Short Quotation Call Notice

Letter No. 4688 **Date:** 26/05/2021

Quotations are invited from solar panel manufacturers and system integrators for the supply and installation of materials and equipment required for solar power plant to be constructed at our NALCO head works in the District of Angul and Water Treatment Plant of Mega Water Supply Scheme Bhograi in the District of Balasore in sealed envelope to the Office of the Engineer-In-Chief,Rural Water Supply and sanitation,Govt of Odisha, Bhubaneswar.

- The price quoted and GST should be mentioned separately.
- The evaluation of accessibility of such materials lies solely with EIC RWS&S, Panchayat Raj and Drinking Water Department.
- These rates are invite to access the market rates. only
- The last date for submission of quotation is **28 May 2021(5 PM).**
- Price Schedule and Technical specifications are enclosed as annexure I and II.

Engineer-In-Chief 25.5.21
Rural Water Supply and sanitation
Govt of Odisha

Annexure I

PRICE SCHEDULE

Sr. No.	Item	Unit	Rate in Rs
1	Supply of Solar PV Module of minimum capacity 335 Wp for 72 cells conforming to IEC: 61215 Ed 2/ IS14286 (Standard for PV module design qualification and type approval) and latest, IEC: 61730 – I :2007 (Standard of requirements for construction), IEC: 61730 – II: 2007 or equivalent IS (Standard of requirements for testing and safety qualifications), manufactured in a plant certified under ISO 9001: 2008 and type tested by an accredited national/international testing laboratory. The Solar PV Module should be made from mono/poly crystalline Silicon Solar Cell connected in series. Cut cells should not be used. Supply for solar power plant 0f 500 KWp Floating type at NALCO head works District Angul NALCO head works District Angul and rooftop plus ground based at Water Treatment Plant of Mega Water Supply Scheme Bhograi District Balasore. Detail specifications are mentioned in the annexure II.	Wp	
2	Supply of UV Stabilized Floats for Solar panels of floating type solar power plant 0f 500 KWp at NALCO head works District Angul as per specifications mentioned in the annexure I.	Wp	
3	Supply of Grid Connected inverter suitable for 500 KWp Solar Power Plant of NALCO Head Works	Wp	
4	Supply of Grid Connected inverter suitable for 300 KWp Solar Power Plant at Water Treatment Plant of Mega Water Supply Scheme Bhograi District Balasore	Wp	
5	Anchoring and mooring system of floating Solar panels including on shore anchoring for Solar panels of floating type solar power plant 0f 500 KWp at NALCO head works District Angul as per specifications mentioned in the annexure II.	Wp	
6	Solar panel Module mounting structure for ground based and roof top solar power plants at 300 KWp Solar Power Plant at Water Treatment Plant of Mega Water Supply Scheme Bhograi District Balasore as per specifications mentioned in the annexure II.	Wp	
7	Solar panel Module mounting structure for ground based and roof top solar power plants at 100 KWp Ground based Solar power plant at NALCO Head works District Angul as per specifications mentioned in the annexure II.	Wp	

25-5-21

Engineer-in-Chief
RWS&S(O) Bhubaneswar

Annexure II

Technical Specifications

Item No 1:
Solar PV Module:

Solar PV Module of minimum capacity 335 Wp for 72 cells conforming to IEC: 61215 Ed 2/ IS14286 (Standard for PV module design qualification and type approval) and latest, IEC: 61730 – I :2007 (Standard of requirements for construction), IEC: 61730 – II: 2007 or equivalent IS (Standard of requirements for testing and safety qualifications), manufactured in a plant certified under ISO 9001: 2008 and type tested by an accredited national/international testing laboratory.

The Solar PV Module should be made from mono/poly crystalline Silicon Solar Cell connected in series. Cut cells should not be used.

Individual solar PV modules must be Potential Induced Degradation (PID) free. Double-glass module will be preferred, which replaces the traditional polymer back sheet with heat strengthened glass. This typology of solar module has no metal frame and is Potential Induced. Degradation (PID) free because it requires no module level grounding, which eliminates the cause of PID.SPV modules of similar output with +5 Wp tolerance in single string shall be employed to avoid array mismatch losses. SPV module shall contain crystalline high power silicon solar cells. The solar cell shall have surface anti-reflective coating to help to absorb more light in all weather conditions. Photo-electric conversion efficiency of SPV module shall not be less than 15.5%. Fill factor of the module shall not be less than 72%.Each module shall have low iron tempered glass front for strength and superior light transmission. It shall also have tough multi- layered polymer back sheet/ heat strengthened glass for environmental protection against moisture and provide high voltage electrical insulation. Transitivity of glass shall not be less than 91%. Module junction box and terminal block (weather resistant) shall be designed for long life outdoor operation in harsh environment. SPV module shall be highly reliable, light weight and shall have a service life of more than 25 years. SPV modules shall have a limited power loss of not more than 10% of nominal output at the end of 10 years and of not more than 20% of nominal output at the end of 25 years. The output of any supplied module shall not be less than the rated output and shall not exceed the rated power by more than 5Wp. Each module, therefore, has to be tested and rating displayed. Whenever more than one module is required, identical modules shall be used.

The module shall perform satisfactorily in relative humidity up to 95% and temperature between -10o degree C and +85 degree C. The solar modules shall have suitable encapsulation and sealing arrangements to protect the silicon cells from the environment. The encapsulation arrangement shall ensure complete moisture proofing for the entire life of solar modules. The terminal block shall be

of Noryl rubber with weatherproof design (min. IP 65) and shall have a provision for opening /replacing the cables if required. SPV Modules shall be tested and approved/certified as per above standards. Qualification Test certificate to be submitted with supply which can be from any NABL/ IEC /MNRE/BIS accredited/recognized testing/calibrating laboratories/Solar Energy Centre. Bidder to provide certification proof/verification of Testing Lab along-with certificates. All the SPV modules to be tested for performance at vendor's works. The performance of PV module (minimum 1% of total PV modules) at STC conditions must be tested and approved by one of the IEC / NABL/MNRE/BIS accredited/recognized Testing/calibrating Laboratories/ Solar Energy Centre. Bidder to provide certification proof/verification of Testing Lab along-with certificates.

- **Markings:** Each module would carry the following clear and indelible markings.
  - Name, monogram or symbol of manufacturer of PV module
  - Name of manufacturer of Solar Cell
  - Type or model number
  - Serial number
  - Polarity of terminals or leads (colour coding is permissible)
  - Open-circuit voltage
  - Operating voltage
  - Maximum system voltage for which module is suitable
  - Operating current
  - Short-circuit current
  - Date and place of manufacture
  - Weight of module
  - Module Wp tolerance

- RFID Tag: Each PV module must use a RF identification tag (RFID), which must contain the following information. The RFID can be inside or outside the module laminate, but must be able to withstand harsh environmental conditions.
  - Name of the manufacturer of PV Module
  - Name of the Manufacturer of Solar cells
  - Month and year of the manufacture (separately for solar cells and module)
  - Country of origin (separately for solar cells and module)
  - I-V curve for the module
  - Peak Wattage, Im, Vm and FF for the module
  - Unique Serial No and Model No of the module
  - Date and year of obtaining IEC PV module qualification certificate
  - Name of the test lab issuing IEC certificate
  - Other relevant information on traceability of solar cells and modules as per ISO 9000 series

Item No 2:

UV Stabilized Floats for Solar panels:

The floatation device should be prefabricated and designed for simple mechanical on-site installation. There shall be no requirement of welding, masonry or complex machinery at the installation site.

- The floatation device should be modular, such that the installed assembly can be easily expanded and scaled up if required. Each module/combination of maximum two modules should support at least one solar panel. All modules should be standardized and independently created.
- The floatation device should be manufactured from appropriate thermoplastic. The grade of thermoplastic used should have a good Environmental Stress Crack Resistance (ESCR) and a combination of hardness and impact strength (ASTM D1693). The thermoplastic used should be safe for use when in contact with drinking water and meet requirements stipulated in standard IS 15410:2003. The material of the floatation device would be UV stabilized. The material used shall be halogen, silicon free conforming to RoHS directive 2002/95/EC
- The flotation device should be chemically resistant to acid, lye, petrol, mineral oil & partially resistant to benzene.
- The floatation device, when installed in the raw water reservoir, should not restrict the process of gas exchange across the air water interface. In order to facilitate this, the design of the flotation device should be such that appropriate voids, greater than at least 30% of all area covered by the flotation device, are provided and form an integral part of the flotation device design. The flotation device should be designed such that it arrests evaporation and facilitates in evaporation loss mitigation. To this end, the vendor should provide appropriate cover of not less than 60% from the floatation device and not less than 90%, when combined with solar panels, of all area covered by the flotation device. Appropriate vapour escape vents should be provided for each flotation device and solar panel assembly for the purpose of maintaining BOD of the water body.
- The design of the flotation device should incorporate appropriately sized walking platforms for regular maintenance and inspection. The walking platform should have a continuous uninterrupted surface with the minimum width of at least 500 mm. The buoyancy, on an average, of the floatation device should be greater than 75 kg/m2 of area covered by the flotation device.
- In order to increase longevity of the flotation device and reduce the maintenance requirements, the flotation device should be foam filled with rigid closed-cell cellular polystyrene with moisture retention of less than 5%.

- The flotation device should be reprocess able and recyclable at the end of its useful life.

Item No 5:

Anchoring and mooring system: The water level variation and prevailing wind speed are the primary safety considerations, to be taken into account, while designing the plant such that the plant has no impact on the reservoir. The mooring system thus needs to be designed that it not only restricts the lateral movement of the proposed plant but also accommodates the water level variability. In addition, the mooring system should also have minimal impact on the overall ecosystem of the reservoir, specifically on the flora and fauna.

- Placement of plant: The floating solar PV power plant should be at a minimum distance of 5 M from the edge of the reservoir.
- Prevailing wind load: the mooring system should be designed for worst-case scenario, for a wind load of 200 km/hr. The design of the mooring system should prevent the lateral movement of the plant in case of maximum wind loads.
- Water variability: The mooring system should accommodate any fluctuations in water level. Further the orientation of the plant needs to be maintained; hence any fluctuations in water level should not result in lateral movement of the plant.
- Flora and fauna: the mooring system should minimize its impact on the flora and fauna, and thus as far as possible pilings or movement of mooring system on the reservoir bed should be avoided.

- **Item No 6 and 7:**
  Module mounting structure:

- The array structure shall be so designed that it will occupy minimum space without sacrificing the output from SPV panels.
- The structure shall be designed to allow easy replacement of any module by authorized personnel and shall be in line with the site requirements.
- The array structure shall be made of Aluminum alloy/ stainless steel SS 304 of suitable size.
- The support structure, design and foundation shall normally be designed to withstand wind speed upto 200 kmph.
- The clearance between lowest part of the module structure and the water level shall normally not be more than 250mm.
- The module alignment and tilt angle, in case of floating SPV power plant, shall be between 1 degree to 20 degrees. It shall be mounted facing south and tilted to an angle within the range of 1 degree to 20 degrees for optimum performance and appropriate wind resistance that must be

- In general bolts, nuts, shims and other hardware should be stainless steel SS304. Fasteners visible outside shall be of stainless steel SS304.

Engineer-in-Chief
RWS&S(O) Bhubaneswar