Version 7.1.4

PVsyst - Simulation report

Grid-Connected System

Project: Norbut - Enfield

Variant: BV400_CPS125_SAT
Tracking system with backtracking
System power: 7498 kWp
Enfield_SA34_GHIAvgmths - United States

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Project: Norbut - Enfield

Variant: BV400_CPS125_SAT

Namaste Solar (United States)

Project summary

Geographical Site
Enfield_SA34_GHIAvgmths
United States

Situation

Latitude	42.45 °N
Longitude	-76.65 °W
Altitude	387 m
Time zone	UTC-5

Meteo data
Enfield_SA34_GHIAvgmths
SA34: TGY - TMY

Monthly albedo values

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Albedo	0.79	0.77	0.57	0.28	0.20	0.20	0.20	0.20	0.20	0.20	0.41	0.67

System summary

Grid-Connected System

Tracking system with backtracking

PV Field Orientation
Tracking plane, horizontal N-S axis
Axis azimuth 0 °

Near Shadings
According to strings
Electrical effect 100 %

User's needs
Unlimited load (grid)

System information

PV Array

Nb. of modules	18746 units
Pnom total	7498 kWp

Inverters

Nb. of units	40 units
Pnom total	5000 kWac
Pnom ratio	1.500

Results summary

Produced Energy	10013 MWh/year	Specific production	1335 kWh/kWp/year	Perf. Ratio PR	81.35 %

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General parameters

Grid-Connected System

Tracking system with backtracking

PV Field Orientation

Orientation		Backtracking strategy		Models used	
Tracking plane, horizontal N-S axis		Nb. of trackers	56 units	Transposition	Perez
Axis azimuth	0 °	**Sizes**		Diffuse	Imported
		Tracker Spacing	5.03 m	Circumsolar	separate
		Collector width	2.03 m		
		Ground Cov. Ratio (GCR)	40.3 %		
		Backtracking limit angle			
		Phi limits	+/- 66.1 °		

Horizon	Near Shadings	User's needs
Free Horizon	According to strings	Unlimited load (grid)
	Electrical effect 100 %	

PV Array Characteristics

PV module

Manufacturer	BOVIET
Model	BVM6612M-400L--H-HC
(Custom parameters definition)	
Unit Nom. Power	400 Wp
Number of PV modules	18746 units
Nominal (STC)	7498 kWp
Modules	721 Strings x 26 In series
At operating cond. (50°C)	
Pmpp	6808 kWp
U mpp	947 V
I mpp	7189 A

Inverter

Manufacturer	Chint Power Systems
Model	CPS SCA125KTL-DO/US-600
(Custom parameters definition)	
Unit Nom. Power	125 kWac
Number of inverters	40 units
Total power	5000 kWac
Operating voltage	870-1300 V
Pnom ratio (DC:AC)	1.50

Total PV power

Nominal (STC)	7498 kWp
Total	18746 modules
Module area	38131 m²
Cell area	34013 m²

Total inverter power

Total power	5000 kWac
Nb. of inverters	40 units
Pnom ratio	1.50

Array losses

Array Soiling Losses

Average loss Fraction 2.3 %

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
7.3%	6.3%	4.3%	1.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.1%	1.9%	5.4%

Thermal Loss factor

Module temperature according to irradiance

Uc (const) 29.0 W/m²K

Uv (wind) 0.0 W/m²K/m/s

DC wiring losses

Global array res. 2.2 mΩ

Loss Fraction 1.5 % at STC

Serie Diode Loss

Voltage drop 0.7 V

Loss Fraction 0.1 % at STC

LID - Light Induced Degradation

Loss Fraction 2.0 %

Module Quality Loss

Loss Fraction -0.8 %

Module mismatch losses

Loss Fraction 1.0 % at MPP

Strings Mismatch loss

Loss Fraction 0.1 %

Array losses

IAM loss factor

Incidence effect (IAM): Fresnel AR coating, n(glass)=1.526, n(AR)=1.290

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.999	0.987	0.962	0.892	0.816	0.681	0.440	0.000

AC wiring losses

Inv. output line up to MV transfo

Inverter voltage	600 Vac tri
Loss Fraction	1.5 % at STC

Inverter: CPS SCA125KTL-DO/US-600

Wire section (40 Inv.)	Copper 40 x 3 x 70 mm²
Average wires length	110 m

AC losses in transformers

MV transfo

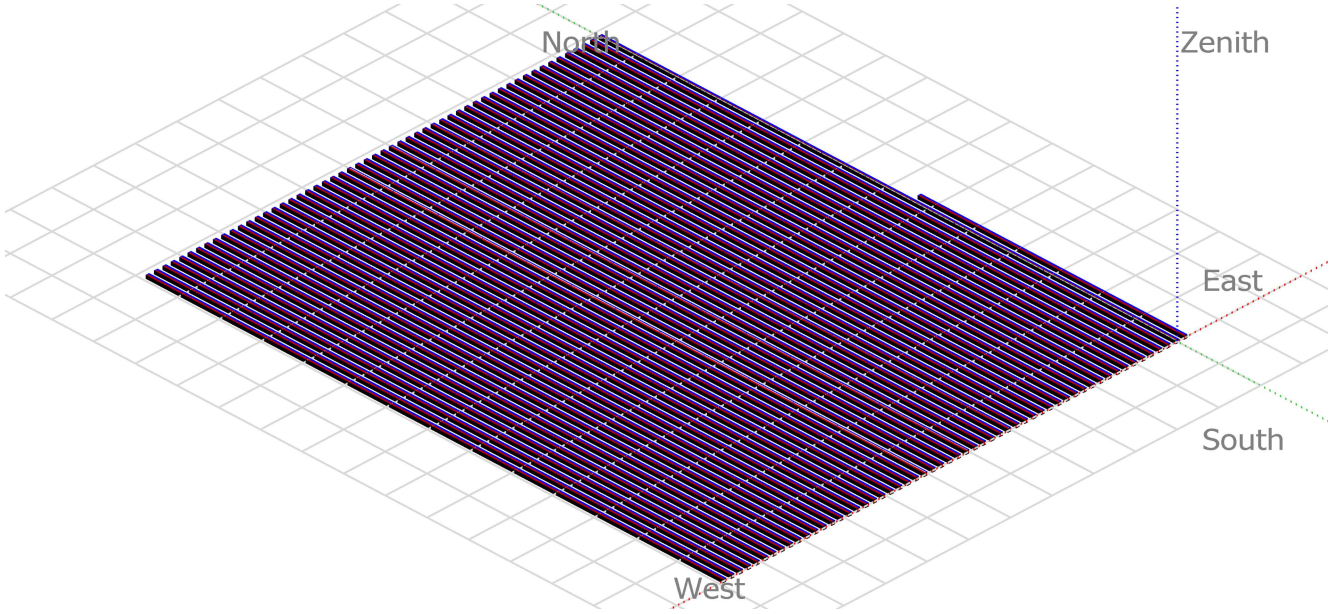
Grid Voltage	20 kV

Operating losses at STC

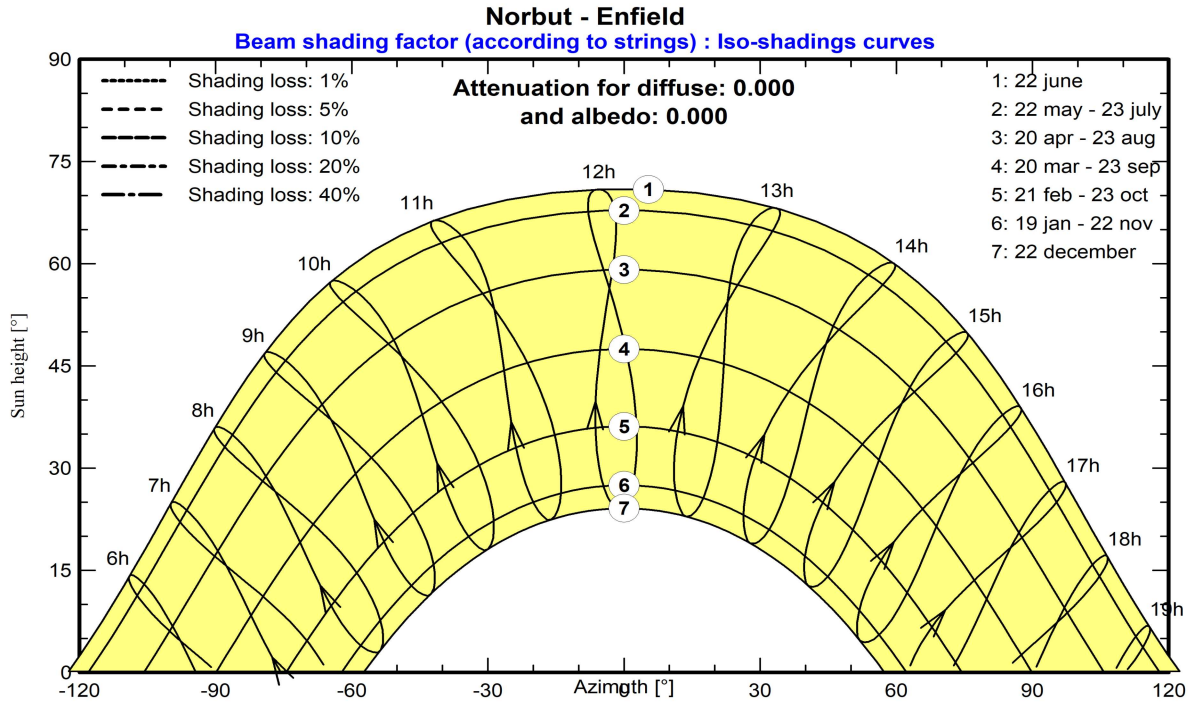
Nominal power at STC (PNomac)	7337 kVA
Iron loss (24/24 Connexion)	7.34 kW
Loss Fraction	0.1 % at STC
Coils equivalent resistance	3 x 0.49 mΩ
Loss Fraction	1.0 % at STC

Near shadings parameter

Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram

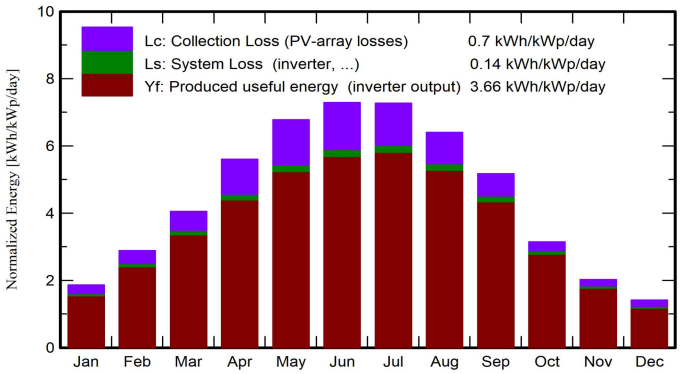


Main results

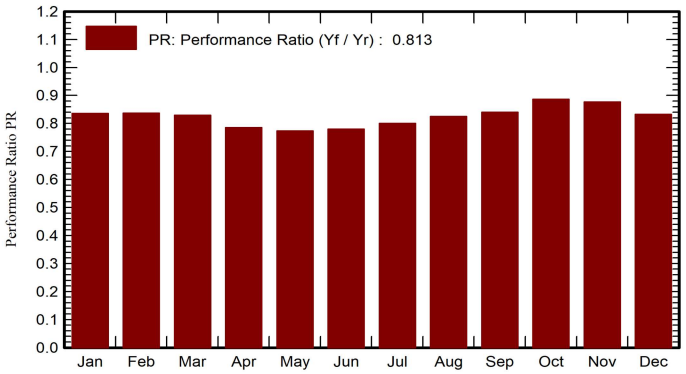
System Production

Produced Energy	10013 MWh/year	Specific production	1335 kWh/kWp/year
		Performance Ratio PR	81.35 %

Normalized productions (per installed kWp)



Performance Ratio PR



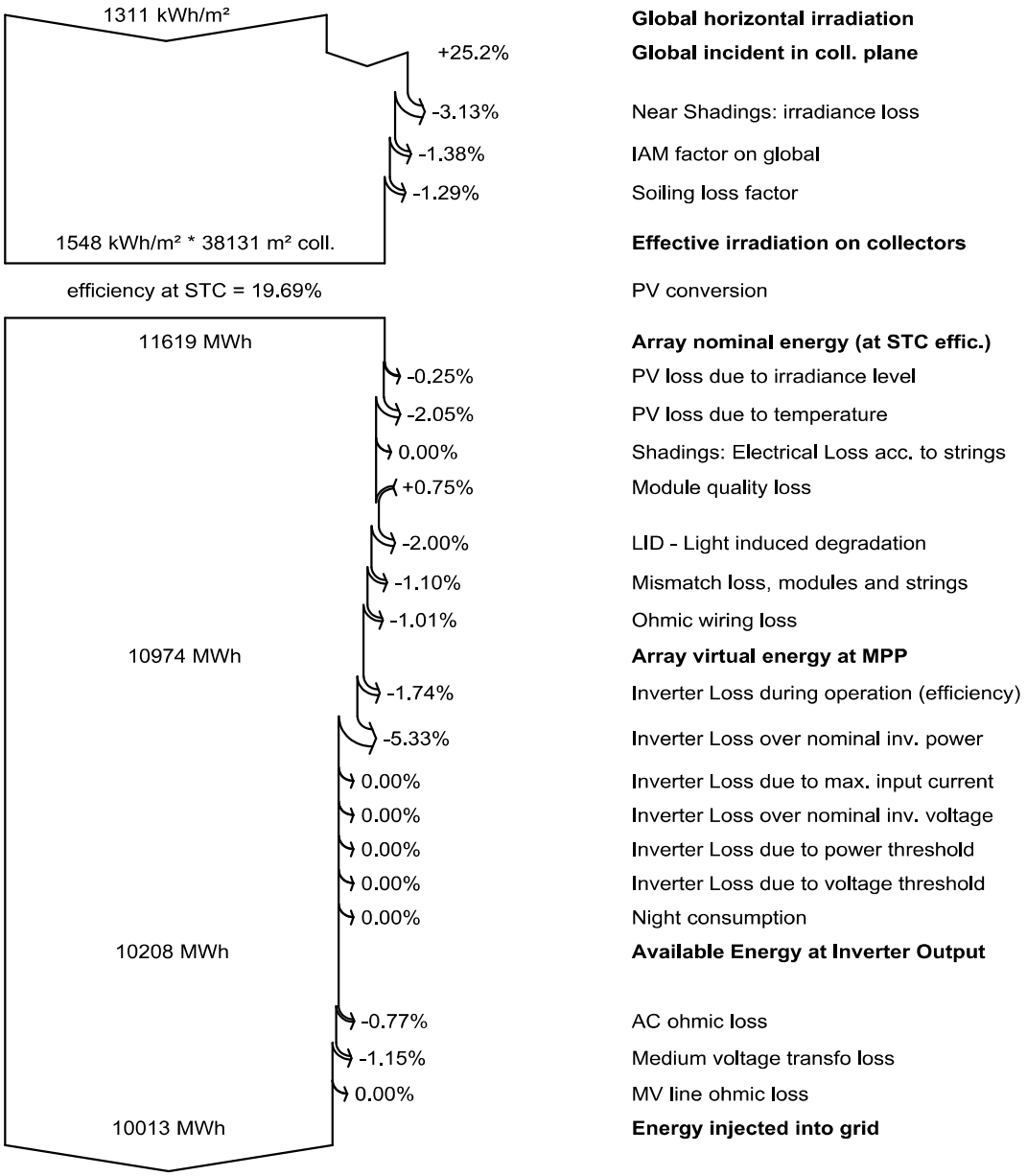
Balances and main results

	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray MWh	E_Grid MWh	PR ratio
January	46.1	29.21	-5.02	57.6	47.9	376	361	0.836
February	62.9	38.50	0.31	80.7	69.0	526	506	0.837
March	102.5	59.85	0.60	125.6	112.1	811	781	0.829
April	134.3	63.25	11.03	168.0	159.6	1028	989	0.785
May	169.3	77.12	16.64	210.1	203.1	1265	1219	0.774
June	174.9	74.98	18.62	218.6	211.6	1328	1279	0.780
July	180.6	80.63	19.51	225.4	218.2	1403	1352	0.800
August	158.8	76.44	19.34	198.3	191.4	1273	1227	0.825
September	119.8	53.25	15.56	155.1	149.5	1015	978	0.841
October	77.3	38.42	9.80	97.6	93.0	673	648	0.886
November	47.7	25.29	3.91	60.7	55.3	416	399	0.877
December	36.8	26.06	-2.51	43.8	37.0	286	274	0.833
Year	1310.9	643.00	9.02	1641.6	1547.9	10399	10013	0.813

Legends

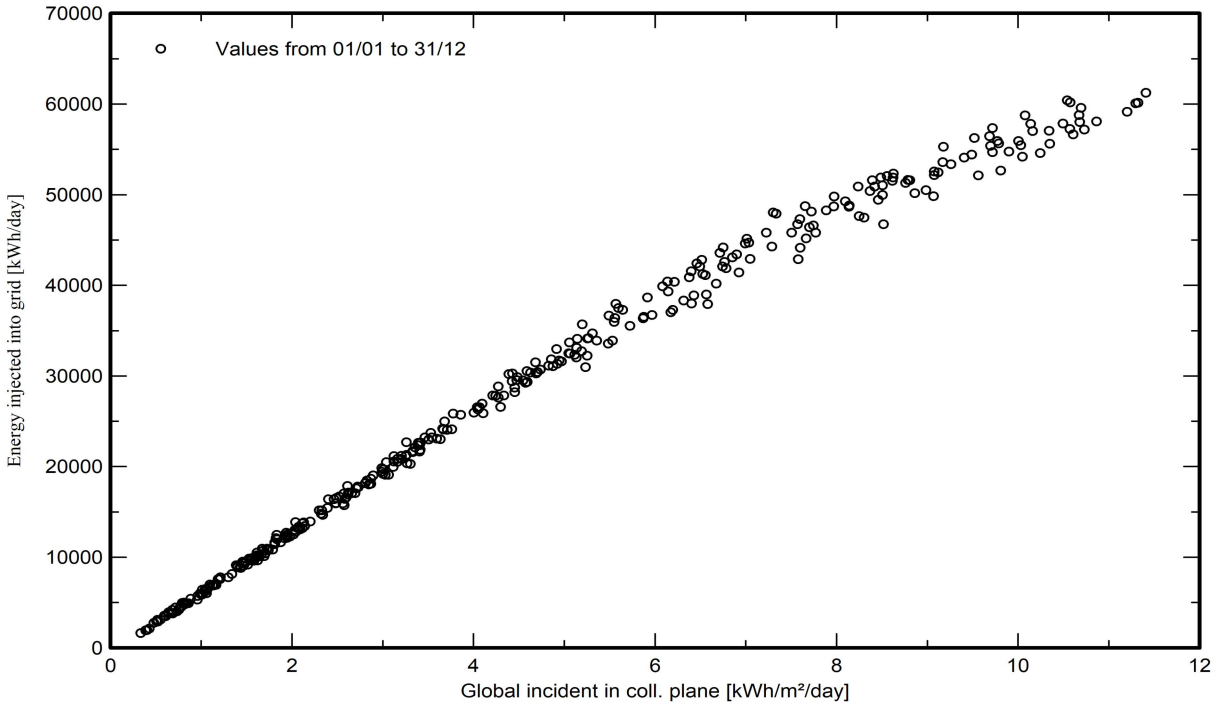
GlobHor	Global horizontal irradiation
DiffHor	Horizontal diffuse irradiation
T_Amb	Ambient Temperature
GlobInc	Global incident in coll. plane
GlobEff	Effective Global, corr. for IAM and shadings
EArray	Effective energy at the output of the array
E_Grid	Energy injected into grid
PR	Performance Ratio

Loss diagram



Special graphs

Daily Input/Output diagram



System Output Power Distribution