

SECTOR CONSULTANT REPORT



Name of Owner: M/s. Karkambh Park SPV4 LLP

Plant Location: - Gut No. 96, Village- Karkamb, Taluka- Pandharpur, District – Solapur,
PIN Code- 413 302, State-Maharashtra, Country-India.



Report Prepared For
State Bank of India

Udyamngar Industrial Estate Branch, Kolhapur

Near Hutatma Park, Shivaji Udyam Nagar, Kolhapur, PIN Code-416 008, State -
Maharashtra, Country - India.


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1. PREAMBLE

Relationship Manager, State of India, Udyamngar Industrial Estate Branch, Near Hutatma Park, Shivaji Udyam Nagar, Kolhapur, PIN Code-416 008, State - Maharashtra, Country - India has appointed **M/s Vastukala Consultants (I) Pvt. Ltd. (VCIPL)** as Sector Consultant for providing sector consultant report 3.5 MW_{DC} Grid-connected Solar Photovoltaic Power Project of Rs. 17.87 Crores by **M/s. Karkambh Park SPV4 LLP**, (hereinafter referred to as either "KARKAMBH" or "the borrower" or "the company") on behalf of lenders. **M/s. Karkambh Park SPV4 LLP** is the borrower and the project is proposed to be financed by State Bank of India. The means of Finance provided by the company is as under:

(Rs in Crs)		
S. No	Particular	Amount
1	Debt	12.51
2	Own Contribution	5.36
	Total	17.87

Pursuant to instructions from Relationship Manager of **State of India**, Udyamngar Industrial Estate Branch, Near Hutatma Park, Shivaji Udyam Nagar, Kolhapur, PIN Code-416 008, State - Maharashtra, Country - India, as appointment of Sector Consultant for 3.5 MW_{DC} grid-connected Solar Photovoltaic Power Project at Gut No. 96, Village- Karkamb, Taluka- Pandharpur, District – Solapur, PIN Code- 413 302, State-Maharashtra, Country-India, submitting the sector consultant report for the project as under.




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2. ASSIGNMENT OVERVIEW

2.1 NATURE OF ASSIGNMENT

To provide the Sector Consultant report of the 3.5 MW_{DC} grid-connected Solar Photovoltaic Power Project at Gut No. 96, Village- Karkamb, Taluka- Pandharpur, District – Solapur, PIN Code- 413 302, State-Maharashtra, Country-India to be developed by M/s. Karkambh Park SPV4 LLP

2.2 SCOPE OF WORK: -

The scope of work is as per work order provided by the Bank is under: - 

- Vetting of project cost
- Suitability of technology proposed to be adopted
- Credentials of technology/equipment supplier and EPC Contractor
- Power evacuation arrangement

2.3 DOCUMENTS PROVIDED FOR VALUATION: -

The following documents were perused during the said assignment:

- Detailed for the proposal.
- Certificate of Incorporation dated 22.06.2024.
- GST Registration Certificate.
- PAN Card.
- Udyam Registration Certificate.
- Limited Liability Partnership agreement from Karkambh Park SPV 4 LLP dated 29.06.2024.
- Lease deed made dated 31.01.2025 between Shri Pradeep Rukubdas Purvat, Shri Prabalkumar Rukubdas Purvat, Shri Kanhaiyalal Rukubdas Purvat (Lessor) and M/s. Karkambh Park SPV 4 LLP (Lessee) for land admeasuring 1 Hector and 20 Aar for the period of 28 years 11 months from the date of singing of Lease Deed.
- Lease deed made dated 04.09.2024 between Shri Amol Pramod Purvat, Shri Shobha Pramod Purvat, Shri Sachin Pramod Purvat (Lessor), Shri Anita Amit Kangale and M/s. Karkambh Park SPV 4 LLP (Lessee) for land admeasuring 0 Hector and 70 Aar for the period of 28 years 11 months from the date of singing of Lease Deed.

- Lease deed made dated 28.08.2024 between Shri Prakash Shantinath Purvat, Shri Prafulrani Rajkumar Yenegure and M/s. Karkambh Park SPV 4 LLP (Lessee) for land admeasuring 1 Hector and 40 Aar for the period of 28 years 11 months from the date of signing of Lease Deed.
- Lease deed made dated 07.02.2024 between Shri Dhaval Rukubbdas Purvat, Shri Chandrashekhar Rukubdas Purvat, Shri Umakant Rukubdas Purvat and Others and M/s. Karkambh Park SPV 4 LLP (Lessee) for land admeasuring 2 Hector and 00 Aar for the period of 28 years 11 months from the date of signing of Lease Deed.
- Layout Plan
- Unsigned EPC Contract Order for Solar EPC Service 3.50 MWp Solar PV Power Project with Tracker Structure System made between Karkambh Park SPV 4 LLP and Ztric India Pvt. Ltd.
- Single Line Diagram of 220/33 kV Sub-Station CC Karkamb (Dist.-Solapur)
- Agreement for exclusive rights for development of the 25 MW Grid connectivity dated 29.11.2023.
- Power Purchase Agreement dated 21.06.2024 made between M/s. Karkambh Park SPV4 LLP (“Power Producer”) and M/s. SFS Group India Pvt. Ltd. (“Offtaker”) for procurement of 3.50 MW_{DC} Solar Power for the period of 25 years from the COD.
- PV SYST Report.

2.4 METHODOLOGY ADOPTED

- ❖ Study of documents for proposed project site of 3.5 MW_{DC} grid-connected Solar Photovoltaic Power Project to be implemented by KARKAMBH.
- ❖ Perusal of documents and information provided by the Company.
- ❖ Examinations of documents provided by the Company.
- ❖ Finalization of Sector Consultants Report.

3. ABOUT COMPANY & THE PROJECT

3.1. ABOUT COMPANY: -

M/s. Karkambh Park SPV4 LLP is a Limited Liability Partnership governed by the LLP Act 2008. on 22th June 2024 and is registered at Registrar of Companies, Pune.

The company has 2 partners/designated partners/key management personal Shri Rohit Jayswal and Shri Jayant Ramchandra Mhetar. Karkambh's LLP Identification Number (LLPIN) is ACH-9269.

Karkambh Park SPV 4 LLP's registered office address is Baner Flat No. B/501 Crystal, S. No. 82/1/7, Baner Gaon, Pune, Haveli, Maharashtra, India, 411 045.

BASIC INFORMATION: -

S. No	Particular	Details
1	Name of the company	Karkambh Park SPV4 LLP
2	LLPIN	ACH-9269
3	Constitution	Limited Liability Partnership
4	Listed on Stock Exchange	Unlisted
5	ROC	ROC Pune
6	Company Sub Category	Non-government company
7	Class of Company	Private
8	Date of Incorporation	22.06.2024
9	Registered Office	Baner Flat No. B/501 Crystal, S. No. 82/1/7, Baner Gaon, Pune, Haveli, Maharashtra, India, 411 045
10	Activity	Electricity, Gas, Steam and Air condition Supply
11	Location of the plant	Gut No. 96, Village- Karkamb, Taluka- Pandharpur, District – Solapur, PIN Code- 413 302, State-Maharashtra, Country-India

S. No	Particular	Details
12	Promoter / Directors	Shri. Rohit Jayswal- Designated Partner Shri Jayant Ramchandra Mhetar- Designated Partner

3.2) ABOUT THE PROJECT

M/s. Karkambh Park SPV4 LLP is a RESCO (Renewable Energy Service Company) incorporated on 22.06.2024 with its main objective of setting up solar power plants of 3.5 MWp. The SPV is presently in the process of setting up a 3.5 MWp Solar Project in Karkambh Solar Park, Pandharpur. The SPV is formed between Sponsor Lokgreen Karkambh Park LLP (74%) and Off-taker (Captive Consumer) SFS Group India Private Limited (26%). SFS Group India Private Limited (erstwhile Indo Schottle Auto Parts Private Limited) is a A+ rated Denmark based MNC. The SPV is formed to provide long term Power Supply to the off-taker for a term of 25 years under a binding Power Purchase Agreement.

M/s. Karkambh Park SPV4 LLP is proposed to develop 3.5 MW_{DC} grid-connected Solar Photovoltaic Power Project at Gut No. 96, Village- Karkamb, Taluka- Pandharpur, District – Solapur, PIN Code- 413 302, State-Maharashtra, Country-India. The 3.5 MW_{DC} grid-connected Solar Photovoltaic Power Project will be based on Bifacial - N Type PV Module Technology and String Inverters Technology.

The company has executed a Lease Deed pertains to a parcel of agricultural land admeasuring 5 Hector 30 Are for a duration of 28 years 11 months commencing from the date of signing of Lease deed. The land is situated at Gut No. 96, Village- Karkamb, Taluka- Pandharpur, District – Solapur, PIN Code- 413 302, State-Maharashtra, Country-India.

The Google location of the Solar Plant is as under:-



Longitude Latitude: 17°51'36.5"N 75°18'51.6"E

KARKAMBH is in the final state of signing Power Purchase Agreement M/s. Karkambh Park SPV4 LLP ("Power Producer") and M/s. SFS Group India Pvt. Ltd. ("Offtaker") for procurement of 3.50 MW_{DC} Solar Power for the period of 25 years from the COD at the rate of Rs 3.85/- per unit fixed for the entire term for supply of energy generated from 3.5 MW_{DC} grid-connected Solar Photovoltaic Power Project.

Total estimated project cost provided by the party is as under:-

S. No	Item	Basic Cost (Rs. In Crs)	GST @ 13.8 % (Rs. In Crs)	Total Cost (Rs. In Crs)
1	3.50 MWp DC Rayzon / Premier make Bifacial - N Type Solar Power Plant including Land	15.70	2.17	17.87
	Total	15.70	2.17	17.87

MEANS OF FINANCE

(Rs in Crs) 

S. No	Particular	Amount
1	Debt	12.51
2	Own Contribution	5.36
	Total	17.87

OBSERVATIONS: -

- Party has applied for the term loan at State Bank of India Industrial Estate Chikalthana Branch.

3.3) VENDOR:-

The Vendor for the proposed project as per EPC is as under:-

S. No	Particular	Vendor
1.	Solar Vendor/EPC Contractor	Ztric India Pvt Ltd CIN: U74990PN2016FTC158151 Incorporated on 29.01.2016
2.	Solar Module	3500KWp, DC Mono PERC, 144 Cells make Premier Solar PV Module – 580 Wp
3.	Structure	Tracker-STL-84BT (1PX84)-65 Nos

S. No	Particular	Vendor
		Tracker-STL-56BT (1PX56)-11 Nos
4.	Inverter	Sineng Inverter:-250KW @ 45' (3/PE, 800 V) grid tied Inverter with MPPT controller.
5.	Electric Fittings	PVC Insulated IS Copper Cables (Polycab/KEI); SGI Earthing, L&T ABT and Generation Meters
6	Module Mounting Structure (Tracker)	MTE / New Energie / Sunrack / Nespro / HelioFix
7	Fasteners	Deepak fastners / Rajaratna / Vyom fasteners / ARaymond
8	Solar PV Cable	Siechem / Apar / Polycab / Lapp / KEI
9	Solar PV Connectors	Bizlink / Elcom / Multicontact / Staubli
10	LT Panel (switchgear)	ABB / L&T / C&S / LS Electric / Panels from System House
11	Power Cable LT & HT	Polycab/ KEI / KEC / Apar / Ravin / Havells / RR Kabel
12	33 kV Transformer (IDT)	Electrotherm / Ornet / Urja / Esennar / Kalpa
13	NIFPS	CTR / EASUN / Tectonic / Tri-Parulex
14	HT Panel (switchgear)	ABB / Schneider (L&T) / C&S / Megawin / Lucy Electric / Panels from System House
15	Auxiliary Transformer	Urja / Voltech / Kalpa / Nissar / The Transformer / Transcon / Aum Transformer / Esennar
16	CCTV	ADOR / Honeywell/ Panasonic/ Sony / Hikvision
17	UPS	APC / Fuji Electric / Emerson / Hitachi
18	Battery Bank	Exide / Amar Raja / HBL / Replus / Likraft
19	CT/ PT	As approved by MSEDCL
20	Energy Meter	As approved by MSEDCL
21	Plant Monitoring System (SCADA RTU Panel)	ABB / Rockwell / Trinity / Phoneix / Armax / Honeywell / Suryalogix

S. No	Particular	Vendor
22	Communication Cable (RS485)	Polycab/ Lapp/ Leoni/ Finolex/ D-Link / Calender / KEI
23	Weather Monitoring Station: Pyranomete	Suryalogix / Kipp & Zonen / Eko / Huskeflux
24	Fiber Optic Cable	Apar/ Polycab / Schneider or equivalent
25	Lightning Arrestor – ESE Type	SGI (Taran) / Sabo (Liva) / Jeff Techno / Cosmos / True Power / U-Protec
26	LA for Switchyard	Oblum / Elpro / Shreem / DCL approved
27	Earthing System	JEF / SGI / U Protec / Sabo Systems / True Power
28	Isolator	Tritech / Kiron / GR Power / GK Isolator / S & S
29	Lighting Fixtures	Bajaj / Philips / Havells / Sys

3.4) APPOINTMENT OF CONSULTANT & CONTRACTORS: -

Karkambh Park SPV 4 LLP has received the EPC from Ztric India Pvt. Ltd. for Procurement of Land & Power Evacuation and EPC for Solar PV Plant. Karkambh is in the final stage of signing the EPC Contract. The Scope of Work of EPC is as under: -

SECTION A : PROCUREMENT OF LAND

Ztric shall be making all necessary arrangements to facilitate procurement of appropriate land for the purpose of Project Land acquisition in Karkambh. The list of approvals is as under:

- To make available all revenue records for the identified land.
- To obtain necessary permissions as required for acquisition of agriculture land in your favor. To arrange for clear Title Land.
- To arrange for execution of Sale Deeds.
- Liaising for obtaining mutation in Owner's name.

S. No	Subject	Description
1.	Land Requirement	Sufficient land for 3.50 MWp with Bifacial N Type modules

S. No	Subject	Description
2.	Scope of Work	Provision of Land : Execution of Lease Deed (excluding all associated duties charges, fees and levies) registration and handing over of land.
3.	Execution Time Frame	Land shall be acquired in phase manner & timeline for Land acquisition will be 02 months from signing of LOI / PO along with advance and issuance of NTP (Notice to Proceed), whichever will be later.

SECTION B : EPC FOR SOLAR PLANT INCLUDING WORKS AND PERMITS

Design, Engineering, Procurement & Supply, Erection, Testing, Commissioning of Solar PV Project including supply of modules at site on Tracker Structure for project of 3.50 MWp (DC) at Solar Park, Solapur District in the state of Maharashtra as per the Scope mentioned in Scope Matrix as under:-

S. No	Item	ZTRIC	KARKUMBH	Remark
A	Land Requirement for Project			
1	Availability & Clear titles of land for construction of Solar Power Project	Yes		
2	Right of way for overhead transmission line for power evacuation	Yes		Common Park Facility
3	Availability of land for construction of Bay Extension Work Grid Sub-Station	Yes		Common Park Facility
B	Supply			
1	Solar PV Modules: Bifacial N Type	Yes		
2	Module Mounting Structure - Tracker	Yes		
3	MC4 compatible connectors for creating blocks of strings	Yes		
4	DC cables from each string (Modules) to String Inverter	Yes		
5	AC cable from String Inverter to LT Panel	Yes		
6	AC cable from LT Panel to Inverter Duty Transformer	Yes		
7	String Inverters	Yes		
8	Inverter Duty Transformer	Yes		
9	HT Panel	Yes		
10	LT Panel	Yes		

S. No	Item	ZTRIC	KARKUMBH	Remark
11	ACSR conductor/HT Power Cable from Transformer through HT panel to outdoor switchyard	Yes		
12	SCADA as per ZTRIC standard specifications	Yes		Common Park Facility
13	Lighting for the entire plant	Yes		
14	Earthing system for both AC and DC side inclusive of mounting structures	Yes		
15	Lightning protection for the entire solar plant	Yes		
16	UPS system	Yes		
17	Auxiliary Distribution system, distribution boards for Conversion Unit	Yes		
18	Communication cables	Yes		
19	Module cleaning system – Manual	Yes		
20	CCTV at strategic location	Yes		Common Park Facility
21	Weather Monitoring System	Yes		Common Park Facility
22	Overhead Transmission Line up to nearest existing transmission line	Yes		Common Park Facility
23	Metering arrangement at receiving substation	Yes		Common Park Facility
24	SLDC communication as per current practice	Yes		Common Park Facility
C	Transportation to Site			
	All Electrical/Mechanical equipment supplied to transport to site			
1	Facilitation for concession for taxes if available	Yes		
2	Unloading of equipment at site	Yes		
3	Open Storage at site and security for all equipment	Yes		
	All Electrical/Mechanical equipment supplied by Client to transport to site			
4	Facilitation for concession for taxes if available		Yes	
5	Unloading of equipment at site	Yes		

S. No	Item	ZTRIC	KARKUMBH	Remark
6	Open Storage at site and security for all equipment	Yes		
D	Installation, Termination, Testing and Commissioning Services			
1	Solar PV Modules: Bifacial N Type	Yes		
2	Module Mounting Structure (Tracker tilt) Hot Dip Galvanized with average 80 micron and uniform coating	Yes		
3	MC4 compatible connectors for creating blocks of strings	Yes		
4	DC cables from each string (Modules) to String Inverter	Yes		
5	AC cable from String Inverter to LT Panel	Yes		
6	AC cable from LT Panel to Inverter Duty Transformer	Yes		
7	String Inverters	Yes		
8	Inverter Duty Transformer	Yes		
9	HT Panel	Yes		
10	LT Panel	Yes		
11	ACSR conductor/HT Power Cable from Transformer through HT panel to 33kV outdoor switchyard	Yes		
12	SCADA as per ZTRIC standard specifications	Yes		Common Park Facility
13	Lighting for the entire plant	Yes		
14	Earthing system for both AC and DC side inclusive of mounting structures	Yes		
15	Lightning protection for the entire solar plant	Yes		
16	UPS system	Yes		
17	Auxiliary LT panel for Distribution system, distribution boards for Conversion Unit	Yes		
18	Communication cables	Yes		
19	Module cleaning system – Manual	Yes		
20	CCTV at strategic location	Yes		Common Park Facility
21	Weather Monitoring System	Yes		Common Park Facility

S. No	Item	ZTRIC	KARKUMBH	Remark
22	33 kV Overhead Transmission Line up to nearest existing transmission line	Yes		Common Park Facility
23	Metering arrangement at 33 kV receiving substation	Yes		Common Park Facility
24	SLDC communication as per current practice	Yes		
	Pre-Commissioning & Commissioning			
25	Pre - commissioning Checks	Yes		
26	Pre - commissioning checks of DC System	Yes		
27	Pre - commissioning checks of AC System	Yes		
	Commissioning of System			
28	Commissioning of DC System	Yes		
29	Commissioning of AC System	Yes		
30	Synchronization to grid	Yes		
E	Civil Works for Phase			
1	Site preparation to suit site construction	Yes		
	Construction of Pile foundation for Module Mounting Structure up to 1.2 Mtr depth from Ground Level having diameter of 300 mm and 150 mm capping (shall be assessed upon soil test)	Yes		
2	Perimeter Fencing – Pre-cast panel compound wall having height of 2.1 mtr from ground level including barbed wire.	Yes		Common Park Facility
3	Yard Fencing – Chain link (1.8m from FGL)	Yes		
4	Roads: • Peripheral Road – Murrum Road having width of 3.0 m along the boundary wall. Internal Road – Murrum Road having width of 4.0 m	Yes		Common Park Facility
5	Cable trench digging, and earth pit digging	Yes		
6	Foundations for Inverter Duty Transformers, 33kV switchgear panels, etc.	Yes		
7	Security Cabin (1.2 meter x 1.8 meter size and height of 2.4 meter)	Yes		Common Park Facility
8	Control Room			Common Park

S. No	Item	ZTRIC	KARKUMBH	Remark
		Yes		Facility
9	Bore-well – (Quantity as per the requirement)	Yes		
10	Main Gate - 4 mtr wide, 1 No	Yes		Common Park Facility
11	PVC Water Tank	Yes		

Bill of Entry:-

S. No	Item	Makes
1	Module (Bifacial N Type 580-590 Wp)	Rayzon / Premier
2	Inverters (String)	Sungrow/ Si-neng / Solis
3	Module Mounting Structure (Tracker)	MTE / New Energie / Sunrack / Nespro / HelioFix
4	Fasteners	Deepak fastners / Rajaratna / Vyom fasteners / A Raymond
5	Solar PV Cable	Siechem / Apar / Polycab / Lapp / KEI
6	Solar PV Connectors	Bizlink / Elcom / Multicontact / Staubli
7	LT Panel (switchgear)	ABB / L&T / C&S / LS Electric / Panels from System House
8	Power Cable LT & HT	Polycab/ KEI / KEC / Apar / Ravin / Havells / RR Kabel
9	33 kV Transformer (IDT)	Electrotherm / Ornet / Urja / Esennar / Kalpa
10	NIFPS	CTR / EASUN / Tectonic / Tri-Parulex
11	HT Panel (switchgear)	ABB / Schneider (L&T) / C&S / Megawin / Lucy Electric / Panels from System House
12	Auxiliary Transformer	Urja / Voltech / Kalpa / Nissar / The Transformer / Transcon / Aum Transforme / Esennar
13	CCTV	ADOR / Honeywell/ Panasonic/ Sony / Hikvision
14	UPS	APC / Fuji Electric / Emerson / Hitachi
15	Battery Bank	Exide / AmarRaja / HBL / Replus / Likraft
16	CT/ PT	As approved by MSEDCL
17	Energy Meter	As approved by MSEDCL
18	Plant Monitoring System (SCADA RTU Panel)	ABB / Rockwell / Trinity / Phoneix / Armax / Honeywell / Suryalogix
19	Communication Cable (RS485)	Polycab/ Lapp/ Leoni/ Finolex/ D-Link / Calender / KEI
20	Weather Monitoring Station : Pyranometer	Suryalogix / Kipp & Zonen / Eko / Huskeflux
21	Fiber Optic Cable	Apar/ Polycab / Schneider or equivalent

S. No	Item	Makes
22	Lightning Arrestor – ESE Type	SGI (Taran) / Sabo (Liva) / Jeff Techno / Cosmos / True Power / U-Protec
23	LA for Switchyard	Oblum / Elpro / Shreem / DCL approved
24	Earthing System	JEF / SGI / U Protec / Sabo Systems / True Power
25	Isolator	Tritech / Kiron / GR Power / GK Isolator / S & S
26	Lighting Fixtures	Bajaj / Philips / Havells / Syska / Proton / Crompton

The EPC Contractor **M/s Ztric India Private Limited** will supply and install solar power modules, string inverters, connectors, DC cables, power cables, modules mounting structures etc at the project site.

It is confirmed that the solar power modules being installed conforms to the list of manufacturer and models of Solar PV modules recommended under ALMM Order of Ministry of New and Renewable Energy (MNRE), Govt of India issued from time to time.

Warranty:

All original equipment warranties from OEM will be passed on back to back basis to the customer at the time of deliver.

1. Solar Modules – 10 Years Product Warranty and 25 years Linear Performance Warranty
2. Inverter – 5 Years Product Warranty
3. Structure – 5 Year Product Warranty
4. Transformer – 2 Years Product Warranty
5. Warranty for Electrical Equipment's and cables – 1 Year

Defect Liability Period:

Defect Liability for complete plant shall be for one year from the date of commissioning of the project.

Commercial Offer

S. No	Item	Basic Cost (Rs. In Crs)	GST @ 13.8 % (Rs. In Crs)	Total Cost (Rs. In Crs)
1	3.50 MWp DC Rayzon / Premier make Bifacial - N Type Solar Power Plant including Land	15.70	2.17	17.87
	Total	15.70	2.17	17.87

OBSERVATIONS: -

- Company is in final stage of signing the EPC Contract with Ztric India Pvt. Ltd. for Procurement of Land & Power Evacuation and EPC for Solar PV Plant.

3.5) LAND FOR THE PROJECT: -

The company has executed a Lease Deed pertains to a parcel of Agricultural land admeasuring 5 Hector 30 Are for a duration of 28 years 11 months commencing from the signing of Lease Deed. The land is situated at Gut No. 96, Village- Karkamb, Taluka- Pandharpur, District – Solapur, PIN Code- 413 302, State-Maharashtra, Country-India.

OBSERVATIONS: -

- Conversion of Agricultural Land to Non- Agricultural land is pending.

3.6) STATUTORY CLEARANCES AND APPROVALS: -

Status of Approvals and clearances is as under: -

S. No.	Approvals / Certifications	Status
1	Date of Incorporation	Done
2	PAN Card	Done
3	GST Certificate	Done
4	Udyam Registration Certificate	Done
5	Land Possession	Done
6	Conversion of Agricultural Land to Non- Agricultural land	Pending
7	Layout	Done
8	MEDA Registration	Not Done
9	Approval for metering specification of SME metering in respect of Solar generation	Not Done
10	Sanction of Startup power	Not Done
11	Charges of Testing of 2 nos. of ABT, 4 Quadrent, Import-Export KVAH Billing compatible meter, 0.2S Class inr/o	Not Done
12	Application with commercial HO, Mumbai	Not Done
13	Instruction from Mumbai to Local SE for Format 1	Not Done
14	1st format 1 from Local SE	Not Done
15	2 nd Format 1 form Local TQC	Not Done
16	Combined Format 1 from local	After above is done
17	Format 2 (SEM Approval), in case no meter change required	After above is done

OBSERVATIONS: -

- **Company must obtain the necessary approval and clearances for the execution of the project.**

3.7) IMPLEMENTATION SCHEDULE: -

Implementation Schedule for implementing 3.5 MW_{DC} grid-connected Solar Photovoltaic Power Project at Gut No. 96, Village- Karkamb, Taluka- Pandharpur, District – Solapur, PIN Code- 413 302, State-Maharashtra, Country-India is as under:-

S. No.	Activity	Start Date	End date	Remark
1	Order and Delivery of 6032 Solar Power Modules having capacity of 580 Wp, 11 Grid Connected Solar Inverter and other Fittings.	March 2025	May 2025	
2	Elevation for Solar Plant Structure	April 2025	June 2025	
3	Erection and Commissioning	June 2025	September 2025	

OBSERVATIONS: -

- Piling, Casting Work Structure work is in progress.
- The Solar panels will be delivered by May end and commissioning of the plant is estimated to be completed by September-2025 end and from October-2025 onwards, the plant will start generating electricity

3.8) INSURANCE: -

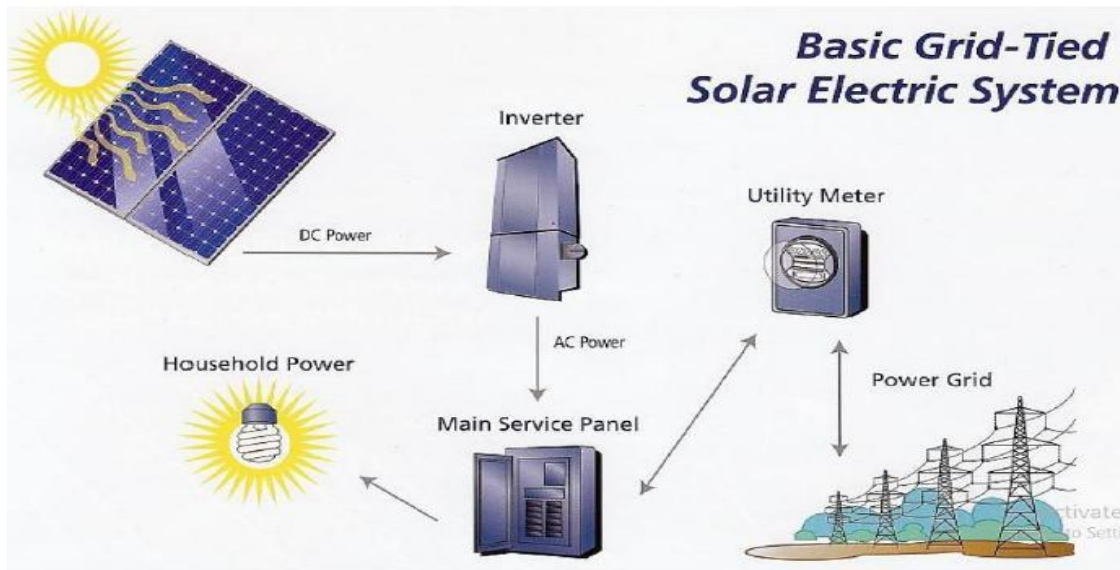
Construction activity not yet started

OBSERVATIONS: -

- Company should obtain Erection All Risk Policy before start of construction of the project.

3.9) PROCESS FLOW CHART AND MAJOR COMPONENTS:-

The Flow Chart of Basic Grid Connected Solar Electric System is as under: -



Solar Photovoltaic Power Plant consists of solar modules in series and parallel connections; these convert solar radiations into DC electrical power at the pre-determined range of Voltages whenever sufficient solar radiation is available. In order to achieve a higher system voltage, modules are installed in a series arrangement, called a string. These Strings are fed to the Central / String inverters/ Power Control Unit (PCU) to invert solar generated DC power in to conventional 3 phase AC power. AC power from inverters will be linked with the local LT power distribution box for local use or can be exported to the grid.

Solar panels mounted in the field generate DC electric power. The DC electric power generated by the solar panels cannot be used directly. The power is fed to the inverters which invert the direct current into grid compliant AC voltage. The system automatically starts up in the morning when the sun gives sufficient radiation and begins to export power to the grid, provided there is sufficient solar energy and the grid voltage, frequency is within the range. If the grid goes out of range the inverter will be immediately disconnected to avoid islanding and reconnect automatically at a pre-determined time after the grid comes back within range. The basic principle of installation of Solar PV is reduction of utility consumption (Units). The system is so designed that Solar PV generation is given preference over grid supply. The power generated can be directly consumed by interconnecting the same with the existing system.

The capacity of SPV is to be interconnected to the system based on best suited load profile of the system, which can directly reduce the Utility electricity consumption. Solar PV & Grid supply may operate in parallel as per load. However, DG & PV will not operate in parallel. i.e., Whenever grid supply fails and DG is operating at that time PV will be OFF. Or in any case when DG is operating PV will be in OFF mode.

PV Technology and Optimal Capacity: -

In order to maximize the electricity generation, the module placement is very important. As sun travels from east to west due south, modules will get maximum exposure to sun if facing south direction. In addition to this, the panels will be arranged with a uniform profile, so as to reduce shadowing effect. There would be no overlapping of panels in the power plant, and this would reduce any losses that could have occurred due to shadowing. To avoid shadow of adjacent strings of modules optimum distance has been calculated.

Solar Power Plant includes following components: -

- PV Module
- Module Mounting Structure
- DCDB
- Inverter
- Lightning Protection
- Monitoring system
- DC Cables: -
- AC cable
- Circuit breaker
- Earthing of Equipment
- Civil Works and Array Structures
- Cable trays, Pipes and Conduits
- Boundary Points

3.10) ABOUT TECHNOLOGY ADOPTED: -

The 3.5 MW_{DC} grid-connected Solar Photovoltaic Power Project will be based on Bifacial - N Type PV Module Technology and String Inverters Technology.

BIFACIAL - N TYPE PV MODULE TECHNOLOGY: -

Bifacial N-type PV modules are solar panels that can capture sunlight from both the front and the back of the panel. This allows them to generate more electricity than traditional solar panels. Features of Bifacial- N type PV Module is as under:-

- **Light capture:-** The front of the module captures direct radiation, while the back captures indirect light and reflected light from the ground.
- **Albedo:-** The amount of reflected light captured depends on the albedo, or retroreflective power, of the surface directly below the module. White or reflective surfaces have a higher albedo.
- **Glass backsheets:-** Bifacial modules often have a glass or clear backsheets to allow light to be captured from the back.

Benefits of Bifacial- N type PV Module:-

- **Increased Energy Production: -** One of the most significant benefits of bifacial glass-glass PV modules is their superior energy production. These modules can capture sunlight from both the front and rear (ground-facing) sides, making them highly efficient. When placed on a reflective surface, such as white gravel or snow, these modules can receive additional sunlight, which significantly boosts their energy output. Some studies say that bifacial modules can increase energy yield by up to 30% compared to traditional monofacial modules.
- **Higher Lifetime Energy Yield:-** Building upon the increased energy production, the bifacial nature of these modules delivers higher lifetime energy yields. This advantage becomes particularly evident in installations that are conducive to capturing reflected light. The inherent ability to harness sunlight from both sides leads to substantial gains in lifetime energy generation, setting them apart from their monofacial counterparts.
- **Enhanced Aesthetics:-** The transparent front and back covers of bifacial glass-glass modules provide a sleek, modern appearance that seamlessly integrates into various

architectural and design applications. This aesthetic appeal makes them an attractive option for both residential and commercial solar installations.

- Strictly connected to HJT and N-type technology
- Mostly in Glass-Glass configuration and Very low degradation
- The lower temperature at which the N-Type is produced
- Hi-tech production process, Best BOS and LCOE costs.

STRING INVERTERS TECHNOLOGY

String inverters are a type of solar inverter that convert direct current (DC) from solar panels into alternating current (AC). They are a cost-effective option for many solar installations.

- Solar panels are grouped into strings and connected by wires
- Multiple strings are connected to a single inverter
- The inverter converts the DC power from the strings to AC power

Advantages:-

- Easy to troubleshoot
- Low cost
- Simple system design


OBSERVATION: -

Karkambh has selected power efficient PV Module

3.11) ABOUT EPC CONTRACTOR: -

The LLP has finalised M/s Ztric India Pvt Ltd for supply and erection of the proposed 3.50 MWp Solar Power Plant. M/s Ztric India Pvt Ltd is a reputed EPC contractor with a proven track record with an experience of having completed installations of more than 100 MWp solar power

Ztric India Private Limited is a Subsidiary of Foreign Company, incorporated on 29th Jan, 2016.

ZTRIC develops custom renewable energy solutions that reduce costs and helps leave the planet a better place for future generations. We offer solar power without any investment. ZTRIC is a leading expert in the field of establishing On-grid and Off-grid solar facilities. 

The EPC Contractor **M/s Ztric India Private Limited** will supply and install solar power modules, string inverters, connectors, DC cables, power cables, modules mounting structures etc at the project site.

It is confirmed that the solar power modules being installed conforms to the list of manufacturer and models of Solar PV modules recommended under ALMM Order of Ministry of New and Renewable Energy (MNRE), Govt of India issued from time to time.

OBSERVATION: -

The major Cost for the Solar Power Plant will be Solar PV Module and Inverter. The EPC Contractor and supplier of major Equipment is reputed and well known in the industry.

3.12) POWER EVACUATION: -

220/33kV Karkamb Substation is at Koyma which is around 5 km from the solar park location

The solar PV power generated will be converted to 800 V AC using String Inverter, and then it will be stepped up to 33 kV as per the required grid level at substation. The power generated from the solar plant will be injected to 220/33kV Karkamb Substation is at Koyma which is around 5 km from the solar park location through transmission line.

The transmission line from the switch yard of the solar substation to the DISCOM substation shall be laid. This should be integrated by installing RMUs by Karkambh so that the penetration can be monitored at the connectivity substation by the SLDC on real time basis.

3.13) IRRADIATION DATA ANALYSIS: -

As per PVsyst report dated 14.08.2024, Weather data is analysed for the period of 20 years from 1996 to 2015 and the result is as under:-

Results summary					
Produced Energy	6847265 kWh/year	Specific production	1957 kWh/kWp/year	Perf. Ratio PR	85.45 %



4. NOTES, LIMITATIONS, DISCLAIMERS & CAVEATS

Notes, Limitations, Disclaimers & Caveats forms important part of the report.

- ❖ The Sector Consultant report is made for proposed project 3.5 MW_{DC} grid-connected Solar Photovoltaic Power Project, outlining the activities completed along with the status.
- ❖ Sector Consultant report is based on the discussions held with the Directors of the Company and information and explanation given & documents provided.
- ❖ The Company has provided the necessary documents. Sector Consultant has referred the same for preparation of report.
- ❖ Our report does not cover verification of ownership, title clearance, or legality and subject to adequacy of engineering / structural design. The report is delayed as compared with the visit date because of delay in receipt of documents.
- ❖ It should be noted that VCIPL's project progress assessments are based upon the facts and evidence available at the time of assessment and the documents provided. The lenders should do the progress assessment from time to time.
- ❖ The legal documents pertaining to the ownership of the properties has been referred to on its face value and that is presumed that Bank /financer have got the same verified through its legal counsel. We do not certify the veracity of the documents. This report does not certify valid or legal or marketable title of any of the parties over the property. Our report does not cover verification of ownership, title clearance, or legality and subject to adequacy of engineering / structural design.
- ❖ Our report is only for the use of the party to whom it is addressed, and no responsibility is accepted to any third party for the whole or any part of its contents.
- ❖ It is presumed that the soft copies of documents are taken from the originals duly tested and verified at the party's end.
- ❖ The progress report is made based on our visit, information furnished, discussions, documents made available at the time of visit. We presume optimistically that the project assessed by us will be a top success project. In case on a future date if the project does not come up to an expectation of the lenders and borrowers, due to various factors i.e., socio, economic and political factors in this region and country, any decrease in projections, profits, non-repayment of regular installments of loan and interest thereon, the VCIPL should not be

held responsible on a future date. The market scenario in India at particular and the whole world at large is at volatile trend since last many months and future cannot be anticipated as of date.

- ❖ Our report should be read along with disclaimers.



5. SUMMARY

Sector Consultant scope of work is as under:-

- Vetting of project cost
- Suitability of technology proposed to be adopted
- Credentials of technology/equipment supplier and PMC Contractor
- Power evacuation arrangement

Point wise comments are as under:-

5.1. VETTING OF PROJECT COST:-

As per EPC Contract the the estimated project cost is as under:-

S. No	Item	Basic Cost (Rs. In Crs)	GST @ 13.8 % (Rs. In Crs)	Total Cost (Rs. In Crs)
1	3.50 MWp DC Rayzon / Premier make Bifacial - N Type Solar Power Plant including Land	15.70	2.17	17.87
	Total	15.70	2.17	17.87

Sector Consultants Comments of Project Cost:-

A 3.5 MW bifacial solar power plant project cost would typically range between ₹12.25 Crore to ₹21.00 Crore in India, depending on the specific components, installation location, and market conditions, with the cost per MW falling somewhere between ₹3.5 Crore to ₹ 6 Crore for bifacial panels. Key factors influencing the cost:

- **Panel type:** High-efficiency bifacial panels generally cost more than standard monocrystalline panels.
- **Balance of System (BOS):** Components like inverters, cables, mounting structures, and transformers also contribute significantly to the overall cost.
- **Land acquisition and preparation:** Costs associated with land purchase, leveling, and site preparation can vary depending on the location.

- **Installation complexity:** Challenging terrain or complex project requirements can increase installation costs.

OBSERVATION: -

- We are at opinion that the project cost 3.5 MW_{DC} Grid Connected Ground Mounted Solar PV Power Plant will be Rs. 17.87 Lakhs is fair and reasonable.

5.2. SUITABILITY OF TECHNOLOGY PROPOSED TO BE ADOPTED: -

KARKAMBH has adopted Solar Photovoltaic Technology for the 3.5 MW_{DC} Ground Mounted Solar PV Plant and the detail is mentioned at **Section 3.10**.

5.3. CREDENTIALS OF TECHNOLOGY/EQUIPMENT SUPPLIER AND PMC CONTRACTOR: -

The supplier of major Vendor and EPC are reputed and well known in the industry and the details are mentioned at **Section 3.11**.

5.4. POWER EVACUATION ARRANGEMENT: -

mentioned at **Section 3.12**.

5.5. IRRADIATION DATA ANALYSIS

mentioned at **Section 3.13**.

6. OPINION

Based on the physical inspection and verification of project site, information and explanation given to us and the documents referred by us and Scope of Work, we are of the opinion that the Proposed Project 3.5 MW_{DC} Ground Mounted Solar PV Plant at Gut No. 96, Village- Karkamb, Taluka- Pandharpur, District – Solapur, PIN Code- 413 302, State-Maharashtra, Country-India by **M/s. Karkambh Park SPV4 LLP** can be considered for funding based on further Legal and financial evaluation by Bank subject to observations made in the main report.

Date:-22.03.2025

Place:- Mumbai

For **VASTUKALA CONSULTANTS (I) PVT. LTD.**

Director

Umang A Patel

Registered Valuer

Chartered Engineer (India)

Reg. No. IBBI/RV/04/2019/10803

Auth. Sign.



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