

Inspection Report of 489.1 kWp Rooftop Solar Plant Installed at DVC- Raghunathpur Thermal Power Station/Project-1, Purulia

Project Inspection Report under RfS No: SECI/C&P/RfS/MNRE/97.5MW
GCRT/R1/IND/082019

Dated: 29/08/2019 (Achievement Linked Incentive Scheme)

Date of Inspection:

A	Name of the Successful Bidder: M/s SunSource Energy Pvt. Ltd.		
B	Name of the Building Department / Organisation: DVC- Raghunathpur Thermal Power Station, Project-1		
C	Name of the Ministry: Ministry of Power		
D	Address of SPV power plant installed: DVC- Raghunathpur Thermal Power Station, Dundumi, Purulia, West Bengal		
E	Meter Consumer Number: DVC Undertaking attached		
S. No	Component	Details	Page No.
1	Installed Project capacity in (kWp)	489.1 kWp	-
2	Whether the system is installed in shadow free area or not? If not mention the details.	YES	-
3	PV modules are made in India	<p>YES</p> <p>1- Attached Undertaking form manufactures with Serial No.</p> <p>2- Attached Undertaking from bidders with Serial No.</p> <p>3- Attached Invoice copy of modules</p> <p>4- Attached Delivery challan of modules</p>	<p>1</p> <p>2</p> <p>3</p> <p>3</p>
4	Whether all major components (except inverters) are made in India	YES	-
5	Type, Make and year of manufacturing of Modules	Poly crystalline Si, Waaree, 2021	-
6	Flash Test Report for all modules (rated output power of any supplied module shall have positive tolerance in range of 5 watt)	YES (Documents attached)	4-36



[Signature]
01.02.22
Sub-Divisional Engineer (E)
USN, Electrical Division for
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7	PV module qualification test standard (IEC 61215/IS14286 / IEC 61730 / IEC 61701/IS 61701 (for highly corrosive atmosphere)	BIS certificate attached Certificate Number: R-72002038 Certificate issued by: BIS Certificate issued on: 30.12.2020 Certificate valid up to: 21.02.2023	37
8	Wattage of each module and Total No. of modules	335 Wp, 1460 Nos.	-
9	Integrated bypass diodes	YES	-
10	Representative I-V curve of modules @STC	Documents attached	38
11	Module RF identification tag (Inside /outside lamination)	YES	-
12	Whether the modules contain information about company name, serial no and year manufacturing etc.	YES (RFID information attached)	39
13	Warranty Certificates (Material Warranty/ Performance Warranty) signed and stamped by bidders	Signed and Stamped by bidder - attached	40-42
14	Protection class of Junction box of modules (IP- 65)	YES, IP-65	38
ARRAY STRUCTURE			
15	Material of structure	Hot dip galvanized MS / Steel (IS 2062: 1992) / Aluminium Al Material test report attached	44-47
16	Galvanisation of mounting structure as per IS 4759	NR Test report as per IS attached	-
17	Galvanisation thickness of mounting structure	1. 80 mm 2. Galvanisation test report as per IS - NR	-
18	Wind load calculation sheet for wind zone of the location	Designed to sustain wind speed up to 170 kmph Calculation sheet attached	48-50
19	MMS Design certified by a recognized Lab/ Institution	1. YES 2. Attach Document	51-53
20	Material of fasteners (Stainless steel)	YES	-
21	Load bearing capacity of the roof	OK (visual observation)	-
22	Minimum clearance of the structure from the roof	600 mm	-



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PCU/ Inverter			
23	Guaranteed Technical Particulars for PCU/ Inverter as per RfS	YES Test certificate attached	54-56
24	Make, rating of each inverter & No. of Inverters (AC capacity of inverter)	Solis; 30kW (01no.), 80kW (02nos.), 100kW (03nos.)	-
25	Combined Rated wattage of all inverters in Plant (Total AC rating)	490 kW	-
26	MPPT is integrated in the PCU/inverter	YES	-
27	Year(s) of manufacturing of inverters	2021	-
28	Switching devices, inverter data sheet as per RfS	YES Data sheet attached	57-59
29	Protection of Enclosure (IP) and Location of Inverters (outdoor/indoor)	IP-65/Outdoor type	57-59
30	Phase of inverter	3 phase	-
31	Whether solar PV plant is synchronized with grid	YES	-
32	Inverter standard codes IEC 61683/IS 61683, IEC 60068- 2(1, 2, 14, 30) /Equivalent BIS Std.	IEC Certificates attached Certificate Number: AK 50442845 0001/AK 50456359 0001/AK 50469617 0001 Certificate issued by: TUV Rheinland/TUV Rheinland/ TUV Rheinland Certificate issued on: 03.09.2019/31.12.2019/29.05.2020 Certificate valid up to: NA	60-65
33	Anti-Islanding (IEEE 1547/UL1741/IEC 62116)	IEC Certificates attached Certificate Number: AK 50442843 0001/ AK 50456354 0001/AK 50469622 0001 Certificate issued by: TUV Rheinland/ TUV Rheinland/TUV Rheinland Certificate issued on: 23.08.2019/31.12.2019/29.05.2020 Certificate valid up to: NA	60-65
34	Serial Numbers of installed inverters	110212216030103 (100kW) 110D12208030002 (30kW) 110212216030089 (100kW) 110BE2218090008 (80kW) 110212216030072 (100kW)	-



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		110BE2218090029 (80kW)	
DCDB /Junction Boxes (if required) (NOT APPLICABLE)			
35	GTP of JB as per RfS (duly signed by bidder and manufacturer)	NA	-
36	IP protection level	NA	-
37	Bus bar material of DCDB	NA	-
38	MCB/MCCB installed	NA	-
39	Surge arrester, SPDS	NA	-
40	Material of sheet and thickness	NA	-
41	Test report of DCDB	NA	-
42	Height of junction box	NA	-
43	Glands type	NA	-
44	JB Earthing provision	NA	-
AC DISTRIBUTION PANEL BOARD/ LT Panel			
45	All switches and the circuit breakers, connectors standards IEC 60947, part I, II and III/ IS60947 part I, II and III)	YES, (document attached)	66
46	IP protection (Minimum 54 or better)	YES	-
47	Material of LT panel and its details	Detail BOM attached.	67-69
48	Change over switch	YES	-
49	Proper Earthing of ACDB (As per IS 3043-1987)	YES	-
50	Surge protections	YES (Data sheet attached)	70-71
51	Height of LT panel form ground	Min. 600 mm	-
52	Test report of ACDB as per IE Rules	YES - document attached	72-
Lightening arrester			
53	Proper Lighting arrester installed (As per NFC 17-102:2011/ IEC 62561)	YES Document attached	73-74
Cables			
54	Meets IEC 60227/IS 694, IEC	YES, document attached	75-77



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	60502/IS1554 standards (or other as applicable)	Certificate Number: Certificate issued by: Certificate issued on: Certificate valid up to:	
55	Cable dimension and Material 1- Modules to inverters, 2- Inverter to LT panels,	1- 1C x 4 sqmm, Material - Copper (All buildings) 2a- 4Cx16 sqmm & 4Cx70 sqmm, Material- Copper (Admin. Bldg.) 2b- 4Cx50 sqmm & 4Cx70, Material- Copper (Store Bldg.)	—
56	Voltage drop in DC cable (Modules to inverters)	2 %	—
57	Voltage drop in AC cable (inverter to LT panel or T/F)	2 %	—
58	Cable Routing/ Marking (GI cable tray and suitably tagged and marked with proper manner by good quality ferrule)	YES	—
Solar Plant Monitoring			
59	Solar Irradiance sensor mounted on Plane of the array.	YES	—
60	Irradiance Sensor calibration certificate	Document attached Certificate Number: — Certificate issued by: Meteo Control Certificate issued on: 22.07.21 Certificate valid up to: 22.07.23	78
61	Temperature sensor	YES	79-80
62	Online Monitoring mechanism for the installed system	YES	81
Transformer (If required)			
63	Transformer rating, Type etc.	Not Applicable	—
Miscellaneous			
64	Earthing and protections (Array Structure, PCU, ACDB and DCDB) IS:3043-1987	OK	—
65	Earthing Resistance less than 5 ohms	YES, values.....ohms Sheet attached	82
66	NOC from the Concerned DISCOM for the connectivity, technical feasibility, and synchronization of SPV plant	Under Process	—
67	Bidirectional meters installed (for net metering)	Under Process	—
68	Accuracy and burden of Meters	0.5S	—



[Signature]
01.02.22
Sub-Divisional Engineer (E)
ESNL Electrical Sub-Division
Purulia

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69	Danger boards and signages	YES	-
70	Fire extinguishers & Sand Buckets	YES	-
71	Tools & Tackles and spares	YES	-
72	O&M manual available at site	YES	-
73	Display Board	YES	-
Drawings at Site			
74	Layout of solar Power Array As built drawing (A3 Sheet)	Attached	83-84
75	Shadow analysis of the roof	Attached	83-84
76	Single line diagram of plant (SLD) A 3 sheet)	Attached	85-86
77	Structural drawing along with foundation details for the structure (A3 Sheet)	Attached	87-88
78	Itemized bill of material for complete SPV plant covering all the components and associated accessories. The country of manufacturing needs to be mentioned for all major components like modules, inverters, cables, mounting structure, switchgear, SCADA system etc.	Attached	89-91
79	Soft copy in CD of final drawing	Attached	-
80	Photo Graphs of sites	Attached	-
81	Any specific problem(s)	None	-
82	Recommendations		-

Format for Performance Ratio (PR)

"Performance Ratio" (PR) means the ratio of plant output versus installed plant capacity at any instance with respect to the radiation measured.

$$PR = \frac{\text{Measured Output in kW}}{\text{Installed capacity in kW} \times \text{Measured radiation intensity in kW/m}^2} \times 100$$

Parameters	Input value	Remarks, if any
Date and Time for PR measurement	Date - 01.02.22	Time - 2:00 PM



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A) Installed Plant Capacity in kW	489.1	
B) Measured output in kW	285.14	
C) Measured radiation intensity in W/m ²	713	
Performance Ratio (%) ($\frac{B \times 1000}{A \times C} \times 100$)	$= \frac{285.14 \times 1000}{713 \times 489.1} \times 100$	= 61.76 %

Declaration:

1. It is to certify that all the information given above is true and correct to best of our knowledge. The plant is found to be installed as per the technical specifications mentioned in SECI's RfS No.: SECI/C&P/RfS/MNRE/97.5MW GCRT/R1/IND/082019 dated: 29/08/2019.
2. The Bidder declares that they including their Affiliate/Group company will not claim any subsidy/incentive using this project under any other schemes of Central/State Govt./Public sector Undertaking.

Signature of Inspecting Officer, Date & Name

Name - Arvind Prakash Yadav

Arvind Prakash Yadav
01.02.22
Sr. Divisional Engineer (E)
Renewable Energy & Energy Efficiency
Damodar Valley Corporation

Signature of Representative of Bidder, Date & Seal



Signature of Government Building Representative, Date & Seal - Conforming installation of rooftop solar plant at their building and its satisfactory operation

Dharmendra Sharma

धर्मन्द्र शर्मा/Dharmendra Sharma
उप मुख्य अभियंता/Dy. Chief Engineer
अक्षय ऊर्जा और ऊर्जा दक्षता/Renewable Energy & Energy Efficiency
दामोदर घाटी निगम/Damodar Valley Corporation

Rajib Khan

राजीव खान/Rajib Khan
वरिष्ठ मंडलीय अभियंता (वि)/Sr. Divisional Engineer (E)
अक्षय ऊर्जा और ऊर्जा दक्षता/Renewable Energy & Energy Efficiency
दामोदर घाटी निगम/Damodar Valley Corporation