







Contents

PROJECT HIGHLIGHT

BRIEF NOTE ABOUT THE COMPANY

Main Features of the Project

Site Assessment

Solar Radiation Resource Assessment

Solar Photovoltaic Technologies

Component of PV Plant

Estimation of Annual Electrical Output

Project implementation schedule

Financial analysis

Enincon Recommendation



Main Features of the Project

- **⇒ Project promoter:- xxxxxx**
- ⇒ **Project location:-** Village, Tehsil
- ⇒ State :- Madhya Pradesh
- ⇒ Proposed technology:- Si-Poly Technology
- ⇒ Technology Supplier (PV Modules):- Waree Si-Poly Module
- ⇒ Technology Supplier (Power Condition units) :- Power Electronics
- ⇒ Design consultant:- enincon LLP
- ⇒ Plant capacity:- 5 MW
- ⇒ **PV Module Type-** Si Poly modules
- ⇒ PV Modules Required (area):- 35892 m²
- ⇒ Total Area Required: 101171 m2
- ⇒ Annual global solar radiation :- 1976 kWh/m²
- ⇒ Annual average temperature :- 25.18 C
- ⇒ Annual Gross Output :- 7896505 kWh
- ⇒ Miscellaneous PV array losses :- 1 %
- ⇒ Miscellaneous power conditioning losses :- 1 %
- ⇒ Expected CUF :- 19 %
- ⇒ Project implementation period:- 14 months
- ⇒ Estimated project cost :- Rs xxxx lakhs
- ⇒ Project IRR :- %
- ⇒ Design Optimization Software used:- RETScreen, METEONORM, PVSYST V5.72
- ⇒ Site selection:- Site identified and suitability confirmed
- ⇒ Financial closure:- On approval of the project, promoters will approach banks



Site Assessment

Abc Village (24.xx" North and 79.xx"East) is located in xx tahsil of xx district of Madhya Pradesh. xx located at 24.12 N and 79.59 E with an average elevation of 352 meters. It is surrounded by rocky, sandy and five salt ranges. It has well road and rail connectivity from abc. xxxx is planning to install a solar energy based grid connected power project in xx, Madhya Pradesh under the Madhya Pradesh Solar Policy. The identified technology is solar Si-Poly; while the capacity of proposed power plant is 5 MW. Enincon LLP has been selected by the company as project consultants and for preparation of detailed project report (DPR) of the proposed plant.

Exhibit 01: Site images for Site Assessment

GRAPHIC







Source: enincon



Solar radiation over Village x, Madhya Pradesh

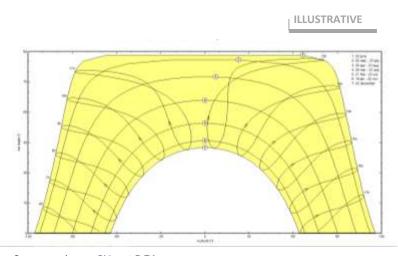
The proposed project site is situated in the x Village,x district of the Madhya Pradesh State in India. The distance from the district headquarters xx to the site is 31 km (by road) towards the north. The nearest meteorological station for solar data is in xx. The solar data collected in this station is available in the "Solar Radiation Handbook 2008", published by the Ministry of New and Renewable Energy (MNRE) and in the "Handbook of Solar Radiation", compiled by Anna Mani. In this exercise, solar data for "Global solar irradiance "is taken from NASA-SSE, Meteonorm and the "Solar Radiation Handbook 2008. Global solar irradiance for the proposed site, xx from PVsyst5.74 software.

Exhibit 02 : Stereographic Sun-path Diagram for xxxx ,Madhya Pradesh

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Source: enincon, PV syst 5.74

Exhibit 03 : Orthographic Sun-path Diagram for xxxx ,Pradesh





Monthly average daily values (average, maximum, minimum) of climatic parameters for site

Month	Air temperature	Relative humidity	Daily solar radiation - horizontal	Atmospheric pressure	Wind speed	Earth temperature
	°C	%	kWh/m²/d	kPa	m/s	°C
January	17.3	46.7%	4.23	97.7	2.7	19.1
February	20.7	41.2%	5.09	97.5	2.8	23.6
March	26.6	31.1%	5.92	97.2	2.9	30.9
April	31.9	24.5%	6.60	96.8	3.1	37.6
May	34.1	32.0%	6.51	96.4	3.3	39.6
June	31.6	55.2%	5.45	96.1	3.3	34.6
July	27.9	76.3%	4.32	96.2	2.9	29.2
August	26.6	81.5%	3.93	96.4	2.5	27.2
September	26.3	73.6%	4.51	96.7	2.4	27.2
October	25.4	50.9%	5.04	97.2	2.0	27.0
November	21.9	40.0%	4.51	97.6	2.1	23.3
December	17.9	45.4%	4.00	97.8	2.3	19.1
Annual	25.7	49.9%	5.01	96.9	2.7	28.2
Measured at (m)					10.0	0.0



Exhibit 04 : Estimation of Annual Electrical Output

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obal System configuration	⊏Global system sum	marv			
Number of kinds of sub-fields	Nb. of modules	21735	Nominal PV Power	4999 kWr	
Number of kirius of sub-fields	Module area	35892 m²	Maximum PV Power	4785 kW	
Simplified Schema	Nb. of inverters	5	Nominal AC Power	5000 kWa	
Simplified Schema 146. Of Inverters 3 Nothinal Act tower 3000 kW					
omogeneous System					
Presizing Help					
○ No Sizing Enter planned power . ☐	5000.0 kWp,	or availal	ble area C 35899	m² ?	
Select the PV module					
Sort modules C Power — C Technolo	gy — 🕟 Man	ufacturer 7	Available Now 🔻]	
230 Wp 24V Si-poly WS-230	Waaree		Photon Mag. 200	🖺 Open	
Approx. needed modules 21739 Sizing voltage	s: Vmpp (60°C) 23.	8 ∨			
	Voc (-10°C) 40 .	6 ∨			
Select the inverter				- ▽ 50 Hz	
Sort inverters by: O Power — O Voltage (n		T-			
	nax) ——— 🕟 Man	nufacturer 🍱	Prod. from 2011 ▼	▼ 60 Hz	
1000 kW 520 - 820 V 50/60 Hz FreeSun FS	·	nufacturer L		▼ 60 Hz	
1000 kW 520 - 820 V 50/60 Hz FreeSun FS	31001 HE/HEC 330V	Power El		▼ 60 Hz ③ Open	
1000 kW 520 - 820 V 50/60 Hz FreeSun FS Nb. of inverters	\$1001 HE/HEC 330V tage: 520-82	Power El		▼ 60 Hz	
1000 kW 520 - 820 V 50/60 Hz FreeSun FS	\$1001 HE/HEC 330V tage: 520-82	Power El	ectronics	60 Hz	
1000 kW 520 - 820 V 50/60 Hz FreeSun FS Nb. of inverters	\$1001 HE/HEC 330V tage: 520-82	Power El	ectronics	▼ 60 Hz ③ Open	
1000 kW 520 - 820 V 50/60 Hz FreeSun FS Nb. of inverters 5	\$1001 HE/HEC 330V tage: 520-82	Power Ele O V Glob	ectronics	▼ 60 Hz	
1000 kW 520 - 820 V 50/60 Hz FreeSun FS Nb. of inverters 5	tage: 520-82 n voltage: 100	Power Ele O V Glob	ectronics	▼ 60 Hz	
1000 kW 520 - 820 V 50/60 Hz FreeSun FS Nb. of inverters 5	tage: 520-82 n voltage: 100 Operating conditions Vmpp (60°C)	Power Elector of the control of the	ectronics	▼ 60 Hz	
1000 kW 520 - 820 V 50/60 Hz FreeSun FS Nb. of inverters 5	0 perating conditions Vmpp (60°C) Vmpp (20°C)	Power Ele 10 ∨ Glob 10 ∨ 10 ∨ 10 ∨ 10 ∨ 10 ∨ 10 ∨ 10 ∨	ectronics	▼ 60 Hz	
1000 kW 520 - 820 ∨ 50/60 Hz FreeSun FS Nb. of inverters 5 □ Operating Voll Input maximum Design the array Number of modules and strings should be Mod. in series 23 □ between 22 and 24	\$1001 HE/HEC 330V tage: 520-82 m voltage: 100 Operating conditions Vmpp (60°C) ! Vmpp (20°C)	Power Elector of the control of the	ectronics	▼ 60 Hz	
1000 kW 520 - 820 V 50/60 Hz FreeSun FS Nb. of inverters 5	0 perating conditions Vmpp (60°C) Vmpp (20°C)	Power Ele 10 V Glob 10 V 547 V 670 V 934 V	ectronics	▼ 60 Hz	
1000 kW 520 - 820 ∨ 50/60 Hz FreeSun FS Nb. of inverters 5 □ Operating Voll Input maximum Design the array Number of modules and strings **Should be** Mod. in series 23 □ ✓ between 22 and 24 Nbre strings 945 □ only possibility 945	0 perating conditions Vmpp (60°C) Vmpp (20°C) Voc (-10°C) Plane irradiance 10	Power Elicov Glob	ectronics al Inverter's power he inverter power is slig	▼ 60 Hz □ Open 5000 kWac httly oversized.	
1000 kW 520 - 820 ∨ 50/60 Hz FreeSun FS Nb. of inverters 5 □ Operating Voll Input maximum Design the array Number of modules and strings should be Mod. in series 23 □ between 22 and 24	### Company of Company	Power Elico V Globio V 5547 V 670 V 934 V 945 A Max	ectronics al Inverter's power he inverter power is slig	▼ 60 Hz	
1000 kW 520 - 820 ∨ 50/60 Hz FreeSun FS Nb. of inverters 5 □ Operating Voll Input maximum Design the array Number of modules and strings **Show sizing 945 □ Show sizing 945	### Company of the co	Power Ele 10 V Glob 10 V 547 V 5570 V 934 V 1000 W/m² 645 A Max. 515 A a	he inverter power is slig	▼ 60 Hz	
1000 kW 520 - 820 ∨ 50/60 Hz FreeSun FS Nb. of inverters 5 □ Operating Voll Input maximum Design the array Number of modules and strings Should be Mod. in series 23 □ ✓ between 22 and 24 Nbre strings 945 □ ✓ only possibility 945 Overload loss Pnom ratio 1.00	Operating conditions Vmpp (60°C) Vmpp (20°C) Voc (-10°C) Plane irradiance 10 Impp (STC) Isc (STC) State (STC) Stat	Power Ele 10 V Glob 10 V 547 V 5570 V 934 V 1000 W/m² 645 A Max. 515 A a	C Max. in data operating power to 1000 W/m² and 50°C) by nom. Power (STC)	▼ 60 Hz	



Exhibit 05 : Project report from Pvsyst V5.74

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PVSYST V5.74					07/09/14	Page 1/3
Å	Grid-Con	nected System	n: Simulatio	on parameters		
Project :	Grid-C	onnected Project	at kanti ,Mac	lhya Pradesh		
[1] (1) 전문 : 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1		dhya Pradesh Country		India		
Situation Time defined as	5 5	Latitude Legal Time Albedo	24.1"N Time zone UT 0.20	Longitude +6 Altitude	79.6°E 352 m	
Meteo data :	kanti m	nadhya pradesh, S	ynthetic Hourly	y data		
Simulation varia	nt: News	imulation variant Simulation date	07/09/14 23h	04		
Simulation param	eters					
Collector Plane O		Tilt	24"	Azimuth	0"	
Horizon	+ 847/497/578757F	Free Horizon	CPEST C	200 MILES - 100 MI	TATAL STATE OF THE PARTY OF THE	
Near Shadings		No Shadings				
PV Array Characte	eristics					
PV module	5	Si-poly Model	WS-230			
Number of PV mod Total number of PV Array global power Array operating cha Total area	modules	Manufacturer In series Nb. modules Nominal (STC) U mpp Module area	23 modules 21735	In parallel Unit Nom. Power At operating cond. I mpp		
Inverter		Model	FreeSun FS1001 HE/HEC 330V			
Characteristics Inverter pack		Manufacturer Operating Voltage Number of Inverter	Power Electro 520-820 V 5 units	nics Unit Nom. Power Total Power	1000 kW A 5000 kW A	
PV Array loss fact Thermal Loss facto => Nominal Ope	r	Uc (const) 300 W/m², Tamb=2	20.0 W/m²K 0°C, Wind=1 n	Uv (wind) n/s.) NOCT	0.0 W/m²K 56 °C	/ m/s
Wiring Ohmic Loss Module Quality Los Module Mismatch L Incidence effect, As	s .osses	Global array res.	1.3 mOhm 1 - bo (1/cos i	Loss Fraction Loss Fraction Loss Fraction - 1) bo Parameter		William .
User's needs :	u	Inlimited load (grid)				



PVSYST V5.74 07/09/14 Page 2/3 Grid-Connected System: Main results Project : Grid-Connected Project at kanti , Madhya Pradesh Simulation variant : **New simulation variant** Main system parameters System type **Grid-Connected** PV Field Orientation O° tilt 240 azimuth PV modules Model WS-230 Pnom 230 Wp 4999 kWp PV Array Nb. of modules 21735 Pnom total Inverter Model FreeSun FS1001 HE/HEC 3500/n 1000 kW ac Inverter pack Nb. of units 5.0 Pnom total 5000 kW ac User's needs Unlimited load (grid) Main simulation results System Production Produced Energy 7896505 kWh/yearSpecific prod 1580 kWh/kWp/year Performance Ratio PR 74.7 % Normalized productions (per installed kWp): Nominal power 4999 kWp Performance Ratio PR See Participands Battle Perc Sci. B. PAT New simulation variant **Balances and main results** GlobHor T Amb Globine Glober EArroy E_Grid ETTATIFE EITSYSFI kVVh/m² °C kVVh/m² kVVh/m² KVVH KWWh January 118.0 14.70 165.0 150.7 636031 625415 11.43 11.24 February 137.0 17.30 106.8 162.4 664185 653022 11.10 10.91 Moren 168.0 22.70 206.6 201.0 795143 762201 10.72 10.55 750843 737680 April 207.0 28.80 204.6 198.6 10.22 10.04 222.0 32.50 203.0 196.7 731628 710413 10.04 9.86 May June 197.0 32.90 175.1 169.0 633246 622059 10.08 9.90 July 167.0 30.30 152.8 147.5 567936 556170 10.36 10.18 August 160.0 29.90 163.1 148.0 667046 667038 10.32 10.13 September 171.0 29.50 170.0 173.7 655598 644063 10.22 10.04 26.20 October 165.0 193.8 155.5 730732 715504 10.50 10.33 November 129.0 20.90 167.5 163.0 661100 650585 10.00 10.62 December 156.9 636621 629064 115.0 16.00 162.6 11.36 11.17 Year 1976.0 26.18 2114.0 2062.0 8033309 7896606 10.59 10.41 Legende GlobHor Horizontal global irradiation Effective energy at the output of the array EArray E Grid T Amb Ambient Temperature Energy injected into grid Global incident in coll. plane Globine EFFARR Effic. Eout erray / rough area GlobEff Effective Global, corr. for IAM and shadings EffSysR Effic. Eout system / rough area



PVSYST V5.74				07/09/14	Page 3/3
	Grid-Connected Sy	stem: Loss dia	gram		
Project :	Grid-Connected Project	at kanti ,Madhya	Pradesh		
Simulation variant:	New simulation variant				
Main system parameters	System type	Grid-Connected	89 9000	p29111	
PV Field Orientation	tilt	24°	azimuth	O°	
PV modules	Model	WS-230	Pnom	230 Wp	
PV Array	Nb. of modules	21735	Pnom total	4999 kWp	
Inverter	Model	FreeSun FS1001 H	E/HEC 35900/n	1000 kW ad	
Inverter pack	Nb. of units	5.0	Pnom total	5000 kW a	
User's needs	Unlimited load (grid)				

Loss diagram over the whole year

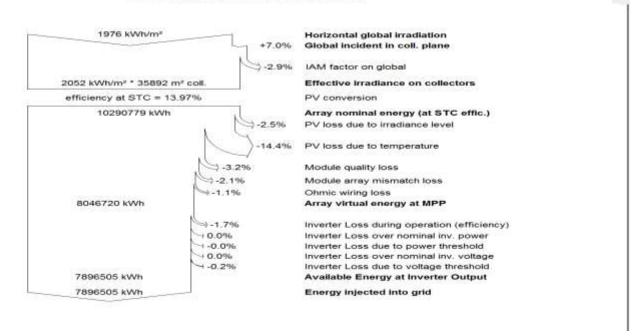




Exhibit 06 : Financial aspect of Project

TABULAR

SR.No.	PARAMETER	UNIT	VALUE
1	IRR	%	Xxxxx
2	IRR EQUITY	%	Xxxxxx
3	DSCR	%	Xxxxxx
4	PAYBACK PERIOD	YEAR	Xxxxxx
5	LEVELISED TARIFF	Kwh/Rs.	xxxxxx



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