of or in connection with the Contract shall be carried out in compliance with the safety requirements of the Government of Pakistan with such modifications thereto as the Engineer may authorise or direct and the Contractor shall take or cause to be taken such further measures and comply with such further requirements as the Engineer may determine to be reasonably necessary for such purpose.*

*The Contractor shall make, maintain, and submit reports to the Engineer concerning safety, health and welfare of persons and damage to property as the Engineer may from time to time prescribe.”*

#### Sub-Clause 14.3 Electricity Water and Gas

The text of Sub-Clause 14.3 is deleted and substituted by the following:

*“The Contractor shall be responsible for making his own arrangements for the adequate supply of electricity, water and gas required for the effective performance of his obligations under the Contract. Subject to the aforesaid, the Contractor shall be entitled to use for the purposes of the Works such supplies and services as may be available on the Site. The Contractor shall, before the commencement of the work at Site, seek the approval of the Engineer as to his detailed requirements of electricity, water and gas for the entire Contract period. The Contractor shall pay the Employer at the rates/cost incurred by the Employer. The Contractor shall at his own cost provide any apparatus necessary for such use.”*

#### Sub-Clause 14.4 Employer's Equipment

The text of Sub-Clause 14.4 is deleted and substituted by the following: (155) *“The Employer shall, if the Contractor so requests for the execution of the works, operate any available equipment of which details are given in the Preamble to Conditions of Contract. The Contractor shall pay the Employer a mutually agreed price for such use.*

*The Employer shall during such operation retain control of and be responsible for the safe working of the equipment.*

#### Sub-Clause 14.8 Information for Import Permits & Licences

The text of Sub-Clause 14.8 is deleted and substituted by the following:

*“The Contractor shall submit to the Employer in good time such details of all Plant and Contractor's Equipment as is to be imported into Pakistan and identify as to what assistance of the Employer is required for obtaining by the Contractor of all necessary import permits or licences.”*

#### Sub-Clause 15.2 Compliance with Laws

The Sub-Clause 15.2 is deleted and substituted by the following:

*“The Contractor shall comply with the Laws of country of manufacture and the Laws of Pakistan where the Plant is to be erected.”*

**Sub-Clause 16.4 Photographs of Works and Advertisement Prohibited**

Sub-Clause 16.4 is added:

*“Except with the prior written authorisation of the Employer the Contractor shall not exhibit or permit to be exhibited any photographs or advertisement on the Works. Any authorized exhibition shall be immediately removed if the Employer so requires.”*

**Sub-Clause 16.5 Training of Employer's Staff**

Sub-Clause 16.5 is added:

*“The Contractor shall provide such facilities for the training of such numbers of Pakistani engineers, engineering students, apprentices and trade apprentices on such sections of the Works at the Site or on the Contractor’s premises or Contractor selected plant manufacturer’s premises and factories, or wherever else work is in hand, as specified or directed by the Engineer. The Employer shall direct what sums by way of wages and allowances are to be paid by the Contractor to such persons and shall reimburse the Contractor for such sums as are so directed to be paid and are paid. The Contractor shall also provide medical expenses or medical insurance and travelling expenses for trainees if required by the Employer which shall be reimbursed by the Employer.*

The language of training at the above stated premises shall be English and Urdu.”

**Sub-Clause 17.4 Consents and Way Leaves (156)** The Sub-Clause 17.4 is deleted and substituted by the following:

*The Employer shall issue permissions, letters, certificates and provide such other assistance to the Contractor for his obtaining permits-to-work, way leaves and approvals from any other department/authority and right of way from private owners, if required. The Contractor will bear the cost of logistics, fees, etc. for such activities. The Employer, will reimburse the Contractor only the payments made by him in respect of any land compensation for obtaining such way leaves, required for the Works.*

Sub-Clause 17.5 – Import Permits and Licences

*The word “Employer” is deleted and substituted by the word “Contractor” and the following is added at the end of Sub-Clause 17.5:*

*“the Employer will provide assistance for this purpose.”*

Sub-Clause 18.1 – Engagement of Labour

At the end of the Clause the following is added:

*“in accordance with the regulations, orders and requirements of the Govt. of Pakistan.”*

Sub-Clauses 18.5 to 18.12 are added:

**“Sub-Clause 18.5 Employment of Persons in the Service of Others**

The Contractor shall not recruit or attempt to recruit staff and labour from amongst the persons in the service of the Employer or the Engineer and vice-versa, unless mutually agreed between the Employer/Engineer and the Contractor

**Sub-Clause 18.6 Alcoholic Liquor or Drugs**

The Contractor shall not, otherwise than in accordance with the Statutes, Ordinances and Government Regulations or Orders for the time being in force, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or suffer any such importation, sale, gift, barter or disposal by his Subcontractors, agents, employees or labour. (157)

**Sub-Clause 18.7 Arms and Ammunition**

*The Contractor shall not give, barter or otherwise dispose of to any person or persons, any arms or ammunition of any kind or permit or suffer the same as aforesaid.*

**Sub-Clause 18.8 Festivals and Religious Customs**

*The Contractor shall in all dealings with his staff and labour have due regard to all recognised festivals, days of rest and religious or other customs.*

**Sub-Clause 18.9 Disorderly Conduct**

*The Contractor shall at all times take all reasonable precautions to prevent any unlawful riotous or disorderly conduct by or amongst his staff and labour and for the preservation of peace and protection of persons and property in the neighbourhood of the Works.*

**Sub-Clause 18.10 Records of Safety and Health**

The Contractor shall maintain such records and make such reports concerning safety, health and welfare of persons and damage to property as the Engineer may from time to time prescribe.

**Sub-Clause 18.11 Reporting of Accidents**

The Contractor shall report to the Engineer details of any accident as soon as possible after its occurrence. In the case of any fatality or serious accident, the Contractor shall, in addition to appropriate action required under the law, notify the Engineer immediately by the quickest available means.

**Sub-Clause 18.12 Compliance by Subcontractors**

The Contractor shall be responsible for compliance by his Subcontractors of the foregoing provisions.”

### **Sub-Clause 19.1 Manner of Execution**

The following is added at the end of Sub-Clause:

*“The Contractor shall submit for approval of the Engineer, his detailed method statement(s) for the execution of such items of work as may be desired by the Engineer. Approval of such method statement(s) shall neither relieve the Contractor of his responsibilities under the Contract nor form any basis for claiming additional costs.”*

### **Sub-Clause 19.3 Uncovering Work**

The following is added at the end of second paragraph of Sub-Clause 19.3:

*“In any other case, all costs shall be borne by the Contractor.” (158)*

### **Sub-Clause 19.4 Use of Pakistani Materials**

The following Sub-Clause 19.4 is added:

*“The Contractor shall so far as may be consistent with the Contract make the maximum use of materials, supplies and equipment indigenous to or produced in Pakistan and services available in Pakistan or operated in Pakistan provided such materials, supplies, equipment and services shall be of required standard.”*

### **Sub-Clause 24.1 Cost of Suspension**

*At the end of the second paragraph after the word “Contractor” the following is added:*

*“or for the proper execution or for the safety of the Works or Plant unless such necessity results from any act or default of the Engineer or the Employer or in consequence of any of the Employer's Risks under Sub-Clause 37.2.”*

### **Sub-Clause 24.4 Resumption of Work**

*First paragraph of Sub-Clause 24.4 is deleted and substituted by the following:*

*“If the Contractor chooses not to treat prolonged suspension as an omission or termination under Sub-Clause 24.3, the Employer shall, upon the request of the Contractor, take over the responsibility for protection, storage, security and insurance of the suspended Works and of the Plant which has been delivered to the Site and which is affected by suspension and the risk of loss or damage thereto shall thereupon pass to the Employer.”*

### **Sub-Clause 25.1 Time for Completion**

The text of Sub-Clause 25.1 is deleted and substituted by the following:

*“The Works at the place of the project mentioned in the Preamble to Conditions of Contract shall be completed tested and commissioned within the period mentioned in the Preamble to Conditions of Contract.”*

### **Sub-Clause 26.1 Extension of Time for Completion**

Sub-Clause 26.1(h) is deleted.

### **Sub-Clause 26.3 Earlier Completion**

(i) At the end of Sub-Clause 26.3(a) the following text is added and Clause is re-designated as 26.3.

*“The extra sum to be paid to the Contractor for Completion of Works prior to the date of Completion established under Sub-Clause 25.1 shall be computed (159) on the basis of the sums mentioned in the Preamble to Conditions of Contract.”*

(ii) Sub-Clause 26.3 (b) is deleted.

### **“Sub-Clause 26.4 Rate of Progress**

Sub-Clause 26.4 is added:

*“If for any reason, which does not entitle the Contractor to an extension of time, the rate of progress of the Works or any Section is at any time, in the opinion of the Engineer, too slow to comply with the Time for Completion, the Engineer shall so notify the Contractor who shall thereupon take such steps as are necessary, subject to the consent of the Engineer, to expedite progress so as to comply with the Time for Completion. The Contractor shall not be entitled to any additional payment for taking such steps. If, as a result of any notice given by the Engineer under this Clause, the Contractor considers that it is necessary to do any work at night or on locally recognised days of rest, he shall be entitled to seek the consent of the Engineer so to do. Provided that if any steps, taken by the Contractor in meeting his obligations under this Sub-Clause, involve the Employer in additional supervision costs, such costs shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be recoverable from the Contractor by the Employer, and may be deducted by the Employer from any moneys due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer.”*

### **Sub-Clause 27.1 Delay in Completion**

Sub-Clause 27.1 is deleted and substituted by the following:

*“If the Contractor fails to deliver the Works, or any part thereof, within the time stated in Sub-Clause 25.1, or fails to complete the whole of the Work, or, if applicable, any Section within the relevant time prescribed by Sub-Clause 25.1, then the Contractor shall pay to the Employer the relevant sum stated herein below as liquidated damages for such default (which sum shall be the only moneys due from the Contractor for such default) for every day or part of a day which shall elapse between the relevant time for Delivery or Time for Completion and the actual date of delivery at site or the date stated in a Taking-Over Certificate of the whole of the Works or the relevant Section, as the case may be, subject to the applicable limit stated herein below. The Employer may deduct the amount of such damages from any monies due or to become due to the Contractor. The payment or deduction of such damages shall not relieve the*

Contractor from his obligation to complete the Works, or from any other of his obligations & liabilities under the Contract.”

The liquidated damages for each day of delay and the maximum amount of liquidated damages shall be the amounts mentioned in the Preamble to Conditions of Contract. (160)

Amount of Liquidity Damages/Delay Damages/Penalties	8.7	Liquidated Damages are two Type a) Delay in Commissioning b) Deviation in Guaranteed Energy Generation (GEG)
<b><i>Delay in Commissioning</i></b>		1.20 x Avg No. of units generated for no. of days delayed (calculated on pro rate basis as per Clause of tender) X Rs. / kWh (As per KE)
<b><i>Liquidated Damages (LD) for deviation in Guaranteed Energy Generation.</i></b>		The Contractor shall guarantee the energy generation from the project as per the generation table of this document. In case the contractor is not able to meet the guaranteed energy generation per the generation table of contract document, then the contractor shall be liable to pay the Liquidated Damages (LD) as per below mentioned formula:  <b>Penalty:</b> 1.20 x No. of kWh shortfall in a year (calculated on pro rata basis as per generation table) X Rs./kWh (As per KE) for average life of 25 Years

#### **Sub-Clause 28.7 Consequences of Failure to Pass Tests on Completion**

The words “by arbitration” appearing at the end of the Sub-Clause 28.7(c) are deleted and substituted by the words “by the Engineer”.

#### **Sub-Clause 30.4 Extension of Defects Liability Period**

At the end of 4th paragraph of Sub-Clause the following is added:

“or a mutually agreed period.”

#### **Sub-Clause 30.5 Failure to Remedy Defects**

In first line after the words “reasonable time” the following is added:

“fixed by the Engineer”.



### **Sub-Clause 30.13 Unfulfilled Obligations**

New Sub-Clause 30.13 is added as herein below:

*“After the Defects Liability Certificate has been issued, the Contractor and the Employer shall remain liable for the fulfillment of any obligation which remains unperformed at that time. For the purposes of determining the nature and extent of any such obligation, the Contract shall be deemed to remain in force.”*

### **Sub-Clause 31.1 Engineer's Right to Vary**

The following is added at the end of second paragraph:

*“No such variation shall in any way vitiate or invalidate the Contract, but the effect, if any, of all such variations shall be valued in accordance with Clause 31. Provided that where the issue of an instruction to vary the Works is necessitated by some default of or breach of Contract by the Contractor or for which he is responsible, any additional cost attributable to such default shall be borne by the Contractor.”*

### **Sub-Clause 31.5 Record of Costs**

The word “Engineer” in 4th line of Sub-Clause is deleted and substituted by “Engineer/Employer”.

### **Sub-Clause 31.6 Daywork under Variation Order**

New Sub-Clause 31.6 is added as given below:

*“A Variation Order may provide that work done pursuant thereto shall be executed as Daywork. In such case the Contractor shall be paid for such work under the conditions and the rates and prices set out in the Day Work Schedule.”*

### **Sub-Clause 31.7 Value Engineering**

New Sub-Clause 31.7 is added as given below:

*The Contractor may, at any time, submit to the Engineer a written proposal which in the Contractor's opinion will reduce the cost of constructing, maintaining or operating the works, or improve the efficiency or value to the Employer of the completed Works or otherwise be of benefit to the Employer. Any such proposal shall be prepared at the cost of the Contractor. However Employer is not bound to accept such proposal.*

### **Sub-Clause 33.1 Terms of Payment**

(Employer may vary this Sub-Clause)

The following Sub-Clauses are added:

**Sub-Clause 33.1.1 Retention of Payment**

If at any time any payment would fall due for Works or part of Works and, if there shall be any defect in part of such Works in respect of which such payment is proposed, the Employer may retain the whole or any part of such payment. Any sum retained by the Employer pursuant to the provisions of this Clause shall be paid to the Contractor after the said defect is removed.

**Sub-Clause 33.1.2 Payment Where Taking-Over Certificate Issued for Section or part of Works**

*If any section or part of the Works shall be taken-over separately under Clause 29 (Taking-Over) hereof, the payments herein provided for on or after Taking-Over shall be made in respect of the section or part taken-over and reference to the price shall mean such part of the price as shall, in the absence of agreement, be apportioned thereto by the Engineer.*

**Sub-Clause 33.2 Method of Application**

(Employer may vary this Sub-Clause)

**Sub-Clause 33.5 Payment**

Sub-Clause 33.5 is deleted and substituted by the following:

*The amount due to the Contractor under any Interim Payment Certificate issued by the Engineer pursuant to this Clause, or to any other term of the Contract, shall, subject to Clause 27, be paid by the Employer to the Contractor within 30 days after such Interim Payment Certificate has been jointly verified by Employer and Contractor, or, in the case of the Final Certificate referred to in Sub-Clause 33.10 within 60 days after such Final Payment Certificate has been jointly verified by Employer and Contractor; Provided that the Interim Payment shall be caused in 42 days and Final Payment in 60 days in case of foreign funded project. Deduction shall be made from the net amounts payable to the Contractor of any sum(s) in accordance with the prevalent Federal and/or Provincial laws, provided that no such deduction shall be made from those payments in respect of which the Contractor has obtained exemption under the Law.”*

**Sub-Clause 33.6 Delayed Payment**

The text of Sub-Clause 33.6 is deleted and substituted by the following:

*“In the event of the failure of the Employer to make payment within the times stated in Sub-Clause 33.5, the Employer shall pay to the Contractor compensation at the rate of KIBOR+2% for local currency and LIBOR+1% for foreign currency per annum, upon all local currency sums unpaid from the date by which the same should have been paid. The provisions of this Sub-Clause are without prejudice to Contractor’s entitlement under Sub-Clause 46.1.”*

**Sub-Clause 33.8 Payment by Measurement**

The work shall be measured for the units mentioned in the Schedule of Prices according to the Contract as determined by the Engineer from approved drawings, Specifications and Contract Documents.

**Sub-Clause 33.12 Withholding of Payment**

New Sub-Clause 33.12 is added as given below:

If the Works or any part thereof are not being carried out to the Engineer's satisfaction and in order to protect the Employer from loss on account of:

- (a) defective work not rectified
- (b) guarantees not met
- (c) claims filed against the Contractor
- (d) failure of the Contractor to make payments due for Plant procured or labour employed by him.
- (e) damage to any other contractor employed by the Employer.
- (f) Contractor's non-compliance with the Contract
- (g) any Government dues recoverable from the Contractor if notified by the Government

The Engineer may notify withholding of such payments or part thereof as may, in his opinion, be related to the aforesaid reasons/grounds. When the reasons/grounds for withholding the payment are removed by the Contractor, the Engineer shall upon being satisfied to that effect issue Certificate of Payment in respect of withheld amounts.

**Sub-Clause 35.1 Payment in Foreign Currencies**

(Employer may vary this Sub-Clause) (163)

**Sub-Clause 35.2 Currency Restrictions**

The text of Sub-Clause 35.2 is deleted and substituted by the following:

*“Any required foreign currency transactions shall be met by the Employer/Contractor at his cost from his own resources.”*

**Sub-Clause 35.3 Rates of Exchange**

The words “as stated in the Preamble” appearing in 3rd line of Sub-Clause are deleted and substituted by the words “as published or authorized by State Bank of Pakistan”.

**Sub-Clause 36.4 Payment against Provisional Sums**

Sub-Clause 36.4 is deleted and substituted by the following:

*“Provisional Sum if any will be expended on the direction of the Engineer through Variation Orders which would be valued in accordance with the provisions of Clause 31 Conditions of Contract.”*

### **Sub-Clause 37.2 Employer's Risks**

The text of Sub-Clause 37.2 is deleted and substituted by the following:

“The Employer's Risks are:

- (a) (Insofar as they relate to Pakistan) war and hostilities (whether war be declared or not), invasion, act of foreign enemies
- (b) (Insofar as they relate to Pakistan) rebellion, revolution, insurrection, military or usurped power or civil war
- (c) ionizing radiation or contamination by radioactivity from any nuclear fuel, radio-active toxic explosives or other hazardous properties of any explosive nuclear assembly or nuclear components thereof
- (d) pressure waves caused by aircraft travelling at sonic or supersonic speed
- (e) (Insofar as they relate to Pakistan) riot, commotion or disorder, unless solely restricted to the employees of the Contractor or of his Subcontractors
- (f) use or occupation of the Work or any part thereof by the Employer
- (g) fault, error, defect or omission in the design of any part of the Works by the Engineer, Employer or those for whom the Employer is responsible for which the Contractor has disclaimed responsibility in writing within a reasonable time after the receipt of such design
- (h) the use or occupation of the Site by the Works or any part thereof, or for the purposes of the Contract: or interference, whether temporary or permanent with any right of way, light, air or water or with any easement, way leaves or right of a similar nature which is the inevitable result of the construction of the Works in accordance with the Contract
- (i) the right of the Employer to construct the Works or any part thereof on, over, under, in or through any land
- (j) damage (other than that resulting from the Contractor's method of construction) which is the inevitable result of the construction of the Works in accordance with the Contract
- (k) the act, neglect or omission or breach of contract or of statutory duty of the Engineer, the Employer or other contractors engaged by the Employer or of their respective employees or agents.”

### **Sub-Clause 39.2 Loss or Damage Before Risk Transfer Date**

The words “by arbitration under Clause 50” are deleted and substituted by the words “by the Engineer”.

### **Sub-Clause 39.4 Duty to Minimize Delay**

New Sub-Clause 39.4 is added as given below:

Each Party shall at all times use all reasonable endeavours to minimize any delay in the Performance of the Contract as a result of Risks.

The Contractor shall give notice to the Employer and vice versa the Employer shall give notice to the Contractor in case of foreseeable delay by the Risks.

**Sub-Clause 40.2 Employer's Liability**

The text of Sub-Clause 40.2 from the words “or of death or personal injury” to the end of the Sub-Clause, is deleted and substituted by the following:

“..... (other than the Works) or of death or personal injury to the extent caused by any of the Employer's Risks listed in paragraphs (f), (g), (h), (i), (j), and (k) of Sub-Clause 37.2 but not otherwise.”

**Sub-Clause 42.2 Maximum Liability**

the words “the sum stated in the Preamble to Conditions of Contract or if no such sum is stated” appearing in 2nd line of Sub-Clause are deleted.

**Sub-Clause 42.6 Foreseen Damage**

Sub-Clause 42.6 is deleted in its entirety.

**Sub-Clause 43.1 The Works (Insurance)**

(Employer may vary this Sub-Clause)

**Sub-Clause 43.2 Contractor's Equipment**

Sub-Clause 43.2 is deleted and substituted by the following:

“The Contractor shall insure the Contractor's Equipment for its full replacement value while on the Site against all loss or damage caused by any of the Contractor's Risks.”

**Sub-Clause 43.3 Third Party Liability (Insurance)**

(Employer may vary this Sub-Clause)

**Sub-Clause 43.7 Remedies on the Contractor's Failure to Insure**

In 3rd line after the word, “purpose”, the expressions- “and reasonable costs including the man-hours costs of Employer's Personnel” are added.

**Sub-Clause 43.9 Currency of Insurance**

New Sub-Clause 43.9 is added as given below:

“All policies of Insurance of the Plant shall provide for payment of indemnity to be made in such amounts as will allow making good of loss of or damage to the whole or any part of the Works.”

**Sub-Clause 43.10 Contractor to Notify**

New Sub-Clause 43.10 is added as given below:

*“It shall be the responsibility of the Contractor to notify the insurance company of any changes in nature and extent of the Works and to ensure the adequacy of the insurance coverage at all times in accordance with the provisions of the Contract.”*

#### **Sub-Clause 43.11 Procurement of Insurance Policies**

New Sub-Clause 43.11 is added as given below:

*“The Contractor shall procure and submit the insurance cover under this Clause within a period of 28 days from the date of receipt of Letter of Acceptance from the Employer.”*

#### **Sub-Clause 44.6 Damage Caused by Force Majeure**

At the end of the Sub-Clause 44.6 the following is added: “However the Contractor shall put up his claim to the Employer / Engineer with full details and justification.”

#### **Sub-Clause 44.8 Payment on Termination for Force Majeure**

Text in sub-para (c) is deleted and para (d) and (e) are re-numbered as (c) and (d).

#### **Sub-Clause 44.10 Force Majeure Affecting Engineer"s Duties**

Sub-Clause 44.10 is deleted in its entirety.

#### **Sub-Clause 45.2 Contractor's Default**

The following paragraph is added at the end of Sub-Clause 45.2.

*“The Employer or such other contractor may use for such completion any Contractor's Equipment which is upon the Site as he or they may think proper, and the Employer shall pay the Contractor a reasonable compensation for such use”.*

#### **Sub-Clause 45.6 is added as follows:**

##### **Sub-Clause 45.6 Integrity Pact**

*If the Contractor, or any of his Subcontractors, agents or servants is found to have violated or involved in violation of the Integrity Pact signed by the Contractor as Schedule-H to his Bid, then the Employer shall be entitled to:*

*(a) recover from the Contractor an amount equivalent to ten times the sum of any commission, gratification, bribe, finder"s fee or kickback given by the Contractor or any of his Subcontractors, agents or servants;*

*(b) terminate the Contract; and*

*(c) recover from the Contractor any loss or damage to the Employer as a result of such termination or of any other corrupt business practices of the Contractor or any of his Subcontractors, agents or servants.*

*The termination under Sub-Para (b) of this Sub-Clause shall proceed in the manner prescribed under Sub-Clauses 45.2 to 45.5 and the payment under Sub-Clause 45.4 shall be made after having deducted the amounts due to the Employer under Sub-Para (a) and (c) of this Sub-Clause.*

#### **Sub-Clause 46.1 Employer's Default**

The comma and the word “or” at the end of paragraph (d) of Sub-Clause 46.1 are deleted and substituted by period (.) Paragraph (e) of Sub-Clause 46.1 is deleted.

**Sub-Clause 46.3 Payment on Termination for Employer's Default**

The words “including loss of profit” in the second paragraph of Sub-Clause 46.3 are deleted.

**Sub-Clause 47.1 Labour, Materials and Transport**

(Employer to modify this Sub-Clause as provided under Clause 70.1 of PCC of PEC Civil Documents and following PEC Procedure and Formula for Price Adjustment)

**Sub-Clause 48.1 Customs and Import Duties**

(Employer may vary this Sub-Clause)

**The Sub-Clause 48.3 is added:**

**Sub-Clause 48.3 Port Charges and Port Congestion**

*The Contractor shall be deemed to have obtained all the information regarding facilities and charges, in respect of port clearance, loading and unloading, storage, transportation, congestion and confirmed the requirements thereof at his own responsibility and all such costs and charges are deemed to be included in the rates and prices of the Schedule of Prices.*

**Sub-Clause 49.1 Notice to Contractor**

The following is added at the end of Sub-Clause 49.1:

*“For the purposes of Sub-Clause 49.1 the Contractor shall, immediately after receipt of Letter of Acceptance, intimate in writing to the Employer and the Engineer by registered post, the address of his principal place of business or any change in such address during the period of the Contract.”*

**Sub-Clause 50 Disputes & Arbitration**

*Clause 50 is deleted and in its place the following Sub-Clauses 50.1 to 50.5 are inserted:*

*“50.1 If a dispute of any kind whatsoever arises between the Employer and the Contractor in connection with, or arising out of, the Contract or the execution of the Works, whether during the execution of the Works or after their completion and whether before or after repudiation or other termination of the Contract, including any dispute as to any opinion, instruction, determination, certificate or valuation of the Engineer, the matter in dispute shall, in the first place, be referred in writing to the Engineer, with a copy to the other party. Such reference shall state that it is made pursuant to this Clause. No later than the fifty sixth (56) day after the day on which he received such reference, the Engineer shall give notice of his decision to the Employer and the Contractor. Such decision shall state that it is made pursuant to this Clause. Unless the Contract has already been repudiated or terminated, the Contractor shall, in every case, continue to proceed with the Work with all due diligence, and the Contractor and the Employer shall give effect forthwith to every such decision of the Engineer unless and until the same shall be revised, as hereinafter provided in an amicable settlement or in an arbitral award. In any case where the Conditions of Contract provide that the decision of the Engineer is to be*

*final and conclusive, such decision shall not be referable to arbitration under this Clause nor shall the same be questioned in any other form of proceedings whatsoever.*

*50.2 If either the Employer or the Contractor be dissatisfied with a decision of the Engineer or if the Engineer fails to give notice of his decision on or before the fifty sixth (56) day after the day on which he received the reference, then either the Employer or the Contractor may, on or before the twenty eighth (28) day after the day on which the said period of fifty six (56) days expired, as the case may be, give notice to the other party to commence arbitration, as hereinafter provided, as to the matter in dispute. Such notice shall establish the entitlement of the party giving the same to commence arbitration, as hereinafter provided, as to such dispute and, subject to Sub-Clause 50.5, no arbitration in respect thereof may be commenced unless such notice is given.*

*If the Engineer has given notice of his decision as to a matter in dispute to the Employer and the Contractor and no notification of intention to commence arbitration as to such dispute has been given by either the Employer or the Contractor on or before the twenty eighth (28) day after the day on which the parties received notice as to such decision from the Engineer the said decision shall become final and binding upon the Employer and the Contractor.*

*50.3 Where notice of intention to commence arbitration as to a dispute has been given in accordance with Sub-Clause 50.2, arbitration of such dispute shall not be commenced unless an attempt has first been made by the parties to settle such dispute amicably through mutual negotiation within ninety (90) days from the date of notification of Engineer's decision.*

**50.4 Any dispute in respect of which:**

*(a) the decision, if any, of the Engineer has not become final and binding pursuant to Sub-Clause 50.1 and*

*(b) amicable settlement has not been started/reached within the period stated in Sub-Clause 50.3*

*shall be finally settled, unless otherwise specified in the Contract, under the Pakistan Arbitration Act, 1940 (Act No. X of 1940) and Rules made thereunder as amended, by one or more arbitrators appointed under such Rules.*

*The said arbitrator(s) shall have full power to open up, review and revise any decision, opinion, instruction, determination, certificate or valuation of the Engineer for the purpose of obtaining said decision pursuant to Sub-Clause 50.1. No such decision shall disqualify the Engineer from being called as a witness and giving evidence before the arbitrator(s) on any matter whatsoever relevant to the dispute. The venue of arbitration proceedings shall be the place in Pakistan as mentioned in the Preamble to Conditions of Contract.*

*50.5 Where neither the Employer nor the Contractor has given notice of intention to commence arbitration of a dispute within the period stated in Sub-Clause 50.1 or 50.2 and the related*



*decision has become final and binding, either party may, if the other party fails to comply with such decision, and without prejudice to any other rights it may have, refer the failure to arbitration in accordance with Sub-Clause 50.4. The provisions of Sub-Clauses 50.1 to 50.2 shall not apply to any such reference.”*

## Appendix-A to Bid

### SPECIAL STIPULATIONS Clause Conditions of Contract

1.	Engineer hired by the procuring agency to issue variation in case of emergency.	3.1	<i>Up to 2 ( Two ) % of the contract price stated in the Letter of Acceptance.</i>
2.	Amount of Performance Security	4.2	Equivalent to the 5 % of the amount mentioned in Letter of Award (LOA) and shall be valid till up to a period of Completion of Maintenance of the Project in Form of Pay Order, Bank Draft or Bank Guarantee by a Schedule Bank of Pakistan in Favor of "IBA Karachi".
3.	Time for Furnishing Programme	8.3	Within 14 days from the date of receipt of Letter of Acceptance.
4.	Minimum amount of Third Party Insurance	18.3	Rs. 500,000/- per occurrence with number of occurrences unlimited.
5.	Time for Commencement	8.1	Within 14 days from the date of receipt of Engineer"s Notice to Commence, this shall be issued within fourteen (14) days after signing of Contract Agreement.
6.	Time for Completion (works & sections)	8.2 & 10.2	12 (Twelve) Months from the date of receipt of Notice to Commence .
7.	Amount of Liquidity Damages/Delay Damages/Penalties	8.7	Liquidated Damages are two Type c) Delay in Commissioning d) Deviation in Guaranteed Energy Generation (GEG)
A	<b><i>Delay in Commissioning</i></b>		1.20 x Avg No. of units generated for no. of days delayed (calculated on pro rate basis as per Clause of tender) X Rs. / kWh (As per KE)
B	<b><i>Liquidated Damages (LD) for deviation in Guaranteed Energy Generation.</i></b>		The Contractor shall guarantee the energy generation from the project as per the generation table of this document. In case the contractor is not able to meet the guaranteed energy generation per the generation table of contract document, then the contractor shall be liable to pay the Liquidated Damages (LD) as per below mentioned formula:  <b>Penalty:</b> 1.20 x No. of kWh shortfall in a year (calculated

			on pro rata basis as per generation table) X Rs./kWh (As per KE) for average life of 25 Years
8.	Defects Liability Period	11.1	365 days from the effective date of Taking Over Certificate.
9.	Percentage of Retention Money	14.2	10% of the amount of Interim / Running Payment Certificate.
10.	Limit of Retention Money	14.2	10 % of Contract Price stated in the Letter of Acceptance.
11.	Minimum amount of Interim/Running Payment Certificates	14.2	Rs. 3 Million
12.	Time of Payment from delivery of Engineer"s Interim/Running Payment Certificate to the procuring agency.	14.7	30 days in case of local currency
13.	Mobilization Advance.	14.2	10% of Contract Price stated in the Letter of Acceptance against Bank Guarantee from a Schedule Bank of Pakistan
14	Secured Advance ( Advance against Material / Plant & Equipment )		<p>Within 20 days of supply of the project material required at site supported with pre-dispatch inspection report, quantity as per BOQ and receipt of the bidders invoice at IBA office with receipt acknowledgement, signed and stamped by IBA-authorized representative</p> <p>Warranty and individual factory test report of manufactures issued shall also to be submitted along with invoice.</p> <p>Every item should bear serial number provided by the manufacturer during the manufacturing process.</p> <p>70% of the supply value Or 70 % as per bid price which ever is lesser</p>

## **SCHEDULES TO BID**

- **SCHEDULE A : SPECIFIC WORKS DATA**
- **SCHEDULE B : WORK TO BE PERFORMED BY SUB CONTRACTOR**
- **SCHEDULE C : PROPOSED PROGRAMME OF WORKS**
- **SCHEDULE D : DEVIATION FROM TECHNICAL PROVISIONS**
- **SCHEDULE E : DEVIATION FROM CONTRACTUAL CONDITIONS**
- **SCHEDULE F : METHOD OF PERFORMING WORKS**
- **SCHEDULE G : PROPOSED ORGANISATION**
- **SCHEDULE H : NAME OF MANUFACTURER / SUPPLIERS OF  
EQUIPMENT/ MATERIAL / RELEVANT TECHNICAL  
DATA ON WHICH THE TENDER IS BASED**
- **SCHEDULE J : SPARE PARTS AND WEAR & TEAR PARTS**
- **SCHEDULE K : LIST OF SPECIAL TOOLS**
- **SCHEDULE L : INTEGRITY PACT**

**SCHEDULE A : SPECIFIC WORKS DATA**

***SUPPLY, CONSTRUCTION, INSTALLATION AND COMMISSIONING OF 750 KW<sub>p</sub>  
ON-GRID SOLAR POWER SYSTEM ROOF MOUNTED , CAR & BUS PORT  
MOUNTED AT INSTITUTE OF BUSINESS ADMINISTRATION KARACHI (MAIN  
CAMPUS)***

*FOR FURTHER DETAILS REFER SCHEDULE OF PRICES*

## **SCHEDULE B : WORK TO BE PERFORMED BY SUB CONTRACTOR**

The Bidder will do the work with his own work forces except the following listed below which he intends to sub – contract.

Item of Works to be Sub-Contracted	Name & Address of the Sub Contractor	Statement of Similar Works Previously executed ( Attached Evidences )

Note :

1. No change of Sub-Contractor shall be made with out prior approval of Employer.
2. The truthfulness and accuracy of the statement as to the experience of sub-Contractors is guaranteed by the bidder. The Employer's judgement shall be final as to the evaluation of the experience of Sub –Contractors submitted by the bidder.
3. Statement of the similar works shall include description, location & value of Work, year Completed and name & address of the clients.

## **SCHEDULE C : PROPOSED PROGRAMME OF WORKS**

The bidder shall provide a programme in the form of Primavera or Microsoft latest version showing the sequence of work items by which he proposes to complete the work of the entire contract. The program should indicate the sequence of work items and the period of time during which he proposes to complete the works including the activities like designing, schedule of submittals of drawings , ordering and procurement of materials, manufacturing, delivering and construction of civil works, erection, testing and commissioning of works to be supplied under the contract etc.

**SCHEDULE D : DEVIATION FROM TECHNICAL PROVISIONS**

It is presumed that the bidder shall not take any deviation . However, if he intends to take deviations to the specified terms , those must be listed in the space provided below :

Sr. No	Clause No / Section No	Deviation / Clarification



## **SCHEDULE E : DEVIATION FROM CONTRACTUAL CONDITIONS**

It is presumed that the bidder shall not take any deviation . However, if he intends to take deviations to the specified Contractual / Commercial Conditions , those must be listed in the space provided below :

Sr. No	Clause No / Section No	Deviation / Clarification

## **SCHEDULE F : METHOD OF PERFORMING WORKS**

The bidder is required to submit a narrative outlining the method of performing the works. The narrative should indicate in detail and include but not limited to :

1. The sequence and methods in which he proposes to carry out the works, including the shifts per day and hours per shift, he expects to work.
2. A list of all constructional and erection plants, tools and vehicles propose to be used in carrying out the work at site. Testing and commissioning of the works, in sufficient detail to demonstrate fully that the equipment will meet all the requirement of the technical provisions.
3. The procedure for installation of equipment and transportation of equipment and materials to the site.
4. Details regarding the mobilization, the type of facilities regarding personnel accommodation, office accommodation, storage, communications, security and other services to be used
5. Organization chart indicating head office & field office personnel involved in management , supervision and engineering of the works to be done under the contract.

## **SCHEDULE G : PROPOSED ORGANISATION**

The bidder shall list in the schedule the key personnel he will employ from the head office and from site office to direct and execute the work, together with their names, qualification, experience, position held and their nationality.

S.No	Position	Name, CNIC & Nationality	Qualification	Experience

**SCHEDULE H : NAME OF MANUFACTURER / SUPPLIERS OF EQUIPMENT/  
MATERIAL / RELEVANT TECHNICAL DATA ON WHICH  
THE TENDER IS BASED**

Give hereunder, item wise list of Manufacturer/ supplier along with address :

S.No	Equipment Description	Make, Model, Manufacturer's Name, Country of Origin	Address, Contact E-mail

**SCHEDULE J : SPARE PARTS AND WEAR & TEAR PARTS**

Bidder / Supplier to provide the list along with the equipment for two years  
Continuous Operation :

**SCHEDULE K : LIST OF SPECIAL TOOLS**

## **SCHEDULE L : INTEGRITY PACT**

### **DECLARATION OF FEES, COMMISSION AND BROKERAGE ETC; PAYABLE BY CONTRACTORS.**

(FOR CONTRACTS WORTH RS. 10.00 MILLION OR MORE)

Contract No. \_\_\_\_\_ Dated \_\_\_\_\_

Contract Value: \_\_\_\_\_

Contract Title: \_\_\_\_\_

..... [name of Contractor] hereby declares that it has not obtained or induced the procurement of any contract, right, interest, privilege or other obligation or benefit from Government of Sindh (GoS) or any administrative subdivision or agency thereof or any other entity owned or controlled by it (GoS) through any corrupt business practice.

Without limiting the generality of the foregoing, [name of Contractor] represents and warrants that it has fully declared the brokerage, commission, fees etc. paid or payable to anyone and not given or agreed to give and shall not give or agree to give to anyone within or outside Pakistan either directly or indirectly through any natural or juridical person, including its affiliate, agent, associate, broker, consultant, director, promoter, shareholder, sponsor or subsidiary, any commission, gratification, bribe, finder's fee or kickback, whether described as consultation fee or otherwise, with the object of obtaining or inducing the procurement of a contract, right, interest, privilege or other obligation or benefit in whatsoever form from, from Procuring Agency (PA) except that which has been expressly declared pursuant hereto.

[name of Contractor] accepts full responsibility and strict liability that it has made and will make full disclosure of all agreements and arrangements with all persons in respect of or related to the transaction with PA and has not taken any action or will not take any action to circumvent the above declaration, representation or warranty.

[name of Contractor] accepts full responsibility and strict liability for making any false declaration, not making full disclosure, misrepresenting facts or taking any action likely to defeat the purpose of this declaration, representation and warranty. It agrees that any contract, right, interest, privilege or other obligation or benefit obtained or procured as aforesaid shall, without prejudice to any other rights and remedies available to PA under any law, contract or other instrument, be voidable at the option of PA.

Notwithstanding any rights and remedies exercised by PA in this regard, [name of Supplier/Contractor/Consultant] agrees to indemnify PA for any loss or damage incurred by it on account of its corrupt business practices and further pay compensation to PA in an amount equivalent to ten times the sum of any commission, gratification, bribe, finder's fee or kickback given by [name of Contractor] as aforesaid for the purpose of obtaining or inducing the procurement of any contract, right, interest, privilege or other obligation or benefit in whatsoever form from PA.

.....  
[ Procuring Agency]

[Contractor]















Institute of  
Business Administration  
Karachi

*Leadership and Ideas for Tomorrow*

## **BIDDING DOCUMENT**

**FOR**

**SUPPLY, CONSTRUCTION, INSTALLATION AND**

**COMMISSIONING OF 750 KW<sub>p</sub> ON-GRID SOLAR POWER SYSTEM**

**ROOF, CAR & BUS PORT MOUNTED**

**AT**

**INSTITUTE OF BUSINESS ADMINISTRATION KARACHI (MAIN CAMPUS)**

**VOLUME -II**

**Technical Specification**

**BOQ**

**Drawings**

**DECEMBER 2019**



Hi-Tech Engineering Company  
Al-Fatah Chamber CC Area, KCHS Block 7/8 Near Old Duty-Free Shop  
Shahra-e-Faisal, Karachi, Pakistan  
Phone # 021-32361355 Mobile No. 0321-8909096  
E-mail: [info@hec-engg.com](mailto:info@hec-engg.com) [www.hec-engg.com](http://www.hec-engg.com)

## **GENERAL REQUIREMENTS OF WORKS**

The contractor shall be responsible to visit the site to familiarize him with the scope of work, preparation of shop drawings and obtaining approval from the various authorities prior to execution of work. The contractor shall also be responsible for obtaining all materials and workmanship approval during execution and on completion of works. All costs and charges required by the various authorities shall be included in the scope of work.

### **1. STANDARDS, CODES, NOTICES, RULES & REGULATIONS**

The entire electrical installation/work shall be carried out by a registered Contractor, authorized to undertake such work by the Pakistan Engineering Council.

All works shall be carried out in accordance with the latest edition of the Regulations of the Electrical Equipment of Buildings issued by the Institute of Electrical Engineers, the Contract Documents, The Electricity Rules and bye-laws that are in force from time to time. Any discrepancy between these Specifications and any other rules and regulations shall be brought to the notice of Engineer for his instructions and the decision of the Engineer shall be final and conclusive.

The Contractor shall be responsible for completing all formalities and submitting the test certificates as per prevailing rules and regulations. All standard requirements of NEPRA, AEDB and DISCO of that region shall be complied with.

The latest standards, codes and recommendations of reputable institutions shall be applicable for the material and equipment specified herein and for installation work. Such organizations to be BSS, IEC, NFPA etc. In case the Specifications lay down herein differ from those given in the standards, then the equivalent or better specifications shall govern.

Contractor shall maintain at the site office one copy of the standards/ codes/recommendations as applicable to the works and will furnish the same as and when required by the Engineer / Employer.

### **2. INTENT**

It is the intent of the Electrical Drawings, Specification and BOQ that all work, Solar Panels, Inverters, Mounting Structure, Earthing, Lightening Arrestors, Monitoring Systems, Other equipment, DBs, conduits, wiring, Civil works and accessories shall be provided complete, commissioned, tested, adjusted and ready for operation.

The drawings, specifications BOQ shall be taken as whole and not separately since they are intended to explain and illustrate each other. Any item or work mentioned in drawings and missed in BOQ (vice versa) but necessary for completion of the work should be carried out by contractor without additional expense to the employer. Any apparatus, appliance, material or work which in BOQ or in drawing not shown but mentioned in the Specification, or Vice Versa, complete in all respects and ready for operation, even if not particularly specified, shall be provided by the contractor without additional expense to the Employer.

### **3. EXAMINATION OF SITE AND DRAWINGS.**

Visit the site of the proposed works and obtain all information as to existing conditions and limitations and all proposed works on adjacent sites and in adjacent areas which might affect the works on this site.

Examine the documents including the Specifications and Drawings of all other Divisions before bidding and again before commencing any portion of the works.

Neither the employer nor the Engineer will be responsible for any claim for extra work or expense resulting from the failure of the Contractor to be fully aware of Site Conditions.

#### **4. CONTRACT DRAWINGS**

The drawings for services works are design drawings, diagrammatic, and intended to convey the scope of work and indicate general arrangement and approximate locations of PV Panel, Inverter, AC/DC DB and cable tray, etc. The drawings do not intend to indicate architectural or structural details.

These cannot be used as shop drawings. Contractor must develop own detailed shop drawings for work at site. Do not scale drawings. Obtain accurate dimensions to structure and architectural items at site. Verify location and elevation of all services before proceeding with the work.

Make at no extra cost, any changes or additions to materials, and/ or equipment necessary to accommodate structural conditions (pipes or ducts around beams, columns, etc.)

Alter, at no additional cost, the location of materials and/ or equipment as directed, provided that the changes are made before installation and do not necessitate additional material.

#### **5. SHOP DRAWINGS AND MATERIAL SUBMITTALS**

After the award of Contract, submit program of works. Along with the program, submit a schedule detailing proposed submission dates for all Material Submittals and Shop drawings.

Prepare and submit for approval working drawings showing full details of Solar Power System like Panel Placement, AC/DC wiring Layout, Structure Layout, Civil Foundations detail, DB's detail drawings, Earthing & Lightening Protection drawings, Remote monitoring detail with detail layout, Single Line Diagrams with Injections points which is clearly shows the injection with the existing system, wiring routes & Civil Rooms for placement of inverters. After final approval by the employer/consultant a sufficient number of copies as directed shall be furnished for distribution.

- Submit to the EMPLOYER for approval samples of Solar Panels, Mounting Structure material, DC Cable, AC Cable, Breakers, communication Cable, Earthing & Lightening protection material, Wiring Devices & necessary accessories to complete the project and of any other items as may be requested by the EMPLOYER/Consultant.

Assume responsibility for accuracy of equipment dimensions related to space available, accessibility for maintenance and service, compliance with inspection authorities' codes. Ensure that shop drawings indicate working weights of all equipment.

#### **6. CO-ORDINATION**

The Contract documents have been carefully coordinated to avoid overlapping or conflicts. However, should any discrepancies be noted between contract documents within a trade or between trades, they shall be immediately reported to the Consultant/Employer so that the required revisions or work directives may issue to all parties concerned, at the earliest possible date and no claim to be made to the principal for any such discrepancy.

#### **7. ACCURACY OF DATA**

The layout of Solar Panel etc. shown on the drawings is generally diagrammatic unless specifically dimensioned. The layout, which shall finally include all approved materials to be used on the job should be checked for interference with work of other trades and with existing conditions before installation. The right is reserved by the Consultant/Employer to make any reasonable change during the construction in location of equipment etc. its size as shown on the drawings in order to conform to the site conditions at no additional cost.

**8. RECORD / AS-BUILT DRAWINGS**

As the job progresses, mark on one set of prints to accurately indicate the status of installed work. Have the prints available for inspection at the site at all times. Before commissioning, finalize the As Built drawings and submit 2 sets as draft to the engineer for checking and approval. Upon approval, submit three sets of prints and soft copies in auto cad format to the engineer for onward transmission to the employer.

**9. OPERATION AND MAINTENANCE MANUALS**

Upon successful commissioning, submit one draft of Operation and Maintenance Manuals for review and approval of Engineer. Separate binders shall be used as follows:

The minimum information required is as follows:

1. Catalogs highlighting the Make, Model and other necessary details for all Material and Equipment installed.
2. List of Local Agents / Suppliers for all Materials and Equipment with Telephone, Fax and Email address.
3. Detailed description of systems operation.
4. Procedures for Preventive, regular and the breakdown maintenance, with Manufacturer's Operation and Maintenance Catalog for all Systems / Equipment.
5. Commissioning data for all Systems / Equipment.
6. List of recommended spares.
7. Country of Origin Certificate

Upon approval of the draft by the Engineer, submit 3 set of manuals to Engineers for onward submission to the Employer.

**10. SUPERVISION.**

The contractor will maintain at site, as necessary for the performance of the Contract, qualified personnel and supporting staff, with proven experience in Installation, testing & Commissioning of Solar Power Project of the same nature and complexity.

**11. CLEANING.**

Each day as the work proceeds and on completion, clean up and remove from the premises all rubbish, surplus material, equipment, machinery, tools, scaffolds and other items used in the installation of the work. Clean out dirt and debris and leave the site clean with no stains and in a condition acceptable to the Engineer.

Where electrical items form part of the visible finish in the rooms, protect from over painting, etc. and give all items a final cleaning before handing over of the project.

**12. ACCESSIBILITY, ACCESS PANELS AND DOORS.**

Any item of equipment requiring maintenance shall be located so as to be accessible for



maintenance or repair without removing adjacent structures, equipment, or other materials.

**13. SITE CONDITIONS**

All electrical equipment and components shall be selected and installed such as to operate satisfactorily and safely under the existing climatic conditions.

**14. TESTING AND COMMISSIONING AT SITE**

Upon completion of the installation or part of the installation, the Contractor shall carry out and be responsible for the installation, testing and commissioning of all equipment and integral systems, in stages if required, to ensure that it is in proper working order and capable of performing all of its functions in accordance with the specification and to the satisfaction of the Engineer. The Contractor shall be fully responsible for all equipment until each item of plant, equipment or system or part thereof has been tested, commissioned and accepted by the Engineer.

Any equipment damaged during installation & commissioning shall be replaced by new equipment by the Contractor at his own expense.

All testing and commissioning shall be carried out according to the requirements of the relevant Standards and regulations as may be stated or implied in this specification.

**15. TAGGING & IDENTIFICATIONS**

Solar Power System installation including DC strings, AC Cables, Communication cables, circuit breakers, switchgears, panels, equipment, isolators, should be neatly and clearly labeled internally and externally corresponding to the drawings and site conditions. The tags shall be Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Permanent adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch or as approve by Engineer.

The distribution panels shall be designated in accordance with the reference letters or number used in the specifications and/or shown on the drawing and the legend and description shall clearly spell out the full name of the equipment. Every circuit in DB's shall be marked with relevant circuit number as per single line diagram before performance of insulation test a) All distribution panels shall be provided with a substantial circuit sheet fixed by screws to the inside of the front cover with Chart under the respective circuit number. Spare circuit breakers shall not be printed "Spare" but left blank.

The particular phase connected to a circuit breaker and bus-bar shall be clearly indicated by marking with the appropriate color. Every DB should have an "as built load schedule" showing each circuit number and its serving pasted on the inner side of opening door to offer ease for maintenance.

**16. EQUIPMENT PROTECTIONS**

Unless otherwise noted, all equipment supply shall conform as a minimum to the following protection classes, in accordance with the BS standard.

With the exception of material specified to be hot dip galvanized after fabrication all metal works including conduits, outlets, boxes, hangers, frames etc. shall be given a protective treatment consisting of degreasing, de-rusting, two coats of zinc chromate / red lead primer and resin bonded powder coat during manufacture.

**17. ASSOCIATED CIVIL WORKS**

Except where separately stated in the Bill of Quantities the cost of all civil works associated with any BOQ item of electrical works, such as excavation and backfilling of earth, compaction of the

earth, foundation pads, thrust boring, chiseling, making openings, etc. shall be deemed to be included in the price quoted against respective items. No separate payment for such works will be made. Such works will also include repair of any damage to civil works caused by the Contractor during electrical installation.

## 18. STANDARD SYSTEM PARAMETERS

Unless otherwise specified elsewhere, all equipment and material shall be designed to operate satisfactorily with the following minimum requirements without any de-rating.

- a) Voltage rating of equipment: 400 V, 3 phases + 10%  
230 V, 1 phase + 10%

In general, the electrical color coding of switchgear cubicles, control panels, desks etc., shall be in accordance with the respective IEC Recommendations.

Live parts of electrical connections shall be color coded according to IEC as follows:

	Conductor Designation	Coding Alphanumeric	Color
.C. Network	Phase 1	L 1	Red
	Phase 2	L 2	Yellow
	Phase 3	L 3	Blue
	Neutral	N	Black
.C. Network	Positive	L+	Red
	Negative	L-	Black
Earthing	Protective Earth	PE	Green/yellow
	Earth	E	Green/yellow

## 20. Control Cables

The Control Cables shall be manufactured according to specifications for LV Cables. The Control Cables shall be of multi-core, PVC insulated type withstanding without deterioration the conditions prevailing at the place of installation. The cross section of cable shall be as per the requirement of the system.

All the cores should be numbered and/or colour coded or otherwise properly identified. At-least 20% spare cores shall be provided in all Control Cables.

No separate payment is admissible for supplying, installing, testing and commissioning of control cables and is deemed to have been included in the BOQ rates of the respective equipment.

Distance in between power, communication and control cables shall be kept as per requirements laid down by NEC800, NFPA 70 and EN50174-2.

**21. GUARANTEE**

The Contractor shall furnish written guarantee of the manufacturer or supplier with respect to satisfactory performance of each equipment. Guarantee shall be given for replacement and repair of part or whole of the equipment, which may be found defective in material or workmanship. The guarantee shall cover the duration of Defects Liability Period as defined in the Conditions of Contract. This guarantee shall not relieve the Contractor of his obligations and he will be fully responsible for the repair or replacement of any defective material in time, so as not to cause any undue delay in carrying out the repairs and/or replacements.

**22. SUBSTITUTIONS**

Wherever it is desired to substitute a different make or type of apparatus from that specified, all information pertinent to the adequacy and adaptability of the proposed apparatus, shall be submitted to the EMPLOYER/Consultant.

**23. INVERTER ROOM IDENTIFICATION SIGNS / CHARTS**

Danger Boards having signs and designation of the room shall be installed on the external door of Electrical and Machine Rooms. Shock/First Aid Charts shall be installed in all INVERTER Rooms. Laminated single line and adequate detail drawings on proper boards highlighting the main system features shall be displayed/ fixed in respective electrical and communication rooms.

**24. INSTALLATION INSTRUCTIONS - GENERAL**

The Contractor shall furnish all labor, materials, tools and equipment required to install, connect, test and commission all electrical equipment specified herein, whether or not such equipment is furnished by him or by others.

For all equipment to be installed by the Contractor, the Contractor shall supply and install all erection materials such as foundation bolts, washers, nuts, etc. as required and without any additional costs.

The Contractor shall set out the works himself as per Specifications and Drawings and shall properly position the equipment on specified foundation/location. In general, the manufacturer's instructions for installation shall be followed. Any defect or faulty operation of equipment due to the Contractor not following the manufacturer's instructions shall be corrected and repaired by the Contractor at his own cost.

For any deviation from the working drawings that are deemed necessary by the Contractor due to site conditions, he shall submit the details and obtain the Engineer approval before starting such works.

**25. FACTORY TESTS**

Contractor shall provide the flash test report of the supplied solar panels with the required certifications and specification as specified in the Solar Power Generating System. In addition contractor shall also provide local electrical properties test of the randomly selected Solar Panels on their own cost from a reputed lab as directed by the Engineer.

Provision for at least two person's visits of production facility shall be made to include one representative each from the Employer and the Engineer/Engineer. The contractor shall undertake all formalities as may be required for the Engineer or his representative to enable him make the visit.

All type and routine tests on AC/DC switchboards, Low tension cables and all other equipment

shall be performed at the manufacturer's works in the presence of the Engineer and the Employer or their representative.

The Contractor shall inform the Engineer about the date and time of test of each equipment at least two weeks in advance. This shall, however, be done after the Contractor has got the test procedures duly approved by the Engineer. The witnessing of test by the Engineer and the Employer shall not absolve the Contractor from his responsibility for the proper functioning of the equipment, and for furnishing the guarantees referred to in clause 9.0. All test results shall be supplied in triplicate. All expenses for carrying out the tests as incurred by the Engineer and the Employer to witness it shall be borne by the Contractor and deemed to have been included in the tender bid.

### **FIELD TESTING – GENERAL**

During the installation, the Contractor shall perform field tests on all equipment, cables, materials and systems. All tests shall be conducted in the presence of the Engineer or his representative for the purpose of demonstrating equipment or system compliance with Specifications. The Contractor shall submit for Engineer's approval complete details of tests to be performed describing the procedure, test observations and expected results.

The Contractor shall furnish all tools, instruments, test equipment, materials, etc., and all qualified personnel required for the testing, setting and adjustment of all electrical equipment and material including putting the same into operation.

All tests shall be made with proper regard for the protection of the personnel and equipment and the Contractor shall be responsible for adequate protection of all personnel and equipment during such tests. The cost of any damages or rectification work due to any accident during the tests shall be the sole responsibility of Contractor.

The Contractor shall record all test values of the tests made by him on all equipment. Three (3) copies of all test data and results certified by the Engineer shall be given to the Engineer for record purposes. These shall also include details of testing method, testing equipment, diagrams, etc.

The witnessing of any tests by the Engineer does not relieve the Contractor of his guarantees for materials, equipment and workmanship, or as any other obligations of Contract.

#### LV Panel & Switchboards

Each circuit breaker shall be operated electrically and mechanically. All interlocks and control circuits shall be checked for proper connections in accordance with the wiring diagrams given by the manufacturer.

The Contractor shall properly identify the phases of all switchgear and cables for connections to give proper phase sequence. Trip circuits shall be checked for correct operation and rating of equipment served. The correct size and function of fuses, disconnect switches, number of interlocks, indicating lights, alarms and remote-control devices shall be in accordance with approved manufacturer drawings. Nameplates shall be checked for proper designation of equipment served. Protective relays shall be tested and set at site prior to commissioning of the equipment.

#### Insulation Resistance Test

Insulation resistance test shall be made on all electrical equipment by using a meggar of 500 volts for circuits up to 250 volts and 1000 volt for circuits between 250 and 500 volts. The insulation resistance values of cables, transformer, switchgears, etc., shall be as per BSS, IEEE, NEC, ICEA and Pakistan Electricity Rules.

The minimum acceptable insulation resistance value for PVC cables shall be 1 Mega ohm. The insulation test between each cable of a circuit shall be made and also between earth and individual cable. All equipment and wiring shall be tested to earth in presence of the EMPLOYER and contractor should in writing submit the test results to EMPLOYER.

If the insulation resistance of the circuit under test is found less than that specified above, the cause of low reading shall be determined and removed. The corrective measures shall include dry out procedure by means of heaters if equipment is found to contain moisture, but if circuit cables are found defective these shall be removed and replaced and tested again. The tests shall be carried out at least three times and the lowest reading shall not be less than 70% of the average value.

The switchgears shall be given an insulation resistance measurement test after installation, but before any wiring is connected. Insulation tests shall be made between open contacts of circuit breakers, switches and between each phase and earth.

#### Earth Resistance Test

Earth resistance tests shall be made by the Contractor on the earthing system, separating and reconnecting each earth connection.

The electrical resistance of the ECC together with the resistance of the earthing leads measured from the connection with earth electrode to any other position in the complete installation shall not exceed 5 Ohm.

#### Phase Sequence Test

The CONTRACTOR shall phase out the entire power installation before final connections to the line. Final connections of main feeder buses to the main circuit breaker of the switch gear shall only be made after correct phase relating of Power Company's primary line has been established. All equipment installed shall be tested for applicable measures and as required by the EMPLOYER.

### **26. MAINTENANCE AND SERVICE DURING DEFECTS LIABILITY PERIOD**

The Contractor shall provide all services, materials, and equipment necessary for successful operations of the entire system during the defects liability period. Provide necessary material required for the work. Minimize impacts on facility operations when performing scheduled adjustments and non-scheduled work.

The adjustment and repairs of the systems include all equipment, software updates, and control devices. Provide the manufacturer's required adjustments and all other work necessary.

Provide all software updates and verify operation in the system. These updates shall be accomplished in a time manner, fully coordinated with system operators, and shall be incorporated into the operations and maintenance manuals, and software documentation.

## **TECHNICAL SPECIFICATION**

## 1. SOLAR POWER GENERATION SYSTEM

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

- Solar photovoltaic panels
- Grid Tied Inverters
- Module mounting structure
- Junction boxes
- AC Distribution board
- Surge Arrester AC & DC
- Earthing protection system
- Cables and other accessories
- Lighting Protection System

The PV array converts the light energy of the sun to DC power. The module mounting structure shall be used to hold the module in position. The DC power generated shall be converted to 3 phase, AC, 415V, 50 Hz. solar panels shall be integrated with the premises power supply from electricity authority.

### a) SOLAR PV MODULES:

Since the light intensity in the region and the temperature parameters have been taken into consideration, we strongly recommend to go for PV Crystalline modules. The photovoltaic modules shall be designed, manufactured, and tested in accordance with the applicable standards as follows

### b) TESTING, CERTIFICATION & QUALITY ASSURANCE

IEC 61215 / IEC 61730: VDE / MCS / CE / SII / CEC AU / INMETRO  
 UL 1703: CSA / IEC 61701 ED2: VDE / IEC 62716: VDE / IEC 60068-2-68: SGS Take-away/UNI  
 9177 Reaction to Fire: Class 2

### c) CERTIFICATION – MANUFACTURER

- The PV module should be AAA or AA rated PV manufacture.
- The Manufacturer should have 10 Years of manufacturing experience.
- The manufacturer should have Authorized Distributor in Pakistan.
- The manufacturer should be Vertically Integrated Company.
- The Product to be listed in PVEL top Performers.

### d) SPECIFICATIONS & CERTIFICATIONS

- Cell Type: 144 or above Half cell, Mono PERC, Minifacial.
- Minimum power should be 530W or above at STC: air mass AM 1.5, irradiance 1000 W/m<sup>2</sup>, temperature 25°C
- Minimum Module efficiency ≥20%
- Operating Temperature: -40°C to 90°C
- Solar module must be minimum 20% efficient at low irradiance of 200W/m<sup>2</sup>:
- Nominal Module Operating Temperature 44.6°C (±2°C)
- Temperature coefficient of PMPP -0.36%/°C or better
- Temperature coefficient of VOC -0.32 %/°C or better
- Connectors: MC4 or comparable
- Maximum series fuse rating: 25A

- PID free (certificate should attached)
- Anti-soiling Coatings.
- Relevant ISO and IEC Certifications should be attached and mentioned (IEC 61215, IEC 61730 & UL 1703. IEC 62804 (PID Free), IEC 60068-2-68, IEC 61701 (Salt Mist Level 6), IEC 62716 (Ammonia Resistance), ISO 11925-2 (Ignitability Class E), UNI 8457/9174 (Class A), comply SRO 604(1) 2019 module batch to be EL flash tested sample size to be selected on S2500/ISO 2859, Waste Electrical and Electronic Equipment (WEEE) COMPLIANT RECYCLING MEMBERSHIP. Mandatory
- Module product warranty 10/12 years and performance warranty 25 years.
- Unique Serial number, Name/Logo of manufacturer and separate date of manufacturing (DD/MM/YY) should be laminated Inside the module so as to be clearly visible from the front side.
- A properly laminated sticker containing the following details should be available at the back side of the module
  - Name of the manufacturer/distinctive log.
  - Model Name and Type of Cell Technology.
  - Peak Watt Rating (Wp) and Power Tolerance Range.
  - Voltage (Vmp) and Current (Imp) at STC.
  - Open Circuit Voltage (Voc) and Short Circuit Current (Isc).
  - Module Voltage RaHg 1500V.
  - Dimensions of PV Module
  - Test Standard(s) to which the module has been tested and certified.
- following essential technical parameters of solar panel/modules should be provided with each pane/ supplied as well as in the technical proposal.
  - I-V curve for the solar photovoltaic module/panel.
  - Date and year of obtaining IEC PV module standardization qualification certificate.
  - Electrical Data (i.e: Pmax, Voc/Vmp, Isc/Imp at nominal Cell Operating Temperature (NOCT).
  - PV Module efficiency at STC.
  - Working temperature range of PV Module.
- Each panel should have factory equipped weather proof terminal junction box having at least IP67 protection with provision of opening for replacement of DC cables, blocking diodes and easy debugging if necessary.
- The PV modules offered should not be more than 12 months old from date of issue of work order.
- The Solar Module should be free from visual and cosmetics defects.
- FAT for consultant and client should arranged by supplier/contractor at its own cost. with serial numbers from manufacturer for each panel (at the time of supply).
- All information regarding solar panel with above mentioned featured data should be accessible and verifiable online on the manufacturer website.
- IEC accredited lab test for solar panels is mandatory.

## 2. PV INVERTERS:

- Make: SMA/Sungrow/Hawaii
- On-Grid string inverter Pure Sine Wave MPPT  $\geq 6$
- Nominal AC Voltage: 3 $\phi$ , 230/400 VAC 50Hz  $\pm$  5Hz
- Inverter rated Output Power @ 400 V 3 $\phi$  50Hz should be  $\geq 25000$ W
- Efficiency  $\geq 97.5\%$
- MPPT Voltage Range: 550V to 850V
- Maximum DC input voltage: 1000V
- Power Factor @ Rated power should be 1
- Operating Temperature Range  $-25^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$  ( $-13^{\circ}\text{F}$  to  $+140^{\circ}\text{F}$ )
- Maximum relative humidity 100%"
- Protection Class: IP66 or above
- Maximum Operating Altitude  $\geq 2900$ m

- Transformer less Topology
- Self-consumption at night  $\leq 0.01\%$
- Total Harmonic distortion  $< 3\%$
- Must meet IEC62109-1 /2, EN50530, IEC 62116, IEC 61727, IEC60068, IEC 61683 certifications
- EMC IEC 61000 family or equivalent
- Inverter must have following functionalities:
- String/Sub array monitoring
- Matching grid voltage and frequency at point-of-coupling
- Anti-islanding protection
- Ground fault monitoring
- Grid monitoring
- Residual-current monitoring unit
- Frequency regulation
- Limitation of voltage fluctuation due to switching operations and long-term flicker
- DC Reverse Polarity protection
- Limitation of short-circuit current
- Over Voltage Protection
- Communication Interface: Ethernet / WLAN / RS485
- Inverter must meet following standards:
- IEC 60068-2, IEC 61727, IEC 62109-1/2, IEC 62116, IEC 60721-3-4, AS 4777, G59/3, VDE 0126-1-1, VDE-ARN 4105"
- Warranty 5 years
- Advanced communication, with intelligent alerts/warnings and another relevant operational parameter, either with Built-in remote monitoring system or Separate remote monitoring system connected to communication ports of the inverter

### 3. MODULE MOUNTING STRUCTURE:

- Structure should be fixed tilt
- The selection of the optimum tilt angle for the module installation. The angle between the modules and the horizontal plane shall be the optimum for the region.
- "The height of the module above ground shall also be carefully chosen, considering factors such as, damage from sand driven by wind and clearance from the ground to allow for cooling air to circulate at the back of the module and any condensation of moisture to dissipate."
- Mounting structure material should be of anodized aluminum & Hot Dip Galvanized Iron and must be resistant to corrosion.
- The mounting structure must be able to withstand basic wind speed of 150Km/Hr.
- The Bidder shall provide detailed drawings civil foundations it plans to use.
- The applicable construction codes for each structural element should be quoted.
- The mounting structures must be earthed for maximum short-circuit current and lightning protection.
- The stability of the supporting structure after installation shall be certified and guaranteed by the Contractor.
- Fittings like washer, screws etc. V2A steel quality or proved high quality coating not interacting with Aluminum.
- All nuts and bolts should be made of good quality Stainless Steel.
- The structure should be designed to allow easy replacement of any module.
- Structure to comply with ASTM-A36, ASTM-123, AL 6005/6063 and ASCE-7-10.
- Detail Calculation required considering wind speed.
- Detail drawings of structure is required.



#### 4. DC CABLE FOR SOLAR:

- The main design requirement is to reduce ohmic losses of DC cabling. without adversely affecting the cost trade-off. to < 1 % at full power under STC conditions
- Design calculations through cable loss simulation have to be provided by the bidder for review & approval.
- String cable shall be selected as per EN50618 standard (1500 VDC).
- DC cables shall be suitable for the environmental conditions at the Project site. including UV protection and rodents
- All cables shall be UV resistant PVC double insulated with each core individually insulated. Insulation rating of cables shall be as per IEC standards.
- All cables shall have annealed copper stranded conductors
- All above ground cables shall be routed in rigid galvanized steel cable trays or metallic galvanized steel conduits.
- All underground cables shall have mechanical protection in the form of galvanized steel wire, steel tape or steel interlocked armor. If unarmored cables will be used then the same will be routed in rigid galvanized steel conduits
- All cable connections with industrial cable connectors. (MC4 or equivalent) Used connectors have to be compatible with connectors of panel supplier.
- Submit type test reports of DC Cable.

#### 5. DC Breaker:

DC Breaker Box/ Array Junction Box with all accessories for out door usage with water proof enclosure. Each Junction Box Shall be provided with suitable Metal Oxide Varistors (MOV's), Surge Arrestors, one fuse, one SPD (Surge Protection device) and one DC Breaker per string. AC Breakers Box with all related accessories for outdoor usage with water proof enclosure.

#### 6. LOW VOLTAGE PANELS & SWITCHGEARS

This Specification covers the minimum requirements for the selection, application, procurement, testing and installation of low-voltage switchgear and associated bus.

##### a) MAIN / SUB-MAIN LOW VOLTAGE PANELS

The main and sub-main Switchboard shall be of wall / floor mounted construction system, incorporating MCCB(s) bus-bars, fuses, measuring equipment etc. all as required and complying to the latest editions of BS EN 60439-1. The switchboard shall be from a reputed manufacturer as per the schedule.

All circuit breakers and busbar ratings shall be as per the load schedules and drawings. All circuit breakers and busbars should be rated for 45 °C ambient temperature. All auxiliary power supplies shall be provided as per the manufacturer's requirement. The fault-current calculation guidelines stated in IEC shall be adhered to when selecting circuit breaker ratings.

The short-circuit current rating of the low-voltage switchgear shall, as a minimum, be 10 percent greater than the calculated available short-circuit current. It is recommended that the rating be 20 percent above the calculated value.

The ambient temperature rating of the switchgear shall be selected in accordance with the maximum ambient temperature of the equipment and shall be 45°C as a minimum.

Low-voltage switchgear shall be, as a minimum, capable of withstanding a current equal to the short-time current capacity of the main circuit breaker for two periods of 0.5 seconds separated by a 15 second interval of zero current. This current shall be maintained without danger to operating personnel and without electrical, thermal or mechanical damage or permanent deformation to the bus, structure or enclosure.

**b) DESIGN & CONSTRUCTION**

Enclosures shall be made of sheet steel. The basic framework should be roll-formed from 1.6 to 2 mm electro-galvanized steel coated with high-solid enamel, polyester electrostatic spray and oven baked. The doors and panels shall be iron-phosphate steel, coated like the framework but also with primer. The color shall be RAL 7035 or equal. The base frame shall be of minimum 3mm thick Electro galvanized steel.

Compartments shall be easily accessible for maintenance purposes. Barriers shall be included between each compartment to contain an internal fault as defined in BS / IEC standards to ensure safe maintenance on any outgoing circuit when the remainder of the board is alive. Each compartment shall be provided with a separately fixed compartment thermostat controlled heater at the bottom of each compartment.

The maximum height of the enclosure shall be 1800 mm. All meters, lamps, operating handles shall be within a maximum height of 1500 mm. All dimensions shall be of uniform appearance. All live conductors shall be shielded in such a manner that they cannot be accidentally touched when the doors are open. All doors and plates shall be interchangeable and may be hinged left, right, top and bottom as standard. Doors shall be provided with an integral gasket and earth stud and a range of locks to meet all regulations.

All internal separations shall be from standard pre-fabricated plates. The usage of Bakelite, fiber sheets or any other material to provide internal separation will not be acceptable. The internal separation between compartments and sections shall be at least IP 40.

Suitable cableways shall be provided for each functional unit section. There shall be front access for cabling purposes. It shall be possible to safely terminate or work on the outgoing cables of any functional unit without having to switch off the main breaker or adjacent functional units. Switchboards shall be suitable for bottom or top cable entry as specified. All openings and entries shall be vermin proof. Switchboards shall be arranged such that safe access (front, rear, side) may be readily obtained. Adjustable gland plates, adequate channel frames and cable clamps for cable supports shall be provided.

**c) BUS-BARS**

Bus-bars shall be of rectangular cross section HDHC tinned copper and suitably rated for continuous operation. The main bus-bar rating shall be the same throughout the entire length of the switchboard. The bus-bars and primary connections shall comply with BS 159. The surface temperature of the bus-bar should not exceed 85 °C over an ambient of 45 °C. Connections to incoming circuit breakers shall be of the same rating.

Bus-bars shall be installed in a separate chamber and shall run along the whole length of the switchboard, which allows for easy extension in the future. Vertical droppers if any, shall run behind each functional unit section. Busbars shall be rigidly supported along their entire length. The busbar supports shall be of a high-grade polymer. The mechanical and dielectric strength of the

busbars and supports shall be capable of withstanding the worst fault conditions and as per ASTA testing requirements.

The main busbar system shall be of a parallel 2 bar per phase arrangement, which eliminates the need for drilling or bending of busbars at joints. All switchboards shall be complete with a neutral and earth bar running along the full length of the panel. The cross section of the neutral bar shall be same as that of the phase conductor and that of the earth bar is at least half the size as that of the phase bar.

Busbars and connections shall be color coded for phase identification and shall conform to the phase sequence R-Y-B, counting from left to right, upper to lower and from near to remote when viewed from the operating side of the switchboard.

Under no circumstances will common earth / neutral bar be accepted. Earth bars, neutral bars and wiring of the switchboard and so that all outgoing neutral and earth conductors can be readily and safely connected and disconnected without moving other cables or disconnecting the incoming supply to the switchboard.

**d) DRAWINGS AND INFORMATION:**

A drawing pouch / pocket shall be provided in each panel and laminated load schedules and approved schematic drawings (Framed) shall be providing.

The vendor shall furnish following submittal after placement of order:

General Arrangement drawing showing front view, plan, foundation plan, floor cutouts and trenches for external cables, elevations, transport sections and weights.

Sectional drawings of various types of feeders, panels showing general constructional features, mounting details of various devices, busbars, current transformers, cable boxes, terminal boxes for control cables etc. Schematic and control wiring diagrams for each type of feeder and protection including indicating devices, metering instruments, alarms, space heaters etc.

**7. AC CABLES:**

- AC cables shall be made of copper. Datasheets, Make, Certifications, and warranties should be provided with proposal.
- Rated voltage, nominal voltage between phase and neutral and nominal voltage between phases have to be specified by the Bidder.
- AC cables shall be suitable for the environmental conditions at the Project site, including UV protection and rodents.
- The main design requirement is to reduce ohmic losses of AC cabling, without adversely affecting the cost trade-off, to below 2% under STC conditions. (Design calculations through cable loss simulation to be provided by the Bidder for review & commenting).
- All cables shall have annealed copper stranded conductors
- All underground cables shall have mechanical protection in the form of galvanized steel wire, steel tape or steel interlocked armor.
- All cables should be XLPE.

## **8. CABLE TRAYS**

### **a) GENERAL**

Under this section of the Contract cable trough (cable tray) shall be installed to support distribution cables, communication cables and all wiring cables not generally installed in conduit and or trunking. The cable trough shall be installed in such a manner to enable easy access for cable installation.

The cable trough shall vary in type, i.e. where large armored cables are installed, ladder rack type cable trough shall be permitted. Where smaller type communication cables are installed, ventilated type cable trough shall be permitted. Cable trough shall be galvanized finished.

### **b) QUALITY ASSURANCE**

Subject to compliance with the requirements of the Contract Documents, acceptable manufacturers are to be firms regularly engaged in manufacturer of all materials specified in this section of types and sizes required, whose products have been in satisfactory use under similar service conditions for not less than ten years.

### **c) SUBMITTALS**

Submit the standards to which the cable trough is manufactured to. Submit shop drawings and data in accordance with the general requirements of the contract. Indicate the various types of cable trough with terminology used. Show actual cable trough installation details, size and suspension system.

### **d) PRODUCTS**

The cable trough system shall be of one manufacturer and shall include factory made trays, tray fittings, connections, complete with accessories and supports to form a complete tray support system. The cable trough system shall include the factory-made tray elements. Straight trays and ladders, fittings and horizontal and vertical bends of various angles crosses, tees, wyes, reducers, vertical riser elements, connectors, joint plates and all necessary fixing accessories including supports. No local or site fabrication of any cable trough system including ceiling and wall supports are acceptable. Threaded rods for ceiling supports are not acceptable.

The whole of the tray work, fittings, supports shall be of mild steel hot dipped galvanized after manufacture / imported GI Sheet. The thickness of the protective sheath on any element shall not be less than 60 microns.

Cable trays shall be constructed from mild steel of minimum thickness 16 gauge (1.5mm). Height shall be 75/100mm. Trays in excess of 300mm width shall be of minimum thickness 14 gauge (2.0mm). Flange height shall be 100mm. Insert elements, bolts, screws, pins etc., shall be mild steel cadmium plated/hot dip galvanized. Tray work shall have oval perforations. Ladder type trays shall be used as required and/or approved by the Employer. All trays (straight and fittings) to be heavy duty returned flanged type unless specified otherwise.

Tray component are to be accurately rolled or formed to close tolerance and all edges rounded. Flanges are to have full round smooth edges. Ladder racks for widths up to and including 300mm

shall be constructed from rolled steel sections of minimum thickness 16 gauge (1.5mm). Height shall be 75/100mm. Ladders in excess of 300mm width shall be C Section construction with a minimum thickness of 14 gauge (2.0mm). Height shall be 100mm. The rungs shall be spaced at a maximum 300mm.

Unless indicated otherwise on drawings, cable trays shall be used in the range and 150mm to 750mm wide, in five preferred standard sizes: 150, 300, 450, 600 and 750mm. Other sizes shall be used where specified or previously agreed with the Employer. Return flanges shall be a minimum of 10mm deep, unless otherwise specified. Minimum radii at side rails, horizontal, and vertical tees and crosses shall be in accordance with the Manufacturer's standard.

**e) INSTALLATION**

Install all cable trays and ladder racks strictly in accordance with IEE and local authorities requirements. Drilling, machining or cutting shall not be carried out after application of protective coat, unless previously agreed by the Employer. If cutting or drilling is necessary, edges shall be cleaned up and painted with zinc-based paint before erection. Provision shall be made when installing all cables and cable trays for the expansion and settlement of the building. Cables shall be fixed to the trays/ladders by means of PVC cleats and flame-retardant cleats for flame/fireproof cables with galvanized bolts, nuts and washers. Use galvanized metal trefoil cleats with rubber pad for single core cables. Control cables run and clipped in groups shall not exceed twelve in number and shall be not more than double banked. Power cables shall be laid in a single layer except with the prior approval of the Employer. Power cables should be spaced 2D between centres of cables throughout the run of cables. Submit calculations for voltage drop for cables and increase the size if necessary.

Vertical distances between trays mounted horizontally shall be minimum of 250mm. Local reduction of distances between trays will be allowed to a minimum of 150mm with approval from the Employer. Trays shall be adequately supported to prevent sagging by more than 3 Deg. between fixed points. All supporting steelwork shall be fixed at not more than 1-meter centers unless otherwise specified.

Where cable tray pass through floor arrange for 100mm concrete curb around opening and fire sealants shall be provided. The Contractor shall submit calculations relating to tray / ladder work and tray / ladder supports demonstrating acceptable mechanical stresses and sag.

Cable trays shall be constructed from mild steel of minimum thickness 16 gauge (1.5mm). Height shall be 75/100mm. Trays in excess of 300mm width shall be of minimum thickness 14 gauge (2.0mm). Flange height shall be 100mm. Where cable tray is intended to cross a series of beams the tray shall be supported from each beam it crosses by metal supports suspended from below the underside of the beam - the space between the tray and the beam underside surface shall not exceed three times the diameter of the largest cable to be carried on the tray. Cable tray covers are only required on roofs or outdoor where cables are installed exposed to weather conditions or as specified in the BOQ.

**f) EARTHING**

The entire cable tray and ladder system shall be bonded and 12mm x 1.5mm tinned copper shall be bolted across each joint in the system by means of galvanized nuts and bolts, complete with flat and spring washers. Tray systems shall be bonded to the main building earthing system as required or directed by the Employer.

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## 9. GROUNDING SYSTEM

### a) GENERAL

This section described the grounding and bonding system components for active green earth system. Each and every electrical / mechanical equipment computers, panels, mechanical equipment, ventilation fans, metal structures etc. should be connected to earthing system. The earthing system should be made by connecting all the earthing electrodes by copper conductor of specified size as shown on drawing, in such a way to form a ring. Contractor has to ensure a minimum earth resistance of 5.0 OHM. If difficulty is faced in getting this value additional earth electrodes be added into the ring system.

### b) WORK DESCRIPTION

This section specifies the engineering, supply, installation, testing, commission and setting to work of the complete earthing network for individual earthing systems, circuit protective conductors and bonding conductors. A complete earthing network comprising cables, copper tapes, electrodes and earth bonding of all relevant necessary non-current carrying metal shall be supplied, erected and connected as required.

The system shall be a common earthing system as described in the specification and as shown on the drawings. Individual earthing systems shall be provided as follows prior to any according to drawing.

- Structure Earthing
- LV Electrical Earthing
- DC Earthing
- Lighting Protection

Sufficient numbers of electrodes interconnect so that the overall earth resistance shall be less than 1 ohm for each individual earthing.

The number of earth electrodes of the earthing system are indicated on the drawings as minimum. The contractor shall test the resistivity of soil at site. Exact number of earth electrodes shall be determined by the contractor to achieve the earth resistance value subject to Engineer approval.

The contractor shall inform the Engineer or his representative before driving earthing rod into ground so that he may supervise the operation. Driving shall be carried out only in the presence of the Engineer or the representative and all rods shall be submitted for the examination before use.

### c) SUBMISSION

All technical submission shall be approved by the Engineer prior to the respective stages of construction.

As minimum requirement, the submission shall include the following:

- Equipment schedule, including all manufacturer's data.
- Shop Drawings and sample submission.
- Builder's work requirements.
- Testing procedures and report format for testing of the earth electrodes and/or earth strips.
- Soil resisting test report with calculation report for the details of the earthing system detail including quantity and layout of earth electrodes and/or earth strips to achieve the required

earth resistance. The report shall be endorsed by the contractor's installation Engineer who supervise and endorse the installation upon completion.

- Proposed details of earthing system including quantity and layout of the earth electrodes and earth strips according to the calculation.

**d) PRODUCT**

- Common earth mats of resistivity of less than one (1) ohms, shall be constructed below the lowest floor structure prior to any ground work construction. The stainless-steel earth mats shall comprise the complete earth electrodes, earth strip/grid, earth inspection chambers, earth leads, main earth terminals, earth test link boxes at ground level etc. Under these circumstances, each individual earthing system shall have earth leads connecting its main earth terminal directly to an earth electrode underground as specified.
- In the case where drilling is required to take the earth rods below ground level, a specified to take the earth resistance enhancement shall be added into bored holes and a mixture at 60% bentonite and 40% of gypsum to 125% of water mixed to give a thick slurry. It shall be grouted into the holes prior to inserting of rods and be allowed to solidify. The hiring of machine drilling equipment and the grouting as described above shall be provided by the contractor.
- All holdfast, claps, earth rod clamps, etc. shall be supplied by the same manufacturer of the rods.
- All earthing products/accessories shall be UL Listed.

**e) EARTH ELECTRODE**

The earthing electrodes shall be comprising of

- 3m length 25mm dia copper rod 99.99% purity UL Listed
- Earth electrodes rod shall be 25mm diameter with internal screw and socket joints, driving head and connection clamp.
- Coupling for each section of the rod shall be of same material of the rod, threaded to fit the rod sections. Driving studs shall be used when driving the electrode into the ground. Earth values shall be measured and recorded before coupling and driving in the next section. Additional earth rod shall be driven in if necessary, to attain the required effective earth values.
- Clamping if the earth leads to the earth rod shall be made by earth clamp. The clamps shall be capable of providing a high pressure contact between the earth rod and the earth leads to achieve a low contact resistance.
- When two or more electrodes are driven to form a group, the heads of the electrodes in the group shall be bonded to each other by means of a 25mm x 3mm copper, laid at a depth of at least 600mm in soil.

**f) GROUNDING CONDUCTORS OR EARTH LEADS**

The earth leads shall be provided from the earth electrodes to the earth test point in external area and shall be of tin plated bare copper conductor type. The termination of earth leads at the electrode end shall be through exothermic cad weld jointing method. A PVC insulated earth continuity conductor of specified size as given in drawing and BOQ shall be laid and connected to the grounding bus bars and from the grounding bus bars to each equipment as shown in the

drawings.

**g) EARTH TEST POINTS**

These points are for testing of earthing systems. At these points hot work can be separated and can be tested for continuity and resistance. Earth Test Point shall be made of copper bar and enclosed in powder coated box as per the sizes shown in the drawings and BOQs.

**h) EARTH INSPECTION CHAMBERS**

These should be made of pre cast concrete with a cover lid and should be placed over the electrode in level with the finished ground level. The cover lid should have marking showing its number and written "Earth Electrode" in Urdu & English.

**i) EARTH CONNECTING POINT / MAIN / SUB MAIN GROUNDING BUS BARS**

The Earth Connecting Point / Grounding Main & Sub Main Bus Bars shall be part of the building grounding electrode system for the electrical infrastructure.

The ECP copper bar shall be electro-tin plated to ensure low resistance corrosion free contact between the lugs and busbars.

**j) CODES AND STANDARDS**

The latest editions of following standards / codes shall be applicable for the materials specified within the scope of this section:

BS 951 - Earthing clamps

CP 1013 - Earthing

BS 2873 - Copper and copper alloys

BS 2874 - Copper and copper alloys - Rods and section (other than forging stock)

BS 1433 - Hard drawn bare copper conductor for earthing

BS 6346 - PVC insulated cables.

## **10. LIGHTNING PROTECTIONS**

**a) GENERAL**

- The Air Rod Lightning Protection System, comprising of Lightning Arrestor shall be provided at top of each Structure/Tower/Building/Rooftop. The Arrestor at least 1 meters from the top of the building/Structure.
- The down conductors shall be 70 sq-mm copper conductor or as mentioned in the BOQ shall be installed as shown in drawings welded with the Earth Connecting Point. Continuity shall be checked and recorded for each pit.
- Contractor should also include in his scope inspection by manufacturers authorized representative to ensure correct installation.
- All metal work on or around the building must be bonded to the lightning protection network to avoid side flashing.
- All materials used throughout the installation shall be either copper or copper-based components



which are corrosion resistant and compatible with the application.

- The Contractor shall submit fully detailed shop drawing for the arrestors, down conductors, earth termination network and bonding and shall be responsible to provide all the necessary accessories to integrate the system with the architectural finish of the building.

#### **b) Electronic System Surge Protection**

- Electronic system surge protection shall be used for the, Incoming Main Power Supply:
- A suitable protection should be installed in the main LV Panels.
- The ESP shall be connected in parallel with the supply. ESP should be installed within the LV Panel by the panel assembler.
- HRC Fuses shall be provided in the connecting leads as required by the Specialist.
- ESP to have neutral earth warning light, to detect if there is excessive voltage present between neutral and earth.
- Protection shall be tested in accordance with the requirement of:
  - BS6651: 1999 'Protection of Structures against lightning' (Appendix C).
  - BS2914:1972 'Specification for surge diverters for alternating current power circuits.'
  - IEEE C62.41 - 1991 'Recommended practice on surge voltage in low voltage AC Power circuits.'
- The protector must not interfere with or restrict the system normal operation. It should not:
  - Corrupt the normal mains power supply.
  - Break or shutdown the power supply during operation.
  - Have an excessive earth leakage current.
- The protector shall be rated for a peak discharge current of no less than 10 KA (8 / 20 microsecond waveform) between any two conductors (phase to neutral, phase to earth, neutral to earth).
- The protector shall limit the transient voltage to below equipment susceptibility levels. Unless otherwise stated, the peak transient let-through voltage shall not exceed 600 volts. For protectors with a nominal working voltage of 230 or 240 volts, when tested in accordance with BS 6651 :1999 Category B - High (6 kV 1.2 / 50microsecond open circuit voltage, 3kA 8/20 microsecond short circuit current).
- This peak transient let through voltage shall not exceed for all combinations of conductors:
  - Phase to neutral
  - Phase to earth.
  - Neutral to earth.
- Mains protectors (installed in shunt / parallel) should have continuous indication of its protection status and the presence of power. Status indication should clearly show per phase.
  - Full protection present.
  - Reduced protection - replacement required.
  - No protection - failure of protector.
- The status indication should warn of protection failure between all combinations of conductors, including neutral to earth. (Otherwise a potentially dangerous short circuit between neutral and earth could go undetected for some time). This should include early warning of excessive neutral to earth voltage.

## **11. JUNCTION BOXES**

- The junction boxes shall have suitable cable entry points via PV Connectors and outgoing cables shall be through cable glands of appropriate sizes.
- 
- Suitable markings are provided on the bus bar for easy identification & cable ferrules shall be fitted at the cable termination points for identification.
-

- Suitable surge protection shall be used at the terminals of array junction boxes for external over voltage protection and also for lightning protections.
- 
- The array junction boxes should be Weather-proof 3 in 2 out Array Junction Box.
- The Positive Input of AJB should be through Fuse & Negative Input through Terminal Block.

## 12. SIMULATION REPORT

The technical bid submission should include an energy generation simulation report with all inputs assumption clearly mentioned in a separate table. This energy generation report can be generated with any commercially available solar PV simulation software, however PVsyst is preferred. The bidder will use this submitted simulation report to commit an annual Performance Ratio (PR) or Energy Generation (KWh) against a specified Irradiance (Kwh/m2/year) and temperature (C°). The bidder is to provide year on year expected solar PV generation table which will called as the “Performance Commitment Table” from year 1 to year 25 against a specified irradiance/temperature with year 1 and year 2 numbers which will be taken as commitment numbers. Provided employer intends to extend O&M period for following years after the second year the performance commitment for that year will be based on the “Performance Commitment Table”.

The “Performance Commitment Table” provided by the bidder will be considered to technically qualify bidders for the commercial bid.

## 13. WEATHER STATION

The bidder will be expected to share a safety and quality control plan along with the detailed design submission

S.no	Parameters	Class	Sensor Type	Notes
1	In place Irradiance (POA)	Class A	PV reference or Thermopile	Sensor recalibration to be carried out once a year. Sensor cleaning every week required
2	Global Horizontal Irradiance	Class A	Pyranometer	
3	Air Module temperature	Class A	Transducer type	Recalibration needed after every 2 years.
4	Ambient Air Temperature	Class A		Recalibration needed after every 2 years.
5	Wind Speed/Direction	Class A	Anemometer and tail Vane	Per manufacturer's recommendations

## 14. HSE PLAN AT SITE

The bidder will be expected to share a safety and quality control plan along with the detailed design submission. The plan shall include all steps taken to maintain quality and the resources that will be engaged at site for quality control. Similarly, safety for all resources and safety of project equipment is an important consideration at site and a safety plan will be shared by the bidder to highlight all consideration, resources that will be engaged for maintaining safety at site. The safety plan to also include special consideration to tackle CoVID-19 and implement best practices and SOP's at SITE. Implementation of these SOP's will also be required as a compulsion at the project site.

## 15. O&M PLAN

One year of operations and maintenance is an integral activity after the completion of this EPC project. It is intended that the project performs as per design "Performance Commitment Table" while also maintaining the project to ensure reliability and longevity for 25 years. Industry best practices to be used to operate and maintain the solar PV Project.

### List of Approved Manufacturers/Suppliers

All equipment and materials provided under this contract shall be procured from the following manufacturers/suppliers only. Alternatives may be approved from the Engineer before the bid is submitted.

1.	Solar Panels	AAA or AA Rated Manufacture
2.	Solar Inverters	SMA
		Hawaii
		ABB
		Schneider
		Sungrow
3.	AC Cables	Pakistan Cables Ltd., Karachi
		Fast Cables Ltd., Karachi
		Newage Cables (Pvt) Ltd.
4.	DC Cables (EN 50618-1500 VDC)	Helukabel
		JOCA
		FR Cables
5.	Cable Lugs and Ferrules	Cembre,
		Raychem
		3 M (USA)
6.	Contactors / Relays	ABB
		Telemecanique
		National
		Finder
7.	AC Circuit Breaker	Teraski
		Schneider
		ABB
8.	DC Circuit Breaker	ABB
		Schneider
9.	Surge Protector Device	Dehn
		Schneider
		Citel
10.	Voltmeters / Ammeters	Saci, Spain
		GEC, UK
		Hobut, UK
		Revalco, Italy
11.	PVC Conduit & Accessories	Jeddah Polymer
		Galaxy (GALCO), Karachi.

		Civic, Karachi
		Dadex, Karachi
12.	Steel Conduit & Accessories	IIL, Karachi
13.	RCC Pipe	Pakistan Pipes & Construction Company Ltd, Karachi
14.	Earthing & Lighting Protection System	Errico
		Furse
		Dehn

## BOQ

## **DRAWINGS**