



SARDAR VALLABHBHAI PATEL NATIONAL POLICE ACADEMY  
(Government of India : Ministry of Home Affairs)  
Hyderabad - 500 052

**OPEN TENDER NO : 11011/1/2019-20/HS.BLDGS**

**SETTING UP OF GRID CONNECTED ROOFTOP SOLAR POWER PLANT  
UNDER RESCO MODEL AT SITE-B OF SVP NPA HYDERABAD**

Date of Tender Enquiry : 18.10.2019

Closing date & time of submitting bids : 08.11.2019 at 1800 hrs



Website: <http://www.eprocure.gov.in>

SARDAR VALLABHBHAI PATEL NATIONAL POLICE ACADEMY  
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**OPEN TENDER**  
**(e-Tender)**

1. SVP National Police Academy, Shivrampally, Hyderabad, invites e-bids under Single Reverse Bidding System from Expert Agencies recognized / empanelled by MNRE for Setting up of Grid Connected ROOFTOP Solar PV Power Plan of 1 MW in Site-B of the Academy under RESCO Model with a financial ceiling of Rs.5.59 per unit flat tariff rate.
2. Salient features of the tender enquiry are as follows:-

a)	Tender No.	11011/1/2019-20/HS.Bldgs
b)	Description of stores	Setting up of Grid Connected ROOF TOP Solar PV Power Plant of 1 MW in Site-B of the Academy under RESCO Model with a financial ceiling of Rs.5.59 per unit flat tariff rate. (Detailed specification is attached as Annexure-'A')
c)	Type of Tender	Open Tender
d)	Bid System	Single Bid System (Reverse Bidding) (Techno- financial Bid)
e)	Earnest Money Deposit	Demand draft for Rs 60,000/- (Rupees Sixty Thousand) only drawn from any of the Commercial Banks in favour of the 'The Director, S.V.P National Police Academy, Hyderabad.
f)	Delivery schedule/ completion period	Work should be completed within 06 months from the date of receipt of work order
g)	Terms of Delivery	Free on Rail/ Road (F.O.R) Destination, SVP NPA Hyderabad.
(h)	Bid validity	Bid should be valid for 180 days from the date of opening of bid.
(i)	Address of correspondence	The Administrative Officer (Admn) SVP National Police Academy, Shivrampally, Hyderabad, Telangana - 500052

3. Important dates related to this tender are furnished below for information: -

S.No.	Particulars	Date	Time
1.	Date of online publication of tender	18.10.2019	1000
2.	Starting date for downloading Tender document	18.10.2019	1000
3.	Bid submission starting date	18.10.2019	1100
4.	Bid submission closing date	08.11.2109	1800
5.	Closing date & time for submission of original copies of EMD	08.11.2019	1800

4. "Expert agencies recognized / empanelled by MNRE" dealing with above works can download the tender document from CPP Portal ([www.eprocure.gov.in](http://www.eprocure.gov.in)) and submit bid only through the same website. Bid submitted other than CPP Portal will not be accepted. The Eligible bidders should have valid digital signature certificate (DSC) issued from any agency authorised by Controller of Certifying Authority (CCA), Govt. of India.

5. The bids are invited online under single cover system (Techno-price bid/ bill of quantity (BOQ) from eligible bidders.

6. Bidders can access and download the tender documents from CPP Portal, fill them with all relevant information and submit the completed tender document online on the website: <http://www.eprocure.gov.in>. The downloading of tender documents shall be carried out strictly as provided on the website. No editing, addition, deletion of matter shall be permitted. If such action is observed at any stage, such tenders are liable for outright rejection.

7. Tender shall be submitted online only at CPPP website. Bidders are advised to refer the Bidders manual kit for e-submission of the bids online through the Central Public procurement portal available at the website: <http://www.eprocure.gov.in>. Aspiring Bidders/ Suppliers who have not enrolled/ registered in e-procurement should enrol/register before participating through the website <http://www.eprocure.gov.in>. The portal enrolment is free of cost.

8. All the documents as per tender requirement should be uploaded online and further, no documents will be accepted offline. However, Demand Draft (EMD - Earnest money deposit) hard copy should be sent to SVP National Police Academy before the due date of opening. Bidders who are not submitting any of the required documents online will summarily be rejected.

9. Expert agencies recognized / empanelled by MNRE are eligible for undertaking design, supply, installation, commissioning and operation and maintenance of Grid Connected ROOPTOP Solar PV Power Plants under RESCO model of MNRE.

10. Bidders should have atleast two years of experience in setting up the grid connected rooftop solar power plants.

11. The details of the Tender document and EMD should be filled and uploaded online. Earnest Money Deposit (EMD) for Rs 60,000/- (Rupees Sixty Thousand only) (Refundable ) should be deposited in form of Crossed Demand draft Drawn on any nationalized bank in favour of Director, SVP National Police Academy, payable at SBH, Shivarampally, Hyderabad. Bids without EMD will not be considered. Tender Reference Number or details should be mentioned on the backside of the original crossed Demand Draft and the same should be sent to SVP National Policy Academy, Hyderabad before due date of opening of the tender.

12. The tenderer shall submit a net worth certificate from the Chartered Accountant to the extent of Rs.6.0 Cr. (equal to estimated cost of the system).

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13. The turnover of the tenderer should be to the extent of Rs.10.0 Cr. in a financial year for last three years and they should submit the relevant documents in support of the turnover.

14. The tenderer should have the experience of installation of a cumulative capacity of 5MW Grid Connected Solar PV Power Plants under Net Metering scheme / RESCO model over the last three years across the country

15. Bidder should have experience of execution of rooftop solar PV power plants as per technical specifications and standards stipulated by MNRE in similar Government agencies.

16. The tenderer should extend the user with minimum generation guarantee during the RESCO period.

17. The products that will be used in setting up of On-Grid solar PV power plant, must conform to technical requirements / standards and specifications stipulated by MNRE under Net Metering scheme/RESCO model. An undertaking from manufacturer of major components has to be submitted along with the bid. (Pl. attach copies of recent test certificates from reputed certifying agencies like TUV, Authorized Test Centres of MNRE, GOI as proof thereof).

18. The RESCO firm, i.e. L1 Bidder should give a guarantee for generation of load requirement of the institution on a monthly average. In case, the generation falls in a month the RESCO firm shall have to pay the difference of actual bill raised by the DISCOM.



## 19. TERMS AND CONDITIONS

Whereas the generator, is engaged in the business of installation, setting up the solar power plants, supply the solar power through such installation, under take the operation and maintenance of the plants installed;

The generator and purchaser enter into agreement with the terms and conditions as recorded in this instrument, here under:

### 1 Installation:

- 1.1 The generator will install Roof Top Solar PV power plant (herein after referred as the power plant) in the premises of the purchaser i.e in the premises known as SVP NPA campus, more fully described in Annexure A, at the locations identified( in the roof tops of various buildings only) by both the parties with in a period of six (6) months from the date of this agreement and the installed unit shall be as per the specifications prescribed by MNRE.
- 1.2 The generator shall be permitted to undertake all the works in the premises of the purchaser for the purpose of installing the power plant there in.
- 1.3 The generator shall lay separate and dedicated cables for transmission of the Solar Power generated from the power plant installed to the delivery point of the installation.
- 1.4 Generator shall also be responsible for installation of any additional equipment for proper functioning or upgrading or improvement of the installed system, from time to time during the period of contract.
- 1.5 The generator shall be responsible for keeping the place and surroundings of the installation clean, and also clear debris and wastage on daily basis during the period of construction as well as operation of the Power Plant.
- 1.6 The generator shall inform the number of workers and the nature of the work that is being carried on from time to time from the date of commencement of installation till its completion and the entry and exit of the workers engaged in installing the Power Plant is regulated as per the policy and practices generally adopted by the purchaser for the entry and exit of the visitors of the premises of the purchaser.
- 1.7 The purchaser shall allow the employees and workers of the generator to have access to all the places to which access is necessary for installation of the Power Plant.
- 1.8 The generator shall be responsible for complying with labour laws in engagement of labourers for the work and the purchaser shall not be responsible for any of the lapses on the part of generator in this regard.

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Purchaser shall have no responsibility what so ever towards the workers and employees engaged by the generator.

- 1.9 Generator agrees to indemnify the purchaser for any loss or damage caused to the purchaser while installing or operating the Power Plant.
- 1.10 The purchaser shall cooperate with the generator in obtaining required approvals from the government/any other agencies though it is the responsibility of the generator to obtain all the necessary statutory approvals at no cost to the purchaser.
- 1.11 CEIG approval for installation of Bidirectional Meter/Net Meter shall be under the scope of purchaser. However, generator shall assist to obtain the approval.
- 1.12 Provision of sufficient electrical lighting and water facility at the solar plant location during the installation and commissioning and the period of agreement for providing regular maintenance, shall be made by the purchaser.
- 1.13 The generator shall also ensure that no damage is caused to the buildings while installing /operating the various rooftop solar plants, Damages caused , if any, would be rectified by the generator immediately.
- 1.14 All installations including wire, cables etc, be done aesthetically and also properly concealed

## 2 Testing:

- 2.1 On completion of the installation, the generator shall inform the purchaser intimating the same to the arrange for inspection of the solar power plant by the representatives / nominees/ officers of the purchaser and the officers of the generator shall also be present during the inspection of the solar power plant.
- 2.2 During such inspection, the representatives of the purchaser and the generator shall agree on the quality and quantity, efficacy of the power plant and record the same.
- 2.3 The purchaser has the right to demand for feasible modifications in the structure, if any required and the generator shall comply with the same.
- 2.4 Generator shall comply with all the norms prescribed by TSSPDCL with regard to installation and operation of the plant as well as production and transmission of solar power through the power plant.

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### 3 Maintenance and Operation:

- 3.1 Installation of Roof top Solar Power Plant and commencement of supply of power generated by it shall be completed within six (6) months from the date of execution of this agreement. In the event of any delay in completion of the installation or supply of the solar power the generator is liable to pay liquidated damages to the purchaser at the rate equivalent to the number of units of power promised to be generated by the generator multiplied by the difference between the tariff rates being paid to TSSPDCL and the rate agreed upon with the generator for every month of such delay and if delay is for less than one month, the liquidated damages payable to the purchaser may be apportioned.
- 3.2 Generator shall supply the power generated by the installed power plant for a period of 25 (Twenty five) years from the date of commissioning the power plant, i.e from the date on which the power supply is commenced and the date of such commencement shall be duly recorded by both the parties.
- 3.3 The generator shall supply the power/energy generated from the solar power plant to the purchaser and the purchaser shall pay the generator for the energy delivered at the inter connection point at the quoted and agreed rate of tariff for a period of twenty five years from the date of commencement of operation of the solar power plant and there shall not be any additional charger or taxes or levies or duties etc, other than the agreed rate of tariff. All the existing taxes if any payable on generation or supply of the power or those that may be revised or payable in future, to the government or local bodies or any other authorities shall be paid by the generator and purchaser shall not be liable to pay any other amount other than the agreed rate of tariff for the power supplied to it, throughout the agreement period.
- 3.4 Separate bidirectional meters shall be fixed and arranged for measuring the electric power supplied by DISCOM, or any such authority which has scales of measuring import and export of energy and the power generated and supplied through solar power unit by the generator. The meter shall be a two way meter, for recording both import and export of energy. The energy generated by the power plant shall be metered separately by providing 3-phase- HT CT/VT operated Energy meter. The Quantum of the power generated from power plant shall be recorded jointly by representative of the generator and representative/ officer of the purchaser. The meters provided by the generator shall conform to the standards prescribed/ guidelines provided by the TSSPDCL.  
In case of any surplus power being exported to the grid, the DISCOM would pay the exporter of power, at the tariff rate fixed by the regulatory commission from time to time. This benefit shall accrue to the Academy(Purchaser).
- 3.5 The generator shall employ as many number of qualified employees technical as well as non technical as required for maintenance of the solar power plant installed in the campus of purchaser and number of such employees of the



generator shall not be less than 3 technically qualified and 3 non technical persons and the persons so employed by the generator shall be paid as per existing laws relating to wages and salaries. The purchaser does not own any kind of responsibility/ obligation towards such employees so employed and they are exclusively considered as employees of the generator.

- 3.6 The generator shall be responsible for observation of all the labour laws and the purchaser has no obligation whatsoever, in this regard. The generator alone is liable for violation of any laws in operation and maintenance of the plant.
- 3.7 The power supplied to the purchaser by the generator through power plant is subject to repairs and preventive maintenance of the plant. In case of malfunctioning/break down of the power plant, the generator shall inform the purchaser immediately and the generator shall also take all the steps/remedial measures immediately. The generator shall ensure that the repair of the solar power plant shall be completed within 7 days in case no replacement of any spare parts is required and within 15 days in case replacement of any spare parts is required and deviation of this condition shall be considered as non compliance of contractual obligations. During the period in which the power could not be generated or supplied to the purchaser, and the purchaser is forced to obtain additional electricity from the TSSPDCL to meet its requirements, the generator shall bear and pay the difference of the amount paid for the power so supplied by the TSSPDCL and the tariff agreed to be paid to the generator for such quantity. Additional electricity consumed from TSSPDCL shall be determined based on the average daily consumption of power from TSSPDCL per day in the preceding 3 months. After giving the above mentioned 15 days time period to generator for repair of solar power plant, if the generator fails to repair the solar power plant then the purchaser, will issue the Purchaser Preliminary Default Notice i.e. on the 16<sup>th</sup> Day.
- 3.8 Upon the occurrence and continuation of Default on the part of generator and the failure by the generator to cure such default within the applicable cure period specified as stated above the purchaser shall be at liberty to avail the services of any other firm/successful bidder.
- 3.9 Following the issue of Purchaser Preliminary Default Notice, it shall be responsibility of the Parties to discuss as to what steps shall be taken with a view to mitigate the consequences of the relevant generators Default having regard to all the circumstances: if the generator Default is not cured within a period of sixty (60) days of the issue of Purchaser Preliminary Default Notice or any other such period mutually agreed upon by the Parties, the Purchaser shall have the right to terminate this Agreement by issuing a Purchaser Termination Notice.
- 3.10 Upon the delivery of the Purchaser Termination Notice, this agreement shall stand terminated. The generator shall have the liability to make payment within sixty (60) days from the date of Purchaser Termination Notice towards compensation to Purchaser equivalent to the difference between the Tariff and the grid rate notified by the relevant Government Authority for that point in time multiplied by the estimated Solar Power generated for a period of two years following the termination, considered on normative capacity utilization factor.



- 3.11 If the generator fails to remove the System from the Premises within one month from the date of termination, the Purchaser shall be entitled to dispose of the System in any manner it deems fit.
- 3.12 The Purchaser may exercise any other remedy it may have at law or equity or under the Agreement.
- 3.13 The maintenance of the solar power plant being the obligation of the generator, any defect which does not cause disruption of supply which is, brought to the notice of the generator by the purchaser shall be immediately rectified.
- 3.14 The purchaser shall provide a Computer with 32 Inches LCD monitor for monitoring the performance of all systems installed in the Academy.
- 3.15 Facility for Safe Storage of materials during the installation and operation of power plant and execution of project shall be provided by the purchaser.

#### 4 Payment:

- 4.1 The billing cycle will be on a monthly basis and the bill shall be prepared and drawn every month, as per the readings of the meter fixed for recording of power supplied through the installed solar power plant to the purchaser, after verification of the readings of the meter by the officer/representative of the purchaser. The bill so drawn shall be presented to the Administrative Officer of the purchaser, who shall process it according to the rules and regulation for payment of bills presented to the government department and the payment for the bills for the units consumed shall be made within 3 weeks of the completion of monthly billing cycle at the agreed rate of tariff by way of RTGS payable on the bank account of the generator and the bank charges if any shall be borne by the purchaser. Generator shall furnish all the required details of the bank account to which the amount is to be paid in writing to the purchaser.
- 4.2 It shall be the obligation of the purchaser to intimate the representative of the generator any defect of the meter installed or when it is burnt, ceases functioning, immediately after noticing the same and on such intimation, the generator shall take all the steps to get the meter rectified or replaced if necessary within 48 hours. For the period between the date of such intimation and rectification of the meter, the purchaser shall pay the charges, based on the **average consumption** of the power on any per day in the preceding month or three months, by multiplying the same with the number of days during which the meter became inoperative/defective. In the event of non rectification of the meter by the generator, within 48 hours after intimation regarding the defective/non operation of the meter, the purchaser shall pay the bill for the days beyond that period based on the minimum consumption of power on any day in the preceding 3 months, by multiplying the same with the number of days during which the meter became inoperative/defective, after the above said 48 hours. The notice of the defect in the meter and completion of the repairs shall be in writing or by email.

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4.3 The office of the purchaser shall maintain all the accounts and statements relating to the units of power supplied and consumed and payments made to the generator. Generator also shall maintain all the records and accounts. Annual account reconciliation shall be conducted between the generator and purchaser, in the month of December every year. Both the parties are entitled to inspect the accounts maintained by the other party, on the prior notice and during working hours.

## 5 Revocation or amendment to the terms of contract:

5.1 Both parties agree that the terms of the contract shall not be amended in ordinary circumstances and if the amendment is required it shall be amended only by a written instrument.

5.2 Both parties also agree that the rate of tariff agreed under this contract shall not be increased by the generator under any circumstances during the 25 (Twenty five) years for which generator agreed to supply the power.

5.3 Both parties also agreed that this contract be considered as the written permission to generator for setting up the power plant for supply of power for a period of 25 years to the purchaser and this permission shall not be annulled/ revoked. However, the Director SVP NPA, reserves the right to annulling the agreement in case of breach of any of the contractual obligations by the generator and violation of any of the terms and conditions of this power purchase agreement.

5.4 Any variation, waiver or modification of any of the terms and conditions of this agreement shall be valid only when the same is in writing and signed by or on behalf of both the parties. The agreement shall remain in force till completion of 25 years from the date of commencing of the power supply and the agreements may continue for future period on mutually agreeable terms and conditions.

5.5 The parties hereto agree and confirm that in the event of any party being prevented from discharging its obligations under this agreement due to any reasons which are beyond its control, viz. Force majeure conditions like but not limited to acts of God, war, rebellion, civil mutiny, riot, strike, lockout, fire, explosion, lightening and cyclone, floods, earthquake, droughts, epidemics etc. resulting in failure to maintain the expected energy delivery to the consumer then the party who is affected by such force majeure shall be exempted from performing and discharging its obligation till such time the force majeure condition continues to exist provided however that the party who is so affected by the force majeure condition give notice in writing of such happening of the force majeure condition to the other party. The generator shall not claim any compensation for any damage caused to the solar power plant, for whatever reason and the generator shall not be entitled to any other claim except the tariff for the power supplied by it. The conditions stipulated in 3.7 and 3.8 above apply in case of non supply of power to the purchaser by the generator, for any such reason.

- 5.6 The invalidity of enforceability for any reason of any part of the agreement shall not prejudice or affect the validity of enforceability of the remainder of this agreement.
- 5.7 Notwithstanding anything in this contract, Director, SVP NPA (the purchaser) can terminate the contract, whether or not breach of contract, occurs, after issuing a notice of ninety clear days to the generator and on such termination the generator shall be entitled to the price of power supplied to the purchaser and shall not claim any damages or compensation or any monetary relief under any name.
- 5.8 The generator shall not assign any work in execution of the contract to any third party except with the express consent of the purchaser.
- 5.9 The generator shall (a) promptly notify purchaser if it becomes aware of any damage to or loss of the use of the system or that could reasonably be expected to adversely affect the system, (b) immediately notify purchaser once it becomes aware of any event or circumstance that poses an imminent risk to human health, the environment, the system or the premises.
- 5.10 System condition: The generator shall take all actions reasonably necessary to ensure that the system is capable of providing Solar Power at a commercially reasonable continuous rate: Subject to there being no purchaser default, the power producer shall provide 24X7 offsite/ offsite monitoring and maintenance of the System throughout the period of this agreement at no additional cost.
- 5.11 Notwithstanding any liability or obligation that may arise out of this Agreement, any loss, damage, liability, payment, obligation or expense which is insured or not or for which the purchaser can claim compensation under any insurance policy, shall not be charged to or payable by the purchaser.
- 5.12 Neither party shall use any name, trade name, service mark or trademark of the other party in any promotional or advertising material without the prior written consent of such other party. The parties shall coordinate and cooperate with each other when making public announcements related to the execution and existence of this Agreement, and each party shall have the right to promptly review, comment upon and approve any publicity materials, press release and other public statements by the other party that refer to, or that describe any aspect of this agreement; provided that no such publicity releases or other public statements (except for fillings or other statements or releases as may be required by applicable law) shall be made by either party without the prior written consent of the other party. Without limiting the generality of the foregoing and whether or not the consent of the other party is required or obtained, all public statements must accurately reflect the rights and obligations of the parties under this agreement.
- 5.13 The generator shall maintain at its own costs, throughout the tenure of this agreement and any extensions thereof all mandatory insurance coverage for adequate amount including but not restricted to comprehensive general



liability insurance including theft and vandalism, covering the system and accidental losses, bodily harm, injury, death of all individual employed/ assigned by the generator to perform the services required under this agreement.

## 6 Correspondence:

6.1 During the subsistence of this agreement the generator undertakes to respond to all questions, concerns and complaints of the purchaser regarding the system in a prompt and efficient manner. The generator nominates the following individual as its representative and he can be accessed through mobile phone or email.

1. Name of the person/office:
2. Phone number:
3. Email Id:
4. Address:

The purchaser can have access to him any of the above modes of correspondence.

6.2 The purchaser designates the following persons as the person to receive communication from the generator.

1. Name of the person/ office:
2. Phone number:
3. Email ID:
4. Address:

6.3 The details of the persons/offices mentioned above can be changed whenever need arises and such change becomes effective from the date of communication received by the other party.

6.4 Irrespective of the above arrangement notices shall be sent to the purchaser though registered post or by courier or transmitted by facsimile to the following address.

1. Director, SVP NPA, Shivrampally, Hyderabad, Telangana.
2. Fax: (Addressed to the Director, SVP NPA) - (Fax no. 24015179).



## **Indemnity:**

6.5 The generator agrees that it shall indemnify and hold harmless purchaser and its members, officers, employees, students, casual labourers, persons permitted' to run any business or service, such as canteens, stores, photocopy units, banks post office, courier service, hospital and to any lawful visitors (collectively, the " purchaser Indemnified Parties") from and against any and all Losses incurred by the Purchaser Indemnified Parties to the extent arising from or out of the following any claim for or arising out a of any injury to or death of any person or Loss of damage to Property of any person to the extent arising out of the negligence of generator or its employees or their wilful misconduct. The generator shall not, however, be required to reimburse or indemnify any Purchaser Indemnified Party for any Loss to the extent such Loss is due to the negligence or wilful misconduct of any Purchaser indemnified Party.

## **7 Successors and Assignees**

7.1 This Agreement and the rights and obligations under the Agreement shall be binding upon and shall ensure to the benefit of the generator and Purchaser and their respective successors and permitted assignees.

## **8 Counterparts**

8.1 This Agreement is on a principal to principal basis between the parties hereto. Nothing contained in this Agreement shall be construed or deemed to create any association, partnership or joint venture or employer employee relationship or principal-agent relationship in any manner whatsoever between the Parties.

## **9 Non- Exclusive Agreement**

9.1 This Agreement is on non-exclusive basis. The purchaser is free to engage any other service provider's or may entrust services similar to those provided by the power producer under this Agreement to any other person/s, provided the Generator rights under this agreement are not affected in any manner.

## **10 Entire Agreement**

10.1 This Agreement constitutes the entire agreement between the Parties hereto with respect to the subject matter of this Agreement and supersedes all prior agreements and undertakings, written or oral, with respect to the subject matter hereof except as otherwise expressly provided herein. The Schedules annexed to this Agreement also form a part of this Agreement.

## **11 Jurisdiction for Adjudication**

11.1 Any dispute between the parties shall be subject to adjudication in the courts at Hyderabad and jurisdiction of all other courts, forums, tribunals is expressly excluded.

12 Scope of the work mentioned here under is in addition to the above contractual terms.

### **Broad Scope of work**

1. Design & Engineering of the solar modules & arrays with associated system comprising of DC system, inverters, transformation to the required voltage for necessary connection to the nearest grid at suitable voltage level, switchgears along with adequate protection and monitoring facilities up to the grid connection point including armoured Aluminium Cable from Transformer to the point of Injection of Power.

2. Optimum design and engineering of suitable mounting structure with anti-corrosion feature so as to have minimum maintenance requirements during operational years of the plant.

3. Survey & route finalisation of the transmission line for connection to the nearby grid substation.

4. Supply and erection of all the components including structures with necessary packaging & forwarding, transportation, loading, unloading and site-storage required for successful implementation of the project up to the grid-connection point.

5. The bidder shall provide necessary Switch Gear and Safety equipments which include CT/PT Energy Meter, VCBs Surge Arrestors, Isolators, Fuses, Structure Frames etc. at AC Side of Power Plant and also at the point of injection at HT Side. However, purchaser shall provide suitable room to facilitate Switch Gear Equipment.

6. The generator shall undertake and maintain necessary Power Evacuation lines up to 33/11 KVA sub-station in the close vicinity of the project location.

**7. Generator shall provide protective perimeter fencing covering the total Solar PV Power Plant.**

8. The generator shall under take the operation & maintenance with necessary labour, spares, consumables etc., during the operation period of 25 years from the date of commissioning of the plant. The generator shall procure and use necessary spares, consumable and maintenance tools for trouble free operation including spare parts during the operation period.

9. The generator shall Supply, erect and commission step-up solar PV power plant, associated electrical works, fencing around the system and installation of metering equipment with required protection as per the approved standards of local DISCOM/TSSPDCL /MNRE.

10. All necessary approvals/ clearances/ statutory approvals from all the concerned like local DISCOM/MNRE shall be obtained by the generator at their cost. However,

SVP NPA will extend necessary assistance in obtaining all clearances and approvals to enable the generator to perform the work.

11. CEIG approval for installation of Bidirectional Meter/Net Meter shall be under the scope of purchaser. However, generator shall assist SVPNPA in obtaining the approval.

12. Generator has to depute qualified and trained engineers and supporting personnel for successful operation of Solar Power Plant for maximizing the guaranteed energy generation for the entire operation and maintenance during the agreement period including proper cleaning of the PV Modules for the entire power plant to be done periodically to ensure generation is not affected.

13. The generator shall lay separate and dedicated cables for transmission of the Solar Power generated from the power plant installed to the delivery point of the installation. The generator would not be allowed to lay cables in the front elevation of the building as it spoils aesthetics of building.

14 While installing the solar panels on the rooftop, the generator should ensure proper safety of the roof and should ensure that no building gets damaged.

- a) Site Visit :- Interested bidders may visit the site (all roof tops of various buildings only ) before submitting the quotation after taking prior permission from the Assistant Commandant (Works) of SVP NPA Hyderabad.
- b) Terms of payment - No advance payment or payment against pro-forma invoice will be made. Payment will be made on monthly basis as per agreed terms.
- c) The work should be completed within 180 days from the date of receipt of work order from the Academy
- d) The bid should be valid for 180 days from the date of opening of bid.
- e) The scope of work as defined above shall be strictly adhered to.
- f) In case of deviations, the same shall be explicitly indicated in a separate statement
- g) The tariff shall be indicated including all taxes and the rates shall remain firm and fixed and there shall not be subjected to any variation at any stage on the tariff agreed to during the entire agreement period.
- h) The period of completion of the work shall be indicated in the offer.
- i) SVP NPA shall not be responsible for postal delay or any other delay in respect of submission of the bid / delay in receipt of the bid and such bid will be summarily rejected.
- j) The work once entrusted, shall be completed in the time frame as stipulated in the work order.

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- k) In case of inordinate delay, the Academy reserves every right to cancel the work order, without any liability including forfeiting the EMD/Security deposit submitted, as the case may be.
- l) The bidder will be blacklisted by the Academy in case of above being invoked.
- m) Prices shall be quoted in Indian rupees only.
- n) Water and electricity charges arising during the period of execution shall be to the contractors account.
- o) **Operation & Maintenance:** O&M of the plant will be carried out by bidder during the agreement period.

13. **Performance security** :- The successful bidder shall have to deposit a performance security of Rs.1.50 lakhs in the form of account payee demand draft / bank guarantee from a nationalized / scheduled commercial bank in favour of the Director, SVP NPA Hyderabad payable at SBH Shivrampally, Hyderabad within 15 days of the placement of work order Performance Security submitted by the bidder will remain valid for a period of sixty days beyond the date of completion of all contractual obligations of the supplier including warranty obligations. No interest will be payable for "Performance Security."

14. Following scanned documents in pdf file format must be enclosed in cover duly sealed and stamped.

- |    |   |
|----|---|
| a) | Firm Registration Certificate as per the Companies Act of India |
|----|---|
- b) Banker details
  - c) Details of previous experience
  - d) Scanned copy of EMD Demand Draft drawn in favour of 'The Director, S.V.P. National Police Academy, Hyderabad' submitted in portal followed by original copy before closing of tender date at the address of the Administrative Officer (Admn.), SVP National Police Academy, Shivarampally, Hyderabad. Offers received without the prescribed EMD will be rejected summarily.
  - e) Manufacturer Authorisation Letters
  - f) Firms should be submitting only required documents and numbering of all the pages is necessary. Checklist of all the important documents should also be enclosed in the bid.
  - g) Financial bid (In excel file like BoQ): - The rates i.e. unit rate of each item and total amount including all taxes, labour charges, if any, are to be quoted explicitly both in words and figures. The Price Bid/ BOQ template must not be modified or replaced by the bidder; else the bid submitted is liable to be rejected for this tender.



15. Taxes and duties.

- (a) Vendor shall be entirely responsible for all taxes, duties, license fees etc. incurred until delivery of the contracted services to the Academy.
- (b) No bid will be considered unless and until all the pages / documents comprising the bid are properly numbered, signed and stamped by the person/s authorized to do so.

16. Right to cancel the order. The Director, SVP National Police Academy reserves the right to cancel the purchase order without any financial repercussion on either side and without seeking the consent of the supplier at any stage of purchase process. No further correspondence in this matter will be entertained.

Yours faithfully,



Administrative Officer (Admn.)  
SVP NPA Hyderabad

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Gram: 'POLACADEMY' e-mail:administrator@svpnpa.gov.in Tel: 91-040-24015151  
to 24015158 Fax: 91-040-24015179



## ANNEXURE - A

### TECHNICAL SPECIFICATION

#### 1. TECHNICAL SPECIFICATIONS FOR 1 MW ROOF TOP SOLAR PV POWER PLANT:

The general scope under this tender includes to design, manufacture, testing, inspection, packing and forwarding, transportation up to project site, loading & unloading, storage in safe custody, erection, carrying out preliminary tests at site, commissioning, performance testing, operation and maintenance of Grid Connected Solar PV Power Plant of 1MW in Site-B of SVPNPA under RESCO model.

#### DEFINITION

A Grid Tied Solar Photo Voltaic (SPV) power plant consists of SPV array, Module Mounting Structure, Inverter consisting of Maximum Power Point Tracker (MPPT) and Controls & Protections, interconnect cables, Junction boxes, Distribution boxes and switches. PV Array is mounted on a suitable structure. Grid tied SPV system should be designed with necessary features to supplement the grid power during day time. Components and parts used in the SPV power plants including the PV modules, metallic structures, cables, junction box, switches, Inverters etc., should conform to the BIS or IEC or international specifications, wherever such specifications are available and applicable as per MNRE guidelines.

Solar PV System shall consist of following equipment/components. Solar PV modules consisting of required number of Crystalline PV cells. Grid interactive Inverter with Remote Monitoring System Mounting structures, Junction Boxes, Earthing and lightning protections, IR/UV protected PVC Cables, pipes and accessories

The Schedule of requirements and technical requirements are given below:

- 1.1 All the items that shall be supplied for setting up 1MW Solar PV Power Plant must confirm to ISI/IE/IEC standards as per guidelines stipulated by MNRE, Gol.

## 1.2 SOLAR PHOTOVOLTAIC MODULES

1.2.1 The SPV Plant should comprise of solar **crystalline modules** from 250Wp up to **300Wp**. Modules should supply minimum 4-Busbar(4BB) and above with latest technology. The manufacturer should be facilitated with fully automated Manufacturing plant in the country with a guaranteed power output for a period of 25 years. Module capacity less than minimum 250watts should not be supplied.

The module type must be qualified as per IEC 61215 latest edition for crystalline silicon. SPV module conversion efficiency should be equal to or greater than 18% under STC. Modules must qualify to IEC 61730 Part I and II for safety qualification testing. Certificate for module qualification from IEC or equivalent to be submitted as part of the bid offer. Self undertaking from manufacturer / supplier that the modules being supplied are as per tender specifications should be submitted.

1.2.2 The PV module shall perform satisfactorily in humidity up to 100% with temperature between - 40 C to + 85 C. Since the modules would be used in a high voltage circuit, the high voltage insulation test shall be carried out on each module and a test certificate to that effect conforming to IEC 61701.

1.2.3 The predicted electrical degradation of power generated not exceeding 20% of the minimum rated power over the 25 year period and not more than 10% after ten years period of the full rated original output (As per MNRE Standards).

1.2.4 Other general requirement for the PV modules and subsystems shall be the following

a. The rated output power of any supplied module shall not be less than the stipulated output.

- b. Protective devices against surges at the PV module shall be provided. Low voltage drop bypass diodes shall be provided.
- c. The cells used for manufacture of modules shall be PID free and a certificate to this effect shall be provided.
- d. The Solar PV Modules should be provided with performance monitoring facilities to remotely monitor the performance of each and every module in the Array to ensure optimum output from the plant. The system shall provide monitoring of various parameters of performance online and benchmark with the desired level of performance and identify the module not meeting the desired level of performance.
- e. The peak-power point voltage and the peak-power point current of any supplied module and/or any module string (series connected modules) shall not vary by more than 2 (two) per cent from the respective arithmetic means for all modules and/or for all module strings, as the case may be.
- f. Except where specified, the front module surface shall consist of impact resistant, low-iron and high-transmission toughened glass.
- g. The module frame, if any, shall be made of a corrosion-resistant material which shall be electrolytically compatible with the structural material used for mounting the modules.
- h. The module shall be provided with a junction box with either provision of external screw terminal connection or sealed type and with arrangement for provision of by-pass diode. The box shall have hinged, weather proof lid with captive screws and cable gland entry points or may be of sealed type and IP65 rated.
- i. IV curves at STC and NOCT should be provided.

- j. Modules deployed must use a RF identification tag. The following information must be mentioned in the RFID used on each modules. This should be inside the laminate only.
- i. Name of the manufacturer of the PV module
  - ii. Name of the manufacturer of Solar Cells.
  - iii. Month & year of the manufacture (separate for solar cells and modules)
  - iv. Country of origin (separately for solar cells and module)
  - v. I-V curve for the module Wattage,  $I_m$ ,  $V_m$  and FF for the module
  - vi. Unique Serial No and Model No of the module
  - vii. Date and year of obtaining IEC PV module qualification certificate.
  - viii. Name of the test lab issuing IEC certificate.
  - ix. Other relevant information on traceability of solar cells and module as per ISO 9001 and ISO 14001
- k. Each Solar PV Modules should be tested during pre dispatch inspection at manufacturing facility of the PV module to ensure the output power as per the standards and specifications stipulated by MNRE.

### 1.3 ARRAY STRUCTURE

1.3.1 Wherever required, suitable number of PV panel structures shall be provided. Structures shall be of flat-plate design either I or L sections.

1.3.2 Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts. Galvanizing should meet ASTM A-123 hot dipped galvanizing or equivalent which provides at least spraying thickness of 70 microns on steel as per IS5905, if steel frame is used. Aluminium frame structures with adequate strength and in accordance with relevant latest BIS/ international standards can also be used.

1.3.3 Structures shall be supplied complete with all members to be compatible for allowing easy installation at the site.



- 1.3.4 The structures shall be designed to allow easy replacement of any module & can be either designed to transfer point loads on the roof top or UDL as per site conditions.
- 1.3.5 Provide the structures without disturbing the existing roof slab either by using existing columns or by providing separate RCC beam/steel girders on roof slab.
- 1.3.6 Each structure shall have a provision to adjust its angle of inclination to the horizontal as per the site conditions.
- 1.3.7 Each panel frame structure be so fabricated as to be fixed on the ground. The structure should be capable of withstanding a wind load of 150 km/hr after grouting & installation. The front end of the solar array must be one meter above the Ground. Grouting material for SPV structure shall be as per M15 (1:2:4) concrete specification.
- 1.3.8 The structures shall be designed for simple mechanical and electrical installation. There shall be no requirement of welding or complex machinery at the installation site. If prior civil work or support platform is absolutely essential to install the structures, the supplier shall clearly and unambiguously communicate such requirements along with their specifications in the bid. Detailed engineering drawings and instructions for such prior civil work shall be carried out prior to the supply of Goods.
- 1.3.9 The supplier shall specify installation details of the PV modules and the support structures with appropriate diagrams and drawings such details shall include, but not limited to, the following;
- a. Determination of true south at the site;
  - b. Array tilt angle to the horizontal, with permitted tolerance;
  - c. Details with drawings for fixing the modules;
  - d. Details with drawings of fixing the junction/terminal boxes;
  - e. Interconnection details inside the junction/terminal boxes;
  - f. Structure installation details and drawings;

- g. Electrical grounding (earthing);
- h. Inter-panel/Inter-row distances with allowed tolerances; and
- i. Safety precautions to be taken.

The array structure shall support SPV modules at a given orientation and absorb and transfer the mechanical loads to the columns properly. All nuts and bolts shall be of very good quality stainless steel.

1.3.10 The design of mounting structures with fixed tilt shall be provided. The array structure shall be so designed that it occupies minimum space without sacrificing the output from SPV panels due to shadowing, orientation or tilt at the same time.

#### 1.4 INVERTER (STRING)

1.4.1 Inverter, grid interactive in nature, shall consist of MPPT controller, associated control and protection devices etc. all integrated into inverter. It shall provide necessary protections for Grid Synchronization and Data Logging/Monitoring. The inverter should convert DC power produced by SPV modules in to AC power and must synchronize automatically its AC output to the exact AC Voltage and frequency of Grid. Self undertaking from manufacturer / supplier that the modules being supplied are as per above.

Control Type: Voltage source, microprocessor assisted, output regulation

Output voltage	: 3 phase, 415 V ac ( $\pm 5$ %)
Frequency	: 50 Hz ( +3 Hz, -3 Hz)
Continuous rating	: As required at site
DC link voltage range	: 580V to 800 V
Nominal Power	: As required at site
Standard conformation	: IEC 61683
Total Harmonic Distortion	: less than 3%
Operating temperature Range	: $-25^0$ to $60^0$ C

Housing cabinet	: Inverter to be housed in suitable switch cabinet, Within IP 20 degree of ingress protection
Inverter efficiency	: 98.2 % and above at full load,
Power Control	: MPPT

1.4.2 The DC energy produced has to be utilized to maximum and supplied to the bus for inverting to AC voltage to extract maximum energy from solar array and provides 3-ph, 415V AC/ (+15% to - 10%), 50+/-1.5 Hz with total harmonic voltage distortion less than 3% to synchronize with local grid . DC voltage ripple content shall be not more than 3%.

1.4.3 The inverter shall be of very high quality having efficiency not less than 98.2% and shall be capable of running in integrated mode.

1.4.4 Degree of protection of the indoor inverter shall be at least IP-31 and that of outdoor at least IP-65.

1.4.5 Built in with data logging to remotely monitor plant performance through external PC shall be provided (PC shall be provided along with SPV Plant).

1.4.6 The inverter shall be designed for continuous, reliable power supply as per specification.

1.4.7 The inverter should be designed to be completely compatible with the SPV array voltage and Grid supply voltage.

1.4.8 The dimension, weight, foundation details etc. of the inverter shall be clearly indicated in the detailed technical specification.

1.4.9 The system should be capable of providing all the data including that of meter and inverter to the central software on IEC-104 protocol. All the equipments /hardware /software for complying to the same will be in the bidder"s scope.



1.4.10 The inverter shall be capable of complete automatic operation, including wake-up, synchronization & shut down independently & automatically.

1.4.11 Both AC & DC lines shall have suitable fuses, Metal Oxide Arrestors/surge arrestors and contactors to allow safe start up and shut down of the system  
Fuses used in the DC circuit should be DC rated.

1.4.12 The Inverter shall operate in sleeping mode when there will no power connected.

1.4.13 Protections:

- Over voltage both at input & output.
- Over current both at input & output.
- Over/under grid frequency.
- Heat sink over temperature.
- Short circuit.
- Protection against lightening.
- Surge arrestors to protect against Surge voltage induced at output due to external source.
- Anti- Islanding Protection

1.4.14 It should have user friendly 4X40 LED/LCD display for programming and view on line parameters such as:

- Inverter per phase Voltage, current, kW, kVA and frequency,
- Grid Voltage and frequency,
- Inverter (Grid) on Line status,
- PV panel voltage,
- Solar charge current and ambient temperature,
- Individual power stage heat sink and cabinet temperature,
- Solar Radiation (with external pyranometer with in scope)
- Inverter Import export kWh summation
- Solar kWh summation
- Inverter on
- Grid on



- Inverter under voltage/over voltage
- Inverter over load
- Inverter over temperature.

1.4.15 The inverter shall have arrangement for adjusting DC input current and should trip against sustainable fault downstream and shall not start till the fault is rectified.

1.4.16 The 3 phase inverter shall be from internationally reputed firms, which will incorporate latest Technological advance to provide highly reliable and efficient energy conversion from DC to AC.

1.4.17 Inverter shall be capable to synchronize independently & automatically with DISCOM grid power line frequency to attain synchronization and export power generated by solar plant to grid.

1.4.18 The Inverter shall be capable of complete automatic operation, including wake-up, synchronization & shut down.

1.4.19 Typical failure analysis report of Inverters and recommended list of critical components shall be provided by the bidder while submitting their offer.

1.4.20 The Inverter shall be capable of operating in parallel with the grid utility service and shall be capable of interrupting line fault currents and line to ground fault currents.

1.4.21 The Inverter shall be able to withstand an unbalanced load conforming to IEC standard and relevant Indian electricity condition. The Inverter shall include appropriate self-protective and self-diagnostic features to protect itself and the PV array from damage in the event of Inverter component failure or from parameters - beyond the Inverter 's safe operating range due to internal or external causes. The self-protective features shall not allow signals from the Inverter front panel to cause the Inverter to be operated in a manner which may be unsafe or damaging. Faults due to malfunctioning within the Inverter,

including commutation feature, shall be cleared by the Inverter protective devices and not by the existing site utility grid service circuit breaker.

1.4.22 The Inverter shall go to shutdown/standby mode, with its contacts open, under the following conditions before attempting an automatic restart after an appropriate time delay.

- When the power available from the PV array is insufficient to supply the losses of the Inverter, the Inverter shall go to standby/shutdown mode.
- The Inverter control shall prevent excessive cycling of shut down during insufficient solar radiance.

1.4.23 Operation outside the limits of power quality as described in the technical data sheet should cause the inverter to disconnect the grid. Additional parameters requiring automatic disconnection are

- i. Neutral voltage displacement
- ii. Over current
- iii. Earth fault
- iv. And reverse power

In each of the above cases, tripping time should be very less.

1.4.24 Detailed technical description of the complete unit of offered Inverter should be furnished with bid document Following Technical documents of Inverter shall be supplied for approval after placement of order.

- Detailed technical description of the complete unit
- Instructions for installation and operation
- Electrical diagrams of all internal cabling, necessary for installation, maintenance and fault finding.
- Description of electrical and mechanical characteristics of units.
- Maintenance and fault finding procedures.
- Safety precautions.
- Software for data monitoring with detailed description.
- Details of data acquisition
- Details of Telemetry linking



- Factory test reports in details on various parameters.
- Trouble shooting procedures.
- All maintenance requirements and their schedules, including detailed instructions on how to perform each task.
- Detailed schematics of all power instrumentation and control equipment and subsystems along with their interconnection diagrams. Schematics shall indicate wiring diagrams, their numbers and quantities, type and ratings of all components and subsystems.
- A detailed bill of materials which shall list components model numbers, quantities and manufacturer of each supplied item.

All documents and write ups shall be in English. They shall be clean and legible, and must be checked, signed, approved and dated by a competent representative of the contractor.

1.4.25 The Bidder should note that Inverter will be installed, which is a hot place and prone to dust, hot air of 52 degree centigrade. Thus the room shelter, air blower/ fan (auto operated as per requirement) if required, for Inverter will be in scope of supply. Preference should be given to Inverter which does not require such protection being desert with extreme climatic conditions

1.4.26 The Bidder shall provide data sheet for Inverter along with their offer as per Guaranteed Technical Particular

1.4.27 Communication Modbus protocol with LAN/WAN options along with remote access facility.

**1.4.28 Electrical safety, earthing and protection**

- a. Internal Faults: In built protection for internal faults including excess temperature, commutation failure, overload and cooling fan failure (if fitted) is obligatory.

b. Galvanic Isolation: Galvanic Isolation is required to avoid any DC component being injected into the grid and the potential for AC components appearing at the array.

c. Over Voltage Protection: Over Voltage Protection against atmospheric lightning discharge to the PV array is required. Protection is to be provided against voltage fluctuations in the grid itself and internal faults in the inverter, operational errors and switching transients.

d. Earth fault supervision: An integrated earth fault device shall have to be provided to detect eventual earth fault on DC side and shall send message to the supervisory system.

e. Cabling practice: Cable connections must be made using PVC Cu cables, as per BIS standards. All cable connections must be made using suitable terminations for effective contact. The PVC Cu cables must be run in GL trays with covers for protection.

f. Fast acting semiconductor type current limiting fuses at the main bus- bar to protect from the grid short circuit contribution.

1.4.29 The Inverter shall include an easily accessible emergency OFF button located at an appropriate position on the unit.

1.4.30 The Inverter shall include ground lugs for equipment and PV array grounding.

1.4.31 All exposed surfaces of ferrous parts shall be thoroughly cleaned, primed, and painted or otherwise suitably protected to survive a nominal 30 years design life of the unit.

1.4.32 The Inverter enclosure shall be weatherproof and capable of surviving climatic changes and should keep the Inverter intact under all conditions in the room where it will be housed. The inverter shall be located indoor and should be

either wall / pad mounted. Moisture condensation and entry of rodents and insects shall be prevented in the Inverter enclosure.

1.4.33 Components and circuit boards mounted inside the enclosures shall be clearly identified with appropriate permanent designations, which shall also serve to identify the items on the supplied drawings.

1.4.34 All doors, covers, panels and cable exits shall be gasketed or otherwise designed to limit the entry of dust and moisture. All doors shall be equipped with locks. All openings shall be provided with grills or screens with openings no larger than 0.95 cm. (about 3x8 inch).

1.4.35 In the design and fabrication of the Inverter the site temperature (5° to 55°C), incident sunlight and the effect of ambient temperature on component life shall be considered carefully. Similar consideration shall be given to the heat sinking and thermal for blocking diodes and similar components.

## **1.5 Factory Testing:**

a. The Inverter shall be tested to demonstrate operation of its control system and the ability to be automatically synchronized and connected in parallel with a utility service, prior to its shipment.

b. Operation of all controls, protective and instrumentation circuits shall be demonstrated by direct test if feasible or by simulation operation conditions for all parameters that cannot be directly tested.

c. Special attention shall be given to demonstration of utility service interface protection circuits and functions, including calibration and functional trip tests of faults and isolation protection equipment.

d. Operation of start up, disconnect and shutdown controls shall also be tested and demonstrate. Stable operation of the Inverter and response to control signals shall also be tested and demonstrated.

e. Factory testing shall not only be limited to measurement of phase currents, efficiencies, harmonic content and power factor, but shall also include all other necessary tests/simulation required and requested by the Purchasers Engineers. Tests may be performed at 25,50,75 and 100 percent of the rated nominal power.

f. A factory Test Report (FTR) shall be supplied with the unit after all tests. The FTR shall include detailed description of all parameters tested qualified and warranted.' A blank format of FTR along with details of test to be conducted be provided along with the bid.

g. Factory testing of the Inverter / Inverters should be carried out and witnessed by the Purchaser's Engineers at the manufacturer's premises.

## 1.6 PLANT METERING/NET METERING SYSTEM/ DATA LOGGING

a) PV array energy production. Digital Meters to log the actual value of AC/DC Voltage, Current & Energy generated by the PV system shall have to be provided. Two way LT 415V energy meter (Import - Export metering) shall be incorporated in the system on the main LT AC Grid supply.

b) One set of Solar Irradiance an integrating pyranometer (Class II or better) should be provided with the sensor mounted in the plane of the array. Readout should be integrated with data logging system for the entire academy.

c) Wind Speed: One set of an integrated wind speed measurement unit be provided.



d) Temperature Sensor: One set of integrated temp, sensors for measuring the module surface temp., inverter inside enclosure temp, and ambient temp to be provided complete with readouts integrated with the data logging system.

All major parameters should be available on the digital bus and logging facility for energy auditing through the internal microprocessor and can be read on the digital front panel at any time the current values, previous values for up to a month and the average values. The following parameters should be accessible via the operating interface display and also on the dedicated laptop in the office of the SVPNPA through internet.

- AC Voltage
- AC Output current
- Output Power
- DC Input Voltage
- DC Input Current
- Time Active
- Time disabled
- Time Idle
- Temperatures (C)
- Invertors Status
- Module temperature

Protective function limits (Viz - AC overload voltage, AC under voltage, Over frequency. Under frequency, ground fault. PV starting voltage, PV stopping voltage, Over voltage delay, Under voltage delay, over frequency, Ground fault delay, PV starting delay, PV stopping delay).

## **1.9 MAXIMUM POWER POINT TRACKER (MPPT)**

Maximum power point tracker shall be integrated in the Inverter to maximize energy drawn from the array. The MPPT should be micro processor based to



minimize power losses. The details of working mechanism of MPPT shall be mentioned. The MPPT must have provision (.manual setting) for constant voltage operation.

The MPPT units environmental testing should qualify IEC 60068-2 (1, 2, 14, 30)/ Equivalent BIS std.

#### 1.10 (a) DISCONNECTION AND ISLANDING (GRID TIED MODE)

Disconnection of the PV generator in the event of loss of the main grid supply while on Grid Tied Mode (on Saturday, Sunday and holidays where generated power is to be evacuated to Sub-Station-I) is to be achieved by in built protection within the inverter. This may be achieved through rate of change of current, phase angle, unbalanced voltage or reactive load variants.

Operation outside the limits of power quality as described in the technical data sheet should cause the inverter to disconnect from the grid. Additional parameters requiring automatic disconnection are: Neutral voltage displacement, Over current, Earth fault and reverse power. In case of the above cases, tripping time should be less than (15 seconds). Response time in case of grid failure due to switch off or failure based shut down should be well within 5 seconds. In case of use of two Inverters, the capacity of suitable equipment for synchronizing with the AC output of both the Inverters to the ACDB / Grid should be provided.

#### 1.11 (b) DISCONNECTION (OFF GRID TIED MODE)

Since, the Inverter from the ACDB is required to supply power at different places, any over load detected at Inverter, should intelligently actuate changeover switch at any one place aforementioned above to bring the connected load within the available capacity of SPV generation within 5 seconds to ensure continued utilization of generated energy. The changeover switches should be automatic and should have double throw, so that the disconnected load from SPV generation can be connected to grid



automatically. And, on availability of appropriate generation capacity be reconnected. In case of any unbalance detected at ACDB appropriate measures like, phase swapping of conductors feeding passive off grid loads to reduce the unbalance within 30%. Only in case of single phasing or unbalance beyond the scope after phase swapping of more than 30% the disconnection be made within 15 seconds.

#### **1.12 AUTOMATIC RECONNECTION AFTER THE GRID FAILURE IS RESTORED**

Inverter shall have the facility to automatically reconnect the Inverter to the grid following restoration of grid subsequent to grid failure condition. The Inverter should wait for 5 seconds to attempt reconnection.

#### **1.13 ARRAY JUNCTION BOX, MAIN JUNCTION BOXES:**

The junction boxes are to be provided in the PV yard for termination of connecting cables. The J. Boxes shall be made of FRP/Powder Coated Aluminum with full dust, water & vermin proof arrangement. All wires/cables must be terminated through cable lugs. The J.Bs shall be such that input & output termination can be made through suitable cable glands.

Made of FRP or cast aluminum/ copper

Copper bus bars/terminal blocks housed in the junction box with suitable termination threads

Conforming to IP65 standards and IEC 62208 Hinged door with EPDM rubber gasket to prevent water entry. Single compression cable glands. Provision of earthing. it should be placed at 5 feet height or above for ease of accessibility.

Each Junction Box shall have High quality Suitable capacity Metal Oxide Varistors(MOVs) / surge arrestors, suitable Reverse Blocking Diodes. The Junction Boxes shall have suitable arrangement monitoring and disconnection for each of the groups.

## 1.14 PLANT CONTROL, DATA LOGGER & PLANT MONITORING UNIT

Basically, this unit should perform the following .

- Measurement and/or recording of energy parameters.
- Simple data logger or energy meter to record the energy data on a pre determined interval basis.
- Measurement & continuous acquisition of ambient air temperature, wind speed, solar radiation, PV module temperature, Inverter output voltage and current, output frequency, currents in the cables at aforementioned locations at the receiving ends.
- Operating state monitoring and failure indication.
- Representation of monitored data in graphics mode or in tabulation mode.
- Controlling & monitoring the entire power system through remote terminal.
- Necessary hardwares & softwares shall have to be supplied by the bidder.
- Both the software and hardware required for interfacing the plant with office including CPUs, UPS are to be supplied and installed by the contractor.
- Remote control/ Instrumentation: The microprocessor control unit should have the provision for installation of RS- 232/485 communication link.

## 1.16 AC DISTRIBUTION PANEL BOARD

1.16.1 Inverter converts DC energy produced by the solar array to AC energy. The AC power output of the inverter shall be fed to the ACDB (metering panel & isolation panel) which also houses energy meter. The 415V AC output of the isolation panel shall be fed to the grid. AC energy is then synchronized with the grid and power is consumed by load or may export to the grid.



1.16.2. ACDB shall be floor mounted type and shall have all the measuring instruments such as voltmeter, ammeter, frequency meter, Energy Meter {for measuring the deliverable units {kWh} for sale, selector switches and Mimic panel.

1.16.3. All the power cables shall be taken through top/ Bottom of the panel as per site requirement.

1.16.4. The ACDB shall fitted with suitable rating & size copper bus, MCCB, circuit breaker/isolator, indicators for all incomer and outgoing terminals.

1.16.5. Nut & bolts including metallic shall have to be adequately protected against atmosphere and weather prevailing in the area.

1.16.6. The overall dimension, weight, sheet thickness, painting etc. should be indicated by the Contractor.

1.16.7 The ACDB must carryout phase swapping of conductors feeding passive off grid load to different aforementioned locations to reduce unbalance within 30%.

1.16.8 All switches and the circuit breakers, connectors should confirm to IEC 60947, part I, II and III.

1.16.9 The change over switches, cabling work should be undertaken by the bidder as part of the project.

## **1.17 CABLES & WIRES**

1.17.1 Cabling in the yard and control room: Cabling in the yard shall be carried out as per IE Rules. All other cabling above ground should be suitably mounted on cable trays with proper covers.

1.17.2 Wires: Only FRLS copper wires of appropriate size and of reputed make shall have to be used.

1.17.3 Cables Ends: All connections are to be made through suitable cable/lug/terminals; crimped properly & with use of Cable Glands.

1.17.4 Cable Marking: All cable/wires are to be marked in proper manner by good quality ferule or by other means so that the cable can be easily identified.

Any change in cabling schedule/sizes if desired by the bidder/supplier be got approved after citing appropriate reasons, All cable schedules/layout drawings have to be got approved from the purchaser prior to installation. All cable tests and measurement methods should confirm to IEC 60189.

#### 1.18 Cable specifications:

- Multi strand, annealed high conductivity copper conductor / Aluminium Conductor.
- PVC type 'A' pressure extruded insulation
- Overall PVC insulation for UV protection and confirm to IEC 69947
- Armoured cable for underground laying
- All cables shall conform to BIS standards (IS 694) and (IS 1554)
- The size of each type of cable selected shall be based on minimum voltage drop, however, the maximum drop shall be limited to 3%
- Selected cable should carry a current density of minimum 1.2Amp/Sq.mm
- All electrical cables / wires inside the building to be fixed in accordance with specifications for electrical works.
- Proper laying of cables have to be ensured in appropriate cable trays, pipes /trenches as per site requirement.
- A.C. supply cables to be terminated at the DB / LT bus bar.
- For laying / termination of cables, latest BIS / IEC codes / standards be followed.



### **1.19 GRID ISLANDING:**

a) In the event of a power failure on the electric grid, it is required that any independent power-producing inverters attached to the grid turn off in a short period of time. This prevents the DC-to-AC inverters from continuing to feed power into small sections of the grid, known as "Islands." Powered Islands present a risk to workers who may expect the area to be unpowered, and they may also damage grid-tied equipment. The Rooftop PV system shall be equipped with islanding protection. In addition to disconnection from the grid (due to islanding protection) disconnection due to under and over voltage conditions shall also be provided. b) A manual disconnect 4-pole isolation switch beside automatic disconnection to grid would have to be provided at utility end to isolate the grid connection by the utility personnel to carry out any maintenance. This switch shall be locked by the utility personnel.

### **1.20 FIRE EXTINGUISHERS:**

The fire fighting system for the proposed power plant for fire protection shall be consisting of:

- Portable fire extinguishers in the control room for fire caused by electrical short circuits.
- Sand buckets in the control room

The installation of Fire Extinguishers should confirm to TAC regulations and BIS standards. The fire extinguishers shall be provided in the control room housing the batteries and Inverters as well as on the site where the PV arrays have been installed.

### **1.21 LIGHTNING PROTECTION:**

There shall be the required number of suitable lightning arrestors installed in the array field. Lightning protection shall be provided by the use of metal oxide items or lightning arrestors and suitable earthing such that induced transients

find an alternate route to earth. Protection shall meet the safety rules as per Indian Electricity Act. The Lightning conductor shall be earthed through flats and connected to earth pits as per applicable Indian Standards. Each Lightning conductor shall be fitted with individual earth pit as required.

## 1.22 EARTHING PROTECTION

Each array structure of the PV yard should be grounded properly. The array structures shall be connected to earth pits as per IS Standards. In addition the lightning arrester/masts should also be provided inside the array field. Provision should be kept be provided inside the array field. Provision should be kept for shorting and grounding of the PV array at the time of maintenance work. All metal casing/shielding of the plant should be thoroughly grounded in accordance with Indian electricity Act./IE Rules. Inverter ACDB should be earthed properly.

## 1.23 TOOLS & TACKLES AND SPARES:

After completion of installation & commissioning of the power plant, necessary tools & tackles are to be provided free of cost by the bidder for maintenance purpose. List of tools and tackles to be supplied by the bidder for approval of specifications and make from SVPNPA.

## 1.24 DANGER BOARDS AND SIGNAGES

Danger boards should be provided as and where necessary as per IE Act./IE rules as amended up to date. Signage's shall be provided each at control room and solar array area. Text of the signage's may be finalized in consultation with SVPNPA.

## 1.25 SAFETY MEASURES

The bidder shall take entire responsibility for electrical safety of the installation(s) including connectivity with the grid and follow all the safety rules regulations applicable as per Electricity Act, 2003 and CEA guidelines etc.

RS



## SARDAR VALLABHBHAI PATEL NATIONAL POLICE ACADEMY

(Government of India : Ministry of Home Affairs)  
Hyderabad - 500 052.  
Phone - 24015151 to 24015158 Fax: 91-040-24015179  
e-mail: administrator@svpnpa.gov.

No. 11011/1/2019-20/HS-Bldgs

Dated the October 18, 2019

### OPEN TENDER ( e-Tender )

The Director, S.V.P National Police Academy, Hyderabad, invites e- bids under single bid system from only the Expert Agencies recognized / empanelled by MNRE for setting up of grid connected rooftop solar PV power plant in Sardar Vallabhbhai Patel National Police Academy under RESCO Model.

Tender No.	1011/1/2019-20/HS.Bldgs
EMD	Rs. 60,000/-
Bid document downloaded / sale start date & time	18/10/2019 at 1000 hrs
Bid submission due date and time	08/11/2019 at 1800 hrs
Bid submission closing date	08/11/2019 at 1800 hrs
Closing date & time for submission of original copies of EMD	08/11/2019 at 1800 hrs

2. The detailed tender along with qualification criteria, EMD bidding document etc can be viewed/ downloaded from the website: <http://eprocure.gov.in>. Bidders are required to upload and submit their E-bid on Central public Procurement Portal only. Bid submitted other than on CPP Portal will not be accepted. All amendments, time extension, clarification etc., will be uploaded in the website only and will not be published separately. Bidders should regularly visit website to keep themselves updated.

Yours faithfully,

Admn. Officer (Admn.)  
SVP NPA, Hyderabad  
(For and on behalf of the Director)