

Bharat Heavy Electricals Ltd
Electronics Division
Mysore Road, Bangalore – 560 026

**Tender Document for SUPPLY & I&C OF POWER
CONDITIONING UNIT (PCU)
RFQ REF: HBS0000445**

Technical Bid Opening Date: 27th May, 2013

This Tender Document Contains:

General Terms and Conditions, Technical Specification, Unpriced Bid Formats & Price
Bid Formats

Note: Part – I: To be submitted in a separate sealed cover

Part – II: To be submitted in a separate sealed cover.

And Part-I & Part-II sealed covers should be put in outer envelope and super scribing the Name of work and Name & Address of the tenderer. Tender document along with EMD should be dropped in Tender drop box super scribed “SC&PV-MM, Monday” kept in reception area of BHEL – EDN, Bangalore.

Contact Person at BHEL:

- 1. Mr. H.B. Srinivasa : Manager (SC&PV-MM)
Ph: 080-26988945, Mob: 09449869655**
- 2. Ms. Mrinalini Gupta: Engineer (SC&PV-MM)
Ph: 080-26988198, Mob: 07259176677**

REQUEST FOR QUOTATION

	BHARAT HEAVY ELECTRICALS LIMITED Electronics Division PB No. 2606, Mysore Road Bangalore - 560026 INDIA	RFQ NUMBER: HBS0000445 RFQ DATE : 10.MAY.2013	Due Date 27.MAY.2013 Time: 13:00 HRS VENUE : NEW ENGG. BLDG
MMI:PU:RF:003			

	(for all correspondence) Purchase Executive : SRINIVAS H B Phone : 26998452 Fax : 00918026989217 E-mail: srinivasahb@bheledn.co.in
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Please submit your lowest quotation subject to our terms and conditions attached for the material mentioned below. The quotation must be enclosed in a sealed envelope / Fax superscribed with RFQ no. and due date, should reach us on or before the due date by **13.00** hours IST and will be opened on the same day at **13.30** hours at the venue mentioned above. **PLEASE DROP THE OFFER IN THE BOX PROVIDED AT RECEPTION.**

RFQ Terms and Conditions for PCU

1. Bid has to be submitted as TWO PART - in two sealed covers- -Techno Commercial Bid(Part-I) & Price Bid (Part-II)- clearly written on each cover both put into one cover super scribed with RFQ No. and Due date.

1A. Submit Enclosures- 1& 2 along with technical bid & Enclosure-3 along with Price bid.

1B. Submit Offer on "FREE ON ROAD" basis to BHEL-RANIPET.

1C. Pre-Qualification criteria read and noted.

2. DELIVERY: Delivery date mentioned in RFQ is tentative. Actual requirement is as given below:

Supply: 12 weeks from drawing approval. Drawings to be submitted in 1 week from LOI/ PO release.

For I&C: 4 weeks from Supply.

3A. PAYMENT TERMS:

For Supply: 75% of basic supply value + 100% taxes & duties with 30 days credit on receipt of material at BHEL-RANIPET. 15% on commissioning and certification. Balance 10% against PBG for 10% of basic supply value valid for 63 months from date of Supply or 60 months from the date of I&C whichever is earlier + 6 months claim period from BHEL Consortium bank.

For I&C: 100% against Commissioning and Certification.

For any other deviation in payment term the offer will be liable for rejection.

3B. Overall L1 of Supply (500 kW Grid Connected PCU+ External Ducts, Exhaust Fans etc. + Mandatory Spare items)+ I&C of PCU & External Ducts, Exhaust Fans on "FOR" basis to BHEL-RANIPET will only be considered.

3C. The basic unit price quoted shall be inclusive of Supply, P&F & Insurance. Taxes like ED, CST/VAT to be quoted extra separately. However the order will be placed on "FREE ON ROAD" basis to BHEL-RANIPET. If Freight is quoted extra, original money receipt from Transporter has to be submitted for payment of freight. Insurance is in vendor's scope. BHEL is trying to get concession on Excise Duty under Supply of Solar Power Project. At the time of clearance of goods we may issue Exemption Certificate. In such case, ED will be exempted but not reimbursed. At present, please quote with applicable rate without concession of ED for comparison.

3D. C-form will be issued if applicable. Mention taxes clearly and state whether taxes are included or extra. Indicate the state from which supply takes place.

Wherever E1/E2 transactions are made, the CST will not be reimbursed. Preferably, all supplies are to be made from Supplier's address only (Material Dispatch).

4A. Pre Shipment Inspection will be carried out by BHEL for which test report shall be sent one week in advance.

4B. Penalty applicable: Penalty of 0.5% per week at the basic price of the good for undelivered quantity of supply portion, subject to a maximum of 10%. Pre Shipment Inspection Call Letter Date (Receipt of test report) will be treated as delivery for purpose of penalty for supply only. Any Deviation attracts Loading.

5. Warranty for a period of 63 months from date of Supply or 60 months from the date of I&C whichever is earlier as per Tech Spec. PS-439-821.

6. Road permit if applicable will be given by BHEL before Dispatch of ordered Items.

7. Do not indicate any TERMS & CONDITIONS in Price Bid. Only Financial Values shall be indicated.

For and On behalf of BHEL.

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SI No.	Description	Qty	Unit	Delivery qty	Delivery Date
8. Enclose the Clause Wise Compliance / Confirmation with respect to BHEL Specification & Purchase Specification.					
9. Deviation from RFQ Terms & Conditions may lead to the rejection of the offer.					
10. BHEL reserves the right to conduct Reverse Auction. Procedure for the same will be informed by BHEL. Please send your acceptance for reverse auction.					
11. The successful bidder will be getting Letter of intent (LOI) from BHEL, EDN, Bangalore. The regular PO/Payment will be issued by BHEL-Ranipet.					
12. Kindly indicate the place/state from where the shipment will take place for assessment of taxation.					


SI No.	Description	Qty	Unit	Delivery qty	Delivery Date
1	I & C of 500 KW PCU as per BHEL specification PS-439-821	10	AU	10	16.SEP.2013
2	I & C of Ducts, Fans & Other Accesories as per BHEL specification PS-439-821	1	AU	1	16.SEP.2013
3	PS0679031480 Power conditioning unit 500kW Supply of power conditioning unit with output power rating of 500kW for 5MWp SPV plant at Ranipet as per BHEL spec PS-439-821. Certificate as per BHEL Norms	10	ST	10	20.SEP.2013
4	PS0679031529 Ducts, exhaust fans, accessories Supply of external ducts, exhaust fans, all associated accessories and hardware for the complete set of 500kW power conditioning units (10 Nos) as per BHEL spec PS-439-821. Certificate as per BHEL Norms	1	ST	1	20.SEP.2013
5	PS0679031570 Spare items for 500kW PCUs Supply of spare items for 500kW Power Conditioning Units as per BHEL spec PS-439-821. Certificate as per BHEL Norms	1	ST	1	16.SEP.2013

Total Number of Items - 5


Please note that the tender will be opened in the presence of the bidders or his authorised representatives (maximum two per organisation) who choose to be present with authorisation letters. Refer annexure for the terms and conditions.
 Preference will be given to vendors who accepts our standard payment terms i.e.100% payment - 30 days after receipt of material at our works subject to acceptance.
 Please specify Terms of delivery, Excise duty, sales tax, Ex-BHEL, Ex-works surcharge, Insurance,P&F, Freight and other taxes very clearly .
 For evaluation,exchange rate(TT selling rate of SBI) as on scheduled date of tender opening (Part-I bid incase of two part bid) shall be considered.
 The offers of the bidders who are on the banned list as also the offer of the bidders, who engage the services of the banned firms, shall be rejected.The list of banned

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firms is available on BHEL web site www.bhel.com			
i). This is only RFQ not an order. ii). In all correspondence quote RFQ No. & due date. iii). In Quotation BHEL material code / RFQ Sl. No. should be mentioned clearly. iv). Quotation Envelope / Fax not superscribed with RFQ No.and due date is liable for rejection. v). Quotation should remain valid for a minimum peiod of 90 days from due date. vi). In case of non-receipt of Quotation or regret letter for 3 consecutive RFQs you are liable to be removed from our vendors list. vii). All Prices should be written in words and numbers. viii). Excise Chapter Heading should be mentioned for all items where VAT is applicable .			


For and On behalf of BHEL.

	PURCHASE SPECIFICATION; GROUP : PHOTOVOLTAICS 500KW GRID-CONNECTED POWER CONDITIONING UNITS FOR 5MW SPV POWER PLANT AT BHEL, RANIPET	PS-439-821
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It must not be used directly or indirectly in anyway detrimental to the interest to the company

Technical specification
for
Supply, installation and commissioning of
10 sets of 500kW 3-phase Grid-connected Power conditioning units
for
5MWp Solar Photovoltaic Power Plant at BHEL, Ranipet, Tamilnadu

Approved by :			
Revision details :R 00	Prepared	Approved	Date
	VRK	NHK	30-Apr-2013

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1.0 Introduction


Bharat Heavy Electricals Limited (BHEL), Electronics Division, Bangalore is setting up a 5 MWp Grid-connected SPV Power Plant at Boiler Auxiliary Plant, BHEL, Ranipet, Tamilnadu.

This technical specification provides details of supply of 500kW 3-phase Grid-connected Power Conditioning Units (PCU). The scope also includes commissioning of the supplied units at the project site for synchronizing the generated ac power with LV side of a transformer that connects to 11kV grid on HV side.

2.0 Pre-qualification criteria (PQC) for vendors

Vendor shall read the following criteria carefully and furnish the necessary details. For this, vendor shall fill up the check list under clause 2.6 with signature, seal and date.

- 2.1** Vendor should have supplied and commissioned 3-phase Grid-connected PCUs with nominal output power rating of 500kW or above for solar photovoltaic power plants in India. At least 5MW should have been commissioned using these PCUs. Evidence of certificates of commissioning from clients together with corresponding PO copies shall be submitted along with technical offer.
- 2.2** Vendor shall also provide a list of such PCUs (500kW and above) supplied and commissioned at solar photovoltaic power plants in India during the last three years. The list shall include details such as year of supply, client name, PCU rating, model number, number of units. This list is only for reference. However, providing this list is mandatory as part of pre-qualification criteria.
- 2.3** Vendor should be an OEM with manufacturing and test facility in India for carrying out the following minimum tests on PCUs of 500kW and above in the presence of BHEL representatives: (a) Burn-in tests and (b) Inverter performance tests. Vendor shall provide confirmation for carrying out these tests that will be witnessed by BHEL representatives. Also, vendor shall furnish the address of their works in India.
- 2.4** Vendor should have commissioning / service engineers placed in India for carrying out commissioning and after-sales service activities. Vendor shall provide confirmation on this. In case service centers are located in separate locations other than their works, vendor shall furnish the addresses.
- 2.5** Physically, PCU panel shall be a single integral unit of 500kW. It shall not be multiple panels of lower ratings. For example, a set of two independently saleable units of 250kW is not acceptable. However, the single integral panel can have compartments separated by internal partition walls. A separate add-on panel will be acceptable, only if it is exclusively meant for DC input or AC output terminations.


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2.6 Checklist for Pre-Qualification-Criteria:

(a)	PQC clause 2.1	Have the client certificates together with corresponding PO copies been enclosed? (Evidence of commissioning the PCUs of 500kW and above in India).	Yes / No
(b)		Do the above certificates amount to a minimum total of 5MW commissioning?	Yes / No
(c)	PQC clause 2.2	Has the list of supply and commissioning of PCUs of rating 500kW and above for the last three years, with particulars as per PQC clause 2.2 been enclosed?	Yes / No
(d)	PQC clause 2.3	Is the vendor an OEM?	Yes / No
(e)		Does the vendor have works in India with manufacturing and test facility for PCUs of 500kW?	Yes / No
(f)		If so, address of works in India shall be provided:	
(g)		Does the vendor have test facility in India for carrying out burn-in tests for PCUs of 500kW, in the presence of BHEL representatives?	Yes / No
(h)		Does the vendor have test facility in India for carrying out inverter performance tests, in the presence of BHEL representatives?	
(i)	PQC clause 2.4	Does the vendor have commissioning / service engineers placed in India to ensure timely commissioning and after-sales service support?	Yes / No
(j)		Locations of service centers in India, if available separately other than the works, shall be furnished:	
(k)	PQC clause 2.5	Is the offered PCU an integral single panel as described in PQC clause 2.5?	Yes / No
(l)		Is the DC side termination an integral part of the single PCU panel or a separate add-on attachment?	Integral part / separate add-on
(m)		Is the AC side termination an integral part of the single PCU panel or a separate add-on attachment?	Integral part / separate add-on


Note: Failure to comply with PQC as per clause 2.0 as evidenced in the responses to the checklist above will result in rejection of bid.

Signature with seal and date


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3.0 Scope of supply

SL No	Item Description	Qty	Remarks
3.1	Supply of 500kW (minimum), 3-phase, Grid-connected Power Conditioning Unit (PCU).	10 sets	Offer shall be per set basis.
3.2	Supply of external ducts, exhaust fans (wall-mounted for fixing on control room wall), starters for fans including cables for wiring, with all associated accessories and hardware required for the complete set of 10 sets of PCUs.	1 set	
3.3	Supply of mandatory spare items for 500kW power conditioning units. List of items with quantity is as follows: 1) Complete IGBT stack assembly with drivers for 1 PCU 2) Surge protection devices for 1 PCU 3) Fuse with fuse holders (all types) for 1 PCU 4) Power supply SMPS set for 1 PCU 5) MPPT unit – 1 No The above list is for contingency purposes over and above the warranty requirements.	1 set	
3.4	Commissioning of 500kW PCUs. BHEL scope of activities at site for commissioning: (1) Movement and positioning of PCU panels at the earmarked position in the control room. (2) Crimping the incoming (DC side) and outgoing (AC side) cables (BHEL supply) using the cable lugs provided by the vendor. (3) Connecting at the respective termination ends of the panels using the cable glands and fastening hardware (nuts, bolts, washers etc) provided by the vendor. Vendor scope of activities at site for commissioning: (1) All the electrical checks that are required to confirm that solar DC parameters (current, voltage) are available at the DC input side of PCUs. (2) All the pre-commissioning checks such as mechanical checks (physical firmness of internal components), electrical tests etc up to the level of synchronization of the PCU output with the grid. (3) All the mechanical tools such as spanners, crimping tools etc required for above checks at site shall be in the scope of vendor. (4) All the electrical tools such as measuring instruments, meters etc required for above checks at site shall be in the scope of vendor. (5) Guidance and support to BHEL team in case of technical problems associated with AC grid side (synchronization-related, etc) or DC side (Problems related to DC input parameters, Earth-faults in solar array, etc).	10 sets	1 Set represents commissioning of 1 PCU


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	<p>(6) Service engineers shall be present at site during commissioning of power plant, providing all necessary guidance and support to achieve successful synchronization of PCU output with grid and also to trouble-shoot / resolve the technical problems associated with PCU.</p> <p>(7) Guidance and support to BHEL team, at the time of installation and commissioning of SCADA, in respect of connection of communication cables to PCUs and technical problems related to receiving data signals at SCADA station from PCUs. Note: Supply and installation of integrated SCADA system for the overall power plant is within BHEL scope.</p> <p>A single lump-sum price on per-PCU basis shall be offered.</p>		
3.5	<p>Installation and commissioning of external ducts and exhaust fans.</p> <p>Scope shall include installation of external ducts, exhaust fans with starters, with all associated accessory parts, including erection, fixing, mounting, wiring of starters.</p> <p>BHEL will provide the cut-outs on the control room walls for fixing the exhaust fans as per dimensions provided by the vendor.</p> <p>A single lump-sum price taking this as a single activity covering all the 10 PCUs shall be offered.</p>	1 set	1 set represents I&C of ducts and fans for all the 10 PCUs.
3.6	<p>Warranty</p> <p>Vendor shall provide warranty for 60 months from the date of commissioning or 63 months from the date of supply, whichever is earlier.</p> <p>Vendor shall enclose, along with technical bid, the complete scope, terms and conditions of the warranty.</p>	-	-

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4.0 Instructions to vendors on bid submission

4.1	<p>Offer shall be submitted in two-parts (Two part-bid).</p> <p>Both parts shall be in separate sealed envelopes as per instructions in tender.</p> <p>The individual envelopes shall be enclosed in a common bigger envelope with markings (address, etc) on the envelope as per instructions provided in tender.</p>
4.2	<p>First-part shall be techno-commercial bid. Following details shall be furnished:</p> <ol style="list-style-type: none"> 1. Pre-qualification criteria checklist, duly filled-up with signature, seal and date, as provided under PQC section above. 2. Enclosures for PQC checklist. 3. Technical offer covering letter. 4. Filled-up enclosures as per BHEL tender formats (meant for first-part technical bid). 5. Clause-wise compliance shall be filled-up in the column provided in this specification, with signature and seal on every page. 6. Product brochure of company. 7. Product datasheet of the offered PCU model. 8. Overall General Arrangement showing relevant views (plan, elevation, side views) with width, height and depth and overall weight. Such details of add-on DC / AC termination panels, if any, as applicable, shall also be provided. 9. Overall electrical schematic diagram of PCU showing details such as DC / AC side isolators / breakers, AC/DC side surge protection devices, inverter bridge, filters (EMC etc) 10. Drawings showing DC and AC side input terminations for connecting BHEL cables. 11. Details of MPPT unit 12. General Arrangement drawings showing different internal views of the panel. 13. Bill of materials of PCU – top levels. 14. General Arrangement drawings showing connections of external ducts and exhaust fans 15. List of spares offered (with quantity) and without prices 16. List of type test certifications available.
4.3	<p>Second-part shall be price bid with filled up enclosures as per BHEL tender format.</p>
4.4	<p>In addition to the above instructions, tender document provides detailed instructions for bid submission. Vendor shall submit the bid based on such tender instructions.</p>

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5.0 Power plant configuration

A brief summary of the power plant as well as type of SPV modules used is provided here below so as to enable the vendors to select and offer appropriate type / model of power conditioning unit (PCU).


5.1 Overall summary of plant

The 5MWp solar photovoltaic power plant at BHEL, Ranipet, Tamilnadu has 10 equal segments of solar photovoltaic array that employs BHEL make, mono-crystalline type, SPV modules. Each segment generates DC power of 500kWp, which is then inverted by a 3-phase grid-connected power conditioning unit of 500kWp rating. At the ac output level, every two PCUs are combined to form a 1 MWp group using a three-winding transformer. Thus, at each 1MWp level, two PCUs are connected independently to the two LV windings of the transformer to get the combined 1MWp output on the HV side (11kV). An LT panel with supply indications, metering and motorized air-circuit breaker (ACB) of 1250A, 50kA is used between the PCU and the transformer LV winding. Thus, the plant employs 10 PCUs, 10 LT panels and 5 transformers, whereby the transformers are combined on the HV side to achieve the overall power output of 5MWp.

5.2 Parameters of solar photovoltaic modules

Details of BHEL-make SPV modules with mono-crystalline cells are as follows:


#	Module type	Pmax	Voc	Isc	Vmp	Imp	Remarks
1	L20220	230 +/- 20W	36V	8.5A	29V	7.94A	This will be for 4 x 500 kWp = 2 MWp 24 numbers of modules of this type will be connected in series per string.
2	L24270	280 +/- 20W	43V	8.5A	35V	8.00A	This will be for 6 x 500 kWp = 3 MWp 20 numbers of modules of this type will be connected in series per string.

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6.0 Technical specification of Power Conditioning Units

6.1 Basic requirements (PCU type, Standards, Technology, Interconnections, Interfaces etc)

#	Parameter	BHEL specification	Vendor compliance (Yes / No) In case of non-compliance or deviation, vendors shall record their comments
6.1.1	PCU type	<p>Grid-interactive.</p> <p>PCU shall always remain synchronized with grid, following the grid voltage, frequency and phase. For this purpose, the PCU shall control its output voltage, frequency and phase based on a feedback loop linked to grid.</p> <p>PCU shall automatically control its ON/OFF state, depending on grid availability. It shall, by itself, shutdown in the absence of grid. Similarly, it shall, by itself, resume operations when grid reappears.</p> <p>PCU shall also automatically control its ON/OFF status, based on solar power availability. It shall, by itself, shutdown below a settable value of DC input power. Similarly, it shall, by itself, wake up, above a settable value of DC input power.</p>	
6.1.2	Compliance with standards	<p>IEEE 929-2000 or equivalent: Recommended practice for utility interface with PV systems.</p> <p>IEC 62093 or equivalent: Balance of system components for photovoltaic systems: design qualification natural environments</p> <p>IEC 61683 or equivalent: Photovoltaic systems – power conditioners – procedure for measuring efficiency</p> <p>IEC 60068-2 or equivalent: Environmental testing.</p>	


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		IEC 62109-1 and 62109-2 or equivalent: Safety of power converters for use in photovoltaic systems: Part-1: General requirements; Part-2: Particular requirements for inverters. IEC 61727 or equivalent for grid utility.	
6.1.3	Output transformer	PCU shall be of 'transformer-less' design.	
6.1.4	Maximum Power Point Tracking (MPPT)	MPPT controller, based on intelligent software, as per IEC 62093, for the purpose of maximizing the energy generation from PV array, with constant voltage operation.	
		Microprocessor-based MPPT, to minimize losses.	
6.1.5	AC-DC conversion	IGBT-based 3-phase bridge	
6.1.6	Built-in support systems	PCU shall be provided with protection circuits, monitoring circuits, data logging & storage system, digital displays, provisions to download data to PC/Laptop, MODBUS communication outputs for SCADA interface etc as per related clauses of this specification.	
6.1.7	External ducts and fans	PCUs shall be provided with external cooling ducts and exhaust fans suiting to the control room layout of BHEL. The power plant will have a centralized RCC control room with two compartments: one with 6 PCUs and the other with 4 PCUs. Ducts and fans shall be provided for all the PCUs as per related clauses of this specification.	
6.1.8	DC input and AC output terminations	Input and output terminations together with cable glands, lugs, hardware shall be provided to match the connections using BHEL cables as specified under related clauses of this specification.	
6.1.9	Environment protection	(a) All PCB cards shall be provided with suitable coating (epoxy etc) for protection. (b) All metallic hardware shall be stainless steel such as SS304 etc.	

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6.2 Technical parameters

#	Technical parameter	BHEL specification	Vendor compliance (Yes / No) In case of non-compliance or deviation, vendors shall record their comments
6.2.1	Output power rating	500 kW minimum	
6.2.2	AC grid connection	3-phase	
6.2.3	Output frequency	50 Hz +/- 5%	
6.2.4	Nominal output voltage	Value to be indicated by vendor. Expected value: between 270V & 360V	
6.2.5	Maximum DC input voltage (Max open circuit PV voltage)	1000 V DC	
6.2.6	MPPT Range, control system	Range to be indicated by vendor. Expected range: 450 V to 900 V DC	
6.2.7	DC side peak power	Value to be indicated by vendor.	
6.2.8	Max DC operating current	Value to be indicated by vendor.	
6.2.9	Max AC output current	Value to be indicated by vendor.	
6.2.10	Power factor	Designed operation close to unity PF. Adjustable window 0.8 lead to 0.8 lag	
6.2.11	Ambient temperature	0 to 45 deg C; Power derating curves for higher temperature shall be provided.	
6.2.12	Relative Humidity	15% to 95% non-condensing	
6.2.13	Enclosure	IP 20 or better	
6.2.14	Grid Frequency tolerance	+/- 3 Hz	
6.2.15	Grid Voltage tolerance	- 20% and + 15%	
6.2.16	PCU conversion efficiency	> 95% at 75 % of full load. Values at 25%, 50% and 100% load shall be provided by vendor.	
6.2.17	AC output current distortion	< 3 % THD at rated power	
6.2.18	Optional VAR control	To be provided with set point selection.	


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6.3 Protection systems

6.3.1	Protection systems for current, voltage, temperature, surges, ground faults, etc.	AC & DC over current	
6.3.2		AC & DC short circuit	
6.3.3		DC reverse polarity	
6.3.4		Over temperature protection: Heat sink, Cabinet, Ambient etc	
6.3.5		Forced cooling (fans)	
6.3.6		Synchronization loss	
6.3.7		Anti islanding protection	
6.3.8		EMI and RFI	
6.3.9		Dust control (air filters)	
6.3.10		Grid monitoring Protection against any sustained fault (lightning effect etc) in grid / feeder line.	
6.3.11		Ground fault monitoring	
6.3.12		Ground fault / leakage detector (PV array)	
6.3.13		Insulation monitoring of PV array with sequential fault location	
6.3.14		AC & DC overvoltage (SPD arrestors)	
6.3.15		SPD for auxiliary power supply	

6.4 DC, AC side load break disconnecting switch / breaker provisions

6.4.1	DC side	Load break disconnecting mechanism required on DC side. Type (manual / motorized) offered shall be indicated.	
6.4.2	AC side	Load break disconnecting mechanism required on AC output side. Type offered, manual / motorized, disconnecting switch / breaker shall be indicated by vendor.	


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6.5 Front panel display and control

6.5.1	Front panel screen (LCD display, etc) with browsing / navigation provisions to 1) select display parameters 2) provide settings for various parameters	DC side voltage, current, power, energy	
6.5.2		AC side output voltage (all three lines), current (all three lines), frequency, phase, power factor, power, import energy, export energy etc	
6.5.3		Grid side voltage, frequency, phase, etc	
6.5.4		Temperatures (ambient, heat sink, cabinet etc)	
6.5.5		Faults	
6.5.6		Other event logs	
6.5.7		Other features as may be necessary for supervisory control and operation of the PCUs shall be provided.	


6.6 Data logging, storage, retrieval, downloading, uploading

6.6.1	Provision of built-in systems for data logging, storage, retrieval, downloading, uploading etc.	Date-cum-time stamped logging of DC and AC side parameters (current, voltage, frequency, phase, power factor, power, import / export energy etc), faults and other events.	
6.6.2		Data storage with large capacity (3 to 4 years of data) and retrieval features.	
6.6.3		Provision of all necessary built-in systems, ports etc for downloading the data into a PC / Laptop etc that will be required for reporting, data analysis and trouble-shooting purposes.	
6.6.4		Provision of all necessary built-in systems, ports etc for uploading of software etc that will be required for replacing, revising, upgrading the system.	

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6.7 Provisions for SCADA interface


6.7.1	SCADA interface requirement	<p>Solar PV power plant will have an integrated SCADA, which is within BHEL scope, whereby all the 10 PCUs will be integrated with other data systems such as solar array string monitoring, weather monitoring, HT side transformers / breakers monitoring, etc.</p> <p>Accordingly, PCU shall have necessary communication protocol and output ports to facilitate SCADA interface.</p>	
6.7.2	Communication protocol	RS485 (MODBUS RTU), Ethernet (MODBUS TCP)	
6.7.3	Daisy-chain looping	PCU shall have provisions for daisy-chain looping of one another for SCADA purposes.	
6.7.4	Parameters for SCADA	All DC and AC parameters (current, voltage, frequency, phase, power factor, power, import/export energy etc), grid data, faults, other event logs, date/time logs etc from each PCU will be required at SCADA control desk. PCU shall provide for this requirement.	

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6.8 DC Inputs and termination details

Vendor shall supply the PCU with the termination features on DC side as tabulated below. Detailed drawings of termination arrangements with bus bar particulars such as positions, dimensions, hole sizes, spacing between holes, support to bus bar, etc shall be submitted for BHEL approval within seven days after receipt of purchase order.

6.8.1	DC input terminals	6 inputs + 1 spare = 7 inputs Hence, a minimum of 7 DC input terminals shall be provided.	
6.8.2	Fuses on DC input side	For every positive DC input, one fuse shall be provided. No fuse shall be provided on negative side. Fuse rating shall be selected considering that 6 DC inputs will be used and that max current per DC input will be in the range 128-136A.	
6.8.3	Max DC input current rating of PCU	Rating shall be selected based on above DC side input current information (6 DC inputs, 136A max per DC input) and PCU-related internal design considerations, if any. Vendor shall indicate the rating.	
6.8.4	DC cable entry into panel	Bottom entry. Cable is within BHEL scope. Per positive / negative DC input, 1C x 120 sq-mm, copper, multi-strand, armoured, PVC insulation, PVC sheath as per IS:1554 cable will be used.	
6.8.5	Gland plates	Gland plates shall be provided with holes to accommodate the cable glands. Spacing between holes shall be chosen to ensure that glands do not touch each other, duly taking into account the clearance required for placing the spanners used to tighten the glands. Preferably, back side portion of the panel shall be used for bottom entry	

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		of cable. This is because the front side portion of the panel will be seated on the floor with back portion open to cable trench below.	
6.8.6	Cable glands	<p>Nickel plated brass, double compression type cable glands of reputed make (comet or equivalent) shall be provided by the vendor. To enable right selection of glands, samples of cable piece will be provided by BHEL at the time of manufacturing.</p> <p>Approval of make and type shall be taken from BHEL before procurement of glands.</p> <p>PCUs shall be supplied with all the glands fixed on the gland plates.</p>	
6.8.7	Cable lugs, plain washers, spring washers, bolts and nuts	<p>Similarly, nickel plated cable lugs (copper), SS304 bolts, nuts & plain washers, Zinc coated spring washers shall be provided by the vendor. All these shall be of reputed make (dowell or equivalent), of appropriate size and type.</p> <p>Approval of make and type shall be taken from BHEL before procurement of these items.</p> <p>PCUs shall be supplied with all these items fixed on the bus bars at their respective positions.</p>	
6.8.8	Bus bar design	<p>Width and length of the bus bars shall be so chosen as (1) to provide full electrical contact to the cable lugs, (2) to ensure that lugs and cables do not touch each other and (3) to provide adequate access to the tightening tools (spanners, etc).</p> <p>Bus bars shall be positioned in such a way that the cables enter the panel vertically upwards from the cable trench below, without having to take any bends or turns after entering the panel.</p>	


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6.8.9	In case of separate DC termination panel	<p>(a) In case the DC terminations are not within the main PCU panel with the vendor design featuring a separate panel, the add-on panel shall also be included in the offer.</p> <p>(b) General arrangement showing views and details of termination panel, with cable entry particulars, shall be submitted as part of technical bid.</p> <p>(c) Interconnecting the add-on DC termination panel with the main panel, including supply of cables for this purpose, shall be within the scope of vendor.</p>
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6.9 AC Output and termination details

Vendor shall supply the PCU with the termination requirements on AC side as tabulated below. General arrangement showing views of termination shall be submitted as part of technical bid. Detailed drawings of termination arrangements with bus bar particulars such as positions, dimensions, hole sizes, spacing between holes, support to bus bar, etc shall be submitted within seven days after receipt of purchase order for BHEL approval.

6.9.1	Number of AC outputs	Three phases: R, Y, B terminals
6.9.2	AC cable entry into panel	<p>Bottom entry.</p> <p>Cables are in BHEL scope.</p> <p>For each phase, 3 runs x 1C x 300 sq-mm, copper, multi-strand, unarmoured, PVC insulation, PVC sheath as per IS: 1554 cable will be used.</p>
6.9.3	Gland plates	<p>Gland plates shall be provided with holes to accommodate the cable glands. Spacing between holes shall be chosen to ensure that glands do not touch each other, duly taking to account the clearance required for placing the spanners used to tighten the glands.</p> <p>Preferably, back side portion of the panel shall be used for bottom entry of cable. This is because the front</p>

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		side portion of the panel will be seated on the floor with back portion open to cable trench below.	
6.9.4	Cable glands	<p>Nickel plated brass, double compression type cable glands of reputed make (comet or equivalent) shall be provided by the vendor. To enable right selection of glands, samples of cable piece will be provided by BHEL at the time of manufacturing.</p> <p>Approval of make and type shall be taken from BHEL before procurement of glands.</p> <p>PCUs shall be supplied with all the glands fixed on the gland plates.</p>	
6.9.5	Cable lugs, plain washers, spring washers, bolts and nuts	<p>Similarly, nickel plated cable lugs (copper), SS304 bolts, nuts & plain washers, Zinc coated spring washers shall be provided by the vendor. All these shall be of reputed make (dowell or equivalent), of appropriate size and type.</p> <p>Approval of make and type shall be taken from BHEL before procurement of these items.</p> <p>PCUs shall be supplied with all these items fixed on the bus bars at their respective positions.</p>	
6.9.6	Bus bar design	<p>Width and length of the bus bars shall be so chosen as (1) to provide full electrical contact to the cable lugs, (2) to ensure that lugs and cables do not touch each other and (3) to provide adequate access to the tightening tools (spanners, etc).</p> <p>Bus bars shall be positioned in such a way that cable shall enter the panel vertically upwards from cable trench below, without any bends or turns after entering the panel.</p>	
6.9.7	In case of separate AC	(a) In case the AC output terminations are not within the	

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	termination panel	<p>main PCU panel with the vendor design featuring a separate panel, the add-on panel shall also be included in the offer.</p> <p>(b) General arrangement showing views and details of termination panel, with cable entry particulars, shall be submitted as part of technical bid.</p> <p>(c) Interconnecting the add-on AC termination panel with the main panel, including supply of cables for this purpose, shall be within the scope of vendor.</p>	
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6.10 Panel related parameters

6.10.1	Structure sheets	<p>CRCA sheet</p> <p>Main frames: 2mm thick min</p> <p>Door: 1.6 mm thick min</p> <p>Gland plate: 3mm thick min</p>	
6.10.2	Bus bars	Tinned copper with appropriate size to match current rating, based on vertical / horizontal layouts and bus bar orientations. Insulation sleeves (PVC etc) shall be used wherever necessary.	
6.10.3	Internal power cables	Insulated (PVC etc) copper cable with appropriate cross section to match current rating.	
6.10.4	Control wiring	Insulated (PVC etc) copper cable with 1.5 sq-mm min. CT wiring 2.5 sq-mm min.	
6.10.5	Base channel	ISMC channel of appropriate size to withstand the weight of the panel; suitable anti-corrosive finish (powder coated finish etc).	
6.10.6	Provisions for grouting	Base channel shall have suitable provisions (holes, etc) for grouting the panel on floor.	
6.10.7	Earthing terminals as per relevant standards	Earthing terminals shall be provided using tinned copper / aluminium bars of suitable cross section. Terminals shall be brought out to	

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		facilitate external connections.	
6.10.8	Insulation clearances	AC side: Phase to Phase / neutral: 25 mm min. DC side: As per relevant standards.	
6.10.9	Painting	Powder coating to RAL 7032 – Siemens grey. This is preferred colour. Vendor shall adopt the nearest grey shade in case of deviation.	
6.10.10	Overall dimensions	Width x Depth x Height in mm shall be indicated in the offer.	
6.10.11	Weight	Panel weight shall be indicated in the offer.	

6.11 External ducts and exhaust fans


6.11.1	External ducts and exhaust fans	Power plant will have a centralized control room having two compartments, one housing 6 PCUs and the other 4 PCUs. The distance between back side of PCU and control room wall will be approximately 2m.	
6.11.2		Exact layout of PCUs in the control room will be provided by BHEL to facilitate design of external duct profiles.	
6.11.3		Ducts, fans, starters and other accessories including hardware shall be supplied, installed and commissioned at the site by the vendor. The scope shall also include wiring of starters to the AC distribution board in the control room. (cables for wiring within vendor scope)	
6.11.3		External exhaust fans of suitable wattage and size shall be fitted into the cut-out of control room walls. These cut-outs will be made by BHEL based on dimensions and positions provided by vendor.	

7.0 Testing and inspection

7.1	Routine tests, as per relevant standards (IEC etc), shall be carried out on the PCUs and shall be witnessed by BHEL. Vendor shall submit quality plan prior to inviting BHEL for inspection. Following shall be the minimum checks.	
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	<ol style="list-style-type: none"> 1. Visual inspection check 2. Bill of materials check 3. HV insulation tests 4. Burn-in tests on full load 5. Factory acceptance tests <ol style="list-style-type: none"> (a) Load testing of inverter module: <ul style="list-style-type: none"> - Verification of inverter performance in its standalone operational mode with a defined power (up to 100%) and DC input voltage (up to max value). All parameters: DC voltage, current, power, grid voltage / current of R,Y,B lines, line frequency, ac output power, power factor, line current THD etc. to be measured and checked against specified acceptance norms. - Verification of responses of heat sink and cabinet cooling fans to heat sink and cabinet temperature rises. - Verification of inverter tripping response to simulated electrical shorts on ac output side. (b) Automatic mode testing (wake up and shut down) with simulated grid and dc input supplies. <ul style="list-style-type: none"> - Verification of automatic waking up of inverter as the dc input supply picks up and rises beyond set point levels. - Verification of export of power to the grid in relation to functioning of MPPT. - Verification of automatic shutdown of inverter as dc input supply falls below set point levels (c) System fault tests <ul style="list-style-type: none"> - Verification of automatic disconnecting and reconnecting of inverter module to the grid, based on rise and fall of heat sink and cabinet temperature with reference to set points. - Verification of inverter tripping response to simulated failure of cooling fans. (d) Functional tests <ul style="list-style-type: none"> - System response to various set points - Emergency shutdown cases - Disconnect switch, breaker and contactor operations - Meters and displays - Data downloading from PCU 	
	Test reports shall be submitted prior to dispatch of the system to the site.	


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8.0 Service during warranty period

8.1	<p>During the warranty period, whenever a technical problem is encountered with the PCU, BHEL will report the same to the vendor.</p> <p>Vendor shall ensure that the problem is attended to by their service engineer within two days from the date of reporting.</p>	
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9.0 Documents to be submitted after receipt of purchase order

9.1	<p>Following documents shall be submitted for BHEL approval within seven days from date of purchase order.</p> <ol style="list-style-type: none"> 1. Inverter module and control system specification (GTP) 2. General Arrangement of PCU with overall dimensions, plan, elevation, side views, bill of materials of major functional components viz. Inverter stack, IGBTs, heat sinks, cooling fans, air filters, capacitors, inductors, power supplies, sensors, protection cards, fuses, MCBs, surge protection devices, isolator switches, breakers, contactors, displays, push buttons, data loggers, communication devices, ports etc, make / part number / rating / quantity of these components. 3. Panel details of doors, frames, gland plates, bus bars, cables, earth terminals, base channel, paint finish, IP class, applicable standards. 4. General arrangement of front panel with displays, push buttons, lamp indicators, etc. 5. General arrangement showing DC input termination details viz. bus bars with details of holes for cable connections, bus bar supports, fuses, etc. 6. General arrangement showing AC output termination details viz. bus bars with details of holes for cable connection, bus bar supports, etc. 	
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10.0 Documents to be submitted along with consignment

10.1	<p>Following documents shall be submitted at the time of dispatch:</p> <ol style="list-style-type: none"> 1. Test reports on individual PCUs 2. Technical manual with system specifications, installation guidelines, commissioning guidelines, schematic drawings, circuit board overlays, system set points, calibration settings, hardware settings, cable schedule, general arrangement drawings, panel details. 3. Operations and maintenance manual 4. Product catalogues / datasheets of disconnecter switches, breakers, contactors, IGBTs, DC/AC capacitors, power supplies, communication devices, sensors, meters etc 	
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TECHNICAL BID ENCLOSURE FOR COMPLIANCE OF QUOTE									
RFQ REF:HBS0000445 Dt. 10.05.2013 DUE DATE(TECH BID) :27.05.2013									
SI No.	DESCRIPTION	QTY	UNIT	QUOTED	TAXES (TO BE QUOTED EXTRA)				REMARKS (TAX)
					ED %	CST %	VAT %	SERVICE TAX %	
1	PS0679031480: Supply of Power Conditioning Unit of 500 kW as per Clause No.3.1 of Tech Specification PS-439-821	10	Sets	YES/NO				NA	EXTRA
2	PS0679031529: Supply of external ducts, exhaust fans & all other accessories as per Clause 3.2 of Tech Specification PS-439-821	1	Set	YES/NO				NA	EXTRA
3	PS0679031570: Supply of Spare items as per Clause 3.3 of Tech Specification PS-439-821	1	Set	YES/NO	NA	NA	NA		EXTRA
4	I&C of Power Conditioning Unit of 500 kW	10	AU	YES/NO	NA	NA	NA		EXTRA
5	I&C of external ducts, exhaust fans & all other accessories	1	AU	YES/NO	NA	NA	NA		EXTRA

GENERAL NOTE :

- 1)PL INDICATE TAXES AS EXTRA: ED,VAT/CST,SERVICE TAX CLEARLY APPLICABLE AS ON DATE.
- 2)USE THIS FORMAT FOR COMPLIANCE(REPRODUCING ON YOUR LETTER HEAD IS ACCEPTABLE).
- 3)**OVERALL L1 OF SUPPLY (500 kW Grid Connected PCU+ External Ducts, Exhaust Fans etc. + Mandatory Spare items)+ I&C of PCU & External Ducts, Exhaust Fans on "FOR" basis to BHEL-RANIPET will only be considered.**
- 4) **BHEL IS TRYING TO GET CONCESSION ON EXCISE DUTY UNDER SUPPLY OF SOLAR POWER PROJECT.AT THE TIME OF CLEARANCE OF GOODS WE MAY ISSUE EXEMPTION CERTIFICATE.IN SUCH CASE, ED WILL BE EXEMPTED BUT NOT REIMBURSED. At present, please quote with applicable rate without concession of ED for comparison.**
- 5)**The successful bidder will be getting Letter of intent (LOI) from BHEL, EDN, Bangalore. The regular PO/Payment will be issued by BHEL-Ranipet.**
- 6) Kindly indicate the place/state from where the shipment will take place for assessment of taxation.

AUTHORISED SIGNATORY WITH SEAL

RFQ TERMS & CONDITIONS COMPLIANCE			
RFQ REF:HBS0000445 Dt. 10.05.2013 DUE DATE(TECH BID) :27.05.2013			
SN IN RFQ	CONDITION AS PER RFQ	ACCEPTANCE/ COMPLIANCE	DEVIATION
1	Two Part Bid	YES/NO	
1A	Enclosure 1 & 2 along with Techno-commercial Bid & Enclosure 3 along with Price bid.	YES/NO	
1B	"FREE ON ROAD" basis to BHEL-RANIPET	YES/NO	
1C	Pre Qualification criteria read and noted	YES/NO	
2	DELIVERY DATE : Supply : 12 weeks from Drawing approval. Drawings to be submitted in 1 week from LOI/PO release. For I&C: 4 weeks from Supply	YES/NO	
3A	PAYMENT TERMS : For Supply: 75% of basic supply value + 100% taxes & duties with 30 days credit on receipt of material at BHEL-RANIPET. 15% on Commissioning and Certification. Balance 10% against PBG for 10% of basic supply value valid for 63 months from date of Supply or 60 months from the date of I&C + 6 months claim period from BHEL Consortium bank. For I&C : 100% against commissioning and certification. For any other deviation in payment term the offer will be liable for rejection.	YES/NO	
3B	Overall L1 of Supply (500 kW Grid Connected PCU+ External Ducts, Exhaust Fans etc. + Mandatory Spare items)+ I&C of PCU & External Ducts, Exhaust Fans on "FOR" basis to BHEL-RANIPET will only be considered.	YES/NO	
3C	The basic unit price quoted shall be inclusive of Supply, P&F & Insurance. Taxes like ED, CST/VAT to be quoted extra separately .However the order will be placed on "FREE ON ROAD" basis to BHEL-RANIPET. If Freight is quoted extra, original money receipt from Transporter has to be submitted for payment of freight. Insurance is in vendor's scope. BHEL is trying to get concession on Excise Duty under Supply of Solar Power Project. At the time of clearance of goods we may issue Exemption Certificate. In such case, ED will be exempted but not reimbursed.At present, please quote with applicable rate without concession of ED for comparison.	YES/NO	
3D	C-form will be issued if applicable. Mention taxes clearly and state whether taxes are included or extra. Indicate the state from which supply takes place.	YES/NO	
4A	Pre Shipment Inspection will be carried out by BHEL for which test report shall be sent one week in advance.	YES/NO	
4B	PENALTY APPLICABLE: Penalty of 0.5% per week at the basic price of the good for undelivered quantity of supply portion, subject to a maximum of 10%. Pre Shipment Inspection Call Letter Date (Receipt of test report) will be treated as delivery for purpose of penalty for supply only. Any Deviation attracts Loading.	YES/NO	
5	WARRANTY:for a period of 63 months from date of Supply or 60 months from the date of I&C whichever is earlier as per Tech Spec. PS-439-821.	YES/NO	
6	Road permit if applicable will be given by BHEL before dispatch of ordered items.	NA	BHELSCOPE
7	Do not indicate any TERMS & CONDITIONS in price bid. Only financial values shall be indicated.	YES/NO	
8	Clause Wise Compliance / Confirmation with respect to BHEL Purchase Specification enclosed.	YES/NO	
9	Deviation from RFQ Terms & Conditions may lead to the rejection of the offer	YES/NO	
10	BHEL reserves the right to conduct reverse auction. Procedure for the same will be informed by BHEL. Please send your acceptance for reverse auction.	YES/NO	
11	The successful bidder will be getting Letter of intent (LOI) from BHEL, EDN, Bangalore. The regular PO/Payment will be issued by BHEL-Ranipet.	YES/NO	
12	Kindly indicate the place/state from where the shipment will take place for assessment of taxation.		

AUTHORISED SIGNATORY WITH SEAL

NOTE : INDICATE YES/NO CLEARLY IN THE FORMAT. OTHERWISE IT WILL BE TREATED AS DEVIATION FROM RFQ TERMS AND CONDITIONS.

USE THIS FORMAT FOR COMPLIANCE(REPRODUCING ON YOUR LETTER HEAD IS ACCEPTABLE).

PRICE BID ENCLOSURE									
RFQ REF:HBS0000445 Dt. 10.05.2013 DUE DATE(TECH BID) :27.05.2013									
SI No.	DESCRIPTION	QTY	UNIT	BASIC UNIT RATE (Rs.)	TAXES (TO BE QUOTED EXTRA)				REMARKS
					ED %	CST %	VAT %	SERVICE TAX %	
1	PS0679031480: Supply of Power Conditioning Unit of 500 kW as per Clause No.3.1 of Tech Specification PS-439-821	10	Sets					NA	EXTRA
	Unit Rate in Words								
2	PS0679031529: Supply of external ducts, exhaust fans & all other accessories as per Clause 3.2 of Tech Specification PS-439-821	1	Set					NA	EXTRA
	Unit Rate in Words								
3	PS0679031570: Supply of Spare items as per Clause 3.3 of Tech Specification PS-439-821	1	Set		NA	NA	NA		EXTRA
	Unit Rate in Words								
4	I&C of Power Conditioning Unit of 500 kW	10	AU		NA	NA	NA		EXTRA
	Unit Rate in Words								
5	I&C of external ducts, exhaust fans & all other accessories	1	AU		NA	NA	NA		EXTRA
	Unit Rate in Words								
6	Freight Charge including Service Tax on Freight	LUMPSUM		Rs.					
	Lumpsum Charge in Words								
7	Insurance	LUMPSUM		Rs.					
	Insurance Charge in Words								

GENERAL NOTE :

- 1)PL INDICATE TAXES AS EXTRA: ED,VAT/CST,SERVICE TAX CLEARLY APPLICABLE AS ON DATE.
- 2)USE THIS FORMAT FOR COMPLIANCE(REPRODUCING ON YOUR LETTER HEAD IS ACCEPTABLE).
- 3)ALSO INDICATE WHETHER FREIGHT CHARGE & INSURANCE IS INCLUDED IN QUOTED RATE OR WILL BE CHARGED EXTRA. IN ABSENCE OF CLARITY, QUOTED RATE WILL BE CONSIDERED AS INCLUSIVE OF FREIGHT CHARGES.
- 4)SERVICE TAX ON FREIGHT APPLICABLE IS 3.09% OF TOTAL FREIGHT.
- 5)OVERALL L1 OF SUPPLY (500 kW Grid Connected PCU+ External Ducts, Exhaust Fans etc. + Mandatory Spare items)+ I&C of PCU & External Ducts, Exhaust Fans on "FOR" basis to BHEL-RANIPET will only be considered.
- 6)INSURANCE IS IN VENDOR'S SCOPE.
- 7) BHEL IS TRYING TO GET CONCESSION ON EXCISE DUTY UNDER SUPPLY OF SOLAR POWER PROJECT.AT THE TIME OF CLEARANCE OF GOODS WE MAY ISSUE EXEMPTION CERTIFICATE.IN SUCH CASE, ED WILL BE EXEMPTED BUT NOT REIMBURSED. At present, please quote with applicable rate without concession of ED for comparison.
- 8)The successful bidder will be getting Letter of intent (LOI) from BHEL, EDN, Bangalore. The regular PO/Payment will be issued by BHEL-Ranipet.
- 9) Kindly indicate the place/state from where the shipment will take place for assessment of taxation.

AUTHORISED SIGNATORY WITH SEAL

PERFORMANCE BANK GUARANTEE
(FOR INDIGENOUS PURCHASE ORDERS)

THIS DEED OF GUARANTEE made and executed on the _____ day of _____ (year), by the _____ (Bank), registered under the Companies Act 1956/Nationalised Bank constituted under the Banking Companies (acquisition and transfer of undertakings) Act constituted under the State Bank of India Act / Subsidiary Banks Act, having its registered / head office at

_____ represented herein by its Branch Manager / authorised representative Sri. _____ & Sri. _____ (Hereinafter called 'guarantor ' which term shall mean and include its successors and assigns)

IN FAVOUR OF BHARAT HEAVY ELECTRICALS LIMITED

_____ (Buyer's Name), a company registered under the companies Act, 1956 having its registered office at BHEL House at Siri Fort , New Delhi-100 049 and its Electronics Division at Mysore road, Bangalore-26 (hereinafter referred to as the 'Company' Which term shall include its successors and assigns):

Whereas the company has placed an order on _____ (State the name of the company / firm and its address) (hereinafter referred to as the 'Supplier' which term shall mean and include its liquidators, successors and assign) for the supply of system under order / Contract No _____ Dt _____.

AND WHEREAS the supplier has agreed to supply the materials and carryout the works as detailed and in accordance with the terms set out in the said order/contract.

AND WHEREAS the company is not required to pay to the supplier a sum of Rupees _____ being the 10% of the value of the goods supplied / Works performed / Services rendered under the said order / contract between the supplier and the company, till the company is satisfied with the mechanical Warranties and the performance standards stipulated in the said order / contract between the company and the supplier has been duly fulfilled, except against a Bank Guarantee for the said sum of Rs _____ in favour of the company by reputed Bank, in which case the company has agreed to make payment to the supplier of the said sum of Rupees _____ being (...%) of the value of the goods supplied / Works performed / Services rendered under the agreement between the supplier and the company and the Guarantor has at the request of the supplier, agreed to furnish this Guarantee subject to the terms and conditions stated below:

NOW THIS DEED WITNESSES THAT IN pursuance of the above said agreement, the guarantor hereby agrees and covenants With company is as follows :-

- 1) That during the period this contract of Guarantee remains effectual, the guarantor shall be liable in respect of the amount due and owing to the company in respect of the payments to the extent of Rs _____ (in words)

_____ against any loss or damage caused to or suffered by the company by reasons of any breach of the terms of the said order / contract / Agreement by the supplier.

- 2) The Guarantor hereby undertakes to pay the amounts due and payable under this guarantee without any demur, merely on demand from the company intimating that the amount claimed is due by way of loss or damage caused to or suffered or would be caused or suffered by the supplier of any terms contained in the said order / contract. Any such demand made on the guarantor shall be conclusive as regards the amount due and payable by the Guarantor irrespective of the fact whether the Contractor / supplier admits or denies.
- 3) The Guarantor further agrees that the agreement herein contained shall remain in force and effect till all the supplies to be made / Works to be performed / Services to be rendered under the said order / contract / agreement are completed to the entire satisfaction of the company or till company certifies that the terms and conditions of the said order / contract / agreement have been fully and properly carried out by the said supplier and accordingly discharges the Guarantee. Unless a demand or claim under this guarantee is made on the guarantor in writing on or before the expiry of claim period indicated in clause 6 below , the guarantor shall be discharged from all the liability under this guarantee thereafter.
- 4) The guarantor further agrees with the company that the company shall have the fullest liberty without the consent of the guarantor and without effecting in any manner the obligations of the guarantor hereunder to vary any of the terms of the said order / contract / agreement or extend the time of performance by the said supplier from time to time or refrain from exercising the power exercisable by the company against the said supplier or to forebear or omit to enforce any of the terms and conditions relating to the said order / contract / agreement, and the guarantor shall not be relieved of its liability in whole or in part , by reason of any act, commission or forbearance on the part of the company or by reason of any such variation, or extension being granted to the said supplier or by reason of any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving the guarantor.
- 5) The guarantor undertakes not to revoke this guarantee during its currency except with the previous consent of the company in writing.
- 6) Notwithstanding anything herein above contained, the liability of the guarantor under these presents is restricted to Rs_____. The guarantee shall be in force till its expiry on _____ unless a demand is made on the guarantor within SIX months from the date of expiry, all the liability of the guarantor under this guarantee shall stand fully discharged. The decision of the claimant in regard to breach of contract is final and binding on the Bank.

IN WITNESS whereof, the guarantor, acting through it authorised representative has executed this deed of Guarantee on the day, month and year first above written.

(Seal of the Bank to be affixed)

WITNESS

- 1.
- 2.

Note:

- (1) To be executed in INR 100 Non-Judicial stamp paper by any authorized Indian Bank.
- (2) To be submitted directly by banker to concerned executive in purchase dept., Please give BHEL address to banker.
- (3) Do not enclose with Bank document.
- (4) Any Modification & omissions to this are not permitted

BHEL MEMBER BANKS (CONSORTIUM BANKS)

PBG SHALL BE ISSUED FROM THE FOLLOWING BANKS OR THEIR BRANCH OFFICES ONLY

1	STATE BANK OF INDIA
2	PUNJAB NATIONAL BANK
3	HDFC BANK
4	SYNDICATE BANK
5	CANARA BANK
6	INDIAN BANK
7	ST. BANK OF HYDERABAD
8	ICICI BANK
9	STANDARD CHARTERED BANK
10	UCO BANK
11	KOTAK MAHINDRA
12	ORIENTAL BANK OF COMMERCE
13	STATE BANK OF TRAVANCORE
14	CENTRAL BANK
15	IDBI BANK
16	FEDERAL BANK
17	HSBC LTD
18	DEUTSCHE BANK
19	CORPORATION BANK
20	CITI BANK
21	BANK OF BARODA
22	ABN AMRO BANK
23	UNITED BANK OF INDIA
24	VIJAYA BANK
25	UNION BANK OF INDIA
26	PUNJAB & SIND BANK
27	ANDHRA BANK
28	BANK OF INDIA
29	AXIS BANK

