Version 7.4.0

PVsyst - Simulation report

Grid-Connected System

Project: NEOM

Variant: New simulation variant

No 3D scene defined, no shadings

System power: 4999 kWp

Neom City - Saudi Arabia

Author

University of Sheffield (United kingdom)

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with v7.4.0

Project summary

Geographical Site
Neom City
Saudi Arabia

Situation

Latitude	28.33 °N
Longitude	34.95 °E
Altitude	147 m
Time zone	UTC+3

Project settings

Albedo	0.20

Meteo data
Neom City
Meteonorm 8.1 (1998-2002), Sat=100% - Synthetic

System summary

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation
Fixed plane
Tilt/Azimuth 30 / 0 °

Near Shadings
No Shadings

User's needs
Unlimited load (grid)

System information

PV Array

Nb. of modules	10203 units
Pnom total	4999 kWp

Inverters

Nb. of units	5 units
Pnom total	4375 kWac
Pnom ratio	1.143

Results summary

Produced Energy	10602177 kWh/year	Specific production	2121 kWh/kWp/year	Perf. Ratio PR	84.07 %

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General parameters

Grid-Connected System — **No 3D scene defined, no shadings**

PV Field Orientation

Orientation		Sheds configuration	Models used	
Fixed plane		No 3D scene defined	Transposition	Perez
Tilt/Azimuth	30 / 0 °		Diffuse	Perez, Meteonorm
			Circumsolar	separate

Horizon
Free Horizon

Near Shadings
No Shadings

User's needs
Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer	Generic
Model	LR5-66HPH-490M G2
(Original PVsyst database)	
Unit Nom. Power	490 Wp
Number of PV modules	10203 units
Nominal (STC)	4999 kWp
Modules	537 Strings x 19 In series
At operating cond. (50°C)	
Pmpp	4581 kWp
U mpp	650 V
I mpp	7048 A

Inverter

Manufacturer	Generic
Model	PVS800-57-0875kW-B
(Original PVsyst database)	
Unit Nom. Power	875 kWac
Number of inverters	5 units
Total power	4375 kWac
Operating voltage	525-825 V
Max. power (=>25°C)	1050 kWac
Pnom ratio (DC:AC)	1.14

Total PV power

Nominal (STC)	4999 kWp
Total	10203 modules
Module area	24228 m²
Cell area	22428 m²

Total inverter power

Total power	4375 kWac
Max. power	5250 kWac
Number of inverters	5 units
Pnom ratio	1.14

Array losses

Thermal Loss factor
Module temperature according to irradiance
Uc (const) 20.0 W/m²K
Uv (wind) 0.0 W/m²K/m/s

DC wiring losses
Global array res. 1.5 mΩ
Loss Fraction 1.5 % at STC

Module Quality Loss
Loss Fraction -0.8 %

Module mismatch losses
Loss Fraction 2.0 % at MPP

Strings Mismatch loss
Loss Fraction 0.2 %

IAM loss factor
Incidence effect (IAM): User defined profile

0°	25°	45°	60°	65°	70°	75°	80°	90°
1.000	1.000	0.995	0.962	0.936	0.903	0.851	0.754	0.000

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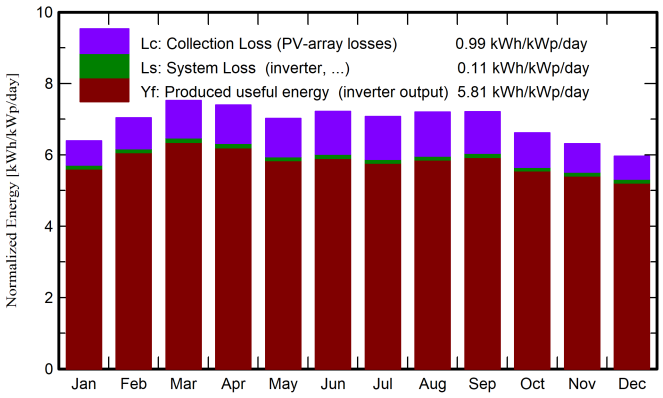
Main results

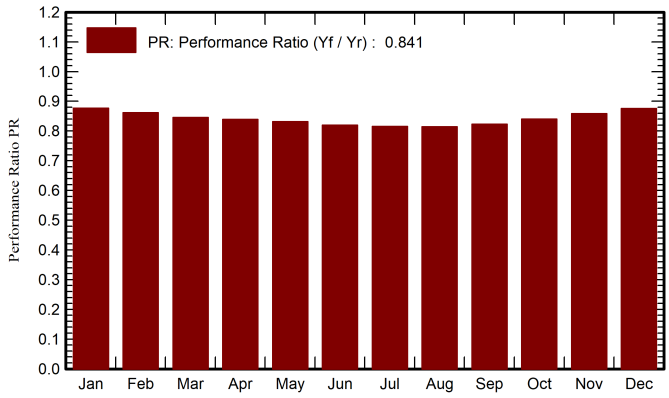
System Production

Produced Energy	10602177 kWh/year	Specific production	2121 kWh/kWp/year
		Perf. Ratio PR	84.07 %

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 kWh	E_Grid kWh	PR ratio
January	130.7	25.19	17.53	198.2	196.1	885876	869152	0.877
February	146.3	28.17	19.05	197.0	194.9	865252	848957	0.862
March	199.4	38.75	22.30	233.1	230.2	1004410	985098	0.845
April	216.5	54.60	25.45	221.9	218.4	948657	930486	0.839
May	236.5	68.45	29.51	217.7	213.5	923049	905660	0.832
June	249.7	47.74	31.96	216.4	211.7	903513	886663	0.820
July	246.4	57.86	33.51	219.4	214.5	911750	894840	0.816
August	227.7	59.66	33.69	223.2	219.0	925413	908186	0.814
September	195.0	49.09	31.07	216.3	213.0	906891	890372	0.823
October	162.6	46.43	28.08	205.0	202.3	876984	860921	0.840
November	131.0	29.08	23.37	189.4	187.6	828508	812662	0.858
December	118.9	25.03	19.39	184.9	183.1	824644	809182	0.875
Year	2260.6	530.06	26.28	2522.5	2484.2	10804946	10602177	0.841

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

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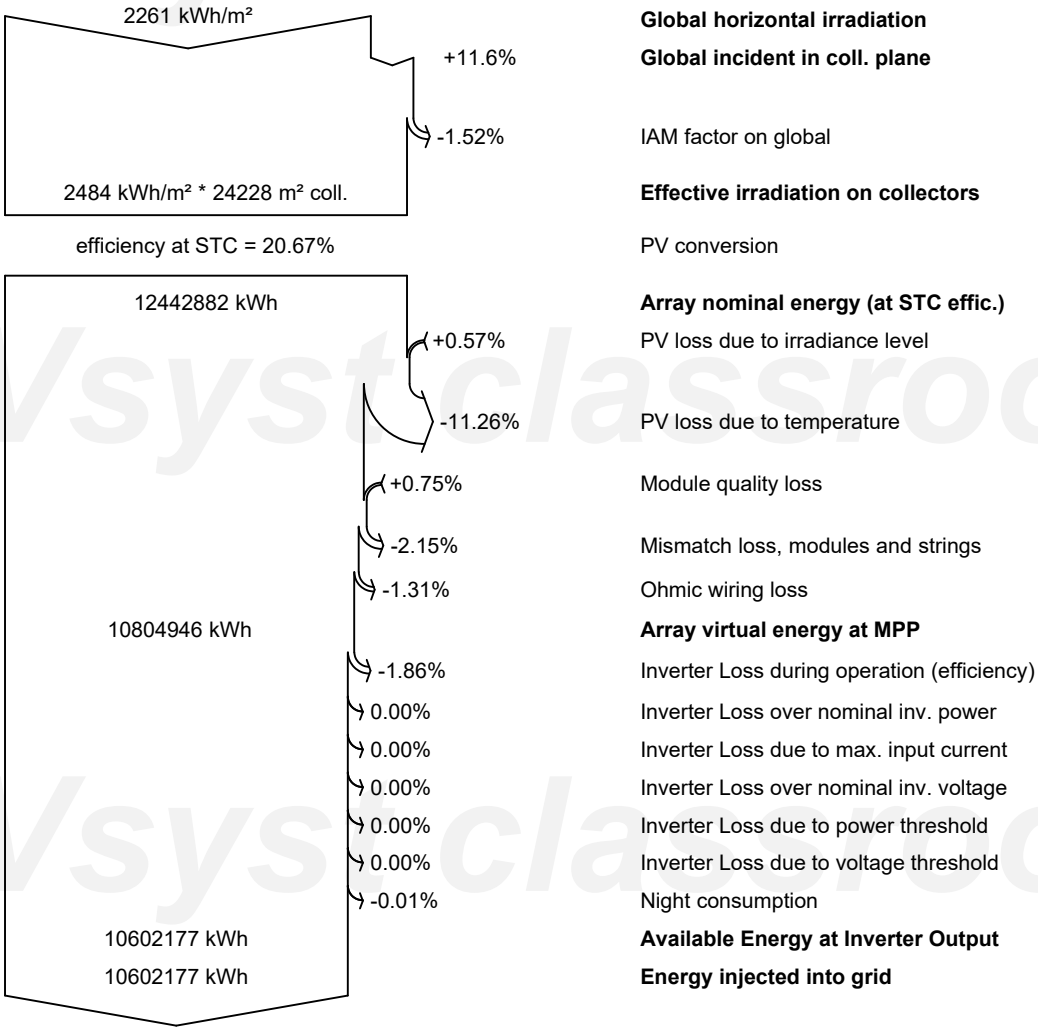
Loss diagram



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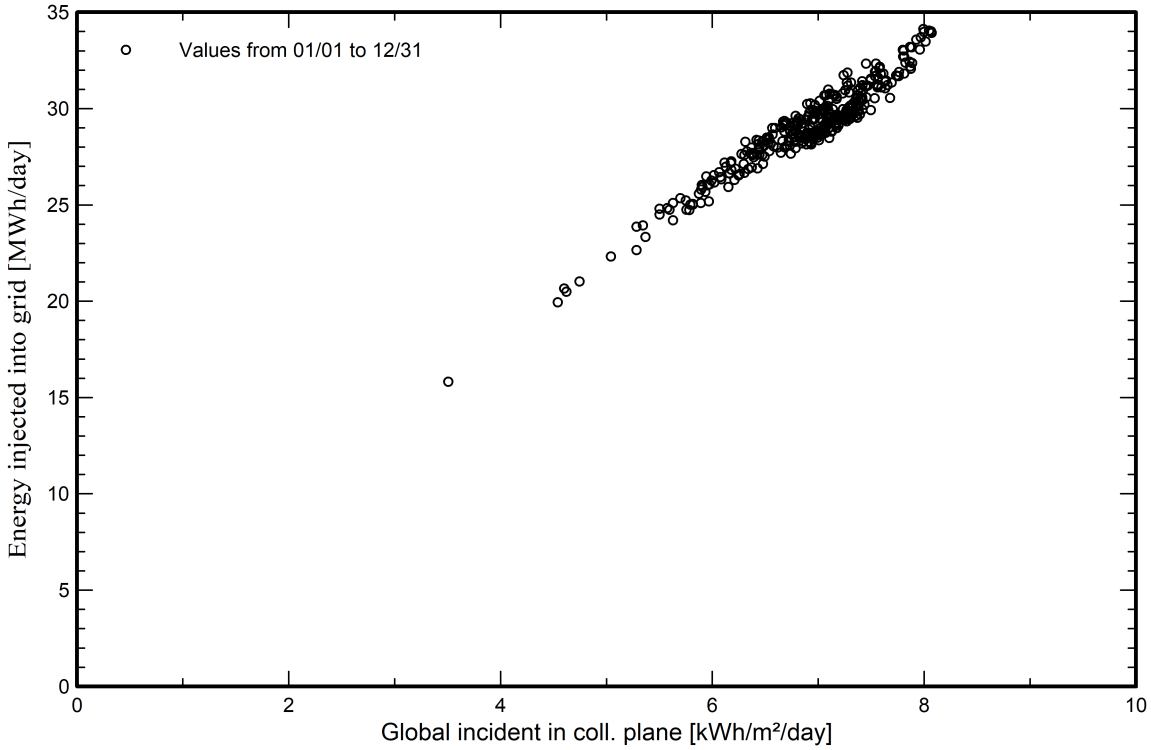
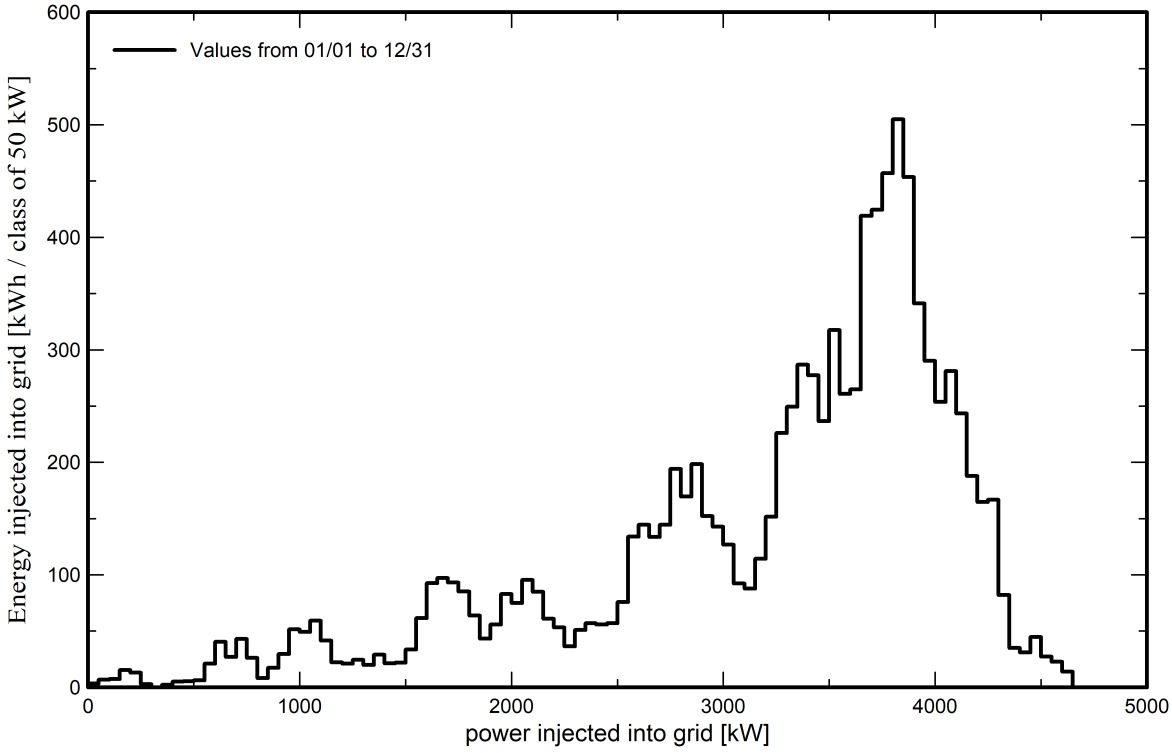
Predef. graphs

Daily Input/Output diagram



System Output Power Distribution



Single-line diagram

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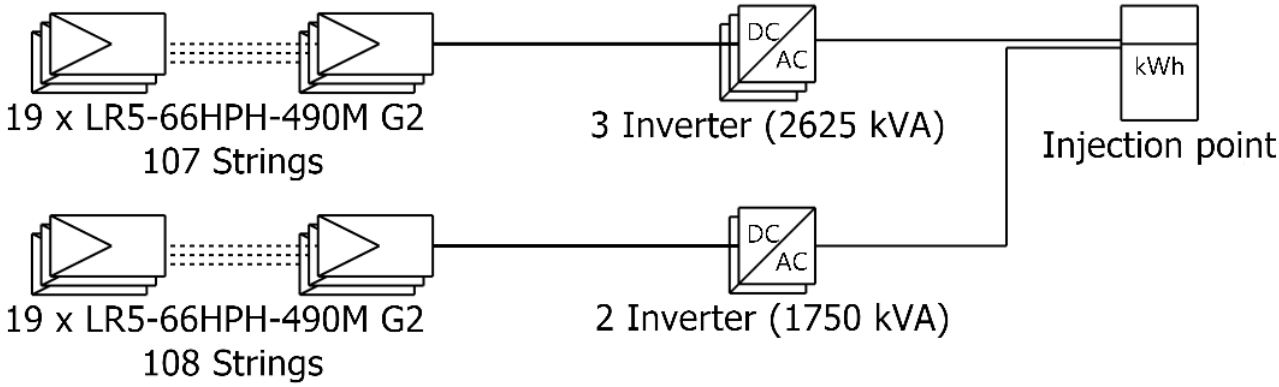

PV module	LR5-66HPH-490M G2
Inverter	PVS800-57-0875kW-B
String	19 x LR5-66HPH-490M G2

	NEOM	University of Sheffield (United kir
	VC0 : New simulation variant	08/01/23

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CO_2 Emission Balance

Total: 195978.1 tCO_2

Generated emissions

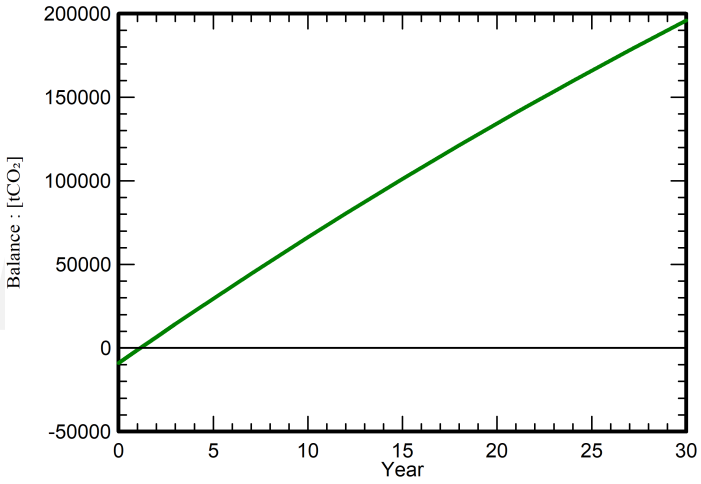
Total: 9070.79 tCO_2

Source: Detailed calculation from table below

Replaced Emissions

Total: 236322.5 tCO_2
System production: 10602.18 MWh/yr
Grid Lifecycle Emissions: 743 gCO_2/kWh
Source: IEA List
Country: Saudi Arabia
Lifetime: 30 years
Annual degradation: 1.0 %

Saved CO_2 Emission vs. Time



System Lifecycle Emissions Details

Item	LCE	Quantity	Subtotal
			[$kgCO_2$]
Modules	1713 kgCO2/kWp	4999 kWp	8562692
Supports	4.96 kgCO2/kg	102030 kg	505641
Inverters	491 kgCO2/	5.00	2455