Grid-Connected System: Simulation parameters

Project : **6_19_XXXX_JUPITER_NADIA_10MW_DE**

Geographical Site	**Bhajanghat**		Country	**India**
Situation	Latitude	23.38° N	Longitude	88.75° E
Time defined as	Legal Time	Time zone UT+5.5	Altitude	16 m
	Albedo	0.20		
Meteo data:	**Bhajanghat**	SolarGIS Monthly aver. , period not spec. - Synthetic		

Simulation variant : **SOVA_DELTA_T20°_P7.5_L1.09**

Simulation date 07/06/19 16h22

Simulation parameters	System type	**Sheds, single array**		
Collector Plane Orientation	Tilt	20°	Azimuth	0°
Sheds configuration	Nb. of sheds	50	Single array	
	Sheds spacing	7.50 m	Collector width	3.96 m
Inactive band	Top	0.02 m	Bottom	0.02 m
Shading limit angle	Limit profile angle	19.9°	Ground cov. Ratio (GCR)	52.8 %
Models used	Transposition	Perez	Diffuse	Perez, Meteonorm
Horizon	Free Horizon			
Near Shadings	According to strings		Electrical effect	100 %
User's needs :	Unlimited load (grid)			

PV Arrays Characteristics (2 kinds of array defined)

Sub-array "Sub-array #1"	Si-poly	Model	**SSL 325 Wp POLY 1500 V**		
Custom parameters definition		Manufacturer	SOVA SOLAR LIMITED		
Number of PV modules		In series	30 modules	In parallel	280 strings
Total number of PV modules		Nb. modules	8400	Unit Nom. Power	325 Wp
Array global power		Nominal (STC)	**2730 kWp**	At operating cond.	2493 kWp (50°C)
Array operating characteristics (50°C)		U mpp	1018 V	I mpp	2448 A
Sub-array "Sub-array #2"	Si-poly	Model	**SS330 72 MC**		
Custom parameters definition		Manufacturer	Sova Solar Limited		
Number of PV modules		In series	30 modules	In parallel	826 strings
Total number of PV modules		Nb. modules	24780	Unit Nom. Power	330 Wp
Array global power		Nominal (STC)	**8177 kWp**	At operating cond.	7471 kWp (50°C)
Array operating characteristics (50°C)		U mpp	1023 V	I mpp	7304 A
Total Arrays global power		Nominal (STC)	**10907 kWp**	Total	33180 modules
		Module area	**64480 m²**	Cell area	58697 m²

Inverter		Model	**Solar Inverter DelCEN 2500 HV-TT**		
Custom parameters definition		Manufacturer	Delta Power Solutions India		
Characteristics		Operating Voltage	875-1450 V	Unit Nom. Power	2500 kWac
				Max. power (=>40°C)	2750 kWac
Sub-array "Sub-array #1"		Nb. of inverters	1 units	Total Power	2500 kWac
				Pnom ratio	1.09
Sub-array "Sub-array #2"		Nb. of inverters	3 units	Total Power	7500 kWac
				Pnom ratio	1.09
Total		Nb. of inverters	4	Total Power	10000 kWac

PV Array loss factors

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Array Soiling Losses			Loss Fraction	1.5 %
Thermal Loss factor	Uc (const)	29.0 W/m²K	Uv (wind)	0.0 W/m²K / m/s
Wiring Ohmic Loss	Array#1	4.6 mOhm	Loss Fraction	1.0 % at STC
	Array#2	1.6 mOhm	Loss Fraction	1.0 % at STC
	Global		Loss Fraction	1.0 % at STC
LID - Light Induced Degradation			Loss Fraction	2.0 %
Module Quality Loss			Loss Fraction	0.0 %
Module Mismatch Losses			Loss Fraction	1.0 % at MPP

Incidence effect (IAM): User defined profile

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.992	0.972	0.950	0.904	0.857	0.762	0.476	0.000

System loss factors

AC wire loss inverter to transfo	Inverter voltage	600 Vac tri		
	Wires: 3x10000.0 mm²	176 m	Loss Fraction	1.0 % at STC
External transformer	Iron loss (Night disconnect)	10853 W	Loss Fraction	0.1 % at STC
	Resistive/Inductive losses	0.299 mOhm	Loss Fraction	0.9 % at STC

Grid-Connected System: Near shading definition

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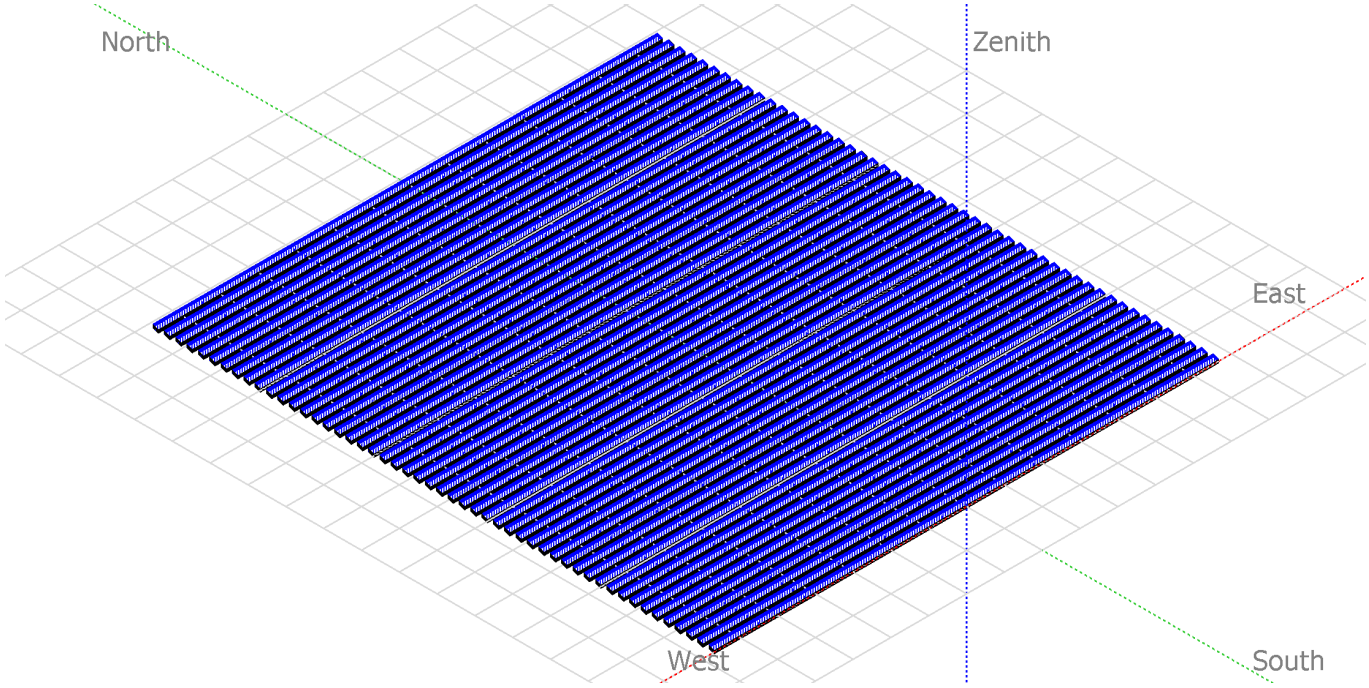
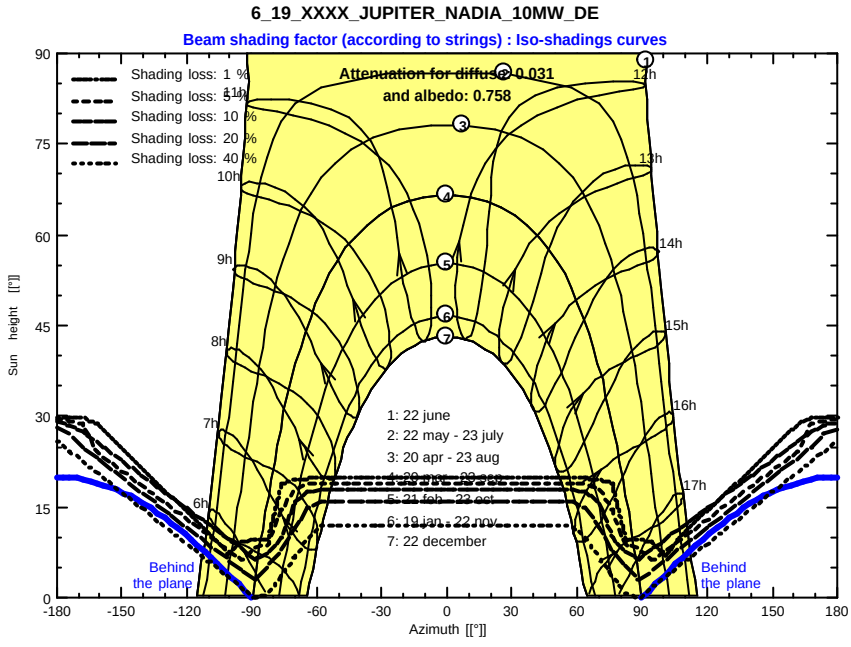
PV modules	Model	SSL 325 Wp POLY 1500 V	Pnom	325 Wp
PV modules	Model	SS330 72 MC	Pnom	330 Wp
PV Array	Nb. of modules	33180	Pnom total	**10907 kWp**
Inverter		Solar Inverter DelCEN 2500 HV-TT	Pnom	2500 kW ac
Inverter pack	Nb. of units	4.0	Pnom total	**10000 kW ac**
User's needs	Unlimited load (grid)			

Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram



Grid-Connected System: Main results

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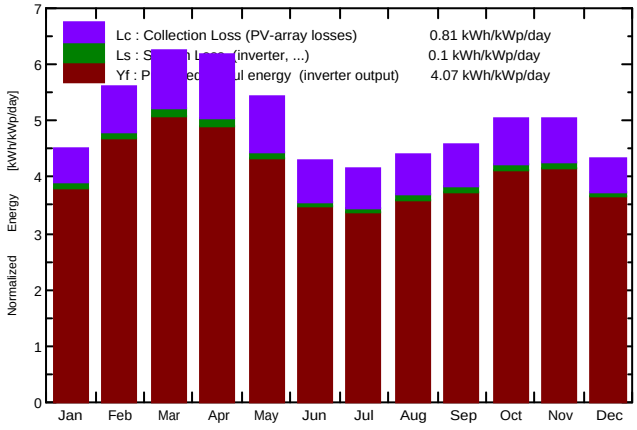
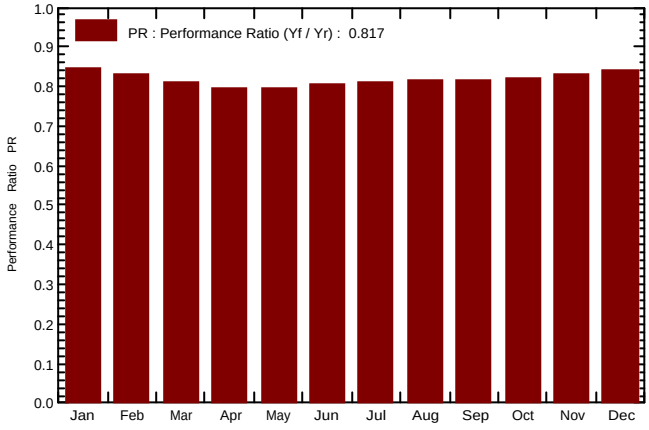
Main simulation results

System Production	**Produced Energy**	**16189 MWh/year**	Specific prod.	1484	kWh/kWp/year
	Performance Ratio PR	81.68 %			

Normalized productions (per installed kWp): Nominal power 10907 kWp



Performance Ratio PR



SOVA_DELTA_T20°_P7.5_L1.09

Balances and main results

	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray MWh	E_Grid MWh	PR
January	116.3	65.4	18.40	139.6	130.6	1316	1286	0.844
February	135.2	65.5	22.10	157.0	147.7	1461	1427	0.833
March	178.5	81.5	27.20	193.9	182.3	1759	1717	0.812
April	182.7	92.7	31.70	185.0	173.3	1645	1606	0.796
May	176.6	102.9	32.80	168.4	156.8	1495	1459	0.794
June	137.9	91.2	30.80	129.3	119.8	1166	1137	0.806
July	136.0	89.3	28.60	128.5	119.0	1167	1136	0.811
August	139.0	88.7	28.30	136.6	126.9	1243	1212	0.814
September	132.6	78.9	27.90	137.4	128.1	1250	1219	0.813
October	138.9	71.9	26.30	155.9	146.2	1427	1393	0.819
November	125.5	63.3	23.10	150.8	141.6	1397	1364	0.830
December	110.6	62.9	19.39	134.7	126.0	1262	1232	0.839
Year	1709.8	954.2	26.40	1817.1	1698.5	16589	16189	0.817

Legends:

GlobHor	Horizontal global irradiation	GlobEff	Effective Global, corr. for IAM and shadings
DiffHor	Horizontal diffuse irradiation	EArray	Effective energy at the output of the array
T_Amb	Ambient Temperature	E_Grid	Energy injected into grid
GlobInc	Global incident in coll. plane	PR	Performance Ratio

Grid-Connected System: Loss diagram

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Loss diagram over the whole year