HCC No. 56/2023

HIGH COURT OF KARNATAKA, HIGH COURT BUILDINGS, BENGALURU-1 DATED: 8th FEBRUARY 2024.

CORRIGENDUM

The High Court of Karnataka, Bengaluru vide Tender Notification No. HCK/2023-24/IND0016 dated 31.01.2024 had called for tender towards procurement and Installation of Solar Power Backup Equipments in 40 Court Complexes of Karnataka State Judiciary and in the High Court of Karnataka, Benches at Dharwad and Kalaburagi through e-procurement portal of Centre for e-Governance, Bengaluru.

The last date fixed for uploading tender is on 15.02.2024 at 4.00 PM. However, Corrigendum is hereby issued for RFP Clauses and Technical Specification same is enclosed as **Flag-A**. For more details visit <u>https://kppp.karnataka.gov.in/#/portal/searchTender/live</u> website.

Sd/-

(N.G.DINESH) REGISTRAR (COMPUTERS) AND TENDER INVITING AND ACCEPTING AUTHORITY HIGH COURT OF KARNATAKA, BENGALURU

Encl: Corrigendum for RFP Clauses and Technical Specification Enclosed as Flag-A

Flag-A Corrigendum/Addendum for Design, Supply, Installation, Netmetering, Testing and Commissioning of 10kWp Capacity Rooftop Solar PV Power Plant (Hybrid Interactive Grid Tied with Battery Bank) with Ten years Comprehensive Warranty in 40 Court Complexes of the District Judiciary in the State									
of Karnataka									
SI.No.	RFP Clause No.	Clause/Specification	Specification/Corrigendum shall be read as						
1	RFP Clause 3	QUALIFICATION CRITERIA - 14 PRODUCT WARRANTY: Design, Supply, Installation, Netmetering, Testing, Commissioning, Maintenance and Operations of 10kWp Capacity Rooftop Solar PV Power Plant (Hybrid Interactive Grid Tied with Battery Bank) with Ten years Comprehensive Warranty (including battery) and Comprehensive Maintenance Contract for 5 years after completion of 10 years warranty period (excluding battery replacement)	Shall be refer modified " PRODUCT WARRANTY: Design, Supply, Installation, Netmetering, Testing, Commissioning, Maintenance and Operations of 10kWp Capacity Rooftop Solar PV Power Plant (Hybrid Interactive Grid Tied with Battery Bank) with 10 years Comprehensive Warranty for Solar PV Power Plant & Accessories, 5 Years for batteries and 25 Years of Performance Warranty for Solar PV Modules"						
2	RFP Clause 4	TECHNICAL SPECIFICATIONS:Technical Specification of 10kWp Capacity Rooftop Solar PV Power Plant (Hybrid interactive grid tied with battery bank)	Shall be refer modified "TECHNICAL SPECIFICATIONS-ANNEXURE - 15: Technical Specification of 10kWp Capacity Rooftop Solar PV Power Plant (Hybrid interactive grid tied with battery bank)" Annexure enclosed with this Corrigendum						
3	RFP Clause 6(a)	Period of Warranty: a). Design, Supply, Installation, Netmetering, Testing, Commissioning, Maintenance and Operations of 10kWp Capacity Rooftop Solar PV Power Plant (Hybrid Interactive Grid Tied with Battery Bank) with Ten years Comprehensive Warranty (including battery) and Comprehensive Maintenance Contract for 5 years after completion of 10 years warranty period (excluding battery replacement)	Shall be read as "Period of Warranty: a). Design, Supply, Installation, Netmetering, Testing, Commissioning, Maintenance and Operations of 10kWp Capacity Rooftop Solar PV Power Plant (Hybrid Interactive Grid Tied with Battery Bank) with 10 years Comprehensive Warranty for Solar PV Power Plant & Accessories, 5 Years for batteries and 25 Years of Performance Warranty for Solar PV Modules''						

ANNEXURE - 15

<u>Technical Specification of 10kWp Capacity Rooftop Solar PV Power Plant (Hybrid</u> <u>interactive grid tied with battery bank)</u>

A. Configuration of Solar Plant:

- 1. The system shall feed the solar energy to the load as well as charge the batteries and excess power will feed to the grid.
- 2. In case of low solar irradiation or cloudy weather, the deficit power is taken from the Batteries/grid or DG.
- **3.** The ON Grid system shall feed the solar energy to the load and excess power will feed to the grid.
- 4. System configuration must conform to Indian grid system (3-phase, neutral & earth). Technical Specifications enumerated below should be followed during various stages like design, construction, commissioning and maintenance.
- 5. The configuration of Solar Plant with (2) hours battery backup is as follows:

Sl.No.	Grid interactive Hybrid rooftop Solar power plant capacity in KW	Grid Interactive Solar Hybrid inverter in KW	Total Minimum VAH of Low Maintenance Tubular battery	Battery backup hour's
1	2	3	4	5
1	10KW- 3Phase	10KW	28800 VAH	2 Hours

- 6. The capacity of the system is defined as the total capacity of solar modules.
- 7. The grid Interactive Hybrid solar PV power plant comprises of solar PV modules with Hybrid inverter should have inbuilt MPPT should charge the battery and converts solar DC power to AC power & feeds AC power to electrical loads and feeding the excess generated electricity to the grid of Distribution Licensee through NET metering facility. The connectivity should be as per ESCOM's Guidelines as per KERC (Implementation of solar rooftop Photovoltaic power plants) Regulations 2016.
- 8. The plant should be sized based on the availability of shade free area for installing solar module array and the feasibility to connect to the grid by the distribution licensee.
- 9. The system should be connected to the mains -Single phase/three phase through a net/export-import meter tested and approved by a lab approved by the Distribution Licensee. Another Energy meter (or existing unidirectional meter) also has to be installed between the Inverter and the point of interconnection , to record electricity generated from Solar power plant if required by ESCOM's

- 10.Technical compliance certificate/ Test report from the approved laboratory of MNRE, NABL, IEC, BIS accredited has to be submitted for the main system components (solar PV module, Hybrid Inverter & Tubular Battery) of all the models proposed.
- 11.Grid Interactive Hybrid Solar Photo Voltaic (SPV) power plant consists of SPV array, Module Mounting Structure, Battery bank, & Hybrid Solar Inverter, AJB, DCDB, ACDB, L.A, Earth kits, Interconnect cables & Civil works. PV Array is mounted on a suitable structure. The Grid Interactive Hybrid SPV power plant should be designed to charge the battery bank as well as feed the excess power to the grid. Components and parts used in the SPV power plants including the PV modules, metallic structures, cables, junction box, switches, Hybrid Solar Inverters etc., should conform to the BIS or IEC or international specifications, wherever such specifications are available and applicable.

B. Solar PV Modules:

- 1. Only crystalline silicon cell PV modules of 300Wp or higher capacity (Indian Module) should be used in the power plant.
- 2. Each PV module used in any solar power project 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.

2.1 Name of the manufacturer of PV Module

2.2 Name of the manufacturer of Solar cells

2.3 Month and year of the manufacture (separately for solar cells and module)

2.4 Country of origin (separately for solar cell and module)

- 2.5 I-V curve for the module
- 2.6 Peak Wattage, Im, Vm and FF for the module
- 2.7 Unique Serial No. and Model No. of the module
- 2.8 Date and year of obtaining IEC PV module qualification certificate
- 2.9 Name of the test lab issuing IEC certificate

Other relevant information on traceability of solar cells and module as per ISO 9000 series.

3. The following details should be provided on the module

i. Name of the manufacturer

- ii. Month and year of manufacture
- iii. Rated Power at STC
- iv. Vmp, Imp, Voc, Isc
- 4. The PV modules must conform to the latest edition of any of the following IEC /equivalent BIS Standards for PV module design qualification and type approval: Crystalline Silicon Terrestrial PV Modules: IEC 61215 / IS14286. In addition the modules must conform to IC 61730 Part 1 requirements for

construction and Part 2 requirements for testing for safety qualification or equivalent IS.

5. PV modules interconnection diagram shall be provided after site survey.

C. Warranties for SPV Module:

1. Material Guarantee:

1.1 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 five (05) years from the date of sale to the original customer ("Customer")

1.2 Defects and/or failures due to manufacturing

1.3 Defects and/or failures due to quality of materials Non-conformity to specifications due to faulty manufacturing and/or inspection processes. If the solar Module(s) fails to conform to this Guarantee, the manufacturer will repair or replace the solar module(s), at the owners sole option.

2. Performance Guarantee: The predicted electrical degradation of power generated by SPV modules 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.

C. Battery Bank:

- 1. Batteries should be Low maintenance Tubular lead acid battery confirming to the standard of IS 13369 (NABL test report as per IS 13369 should be enclosed along with the Bid.)
- 2. Battery Bank should be designed to meet 1 hour / 2 hour backup for the rating of the Solar Hybrid inverter and total VAH should not be less than as mentioned in solar system configuration.
- 3. Suitable Anti corrosive paint coated Metal battery stand should be provided along with the battery.
- 4. Battery make should be any one of the approved brand as per Karnataka Government E-Governance Notification No. DPAR/50/EGM/2019-DS-dparegovsec (G.O.No. DPAR 50 EGM 2019 Dated: 06-09-2019.
- 5. The Battery preferred brands are Panasonic / Southern / Prime / Racket / YUASA / EXIDE / CSB / Amaron / Relicell / SF Sonic (ISO/TUV Certified) with C10 rating.

D. Grid Interactive Hybrid Solar Inverter: Hybrid solar inverter should be a combined unit comprising of MPPT charge controller, visual display, necessary protections and provision to export excess power to Grid and with option of blocking the export.

a)It should have Integrated MPPT Charge Controller.

b)It should not over charge the batteries once all the batteries are fully charged.

c)It should sustain both the temperature during winter and summer season

d)It should have protection from over voltage, under voltage, over current protection.

e)It should have short circuit protection.

f)It should be rated for continuous operation at full load.

g)It should have solar priority grid charging.

Feature	Minimum Specification
Switching Elements	IGBT/MOSFET
Type of Charge Controller	MPPT Charge Controller
Nominal Inverter Capacity	1-Phase : 1kW, 2kW, 3kW, 4kW & 5kW
	3-Phase : 10kW
Nominal Array Capacity	Equivalent/More to the Inverter Capacity.
Maximum DC Voltage	145 V DC for 1- Phase inverters and
	1000V DC for 3-Phae inverter
Mppt Voltage range	65V – 115 V DC for 1- Phase inverters
	400V-800V DC for 3- Phase inverters
Battery Nominal Volt	$\frac{<}{100}$ 48 V (due to Space constraint > 48VDC
	not accepted
Inverter Surge Rating @ 40 deg C	105% > 10 sec
Inverter Output Voltage	230V+/- 1% for single phase
	(DuringSolar/Battery Mode)
	415V +/- 1% for three phase (During
	Solar/Battery Mode)
Inverter Output Frequency	50+/-0.5Hz (Synchronized to Mains during
(Synchronization range)	grid export operation)
Grid synchronization Voltage	170V-260V (Inverter should charge the
range	battery & Inverter should able to work
	at thisvoltage range)
Grid Frequency range	50 Hz (47to 53 Hz)
Inverter Efficiency @ 40 deg C	Above 80 % for 1kw & 2kw
Nominal Load	Above 90 % for 3kw, 4kw, 5kw & 10kw
Operating Ambient Temperature	0 to 50 deg C

Humidity	95 % max. non condensing	
Enclosure	IP 20, Powder Coated	
Cooling	Forced air Cooling	
Protection	Short Circuit, Overload	
	Over Temperature Over Voltage	
Output wave form	Pure Sine Ware	
Mounting Type	Wall mounting only to save the floor	
	space	
	operation	
Dimension	Upto 5kW should not exceed (DXWXH)	
	should not exceed (DXWXH) 175 X 500	
	X 650 in mm Due to Space constraint	
	higher dimensions not	
Grid Charger Capcity	Suitable to charge the battery and feed	
	to	
	to the battery AH capacity to be	
	provided to charge the battery.	
IEC Test Certificates from lab as	per below standards should be enclosed	
	rith hid	
Environmental Testing	IEC 60068-2 (1,214,30)	
Efficiency Measurements	IEC 61683	
Safety Measurements	IEC 62109-1 & IEC 62109-2	
Anti-Islanding Protection and	IEC 62116:2014 and IEC 61727:2004	
utility interface		
Electromagnetic compatibility and	IEC 61000-3, IEC 61000-4	
electromagnetic		
interference of inverter		

In case of delay in installing the net meter there should be provision to block the export of power to grid.

E. Module Mounting Structure: Module mounting structure should be installed on the roof. Modules shall be mounted on a non-corrosive support structures towards suitable direction and inclination to maximize annual energy output. Support structure design and foundation or fixation mounting arrangements should withstand horizontal wind speed up to 150 km/hr. Module mounting structure designed to install solar panels should be made of MS hot dip galvanized. Thickness of galvanizing should be 80 μ m (Microns). Minimum clearance of Solar panels from roof should be 300 mm in case of RCC roof and it may vary based on the type of roof these modules are installed . All fasteners used to fix solar panels with module mounting structure should be of SS 304. All exposed metallic parts should be properly grounded.

- a) Suitable fastening arrangement such as grouting and calming should be provided to secure the installation against the specific wind speed.
- b) Anti-theft bolts should be used to fix the PV modules
- c) 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. Structural material shall be corrosion resistant and electrolytic ally compatible with the materials used in the module frame, its fasteners, nuts and bolts. Aluminum structures also can be used which can withstand the wind speed of respective wind zone. Necessary protection towards rusting need to be provided either by coating or anodization.
- d) The structures shall be designed to allow easy replacement of any module. The array structure shall be so designed that it will occupy minimum space without sacrificing the output from the SPV panels. The MMS should be grouted to RCC roof & civil foundation with RCC of minimum size 250mm x250mm.
- e) Array Junction Boxes (AJB)
 - I. The Array junction boxes are to be provided in the PV array for termination and connecting cables for series and parallel configuration. The Array Junction Boxes (AJBs) shall be made of GRP/FRP/Powder Coated Aluminum /cast aluminum/M.S alloy with full dust, water & vermin proof arrangement. All wires/cables must be terminated through cable lugs. The JBs shall be such that input & output termination can be made through suitable cable glands.
 - II. Each Junction Box shall have High quality Suitable capacity fuse.

F. DC Distribution Board (DCDB): DC distribution board (DCDB) shall be provided in between hybrid solar inverter and AJB. It should be equipped with suitable rating of DC MCB, for solar input from array junction box and fuse of suitable rating between hybrid solar inverter and battery and suitable capacity SPD and DC fuse should be provided and DC SPD should be connected to DC

earth, all switches, circuit breakers and connectors should comply with IEC 60947/IS 60947.

G. AC Distribution Board:

- a) AC Distribution Board (ADB) shall control the AC power from hybrid solar inverter and should have necessary AC SPD connected to AC earth.
- b) All switches and the circuit breakers, should conform to IEC 60947,
- c) Manual changeover switch from dedicated load to grid of suitable capacity should be provided to transfer the dedicated load to grid in case of power plant failure/Maintenance; any cabling work should be undertaken for bifurcation of load by the bidder as part of the project.
- d) All the Panel's shall be metal clad, totally enclosed, rigid, wall mounted, air insulated, cubical type suitable for operation on three phase/single phase, 415 or 230 volts, 50 Hz
- e) Suitable capacity AC circuit breaker for load side and for grid input to be provided.

H. Cables: Cables of appropriate size to be used in the system shall have the following additional characteristics:

- a) Shall meet IEC 60227/IS 694/IEC 60502/IS1554 standards Temp. Range: -10oC to +80oC. Voltage rating 660/1000V
- b) Excellent resistance to heat, cold, water, oil, abrasion, UV radiation and Flexible Sizes of cables between array interconnections, array to junction boxes, junction boxes to Inverter etc. shall be so selected to keep the voltage drop (power loss) of the entire solar system to the minimum. The cables (as per IS) should be insulated with a special grade PVC compound formulated for outdoor use.
- c) Cabling from customer main panel to inverter and from inverter to load distribution is in bidder scope.
- d) Segregation or bifurcation/Extra cabling of load wiring as per the inverter capacity in bidder scope.

I. Lightning Arrestor: The SPV power plants shall be provided with lightning Arrestor. 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 Lightning Arrestor connecting to suitable earth.

J. Earthing Protection: (Three separate earthing for AC side ,DC side and LA to be provided):

- a) Each array structure of the PV yard should be grounded/ earthed properly. In addition, the lighting arrester/masts should also be earthed inside the array field, hybrid solar inverter, ACDB and DCDB should also be earthed properly.
- b) Earth resistance shall not be more than 5 ohms.

H. 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 ESCOM's norms.

I. Operation Manual: An Operation, Instruction and Maintenance Manual in English should be provided with the Solar PV Power Plant. The detailed diagram of wiring and connection diagrams should also be provided with the manual.

J. Display Board: A display board of appropriate size of MS is to be erected at the plant site indicating;

Capacity of Solar Power Plant	:	10kWp Capacity Rooftop Solar PV Power Plant (Hybrid Interactive Grid Tied with Battery Bank)
Promoted by:	:	Distirct Court eCourts Phase-III Project, eCommittee, Supreme Court of India, New Delhi and High Court of Karnataka, Bengaluru.
Name of the Supplier	:	M/s
Contact Numbers		

K. Net Meter: Contractor should provide all help require for documentation with the ESCOM to G.P /RDPR. GP/RDPR will pay official fee as per ESCOM norms for NET meter application and follow up for NET meter approval. Any up gradation in the sanction load, modification in the existing Electrical setup, and all other liasoning work pertaining to the successful implementation of this project shall be in the scope of the RDPR department.

L. Training of End user: The supplier/contractor shall train the users for the operation & maintenance of the plant.

Note: The Detailed Bill of Materials used in the project site to be submitted by the bidder location wise.

NOTE: ALL THE ABOVE SPECIFICATIONS SHOULD BE READ AS EQUIVALENT OR BETTER.