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No.RSA/Nov 2013/2  
Electrical Engineering Department  
INDIAN INSTITUTE OF TECHNOLOGY  
KANPUR 208016 INDIA

12 Nov 2013.

Dr. RAGHUBIR SINGH ANAND  
Principal Research Engineer

To,

### **Tender Enquiry**

Subject: **Roof Top Solar Photovoltaic Power Plant at IITK**

Quotations for Ist Phase 352 KWp roof top IITK grid connected solar photovoltaic plants are invited. The materials, systems specifications and other terms & conditions are given below.

**(a) Option No.1, High efficiency Silicon Module based 192 KWp Solar Power Plant**  
**Rooftop Locations:** Faculty Building (142 KWp) & Western lab (50 KWp)

Silicon (=>20% efficiency) modules of 200 -400 Wp ratings. All modules are to be provided with its Flash Sheets giving test reports of all important parameters.

**(b) Option No.2, Normal Efficiency Silicon based 152 KWp Solar Power Plant**  
**Rooftop locations:** (a) Western Lab (100 kWp), (b) Western Lab Extension (28 kWp), (c) Northern Lab II/Chemical Engineering Lab(24 kWp)

14-15% mc-silicon/c-silicon solar cell modules of 200 - 400Wp ratings. All modules are to be provided with its Flash Sheets giving test reports of all important parameters.

**(c) Structure, Power Electronic interface & other BOS items common to Option I & Option 2**


- (i) Junction boxes with required bypass diodes, IP65 Protection.
- (ii) Roof compatible galvanized structure in the layout shown in the drawing Annexure 'A'. It may vary as per rating & size of modules.
- (iii) At least one 50 KW 3-phase DC to AC grid connected inverters. Rest as per requirement on different buildings to be provided. Small canopy/cover for Inverter shade should be provided.
- (iv) Inverters should be nominally rated to inject full rated power into 415 V, 50 Hz, 3-phase, 4-wire AC grid.
- (v) Inverters must incorporate all standard protection features including, but not limited to, overload, grid over/under voltage, incorrect phase sequence, frequency deviation, short-circuit, input dc over/under voltage, input cable disconnection, line surges etc.

- (vi) Inverters should also be additionally capable of injecting full rated power under normal grid voltage fluctuations (400-460 V line-to-line, rms) and frequency variations (48.5 Hz – 51.5 Hz).
- (vii) Harmonic injection under all operating conditions must adhere to IEEE-512, 1992 norms.
- (viii) Insolation sensitive auto-startup (on availability of daylight) and auto-shutdown (in absence of daylight) features must be incorporated.
- (ix) Isolation between inverter and AC Distribution Board must be provided in case any PV array output terminal is earthed.
- (x) RCD installed for prevention of live wiring of cabinet and support must be present and must be tuned properly to avoid spurious trips.
- (xi) LAN connectivity through RS485/LAN connectivity from each inverter to make available string DC voltage, currents, daily, weekly, monthly, yearly AC power & energy, voltage, current, phase etc.
- (xii) Ambient Humidity, wind speed, temperature and Sun Irradiance sensors will be provided each at Faculty Building, Western Lab, Western Lab Extension and NL II/Chemical Engineering buildings. Data to be collected through RS485/LAN connectivity or other appropriate protocols and to be logged on along with other inverter parameters.
- (xiii) 6mm core double insulated solar grade wires passing through good quality flexible plastic conduit pipes between panels and Combiner Box.
- (xiv) Combiner Boxes (CB) wherever needed with proper fuses and spike buster & IP65 Protection.
- (xv) 10mm core double insulated solar grade wires passing through good quality plastic conduit pipes between CB-inverter & inverter-ACDB.
- (xvi) AC Distribution Boards with appropriately rated switchgear and energy meters between inverter and IITK 3-phase grid interface.
- (xvii) Meter required in ACDB should be accessible through RS485/LAN (local area network) giving instantaneous power, current & voltage, power factor, frequency (Hz), daily, total energy and total running hour.
- (xviii) DC, AC grounding and lightning arrestors network along with civil work as required.

#### Terms & Conditions:

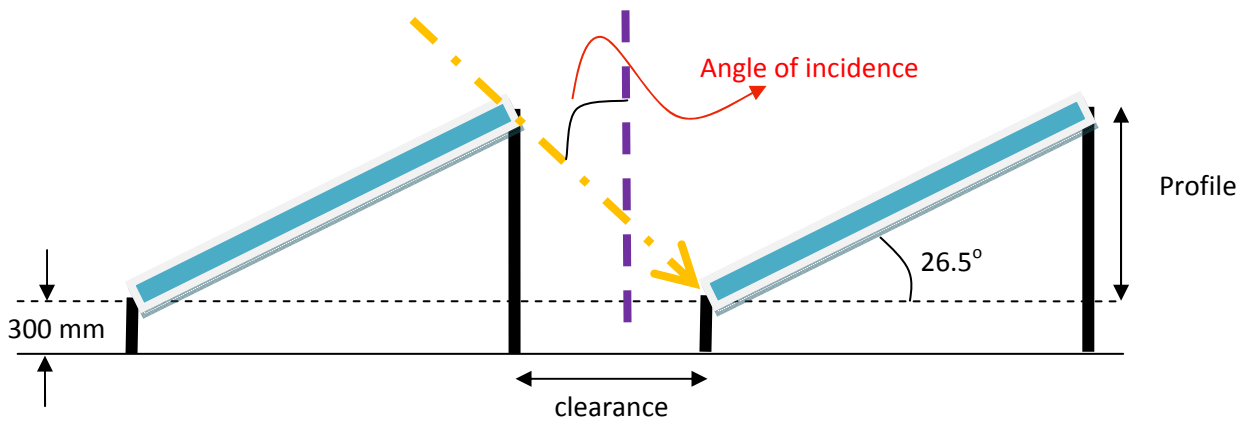
1. Last date for submission of the Quotations is 02 Dec 2013, 1400 hrs.
2. Pre-bid meeting will be held 20 Nov 2013, 1500 hrs at ACES, EE Department Conference room.
3. Quotations are to be submitted in two parts, Technical and Financial bids in two separate sealed covers enclosed in other sealed cover. Technical bid containing materials, systems specifications, terms & conditions as listed will be opened on 02 Dec 2013, 1500 hrs. Financial bids only of those meeting Technical and other terms conditions will be opened on 4/5 Dec 2013. Cover should be marked at its top with "Quotation for **Technical/Financial** bid for Roof Top Solar Photovoltaic Power Plant at IITK".
4. Payment term, 50% on delivery of material and 50% within one month of successful installation, commissioning & Inspection Report.
5. A template of modal IITK Quotation is attached with this email.
6. Installation and commissioning to be completed within 6 months of placement of order. A fine of Rs.8000-00 per day, equivalent to expected electricity generation cost will be imposed after six months. It will be deducted from the final payment.

7. Modules, Inverters and other items should conform to the general guidelines and Specification, MINIMAL TECHNICAL REQUIREMENTS / STANDARDS FOR SPV SYSTEMS / PLANTS TO BE DEPLOYED DURING F.Y. 2012-2013 UNDER THE PROGRAMMES OF MINISTRY OF NEW AND RENEWABLE ENERGY” (copy attached) and other regulations on the subject.
8. Warranty of Silicon modules of 90% performance at 10 years and 80% at 20 years, 5 years for inverters, 10 years for structures.
9. 3 Preventive Maintenance Service visits per year for first five years should be taken into account.
10. Earnest Money Deposit (EMD) of Rs.5 lacs for Option 1 and Rs.2 lacs for Option 2 in the form of FDR in the name of Director, IIT Kanpur is required to be submitted along with quotations.
11. Total yield of the Solar Power System will be measured by the units of electricity logged-in as monitored through the inverter and the solar insolation measured at the sites. At least 5 KWh (units)/KWp at 1000 W/m<sup>2</sup> peak solar insolation and other wise clear sky during the day, should be delivered to IITK grid. Units are supposed to increase or decrease at higher & lower insolation levels linearly respectively.
12. Bank Guarantee valid for 1 year of 5% of the order value will be deposited within 5 days of the Purchase Order confirmation for ensuring the Performance of the plant measured as per clause 11.
13. All civil, electrical installation & commissioning work should be carried by trained persons and as per best labor law practices with no possibility of any accidents. Any mis-happening will be the responsibility of the contractor and he will be liable for due compensation as per laws.
14. The open area & height of different building along with sample layout of panels in useable area is given in the attached drawings. Inverters are supposed to be placed on roofs under canopy cover as provisioned under (c) (iii) and ACDB with IP65 protection will be placed on ground floor within 10 meters of the building walls.
15. We will like to avail the subsidy and other benefits available from the MNRE and other agencies under existing rules. The quoted price must be the final price inclusive of subsidies and against which Purchase Order could be issued. It is installer/channel partner's responsibility of claiming the subsidy.
16. Installer should have experience of completing at least 500 KWp solar photovoltaic project.
17. The final selection will NOT dependent only on Lowest Price quoted. Selection criteria will include (i) fulfillment of technical specification, Terms & Conditions (15 marks) (ii) the lowest price quoted (50 marks) (iii) the technical & financial performance ratings as given by MNRE (35 marks). It will be calculated as given in following “Selection Criteria” in Annexure ‘B’.
18. Provide self attested copy of the MNRE ratings with quotations.
19. Attach proof of completing at least 500 KWp solar photovoltaic projects.
20. The firm should be registered with Sales Tax Office and should have Service Tax Registration, Tax Payer Identification No (TIN) and PAN allotted to them. The firm must maintain an office/shop/show room registered in its own name, in the market/industrial area or another suitable place and should have a bank account wherein the payments may be sent directly in the bank. Supplier must print CST/UPTT/TIN No. on their Letter Head/Bill/Quotations.
21. Quotations should be valid for 60 days at least.
22. A check-list is attached with this Quotation. Please give numbers or fill appropriately in respective columns, sign and stamp it.

  
(RS Anand)

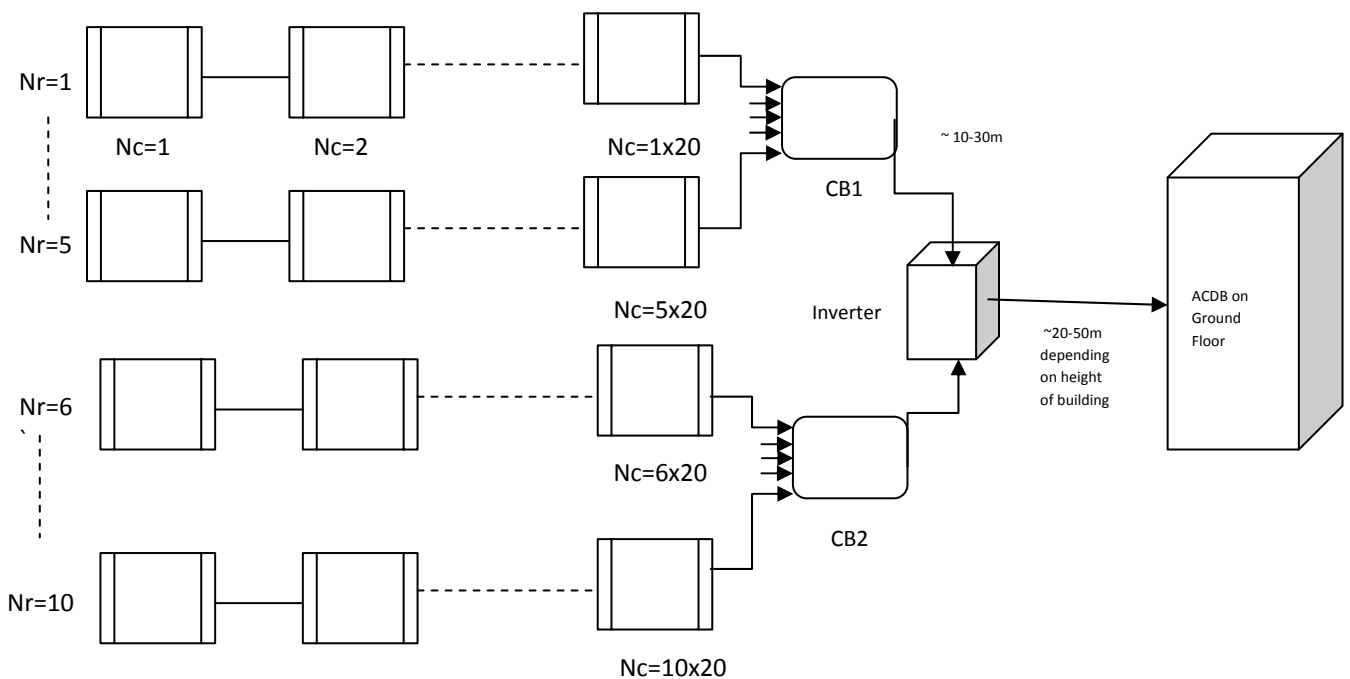
**Area, Clearance, Angle of Tilt and String layout of modules**

Required rooftop surface area (per kWp) is dependent on the maximum tilt of the sun as well as on the maintenance clearance between adjacent rows of panels. In winter, the maximum tilt angle at Kanpur (12 noon) is about 40°. Although this requires 0.5 m clearance, this is not sufficient for maintenance activities. Hence a clearance of 750 mm is proposed which results in rooftop surface requirement of 13.2 m<sup>2</sup>/kWp. This factor has been used for estimating the generation potential for each building. With high efficiency modules, the minimum clearance required can be increased to 975 mm which allows a higher angle of incidence (64.5°).

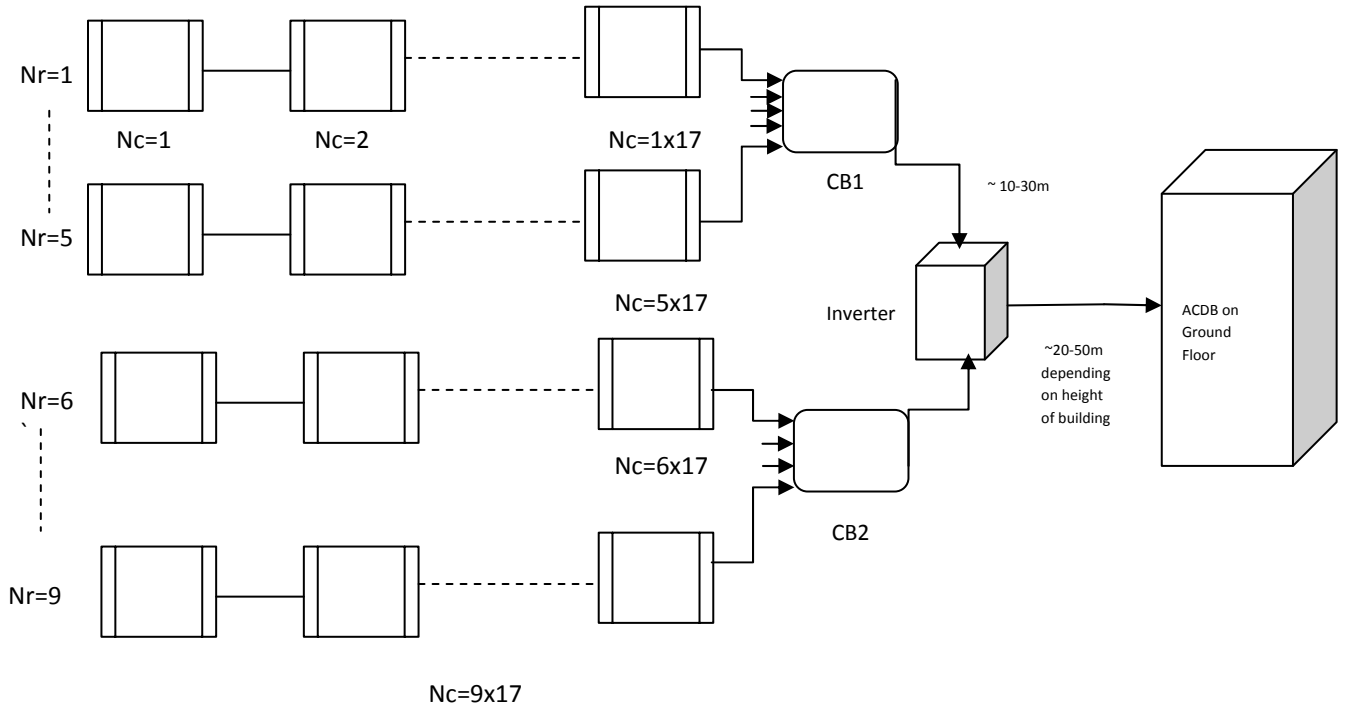


Side view of the proposed panel installation

**Sample String layout of 200 x 250 Wp = 50 KWp Basic Unit for Vm = 35V, 14-15% efficiency solar modules. (It may change as per module ratings)**



**Sample string layout of 153x 327 Wp = 50.0KWp Basic Unit for  $V_m = 54.9V$ , 20.1% efficiency solar modules. (It may change as per module ratings)**



## **Annexure 'B'**

### **Selection Criteria : Roof Top Solar Photovoltaic Power Plant**

The selection criteria includes the (i) fulfillment of technical specification, Terms & Conditions (ii) the lowest price quoted and also including (iii) the technical & financial performance ratings as given by MNRE. To give effect to the above criteria, following formula has been devised to give grading to different firms/companies.

- (1) **15** marks for technical special features as required & given below
  - (a) Inverter with IP65: 3 marks
  - (b) Max ambient temperature at 100% output:-
    - 55 degC : 6 marks
    - 50 degC : 4
    - 45 degC : 1
  - (c) Inverter efficiency: (quoted eff / max quoted eff.) x 6 marks
  
- (2) **35** marks (max) to Performance Capability and Financial Strength (PCFS) as given by MNRE rating of registered Channel Partners
  - (a) FS: A(20), B(15), C(10)
  - (b) PC: SP1(25), SP2(20), SP3(15); 0 marks for anything else

PCFS Marks \* 35/PCFS\_max
  
- (3) **50** marks (max) to Lowest Price quoted and then to L2, L3, L4 & L5 as per following formula.

Marks on Price Quoted = 50 \* Price\_L1/ Price quoted

Total marks obtained will be the sum of 1, 2 & 3. The firm getting the highest marks will be awarded the contract.

## Model Quotation for *Indigenous purchase*

Dated:

To  
Dr./Prof.  
Dept.  
Indian Institute of Technology, Kanpur

Sub : Quotation for supply of :  
Ref : Your enquiry letter no: & date:

Sir / Madam:

With reference to your enquiry letter on the subject mentioned above, the following quotation is hereby submitted for your consideration, in a sealed cover.

\*\*\*

**I Supplier Details : Agency / Vendor name: Local Agent:**

1. Address :
2. Ph.No :
3. Mobile :
4. Email :
5. Bank A/c No :
6. Bank Name & Add :
7. RTGS / NEFT Code :
8. Registration Details like PAN / VAT / Service TAX etc:

**II. Description & Costs of Material / Equipment :**

Sl No.	Complete description / specification of items required	Model No.	No of Units	Unit Price	Total Amount
1	<i>Default Specs:</i>				

<b>2</b>	<b>Optional Specs:</b>				
	Technical Specification as given in the Tender Document No.RSA/Aug 2012/1 & 21 Aug 2013 and 02 Sep 2012 & Pre-bid meeting minutes of 4 & 6 Sep 2013 (copy attached.)				
<b>3</b>	<b>Total Cost in INR:</b> <b>a) Free on Rail</b> <b>b) Ex-Work</b>				
<b>4</b>	<b>Transportation charges</b>				
<b>5</b>	Packing & Forwarding charges				
<b>6</b>	Transit Insurance				
<b>7</b>	Other Charge, if any				
<b>8</b>	<b>Taxes</b>				
	<ul style="list-style-type: none"> <li>• Excise Duty / Customs Duty, if applicable</li> </ul>				
	<ul style="list-style-type: none"> <li>• Sales Tax / CST / VAT</li> <li>• Octroi, if applicable</li> <li>• Service Tax</li> </ul>				
	<ul style="list-style-type: none"> <li>• Other Duties / taxes</li> </ul>				
	<b>Total Value of quotation</b>				

IV. **Terms & Conditions:**

	<b>Particulars</b>	Description
1	Guarantee/Warranty Yrs.	
2	AMC Value per annum	
3	Costs for additional warranty, if any	
4	No. of Preventive Maintenance Service visits	3 visits per year for first five



	per annum	year
5	Validity of quotation (Min. 60 days)	60 days
6	Delivery Period	
7	Method of Payment: <b>(a)</b> ECS <b>(b)</b> Cheque <b>(c)</b> DD <b>(d)</b> CAD <b>(e)</b> TT <b>(f)</b> LC	
8	<b>Payment Terms</b>	
	<ul style="list-style-type: none"> <li>• 90% on delivery &amp; 10% after installation &amp; approval of inspection report.</li> <li>• 50% on installation and 50% on inspection report submission.</li> <li>• 100% on installation and on inspection report submission</li> <li>• Advance payment up to 100 % against Bank guarantee</li> <li>• Any other Conditions</li> </ul>	50% on installation and 50% on inspection report submission.
9	<b>Any other details</b>	

- Encl: (1) Technical Evaluation & Financial bids comparative along with Recommendation of the committee**  
**(2) Tender Notice, Minutes & Criteria of Selection**  
**(3) Quotation Technical Part**  
**(4) Quotation Financial bid**

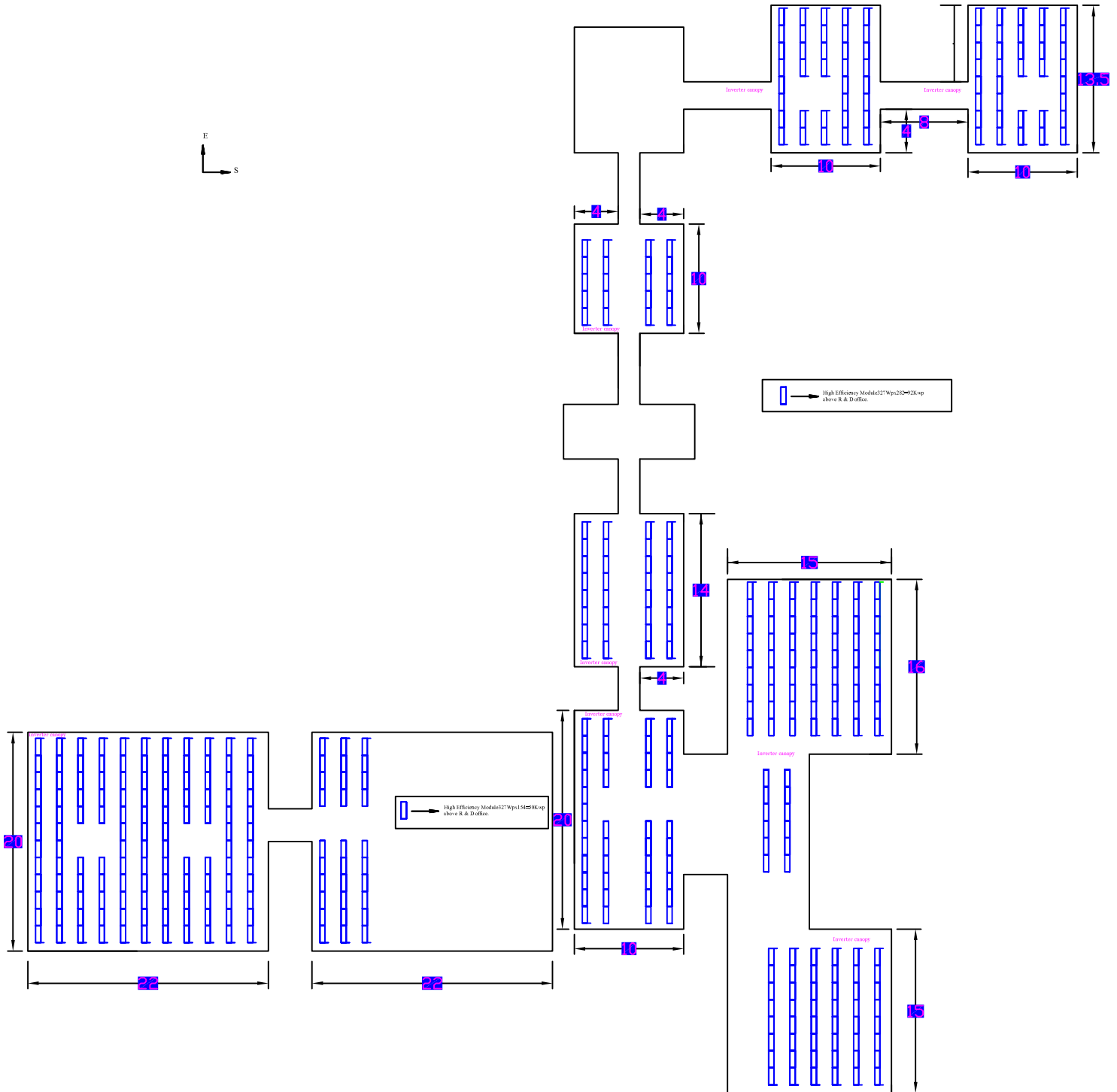
**Signature of the authorized signatory**

**Date & Seal:**

# Faculty Building Roof Top 142KWp.

Height of the building from ground about 30m

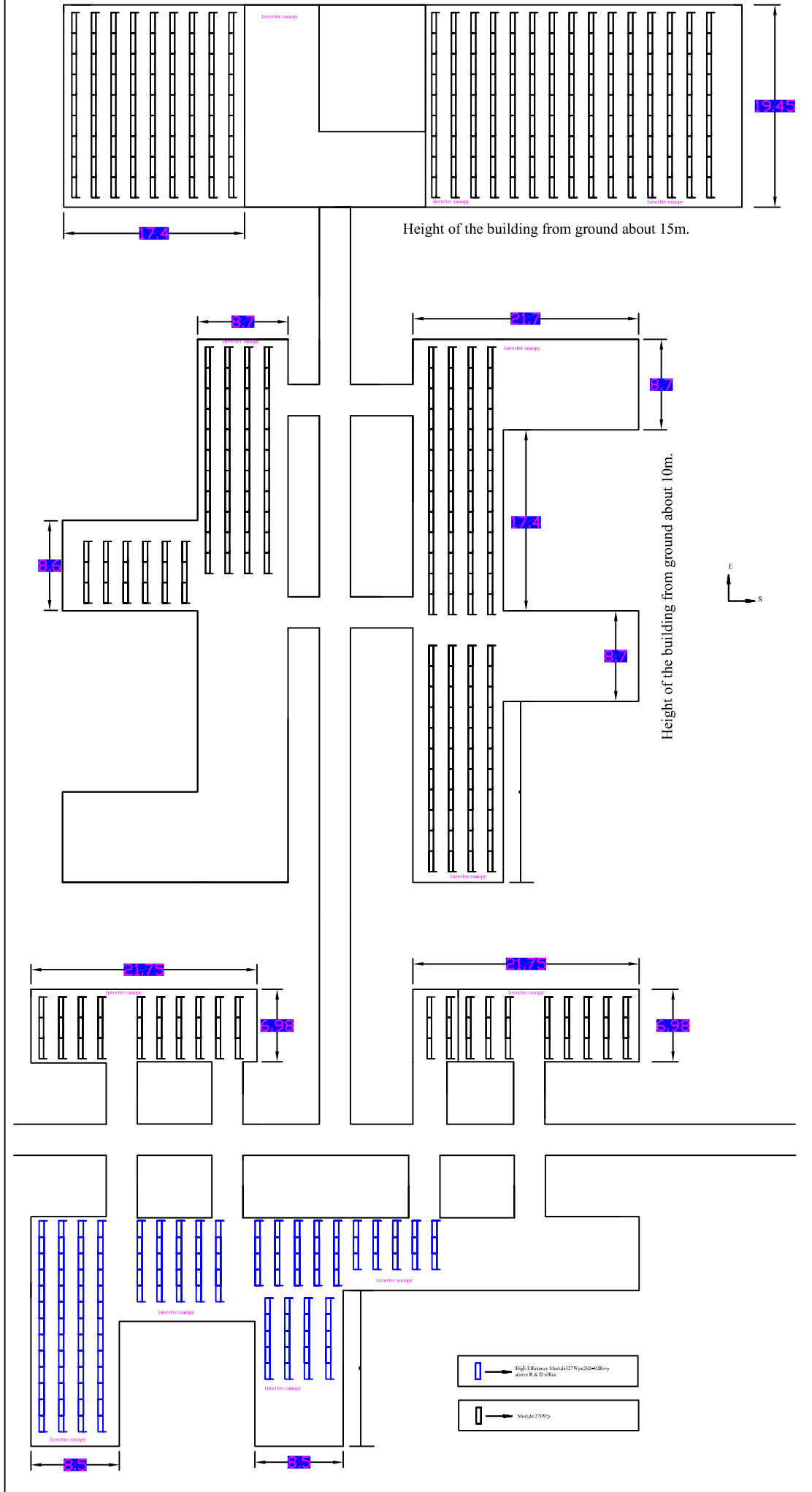
327Wp Module, Total Nos of Modules = 435.( 1.559m x 1.046m )



# Western lab Roof Top 150KWp.

Height of the building from ground max. 15m & min. 10m.

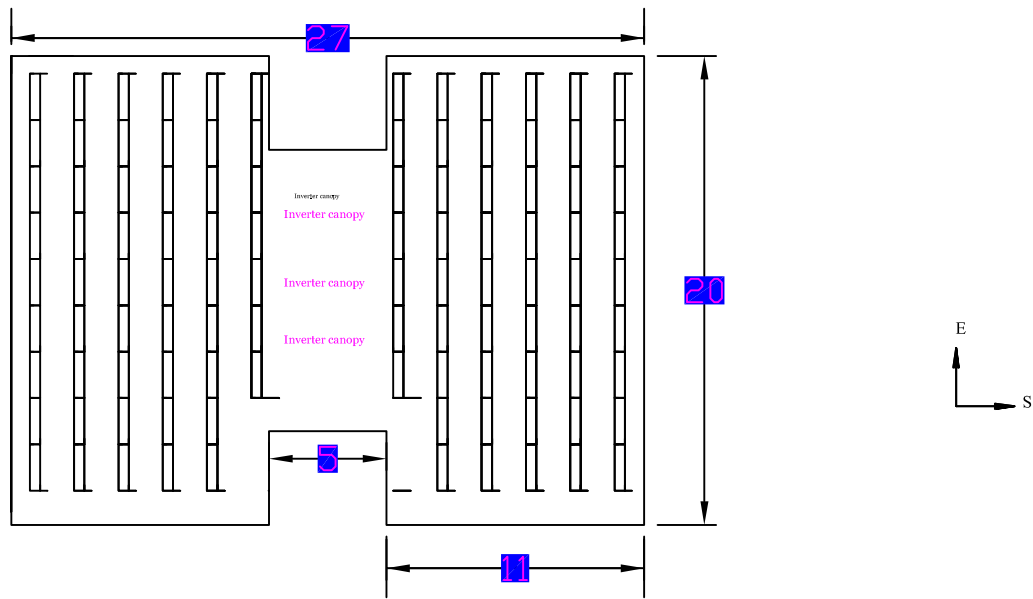
270Wp Module, Total Nos of Modules = 557.( 1.975m x 0.995m )



# Western Lab Extention Roof Top 28KWp.

Height of the building from ground about 15m

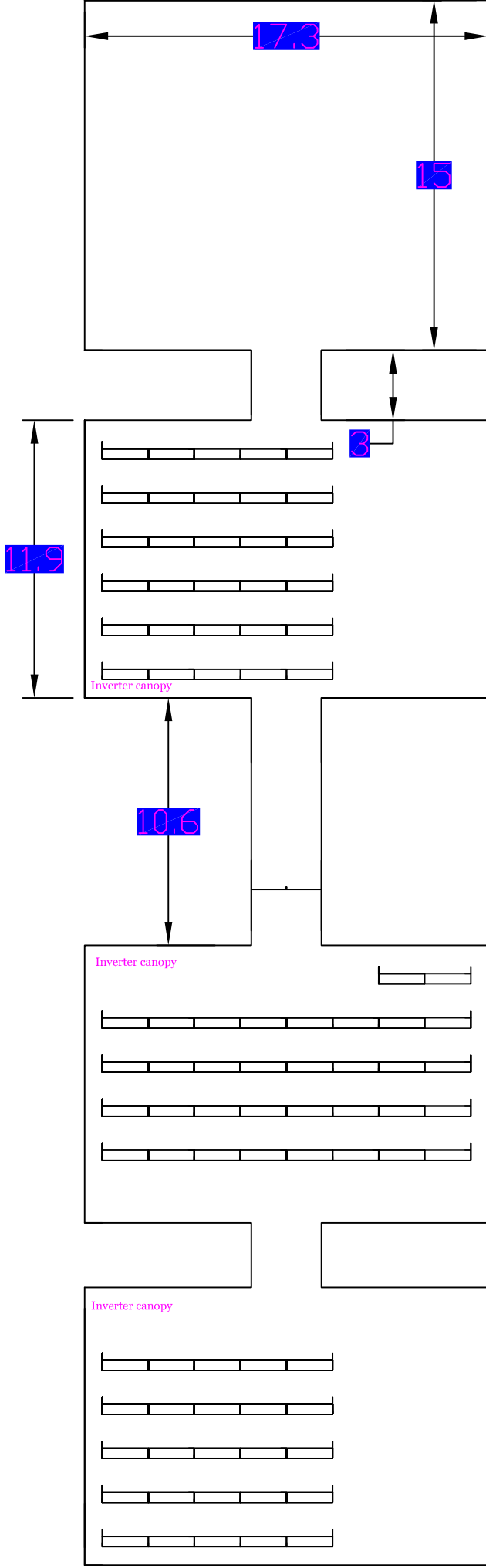
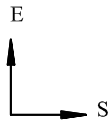
270Wp Module, Total Nos of Modules = 104.( 1.975m x 0.995m )



# NL-II Roof Top 24KWp.

270Wp Module, Total Nos of Modules = 89.( 1.975m x 0.995m )

Height of the building from ground about 18m



## Check List

Check List			
<b>Option No.1</b>		<b>High efficiency Silicon Module based 192 kWp</b>	<b>Put Figures or Mark your consent appropriately</b>
		(Roof Top of Faculty Building (142 KWp) & Western lab (50 KWp))	
	1	Modules efficiency (>=20%)	
	2	Module Wattage (200 - 400 Wp)	
	3	Number of modules	
	4	All modules are to be provided with its Flash Sheets giving test reports of all important parameters.	
<b>Option No.2</b>		<b>152 KWp Solar Power Plant. Normal 14-15% Efficiency Silicon Module Efficiency</b>	
		(Roofs of Western Lab (100 KWp), Western Lab Extension (28KWp), Northern Lab II/Chemical Engineering Lab(24KWp))	
	1	Modules efficiency (14-15%)	
	2	Module Wattage (200 -400Wp)	
	3	Number of modules	
	4	All modules are to be provided with its Flash Sheets giving test reports of all important parameters.	
<b>Other Requirements for Option 1 &amp; 2</b>			
	1	Junction boxes with required bypass diodes, IP65 Protection will provided?	
	2	Roof compatible galvanized structure are provided?	
	3	Grouting of structure on roof to with stand 200 km/h wind. No damage to roof is done.	
	4	At least one 50 KW 3-phase DC to AC grid connected inverters. Rest as per requirement on different buildings will be provided.	
	5	LAN connectivity through RS485 from each inverter to make available string DC voltage, currents, daily, weekly, monthly, yearly AC power & energy, voltage, current, phase etc.	

	6	Ambient Humidity, wind speed, temperature and Sun Irradiance sensors will be provided each at Faculty Building, Western Lab, Western Lab Extension and NL II/Chemical Engg. buildings. Data to be collected through RS485 or other appropriate protocols and to be logged on with other inverter parameters	
	7	6mm core double insulated solar grade wires passing through good quality flexible plastic conduit pipe between panels and Combiner Box .	
	8	Combiner Boxes (CB) with proper fuses and spike buster & IP65 Protection.	
	9	10mm core double insulated solar grade wires passing through good quality plastic conduit pipe between CB-inverter & inverter-ACDB.	
	10	AC Distribution Board with appropriately rated switches and energy meters between inverter and IITK 3-phase grid interface.	
	11	All AC distribution boards must be housed in IP65 compatible enclosures for outdoor installation	
	12	DC, AC grounding and lightning arrestors along with civil work as required across the roof area will be provided.	
<b>Terms &amp; Conditions:</b>			
	1	Installation and commissioning to be completed within 6 months of placement of order?	
	2	Small canopy/cover for Inverter shade will be provided?	

	3	Modules, Inverters and other items should conform to the general guidelines and Specification, MINIMAL TECHNICAL REQUIREMENTS / STANDARDS FOR SPV SYSTEMS / PLANTS TO BE DEPLOYED DURING F.Y. 2012-2013 UNDER THE PROGRAMMES OF MINISTRY OF NEW AND RENEWABLE ENERGY" (copy attached) and other regulations on the subject?	
	4	At least 5 KWh/KWp at 1000 W/m <sup>2</sup> peak solar insolation and other wise clear sky during the day, will be delivered to IITK grid. The units generated may increase & decrease at higher & lower insolation linearly.	
	5	The quoted price is the final price inclusive of all subsidies/benefits/ discounts etc. against which Purchase Order could be issued?	
	6	Agree to the payment term, 50% on delivery of material and 50% on successful installation, commissioning & Inspection Report.	
	7	Warranty of Silicon modules of 90% performance at 10 years and 80% at 20 years, 5 years for inverters, 10 years for structure.	
	8	Earnest Money Deposit (EMD) valid for six months of Rs.5 lacs for Option 1 and Rs.2 lacs for Option 2 in the form of FDR in the name of Director, IIT Kanpur is attached?	
	9	Confirm that Bank Guarantee valid for 1 year of 5% of the order value will be deposited within 5 days of the Purchase Order confirmation.	
	10	Confirm that 3 Preventive Maintenance Service visits per year for first five will be provided?	
	11	Self attested copy of the MNRE ratings provided?	
	12	Proof of at least 500 KWp solar photovoltaic project successfully completed, attached?	



	13	Confirm that validity of Quotation is for 60 days at least?	
	14	CST/UPTT/TIN No. on their Letter Head/Bill/Quotations printed?	
			Signature of the Authorised Signatory
			Stamp of the company

**MINIMAL TECHNICAL REQUIREMENTS / STANDARDS  
FOR SPV SYSTEMS / PLANTS TO BE DEPLOYED DURING F.Y. 2012-2013  
UNDER THE PROGRAMMES OF  
MINISTRY OF NEW AND RENEWABLE ENERGY**

**1. PV MODULES:**

1.1 The PV modules must conform to the latest edition of any of the following IEC / equivalent BIS Standards for PV module design qualification and type approval:

Crystalline Silicon Terrestrial PV Modules	IEC 61215 / IS14286
Thin Film Terrestrial PV Modules	IEC 61646 / Equivalent IS (Under Dev.)

Concentrator PV Modules & Assemblies	IEC 62108
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1.2 In addition, the modules must conform to IEC 61730 Part 1- requirements for construction & Part 2 - requirements for testing, for safety qualification or Equivalent IS (Under Dev.)

1.3 PV modules to be used in a highly corrosive atmosphere (coastal areas, etc.) must qualify Salt Mist Corrosion Testing as per IEC 61701 / IS 61701.

**1.4 IDENTIFICATION AND TRACEABILITY**

Each PV module must use a RF identification tag (RFID), which must contain the following information:

- (i) Name of the manufacturer of PV Module
- (ii) Name of the Manufacturer of Solar cells
- (iii) Month and year of the manufacture (separately for solar cells and module)
- (iv) Country of origin (separately for solar cells and module)
- (v) I-V curve for the module
- (vi) Peak Wattage,  $I_m$ ,  $V_m$  and FF for the module
- (vii) Unique Serial No and Model No of the module
- (viii) Date and year of obtaining IEC PV module qualification certificate
- (ix) Name of the test lab issuing IEC certificate
- (x) Other relevant information on traceability of solar cells and module as per ISO 9000 series.

Until March 2013, the RFID can be inside or outside the module laminate, but must be able to withstand harsh environmental conditions. **However from 1<sup>st</sup> April 2013 onwards; RFID shall be mandatorily placed inside the module laminate**

## 1.5 **VALIDITY :**

*The validity of the existing Certificates/Reports in the old format/procedure shall be valid till March 2013 only. Manufactures are advised to get their samples tested as per the new format/procedure before 31<sup>st</sup> March 2013, whose validity shall be for five years.*

## 1.6 **AUTHORIZED TESTING LABORATORIES/ CENTERS**

PV modules must qualify (enclose test reports/ certificate from IEC/NABL accredited laboratory) as per relevant IEC standard. Additionally the performance of PV modules at STC conditions must be tested and approved by one of the IEC / NABL Accredited Testing Laboratories including Solar Energy Centre. For small capacity PV modules upto 50Wp capacity STC performance as above will be sufficient. However, qualification certificate from IEC/NABL accredited laboratory as per relevant standard for any of the higher wattage regular module should be accompanied with the STC report/ certificate.

### 1.6.1 **Details of Test Labs are given in Annexure I.**

*(Any other Test Lab that has set – up for testing and wants to get included may contact Director,MNRE)*

### 1.6.2 **While applying for Testing , the Manufacturer has to give the following details:**

- *A copy of registration of the company particularly for the relevant product/ component/ PV system to be tested*
- *An adequate proof from the manufacturer, actually showing that they are manufacturing product by way production, testing and other facilities*
- *Certification as per JNNSM standards for other boughtout intems used in the system*

*Without above proof test centers are advised not to accept the samples.*

## 1.7 **WARRANTY**

PV modules used in solar power plants/ systems must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years.

## **2. BALANCE OF SYSTEM (BOS) ITEMS/ COMPONENTS:**

- 2.1 The BOS items / components of the SPV power plants/ systems deployed under the Mission must conform to the latest edition of IEC/ E equivalent BIS Standards/ MNRE specifications / as specified

below:

BOS Item / System	Applicable BIS /Equivalent IEC Standard Or MNRE Specifications	
	Standard Description	Standard Number
Solar PV Lighting Systems:	Solar PV Home Lighting System Solar PV street Lighting System Solar PV Lantern	As per MNRE latest Specifications dated 09.09.2011
Solar PV Systems  ( more than 100 Wp and up to 20 KWp Capacity only) :  Charge Controller/MPPT units  Power Conditioners/ Inverters**including MPPT and Protections	Environmental Testing  Efficiency Measurements  Environmental Testing	IEC 60068-2 (1,2,14,30) / Equivalent BIS Std.  IEC 61683 / IS 61683  IEC 60068-2 (1, 2, 14, 30) / Equivalent BIS Std.
Storage Batteries	General Requirements & Methods of Testing Tubular Lead Acid / VRLA / GEL  Capacity Test  Charge/Discharge Efficiency  Self-Discharge	As per relevant BIS Std.
Cables	General Test and Measuring Method PVC insulated cables for working voltage up to and including 1100 V and UV resistant for outdoor installation	IEC 60227 / IS 694  IEC 60502 / IS 1554 (Pt. I & II)

Switches/Circuit Breakers /Connectors	General Requirements Connectors –safety  A.C. /D.C.	IEC 60947 part I,II, III / IS 60947 Part I,II,III  <b>EN 50521</b>
Junction Boxes /Enclosures for Inverters/Charge Controllers/Luminaries	General Requirements	IP 54(for outdoor)/ IP 21(for indoor) as per IEC 529

\*\*In case if the Charge controller is in-built in the inverter, no separate IEC 62093 test is required and must additionally conform to the relevant national/international Electrical Safety Standards wherever applicable

## 2.2 AUTHORIZED TESTING LABORATORIES/ CENTERS

Test certificates / reports for the BoS items/ components can be from any of the NABL/ IEC Accredited Testing Laboratories or MNRE approved test centers. The list of MNRE approved test centers will be reviewed and updated from time to time.

## 2.3 WARRANTY

The mechanical structures, electrical works including power conditioners/inverters/charge controllers/ maximum power point tracker units/distribution boards/digital meters/ switchgear/ storage batteries, etc. and overall workmanship of the SPV power plants/ systems must be warranted against any manufacturing/ design/ installation defects for a minimum period of 5 years.

### Accredited Test centers for MNRE Off-Grid Programme

Lab/ Organizat ion	PV Module	Lighting Systems		Battery	Inverter >100 W		Charge Controller	
		as per MNRE Specificatio ns	Environment al		Efficiency	Environmental	protections	Environmental
SEC	Yes (IEC61215up to100W <sub>p</sub> ) NABL Accredited	Yes MNRE Accredited	Yes (Including IP) MNRE Accredited	Yes MNRE Accredited	Yes (upto 10KVA) MNRE Accredited	Yes (Including IP) MNRE Accredited	Yes MNRE Accredited	Yes (Including IP) MNRE Accredited
ERTL (east)	STC Test Facility MNRE Accredited	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	Yes Up to 1000AH	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited
ETDC (B)	Yes (IEC61215)u nder ICEEE- CB, IEC 61701 (upto100W <sub>p</sub> ) NABL Accredited	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	Yes Up to 100 AH	Yes (up to 3KVA)  NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited
CPRI (B)	No	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	Yes Up to 500 AH	Yes (up to 10KVA)  NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited
ERTL (N)	No	Only Electronics & luminaire NABL	Yes NABL Accredited	No	Yes (up to 5KVA)	Yes NABL Accredited	Yes (up to 5KW)	Yes NABL Accredited

		Accredited			NABL Accredited		NABL Accredited	
UL (B)	<b>Yes</b> (IEC61215 IEC 61730 Pt.II and IEC 61701) upto400W <sub>P</sub> NABL Accredited	<b>Yes</b> ( <b>except battery</b> ) NABL Accredited	<b>Yes</b> NABL Accredited	No	<b>Yes</b> (up to 6KVA)  NABL Accredited	<b>Yes</b> NABL Accredited	<b>Yes</b> (up to 6KW)  NABL Accredited	<b>Yes</b> NABL Accredited
TUV Rhineland	<b>Yes</b> (IEC61215 & 61730 Pt-II) upto400W <sub>P</sub> NABL Accredited	<b>NO</b>	<b>Yes</b> NABL Accredited	No	<b>Yes</b> (up to 10KVA)  NABL Accredited	<b>Yes</b> NABL Accredited	<b>Yes</b> (up to 10KW) NABL Accredited	<b>Yes</b> NABL Accredited
Inter Tek	No	Only Electronics & luminaire NABL Accredited	<b>Yes</b> NABL Accredited	No	<b>Yes</b> (up to 5KVA)  NABL Accredited	<b>Yes</b> NABL Accredited	<b>Yes</b> (up to 5KW)  NABL Accredited	<b>Yes</b> NABL Accredited

\*Beyond 10KVA self certification by the manufactures is acceptable.