PART- II- ESSENTIAL DETAILS OF ITEMS/SERVICES REQUIRED

1. **Schedule of Requirement**: - The seller is required to supply and install complete set of items for On grid Solar power System (10^0 tilt, ballast type with sensors) which should mandatorily consist of the following items:-

The Grid Tied Solar Rooftop Photo Voltaic (SPV) power plant shall consist of SPV array, Module Mounting Structure, Power Conditioning Unit (PCU) consisting of Maximum power Point Tracker (MPPT), Inverter and Controls and Protections, interconnect cables and switches. SPV array shall be mounted on a suitable structure. Grid tied SPV system shall be without battery and should be designed with necessary features to supplement the grid power during day time. Components and parts used in the SPV power plant including PV modules, metallic structures, cables, junction box, switches, PCUs etc, should confirm to the BIS or IEC or international specifications, as specified herein or otherwise wherever such specifications are available and applicable. Solar PV system shall consist of following equipment / components:-

Sl No.	Description	Qty
(a)	**PV MODULE:** - 440 Wp mono PERC - Multi Crystalline modules of minimum 320 Wp and above wattage. Any less capacity shall not be accepted. - Potential Induced Degradation (PID) resistant - Tested for IEC 62804 - Solar PV offset boxes to be used to mitigate effect of PID - Confirm to IE 61215 / IS 14286 - IEC 61730 Part -1 & Part -2 - IEC 61701 - Protective devices against surges with low voltage drop diodes shall be provided - Module frame shall be in corrosion resistant material, preferably anodized aluminium - Rated output power with tolerance of + 3% - Variation between Peak power point voltage & Peak power point current should not be more than 2%Junction boxes to be weather proof, sealed and IP-65 rated. - RF identification Tag in every module.	69 No's
(b)	**PCU / INVERTER:** - Electronic inverter and associated control & protection devices capable of complete automatic operation including wake-up, synchronization & shutdown - To be DG set interactive and compatible with grid frequency, if required. - Built0in meter and data logger - Switching devices : IGBT / MOSFET - Control : Microprocessor / Digital Signal Processor (DSP)	1 No

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	- 415V, 3 Phase, 50Hz. - Grid Frequency synchronization range : ± 3Hz - Grid Voltage Tolerance : -20% to + 15% - No-Load Losses : Less than 1% of rated power - Efficiency : >97% - THD : <3% - PF : >0.9 - Anti-islanding protection in conformity to IEEE1547 / UL 1741 / 621116 or equivalent BIS standard. **CERTIFICATIONS** IEC-61683 /IS 61683 Efficiency Measurement IEC-60068-2 (1,2,14,30) Environmental Standards IEC-60529 Ingress Protection (IP-21) **ENVIRONMENTAL** - Other requirements for Solar Inverter: - Grid over-under voltage and frequency protection. - Array ground fault detection. - Automatic fault conditions reset. - Metal oxide varistor (MOV) type surge arresters on AC and DC terminals for over voltage protection from lightning-induced surges (may also be provided as separate external equipment). - The inverter shall not produce electromagnetic interference (EMI) which may cause malfunctioning of electronic and electrical instruments including communication equipment, which are located within the facility in which the Solar Inverter is housed. - The inverter shall have a display on the front panel to display the instantaneous AC power output and the DC voltage, current and power input. Each of these measurement displays shall have an accuracy of 1.0 percent of full scale or better. - DC input isolator or circuit breaker (may also be provided as separate equipment installed adjacent to the solar inverter). - AC output circuit breaker (may also be provided as separate equipment installed adjacent to the solar inverter). **- 5 years warranty**	
(c)	**MODULE MOUNTING STRUCTURE** HDG with 100 mm clearance and 10^0 tilt, ballast type Brick work platform to be constructed for mounting the panels	01 Set As required
(d)	**CABLES** 4 sqmm Solar cables DC Cable ; 1C X 4.0 mm^2 Cu AC Cable : 4C X 25 mm^2 Al armoured Clamps : Thermoplastic not exceeding 50 cm intervals Cable tests and measurements : IEC 60189 – 1:2018 Single core copper cable, insulated and sheathed with	DC – 1 Set AC – 1 Set

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	electron beam cross linked XLPO, TUV-specification, flame retardant and rated for 1.1kV Able to withstand harsh environment conditions including High temperatures, UV radiation, Rain, Humidity, Dirt, Salt, Burial, Attack by moss and microbes for 25 years Able to carry current density of maximum 1.2 A/sq mm IEC 60227 / IS 694 IEC 60502 / IS 1554 Insulation for UV protection : IEC 69947 standard Rated DC voltage : 105 KV Working voltage : DC 1000v Insulation Restiance 1000M ohm-km ISO 9001:2008, ISO 14001:2004, OHSAS 18001:2007 Certified cables Ambient temperature : -10° c to ~+80° c Short circuit temperature : 200 deg c Tensile strength : 6.5 N/mm2 for insulation and 8 N/mm2- according to EN60811 EN 60811-2-1: oil resistance EN 50396 : Ozone resistance HD 605/A1 : Weathering – UV EN 60811-2-1 : Acid and alkaline resistance	
(e)	**DGPV** Trackso /Equivalent	-
(f)	**ACDB** Outdoor type with 1-in-1 out, MFM and MCB	1
(g)	Lightning Arrester – Spike Type	1
(h)	**Earthing** Chemical, GI Strip (25mmx5mm) as per IS 3043-1987 All metal frames, enclosures and structures shall be connected to one or more earth electrodes with a combined earth resistance of less than 5 Ohms.	3 No's
(j)	**Cable Tray** : GI 50 X 40 mm	1 Set
(k)	**Conduit** : HDPE, DWC, 40 mm	1 Set
(l)	Walkway : FRP, 265 mm width, 25 mm thickness	-
(m)	Remote Monitoring : Trackso / equivalent	
(n)	Weather monitoring : Ambient Temperature and Irradiation sensor	-
(o)	Module Cleaning System : 1hp pump, UPVC 1" piping with fittings, flexible hose and nozzle	-
(p)	Trench : Soil trench for AC cabling	-
(q)	BOS : MC4 Connectors, Lugs, Glands, RS 485 Cable, Earthing Strip and Cable etc	1 Set
(r)	**Surge protection** on both DC side and AC side The SPDs shall be of type 2 as per IEC 60364-5-53	2 No's

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(s)	Lighting protection as per IS 2309	1 No's
(t)	**Fire Extinguishers** in the control room as per TAC regulations and BIS standards	-
(m)	**Danger Boards and Signages** as and where necessary as per IE Act in consultation with the Buyer	-

The seller may visit the site and familiarize with layout for assessing the requirement for complete installation of the system before submission of the tender. For site visit the seller may contact Executive Director, Air Force School, Avadi at Phone No 044-26842845 / 9910999006.

2. **Technical Details/ Specification:** Items supplied should be of standard make or with ISI specification. Sellers are required to submit the technical details/Brand /Make of the items being offered in their bid.

3. Bidders are required to **submit the Brochure of the item offered** and furnish clause by clause compliance of technical specifications & Technical Vetting Remarks along with commercial terms and conditions bringing out clearly the deviations from specification, if any as per **Annexure- IV** and submit along with technical bid.

4. **Two Bid System** - In respect of two bid system, Bidders are required to furnish clause by clause compliance of specifications bringing out clearly the deviations from specification, if any. The Bidders are advised to submit the compliance statement in the following format along with Technical Bid –

Para of RFP	Specifications	Specification of item offered by the firm	Compliance to RFP specification – whether Yes / No	In case of non-compliance, deviation from RFP to be specified in unambiguous terms
Part II, Para 2 (a)	**As mentioned**			

5. **Delivery Period:** Delivery period for supply and installation of items would be **120 days or before** from the effective date of supply order. Bidder is requested to confirm acceptance of delivery and installation in its forwarding letter. Please note that Contract can be cancelled unilaterally by the Buyer in case items are not received within the contracted delivery period. Extension of contracted delivery period will be at the sole discretion of the Buyer, with applicability of LD clause.

6. **Terms of Delivery:** Items to be delivered free of charge to Air Force Station AVADI within the delivery schedule as specified in Supply Order.

7. **Consignee Details – AIR OFFICER COMMANDING, AIR FORCE STATION, AVADI, CHENNAI - 600055**

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PART- III STANDARD CONDITIONS OF RFP

The Bidder is required to give confirmation of their acceptance of the Standard Conditions of the Request for Proposal mentioned below which will automatically be considered as part of the Contract concluded with the successful Bidder (i.e. Seller in the Contract) as selected by the Buyer. Failure to do so may result in rejection of the Bid submitted by the Bidder.

1. **Law:** The contract shall be considered and made in accordance with the laws of the Republic of India. The contract shall be governed by and interpreted in accordance with the laws of the Republic of India.

2. **Effective Date of the Contract**: Normally the contract shall come into effect on the date of signature of both parties in contract. However, as both parties are not co-located, effective date will come into effect as indicated as below:-

(a) The effective date of contract will be the date of acknowledgement of contract by seller

or

(b) Tenth (10th) day from the date of signing of contract by purchaser whichever is earlier in (a) or(b)

3. **Arbitration**: All disputes or differences arising out of or in connection with the Contract shall be settled by bilateral discussions. Any dispute, disagreement or question arising out of or relating to the Contract or relating to construction or performance, which cannot be settled amicably, may be resolved through arbitration. The standard clause of arbitration is as under:-

(a) All disputes or differences arising out of or in connection with the present contract including the one connected with the validity of the present contract or any part thereof should be settled by bilateral discussions.

(b) Any dispute, disagreement or question arising out of or relating to this contract or relating to construction or performance (except as to any matter the decision or determination whereof is provided for by these conditions),which cannot be settled amicably, shall, within sixty (60) days or such longer period as may be mutually agreed upon, from the date on which either party informs the other in writing by a notice that such dispute, disagreement or question exists, will be referred to a sole Arbitration of Air Officer Commanding-in Chief, Maintenance Command, Indian Air Force or any person appointed by him on his behalf and the decision of such appointment of arbitrator shall be binding upon both the parties.

(c) Within sixty (60) days of the receipt of the said notice, an arbitrator shall be nominated in writing by the authority agreed upon by the parties.

(d) The sole arbitrator shall have his seat at a place as may be decided by the Air Officer Commanding-in-Chief, Maintenance Command and his decision thereon shall be final and binding on both the parties.

(e) The arbitration proceedings shall be conducted under the Indian Arbitration and Conciliation Act, 1996 and the award of such Arbitration Tribunal shall be enforceable in Indian Courts only.

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