

# Nadia Zilla Parishad

Krishnaagar, Nadia

URL: [nadiazillaparishad.gov.in](http://nadiazillaparishad.gov.in)

Email: [aeozp.nadia@gmail.com](mailto:aeozp.nadia@gmail.com), Ph : +91-3472-256106, Fax: 913472-253085

Memo No: 954/NZP

Date: 05/03/2018

## Expression of Interest (EOI)

Expression of Interest is hereby invited from reputed Agencies for installation of Solar Power Grid Energy on newly renovated top floor of press building under Nadia Zilla Parishad.

### PROJECT SUMMARY

Title of the Proposal	Design, Engineering , Supply, Installation and commissioning of Solar PV Grid Connected Power Plant.
Capacity of the plant	Capacity of the plant 40kWp.
Client	Nadia Zilla Parishad.
Site/Plant locatin	Krishnagar, Nadia
Type of Plants	Roof top Grid Connected.
Geographical Co-Ordinate	latitude 23.4 degree N, longitude 88.5 degree E
Total loads to be energized by	
Solar Power	Fed to the existing grid.
Metering arrangement	Export meter.
PV plan area available	Approximate 600 sq.mtr. shadow free area for full daytime.
Size of SPV Modules proposed	134 Nos.>=300 Wp, 72 cells Poly Crystalline Silicon Solar cell
Size of Grid interactive Inverter	500 KW.
Benchmark energy Generation	
(as per PV System)	1386 kWh/kWp/year (as per PV syst.)
Total generation	55440 kWh/units/ year
Grid utility tariff(Existing)	Rs 8.50 per kWh/Unit.

### TECHNICAL SPECIFICATION

#### Standards:

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

Sl No.	Standard	Description
1	IEC : 61215/IS:14286	Crystalline silicon terrestrial photovoltaic modules Design qualification and type approval
2	IEC: 61730-Part I	Photovoltaic (PV) module safety qualification Requirements for construction
3	IEC: 61730- Part @	Photovoltaic (PV) module safety qualification Requirements for testing.
4	IEC: 61701/IS: 61701	Salt Misty Corrosion Testing of the module.

The proposed PV Module must have the Test Certificate issued from accredited test laboratories of Ministry of New and Renewable Energy , Govt. Of India.

Type test Certificate issued from IEC accredited laboratories shall be acceptable.

**Identification and Traceability:**

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

- I Name of the manufacture of PV Module.
- II Name of the manufacture 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 Fill Factor for to module.
- VII Unique Serial No and module 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.

RIDF shall be available with each solar module and must be capable to withstand environmental conditions as per latest Guideline of MNRE. Govt. of India.

**Warranty:**

A. Material Warranty : The manufacturer should warrant the Solar Module(s) to be free from the defects and / or failures specified below for a period not less than ten (10) years from the date of sale to the original customer(i.e. EPC Contractor).

- I Defects and /or failures due to manufacturing
- II Defects and /or failures due to quality and materials.
- III Non conformity to specifications due to faulty manufacturing and / or inspection processes.

If the solar module(S) fails to conform to this warranty, the manufacturer should will repair or replace the solar module(s) , at the Owner's sole option. The contractor shall be responsible to contact with the contractor if any of the above mentioned cases occurred.

B. Performance Warranty: the manufacturer should warrant the output of Solar Module(s) for at least 90% of its rated power after initial 10 years & 80% of its rated power after 25 years from the completion of trial run at site/date of final commission.



**Specification:**

Sl.No.	Item	Description
1	Type	Crystalline Silicon – Poly ( Minimum Capacity of 300 Wp)
2	Efficiency of module	Minimum 15 % at STC
3	Cell efficiency	Minimum 17 % at STC
4	Fill factor	Minimum 72%
5	No. of cell per module	72
6	Module frame	Non-corrosive and electrolytically compatible with the structural material, preferably anodized Al.
7	Termination Box	Thermo plastic, IP 65 UV resistant
8	Bypass Diode	Yes, as required
9	Power Rating	The nominal power of a single PV module shall be min 300 Wp or higher.
10	Power Tolerance	Up to =5% ( only =ve tolerance is acceptable)
11	Approximate temperature co-efficient	i. Power : (-0.43%)/K ii. Voltage : (0.37%)/k iii. Current : (0.03%)/K
12	Glass	High transmittance glass
13	RF Identification tag for each solar module	Shall be provided inside or outside the module and must be able to withstand environmental conditions and last the lifetime of the solar module as per MNRE Norms.
14	Make	Tata power / websol /HHV

**3. MODULE MOUNTING STRUCTURE & FRAMES**

The solar module mounting structure shall be made of hot dipped galvanized MS angles & Pipes. The minimum thickness of galvanization shall be 80 microns. All nuts & bolts shall be made of very good quality stainless steel. The minimum clearance of the lowest part of the module structure and shall be 500 mm minimum from the roof level. The array structure shall be made of hot dip galvanized MS angles of size not less than 50mm X 50 mm X 6mm size.

- i. All nuts & bolts shall be made of very good quality stainless steel (SS 304 minimum)
- ii. The structure shall be designed to allow easy replacement of any module and shall be in line with site requirements.
- iii. The structure shall be designed for simple mechanical and electrical installation. It shall support.
- iv. SPV module at a given orientation, absorb and transfer the mechanical loads to the ground properly.
- v. The mounting structure steel shall be as per latest IS 2062: 1992 and galvanization of the mounting structure shall be in compliance of latest IS-4759.
- vi. There shall be no requirement of welding or complex machinery at site.
- vii. The array structure shall be designed to occupy minimum space and to withstand wind speed up to maximum 150km/h. Wind analysis simulation report to be attached in the Technical offer.
- viii. The supplier/ manufacturer shall specify installation and foundation details for the structures.
- ix. Structure drawing should be submitted for approval before commencing the work.
- x. Structure shall be suitable for mounting of the SPV modules on rooftop.
- xi. Provision for installing the solar inverters, Array Junction Box and ACDB shall be available on the module mounting structure.



#### **PCC for Solar PV Array foundation:**

The leg of the structures made of GI angles shall be fixed and grouted in the PCC foundation columns made with 1:2:4 cement concrete. The minimum clearance of the lowest part of any module structure shall not be less than 600mm from ground level. While making foundation design, due consideration shall be given to weight of module assembly, maximum wind speed of 150 km/hr.

#### **PV ARRAY JUNCTION BOX (AJB)**

Array junction box (AJB) shall have to be used for termination of string prior connecting array with each inverter. The string combiner box / array junction box shall be dust, vermin and water proof and made of Polycarbonate Plastic. The number of PV Array junction Box will be as per plant configuration.

#### **Standards :**

The Array Junction Boxes shall conform to the latest edition of following Standards except where specified otherwise in this specification:

- i Junction boxes should be equipped with fuses on both positive & negative input to protect the PV module from short circuits.
- ii Input termination through VDE/UL/TUL approved PV connectors made of Polyamide with IP68 (IP65) protection and Output termination through IEC/VDE/UL approved Glands made of Polyamide with IP68 (IP65) protection.
- iii Copper bus bars / terminal blocks housed in the junction box with suitable termination threads.
- iv Earth terminal Block for earthing.
- v Surge Protection Devices are to protect the PV modules as well as the other electrical / electronic systems from transient over voltages created due to lightning and to reduce insulation breakdowns due to lightning. The SPDs shall be of 3 nos of pluggable type installed in a star connected common base. The SPD's should be tested and approved according to IEC 61643-11 and EN 50539-11 : 2013-03 for the following parameters to be used.

Type of connection : Between Positive, Negative and Earth in star connection.

Voltage : up to 1000 volts DC , Maximum Discharge current : 40 KA ( 8/20ms)

Nominal Discharge Current ; 20 KA (8/20ms), Voltage Protection Level : 2.6KV (for 600 volt system), 4.0KV (for 1000 volt system).

Response time : 25 nS

- vi Isolator suitable for 1000 volts DC solar application at the outgoing side. It should comply with IEC 60947-3, IEC61364-4-410 and IEC 60364-7-712.



vii Selection of fuses :-

it is important to coordinate the power dissipation of fuse-links with the acceptable power dissipation of fuse holders. Rated voltage of fuse-link and fuse holder should be at least 20% higher than open circuit voltage of photovoltaic installation. Typical rated voltage of fuse-links and fuse holders is 100 V DC. Rated current of fuse-links 1.4 ISC. (ISC = short circuit current of photovoltaic modules).

Rated voltage 1000 V DC

Rated breaking capacity 30 kA

**Specification :**

Sl.no.	Item	Desired Data
1	Enclosure	
	Degree of Protection	IP 65 with UV Protected
	Material	Polycarbonate
	Withstanding voltage	1000 V DC
	Withstanding Temperature	100 degree C
	Accessories mounting arrangement	DIN Rail
	Number of Strings entry	As may be required
	Approved Make	Hensell /Spelsberg/Ensto
2	Cable entry and Exit	
	Position	Bottom at cable entry and exit
	Cable Entry and Exit connector type	MC 4 / Tyco Connector (PV Array String cable). All wires / output terminated through
	Cable gland	Input & output termination shall be made through suitable cable glands.
3	Surge Protection Device (SPD)	
	Type	DC ( class-II)
	Approve Make	OBO Bettermann / Citel /Mersen.
	Rating	1000 V, 20kV
	Number of set	As may be required as per string Design
4	Fuse with fuse holder	
	Position	+ve and -ve terminal for each series string
	Type	PV fuse, for PV use only
	Rating	Current : Minimum 1.5 times of the ISC Rating of the string
	Approved make	Cooper Bussman/ETI/Noark
5	Earthing	
	Earthing Provision	Terminal blokes will have to be provided
	Terminals, lugs and bus bar	
	Material	Tinned Copper



## GRID TIED / CONNECTED STRING INVERTER

The power generated from PV array shall be fed to the MPPT Tracker of Three Phase Grid-Tied Solar String Inverter or multiple inverters of nominal capacity ( maximum 50 kW Power output each ) as per the individual solar PV system capacity through Array Junction Box (AJB).

### Standards :

Sl No. Standard	Description
1. IEC/IS:61683	Photovoltaic system-power Conditioners-Procedure for measuring efficiency
2. IEC 62093	Balance-of-system components for photovoltaic systems-Design qualification natural environments.
3. IEC 60068	environmental Testing.
4. IEC 62116	islanding Prevention Measurement.
5. IEC 61727	interfacing with utility grid.

Type test certificate issuing authorities should be any NABL/IEC Accredited Testing Laboratories of MNRE approved test centers.

### Specification :

Desired specification of each inverter shall include but not limited to the following.

SL.No.	Operating Parameter	Desired specification
1	Type	Grid connected String Inverter
2	Input (DC)	
	PV array connectivity capacity	As per site requirement
	MPPT Voltage range	Compatible with the array voltage
	Number of MPPT Channel	2 Nos. ( Minimum)
3	Output (AC)	
	Nominal AC Power output	As per the capacity of individual SPV system
	Phase	Three Phase = N
	Adjustable AC voltage range	The inverters shall continue generation for grid voltage variation from + 10 % to at least – 10 % of the rated system voltage.
	Frequency range	The inverters shall continue The inverters shall continue generation for grid voltage variation from + 5 % to at least - 5 % of the rated system frequency.
	THD	The limit on voltage harmonics are 3 % for THD. Current harmonics for various power output conditions shall be limited as per the values provided in relevant Indian Standard.
	Switching	H.F. transformer / transformer less
4	General Electrical data	
	Maximum efficiency	96 % (minimum)
	Night mode consumption	Less than 2 W
5	Protection	
	DC Side	Reverse-polarity, reverse current to PV array , over voltage, under voltage, over current
	AC Side	Over voltage and under voltage over current over and under grid frequency, ground fault
	Isolation Switch	PV array isolation switch ( integrated)
	Earthing	Provision of Body Earthing
6	LCD Display Parameters	



	General	Unit temperature
	DC	Voltage, current Power
	On grid connected mode	Line status, Grid voltage, Grid frequency, Export Power, Cumulative Export Energy
7	Switching Devices	IGBT / MOSFET
8	CONTROL	Microprocessor /DSP
9	Interface	Suitable port must be provided i the inverter for onsite dumping data from the memory
10	Storage of Data	At least for 1 year data logger may be provided in the Inverter
11	Mechanical data	
	Protection class	IP 65 or higher
	Cooling	Natural / forced air cooling
12	Make	ABB/SMA/Delta

#### GRID INTEFACING LT PANEL (ACDB)

Output from the Grid-tied Solar Inverter shall be fed to the Grid Interfacing Panel (ACDB) installed adjacent to the inverter through 4 Pole MCCB of suitable current rating and multi function export kWh meter.

- i ACDB shall control the AC power from inverters, and should have necessary surge arrestors ( Class-II) . The ACDB should be interconnected to the Building LT Panel /Substation while in grid tied mode.
- ii All switches and the circuit breakers, connectors should conform to IEC 60947, part I, II and III / IS60947 part I, II and III.
- iii The ACDB should be outdoor type, metal clad, totally enclosed, rigid, floor mounted, air insulated, cubical type suitable for operation on three phase 415V ,50 Hz.
- iv unidirectional energy export meter along with CT/PT shall be provided at the output feeder of ACDB to monitor the solar PV generation.
- v the ACDB shall be designed for minimum expected ambient conditions..
- vi All the 415 AC or 230 volts devices / equipment like bus support insulators, circuit breakers etc., mounted inside the switchgear shall be suitable for continuous operation.

#### CABLES & WIRES

##### SPECIFICATION:

Copper cables of appropriate size to be used in the system shall have the following characteristics:

Shall meet IEC 60227/IS 694, IEC 60502/IS1554 Standards.

Temp. Range : -10 Deg C to + 80 Deg C.

Voltage rating: -1100V

Excellent resistance to heat cold, water, oil, abrasion, UV radiation

Flexible.

The size of the cables between array interconnection , array to junction boxes, junction boxes to Inverter etc shall be so selected to keep the voltage drop and losses to the minimum. The cables (as per IS) should be insulated with a special grade PVC compound formulated for outdoor use.

All installation accessories, which are required to install and successfully commission the power plant , are to be provided.

All cables must be identified by Rubber / Plastic tags. Cables must be neatly enclosed in conduits.



Al cable/wires are to be routed in a GI cable tray and suitably tagged and marked with proper manner by good quality ferrule or by other means so that the cable can be easily indentified. The GI cable trays with covers should be suitably mounted on the roof.

Multi strand, annealed high conductivity copper conductors with PVC type "A" pressure extruded insulation or XLPE insulation should be used. Overall PVC/XLPE insulation should be provided for UV protection. Armoured cable for underground laying.

The size of each type of DC cable selected shall be based on minimum voltage drop. However, the maximum drop shall be limited to 2 %.

The cable from ACDB on rooftop to the Building LT panel / sub station has be armoured copper cable.

All cable sizes shall be as indicated in the SLD.

#### PROTECTION SYSTEM

##### Lightning Protection:

The SPV power plants shall be provided with lightning & over voltage protection . The main aim in this protection shall be to reduce the over voltage to a tolerable value before it reaches the PV or other sub system components. The source of over voltage can be lightning atmosphere disturbances etc. The entire space occupying the SPV array shall be suitably protected against LIGHTNING BY DEPLOYING REQWUIRED NUMBER OF LIGHTNING ARRESTORS. Lightning protection should be provided as per IEC:62305. The protection against induced high-voltages shall be provided by the use of surge protection devices (SPDs) and suitable earthing such that induced transients find an ultimate route to earth.

##### Surge Protection:

Internal surge protection shall consist of three surge-arrestors connected from +ve and -ve terminals to earth (vies Y arrangement) / SPDs.

##### Earthing Portection :

Earthing system shall connect all non-current carrying metal receptacles, electrical boxes, appliance frames, chassis and PV module mounting structures in one long run. The earth strips should not be bolted or interrupted. Earthing GI strips shall be interconnected by proper welding.

The complete earthing system shall be electrically connected to provide return to earth from all equipment independent of mechanical connection.

The equipment grounding wire shall be connected to earth strip by proper fixing arrangement. The earth strip shall be continued up to at least 500 mm from the equipments.

Earthing system design should be as per the standard practices and should conform to the latest edition of IS 3043.

Masonry enclosure with the earth pit of size not less than 400 mm X 400mm X 400mm (depth) complete with cemented brick work (1:6) of minimum 150 mm width duly plastered with cement mortar ( inside) shall be provided. Hinged inspection covers of size not less than 300 mm X 300 mm with locking arrangement shall be provided. Suitable handle shall be provided on the cover by means of welding a rod on top of the cover for future maintenance.

Necessary provision shall be made at bolted isolating joints of each earthing pit for periodic checking of earth resistance an earth bus and a test point shall be provided inside control room. Test point shall also be provided at each earth pit.



Minimum suitable numbers of interconnected earth pit needs to be provided in each location. Minimum required gap shall be provided in between earth pits as per relevant standard. Body earthing shall be provided in Inverter, each panel module mounting structure, kiosk and in any other item as required.

Earthing system must be interconnected through GI strip to arrive equipment an bonding . the size of the GI earth strip must be minimum 25 mm X 3mm.

Chemical earthing may be considered.

#### **GRID ISLANDING :**

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. 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.

#### **ON LINE DATA LOGGER & REMOTE MONITORING**

Remote monitoring complete systems including hardware and modem/router shall facilitate monitoring of the performance of the inverter/ inverters, energy yield, temperature, irradiance level etc through LAN based or GSM based network. PC based inverter monitoring is also required for local monitoring of each system, some of the salient features of the monitoring system shall be.

central recording of all system data

data transfer remotely for monitoring and evaluation

high data backup

expansion possible with additional measuring modules.

Communication to the most diverse systems with different interfaces.

Compatible with the products of all leading inverter manufacturers.

#### **Terms & Conditions:**

- Bank Draft of 2% of total quoted rate as Earnest Money should be submitted along with; EOI in favour of FC & CAO, Nadia Zilla Parishad.
- GST registration certificate & IT returns of recent years will have to be submitted by the agency.
- Credential : 40% of total work value in similar type of work.
- Details Project Report to be submit with drawing.
- 15 % security money of quoted rate including 2% Earnest money, to release be after one year of execution 10% of total and rest 5 % after two years of execution
- The bidder should either be a reputed MNRE approved manufacturer of Solar PV Modules ( using mono/poly silicon crystalline Cells) or a Solar PV System Integrator and should have experience of having executed contracts of Supply Installation and Commissioning of Solar PV power plant (s) with a least one such project having an installed capacity of minimum 40KWP in one location opening successfully for at least 1 year after installation.



- MNRE approved channel partners having obtained highest performance grading (SPIS/SP 1B/SP 2A) from MNRE approved grating agency would be eligible to participate only. Grading report for grid connected application to be submitted.
- Preferable have office & field service centre at state capital or nearly location within 100KM from the place of installation to provide good after sale services including necessary repair and maintenance.
- Must provide acceptable documents for its capacity to design, supply, installation & commissioning of 40KW Solar power plant or more within the given time schedule.
- Must submit documents for having cumulative financial turnover of more than 25 crore with profit earn for each year in last 3 years.
- Bidder should be in solar power business in India for at least last 5 years.
- Bidder should provide CIN no. and GST no.
- Bidder should have valid Electrical Contractor Licenses in the name of the bidder having National Electrical Supervisor.
- Bidder should have toll free no. for after sales support.

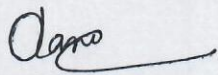
The last date for submitting the expression of Interest (EOI) as per following proforma is 20.3.18 before 2.00 PM. And the same will be opened on 20.3.18 at 4.00 PM.

1. Details of Organization

Name of the agency	Address	Telephone Number	Contact Person's name	Mobile Number	Email ID

2. : \_\_\_\_\_ only inclusive of applicable tax.
3. All supporting documents as mentioned in terms & condition.

The authority reserves the right to accept/ reject rates without assigning any reason thereof.

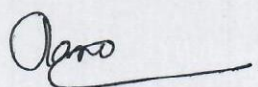
  
Deputy Secretary  
Nadia Zilla Parishad  
Sud  
05/3/18

Memo No: 954/NZP

Date: 05/03/2018

Copy forwarded for information to :

1. PA to Savadhipati, Nadia Zilla Parishad
2. CA to District Magistrate, Nadia
- 3-6 The S.D.O.....(All).
7. The FC & CAO, Nadia Zilla Parishad .
8. The District Engineer, Nadia Zilla Parishad.
9. The DICO, Nadia .
10. The Deputy A.R.D&P.O. , Nadia .
- 11-27 The B.D.O ..... (All).
- 28 DIA , Nadia Zilla Parishad , uploading in website.
- 29 DIO,NIC for uploading in website.
- 30 Notice Board of Nadia Zilla Parishad

  
Deputy Secretary  
Nadia Zilla Parishad.  
Sud  
06/3/18