PVsyst V8.0.14

PVsyst - Simulation report

Grid-Connected System

Project: Leeds, AI Compute + Solar
Variant: Latest Design
Tables on a building System
power: 150 kWp Farsley -
United Kingdom

Author
JLMEnergy Ltd (United Kingdom)

PVsyst V8.0.14
VC0, Simulation date:
04/08/25 11:43
with V8.0.14

JLM Energy Ltd (United Kingdom)

Project summary

Geographical Site
Farsley
United Kingdom

Situation

Latitude	53.81 °(N)
Longitude	-1.68 °(W)
Altitude	133m
Time zone	UTC

Project settings

Albedo	0.20

Weather data
Farsley
Meteonorm 8.2 (2004-2013), Sat=100% - Synthetic

System summary

Grid-Connected System

Tables on a building

Orientation #1
Fixed plane
Tilt/Azimuth 30 / -85.7°

Orientation #2
Fixed plane
Tilt/Azimuth 30 / 94.3°

Orientation #3
Fixed plane
Tilt/Azimuth 30 / -175.7°

Near Shadings
Linear shadings : Fast (table)

User's needs
Ext. defined as file
C:\Users\user\Documents\EcoYield\Pilot Project\HH Consumption - PVSyst Format.csv

System information

PV Array

Nb. of modules	334 units
Pnom total	150 kWp

Inverters

Nb. of units	3 units
Total power	99.9 kWac
Pnom ratio	1.50

Results summary

Produced Energy	121.06 MWh/year	Specific production	805 kWh/kWp/year	Perf. Ratio PR	86.76 %
Used Energy	700.80 MWh/year			Solar Fraction SF	17.15 %

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General parameters

Grid-Connected System

Tables on a building

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Tilt/Azimuth 30 / -85.7°

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Tilt/Azimuth 30 / 94.3°

Orientation #3
Fixed plane
Tilt/Azimuth 30 / -175.7°

Models used
Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

Horizon
Free Horizon

Near Shadings
Linear shadings : Fast (table)

User's needs
Ext. defined as file
C:\Users\user\Documents\EcoYield\Pilot Project\HH Consumption - PVSyst Format.csv

Jan	Feb	Mar.	Apr	May	June	July	Aug	Sep	Oct.	Nov.	Dec.	Year	
5952	5376	59520	5760	59520	5760	5952	5952	5760	59520	57600	59520	700800	kWh
0	0		0		0	0	0	0					

PV Array Characteristics

PV module
Manufacturer JA Solar
Model JAM54-D40-450-LB
(Original PVsyst database)
Unit Nom. Power 450Wp

Inverter
Manufacturer SolarEdge
Model SE33.3K-EU-APAC/AUS (400V)
(Original PVsyst database)
Unit Nom. Power 33.3kWac

SolarEdgePower Optimizer
Model S1000 Worldwide
Unit Nom. Power 1050 W
Input modules 2in series

Array#1 - #1
Orientation #1
Tilt/Azimuth 30/-86 °
Number of PV modules 144 units
Nominal (STC) 64.8 kWp
Optimizer Array 4 string x 18In series
Atoperatingcond. (50°C)
Pmpp 59.9 kWp
Output of optimizers
Voper 750V
I at Poper 80A

Number of inverters 1.3 unit
Total power 43.1 kWac
Operating voltage 750V
Pnom ratio (DC:AC) 1.33

Array#2 - #2
Orientation #2
Tilt/Azimuth 30/94 °
Number of PV modules 160 units
Nominal (STC) 72.0 kWp
Optimizer Array 4 string x 20In series
Atoperatingcond. (50°C)
Pmpp 66.6 kWp
Output of optimizers
Voper 750V
I at Poper 89A

Number of inverters 1.3 unit
Total power 47.9 kWac
Operating voltage 750V
Pnom ratio (DC:AC) 1.29

PV Array Characteristics

Array#3 - #3

Orientation	#3		
Tilt/Azimuth	30/-176 °		
Number of PV modules	30 units	Number of inverters	0.3 unit
Nominal (STC)	13.50 kWp	Total power	9.0 kWac
Optimizer Array	1 strings x 15In series		
Atoperatingcond. (50°C)		Operating voltage	750V
Pmpp	12.48 kWp	Pnom ratio (DC:AC)	0.74
Output of optimizers			
Voper	750V		
I at Poper	17A		

Total PV power		**Total inverter power**	
Nominal (STC)	150 kWp	Total power	99.9 kWac
Total	334 modules	Number of inverters	3 units
Module area	667 m²	Pnom ratio	1.50

Array losses

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

ModuleQuality Loss
Loss Fraction -0.38 %

Modulemismatch losses
Loss Fraction 0.50% at MPP

IAM loss factor
Incidence effect (IAM): Fresnel smooth glass, n = 1.526

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.998	0.981	0.948	0.862	0.776	0.636	0.402	0.000

DC wiring losses

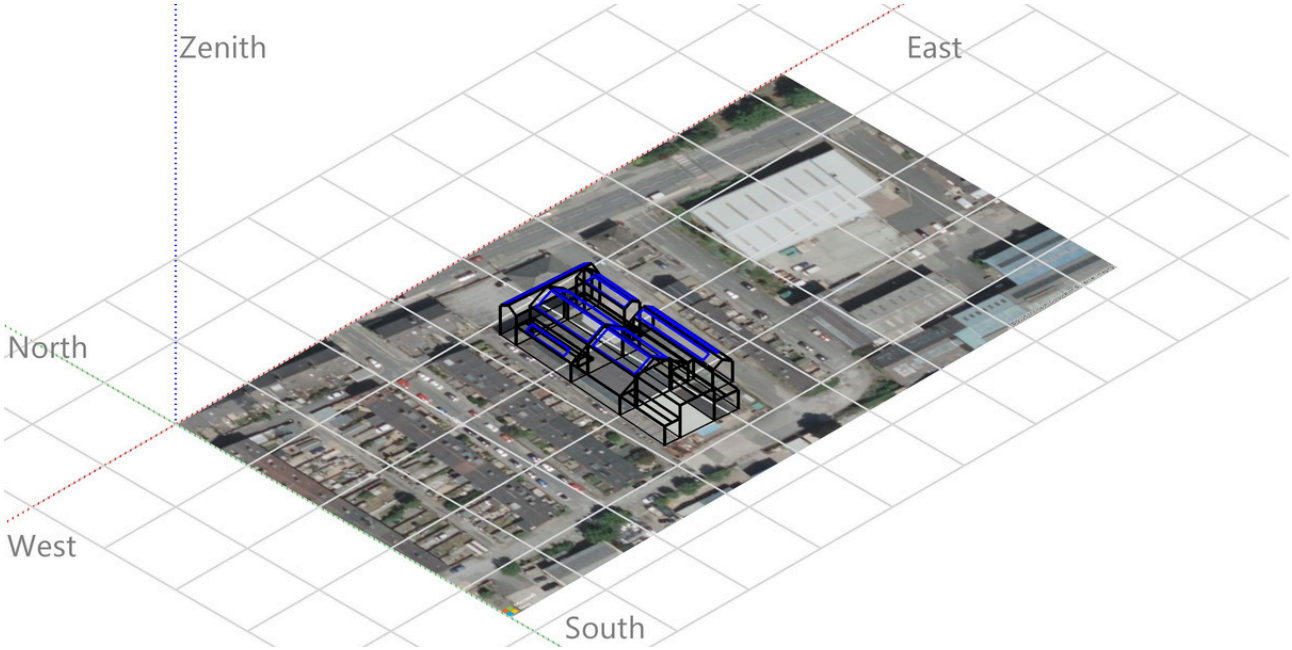
Global wiring resistance 10mΩ
Loss Fraction 1.5% at STC

Array#1 - #1		**Array#2 - #2**	
Global array res.	156 mΩ	Global array res.	156 mΩ
Loss Fraction	1.5% at STC	Loss Fraction	1.5% at STC

Array#3 - #3
Global array res. 629 mΩ
Loss Fraction 1.5% at STC

Near shadings parameter

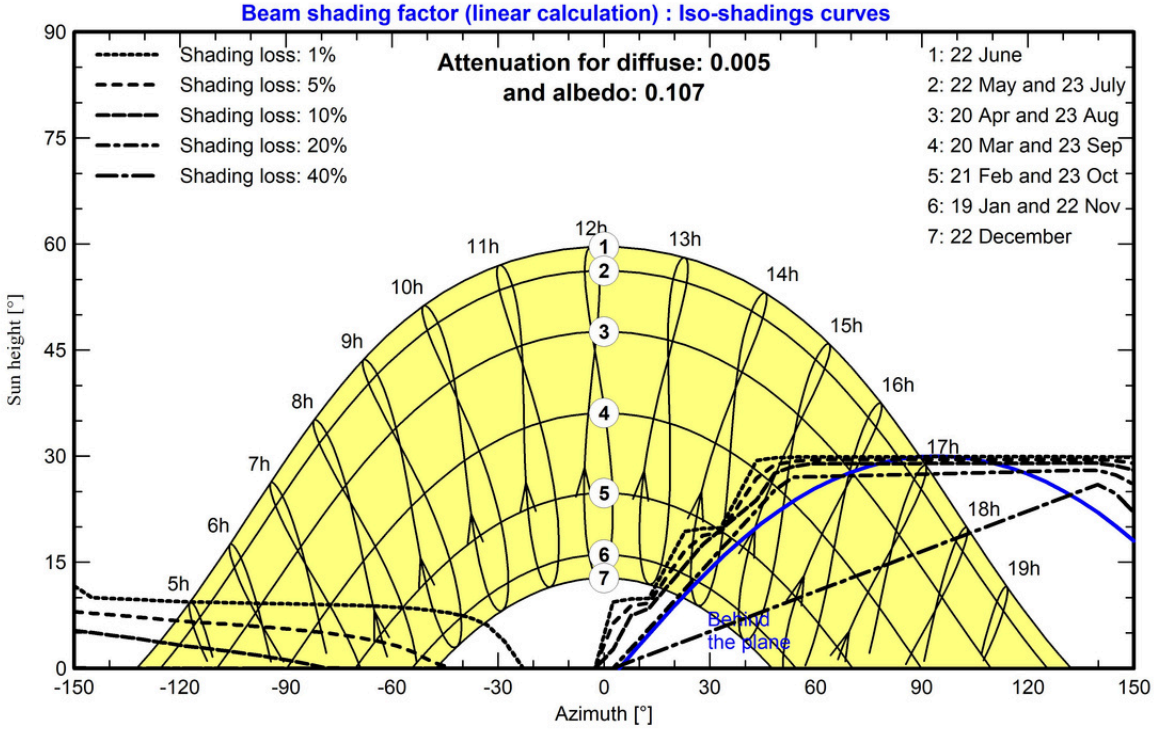
Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram

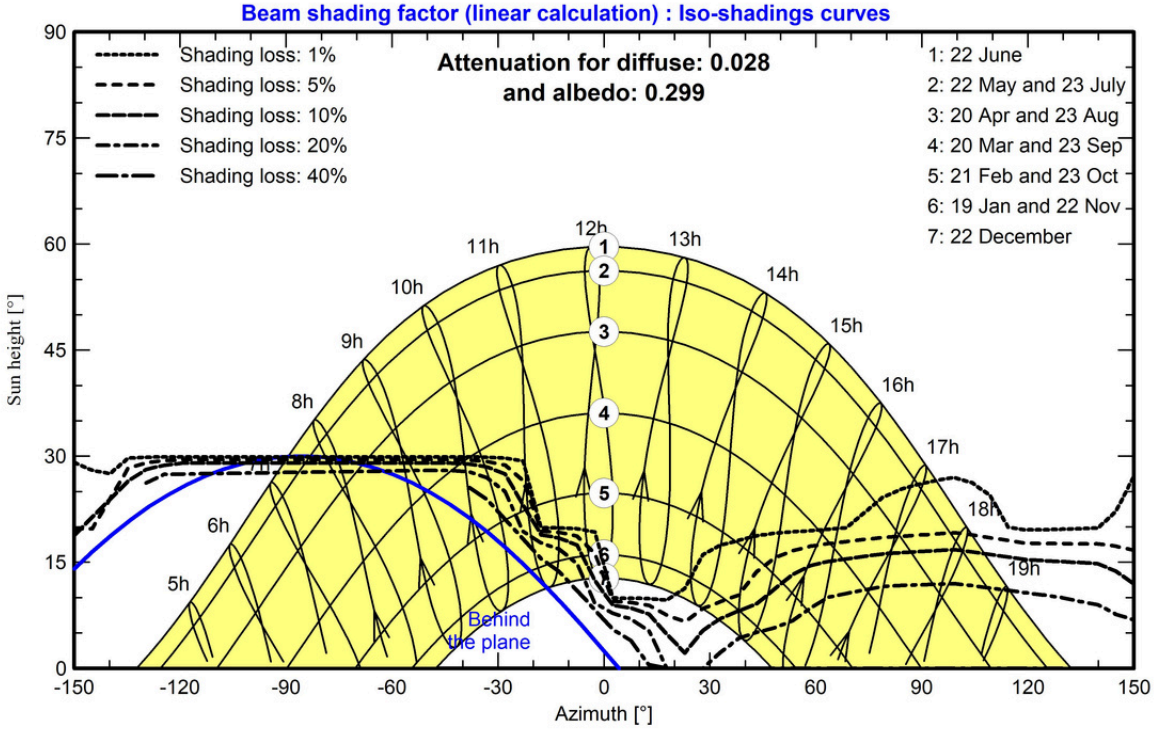
Orientation #1 - Fixed plane, Tilts/azimuths: 30°/ -85.7°

Beam shading factor (linear calculation) : Iso-shadings curves



Orientation #2 - Fixed plane, Tilts/azimuths: 30°/ 94.3°

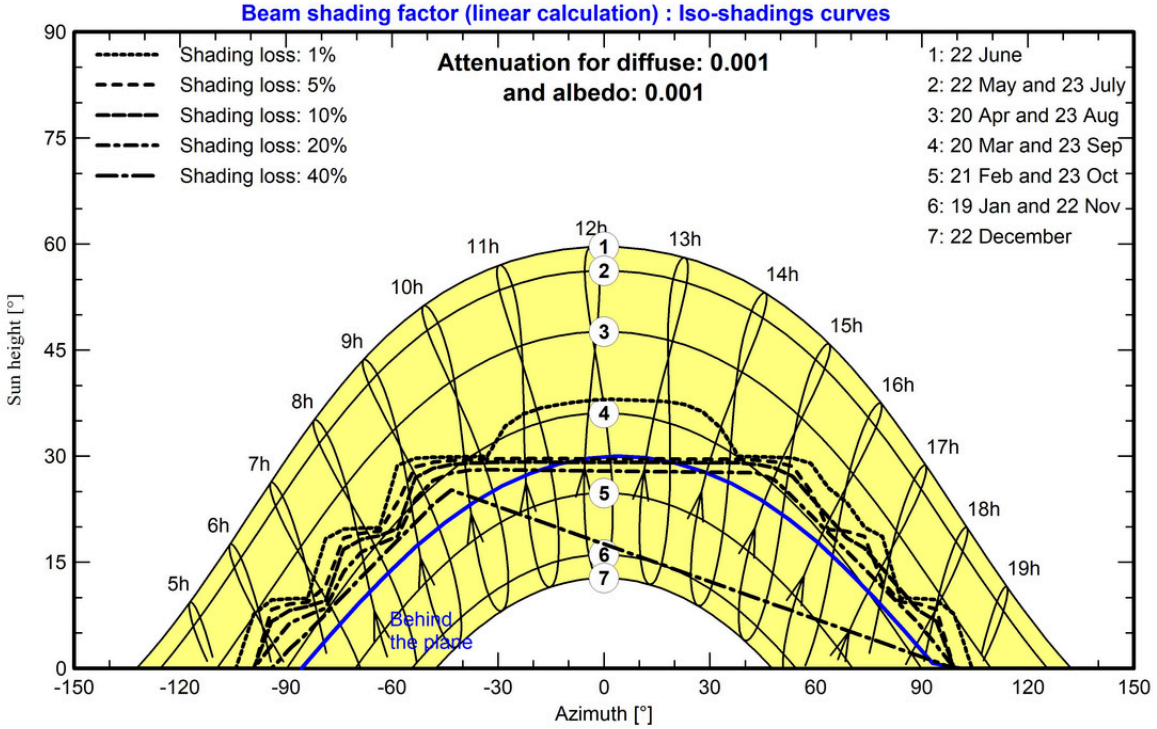
Beam shading factor (linear calculation) : Iso-shadings curves



Iso-shadings diagram

Orientation #3 - Fixed plane, Tilts/azimuths: 30°/ -175.7°

Beam shading factor (linear calculation) : Iso-shadings curves



Main results

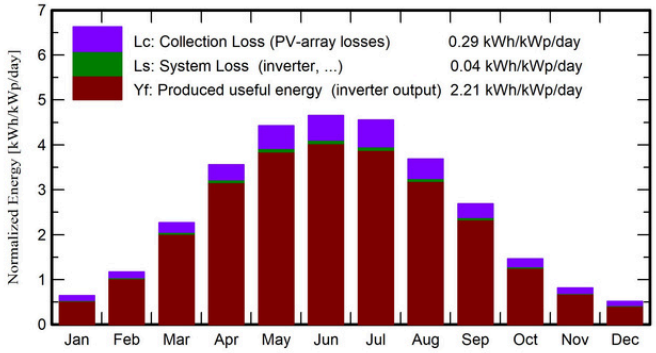
System Production

Produced Energy	121.06 MWh/year	Specific production	805 kWh/kWp/year
Used Energy	700.80 MWh/year	Perf. Ratio PR	86.76 %
		Solar Fraction SF	17.15 %

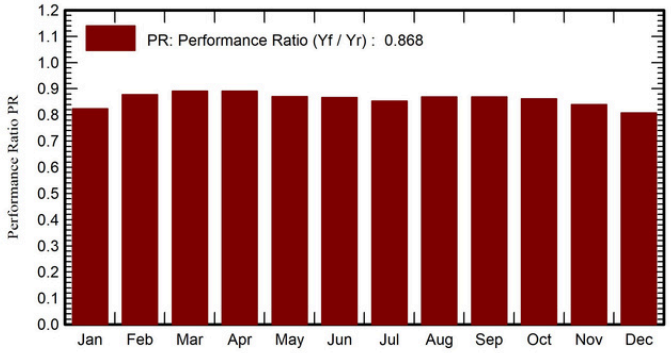
Economic evaluation

Investment		Yearly cost		LCOE	
Global	112,500.00 GBP	Annuities	0.00 GBP/yr	Energy cost	0.07 GBP/kWh
Specific	0.75 GBP/Wp	Run. costs	2,250.00 GBP/yr		
		Payback period	5.1 years		

Normalized productions (per installed kWp)



Performance Ratio PR



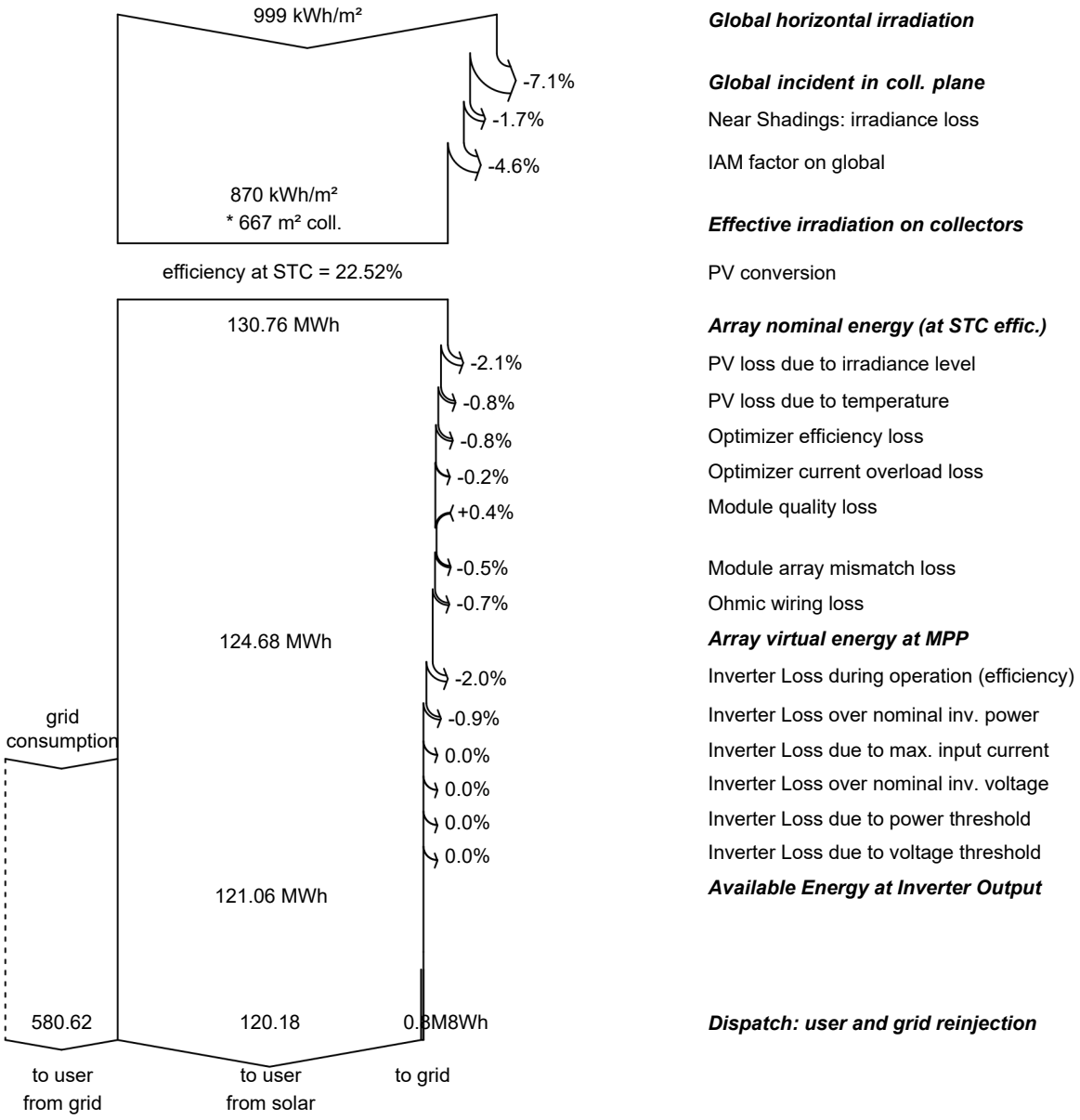
Balances and main results

	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray MWh	E_User MWh	E_Solar MWh	E_Grid MWh	EFrGrid MWh
January	20.8	12.64	3.91	19.8	17.3	2.51	59.52	2.46	0.000	57.06
February	35.4	23.01	3.90	32.8	29.9	4.42	53.76	4.33	0.000	49.43
March	76.6	40.91	5.45	70.3	65.3	9.60	59.52	9.41	0.000	50.11
April	115.2	61.39	7.56	106.6	100.4	14.56	57.60	14.24	0.039	43.36
May	147.9	78.14	10.72	137.2	130.3	18.30	59.52	17.72	0.221	41.80
June	150.3	84.86	13.43	139.6	132.8	18.55	57.60	17.90	0.285	39.70
July	151.0	79.72	15.50	141.2	133.9	18.45	59.52	17.80	0.291	41.72
August	122.7	66.86	15.19	114.1	107.8	15.19	59.52	14.85	0.049	44.67
September	87.0	44.51	12.82	80.7	75.0	10.76	57.60	10.55	0.000	47.05
October	49.1	23.89	9.92	45.4	41.7	6.00	59.52	5.88	0.000	53.64
November	25.9	15.14	6.33	24.5	21.8	3.16	57.60	3.09	0.000	54.51
December	17.0	10.51	4.35	16.1	13.8	2.00	59.52	1.95	0.000	57.57
Year	**998.9**	**541.59**	**9.12**	**928.4**	**870.0**	**123.52**	**700.80**	**120.18**	**0.884**	**580.62**

Legends

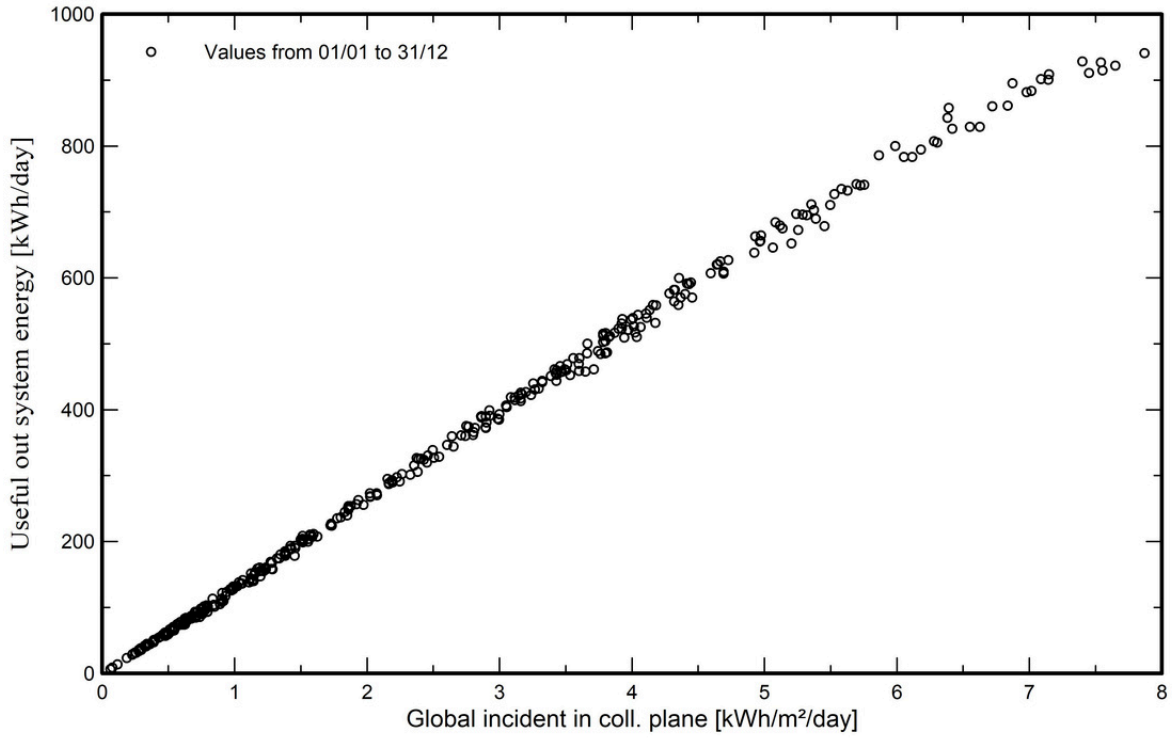
GlobHor	Global horizontal irradiation	EArray	Effective energy at the output of the array
DiffHor	Horizontal diffuse irradiation	E_User	Energy supplied to the user
T_Amb	Ambient Temperature	E_Solar	Energy from the sun
GlobInc	Global incident in coll. plane	E_Grid	Energy injected into grid
GlobEff	Effective Global, corr. for IAM and shadings	EFrGrid	Energy from the grid

Loss diagram

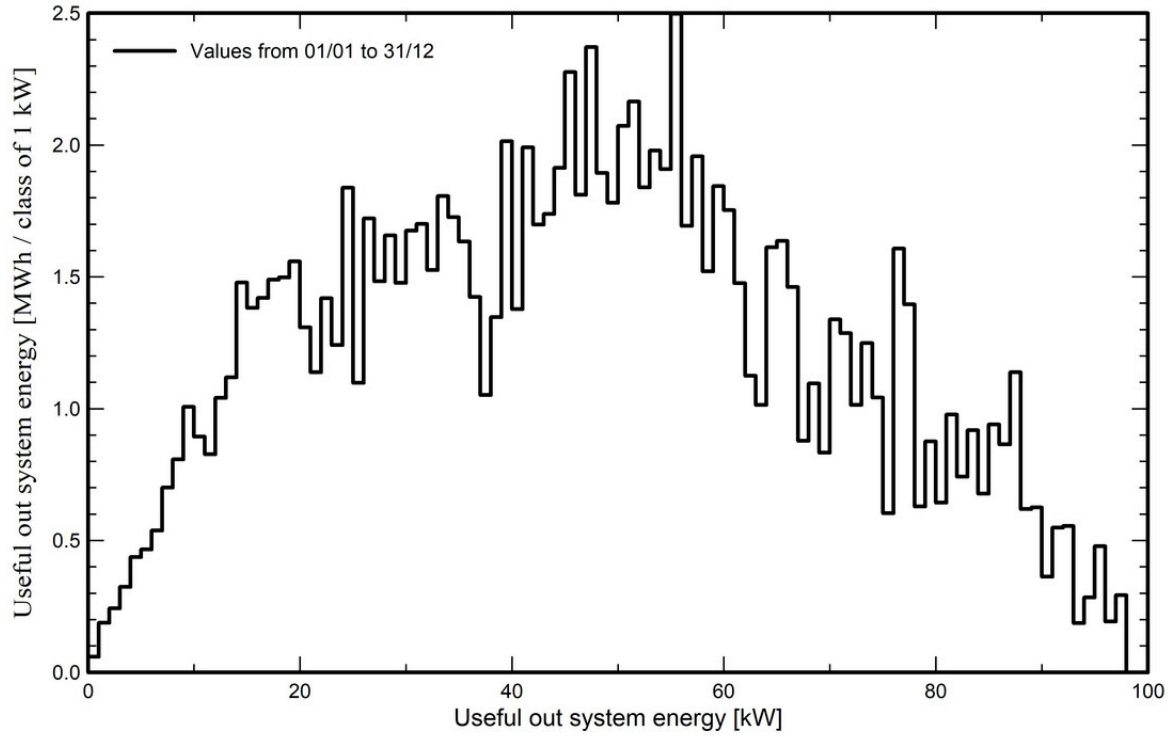


Predef. graphs

Daily Input/Output diagram



System Output Power Distribution



Cost of the system

Installation costs

Item	Quantity	Cost GBP	Total GBP
	units	**750.00**	**112,500.00**
Cost per	**150**	**Total**	**112,500.00**
kW		**Depreciable asset**	**0.00**

Operating costs

Item	Total GBP/year
O&M Total	**2,250.00**
(OPEX)	**2,250.00**

System summary

Total installation cost	112,500.00 GBP
Operating costs	2,250.00 GBP/year
Useful energy from solar	120 MWh/year
Energy sold to the grid	0.9 MWh/year
Cost of produced energy (LCOE)	0.0651 GBP/kWh

Financial analysis

Simulation period

Project lifetime	20 years	Start year	2026

Incomevariationover time

Inflation	0.00 %/year
Module Degradation	0.00 %/year
Discount rate	0.00 %/year

Incomedependent expenses

Income tax rate	0.00 %/year
Other income tax	0.00 %/year
Dividends	0.00 %/year

Financing

Own funds	112,500.00 GBP

Electricity sale

Feed-in tariff	0.07000 GBP/kWh
Duration of tariff warranty	20 years
Annual connection tax	0.00 GBP/year
Annual tariff variation	0.0 %/year
Feed-in tariff decrease after warranty	0.00 %

Self-consumption

Consumption tariff	0.20000 GBP/kWh
Tariff evolution	0.0 %/year

Return on investment

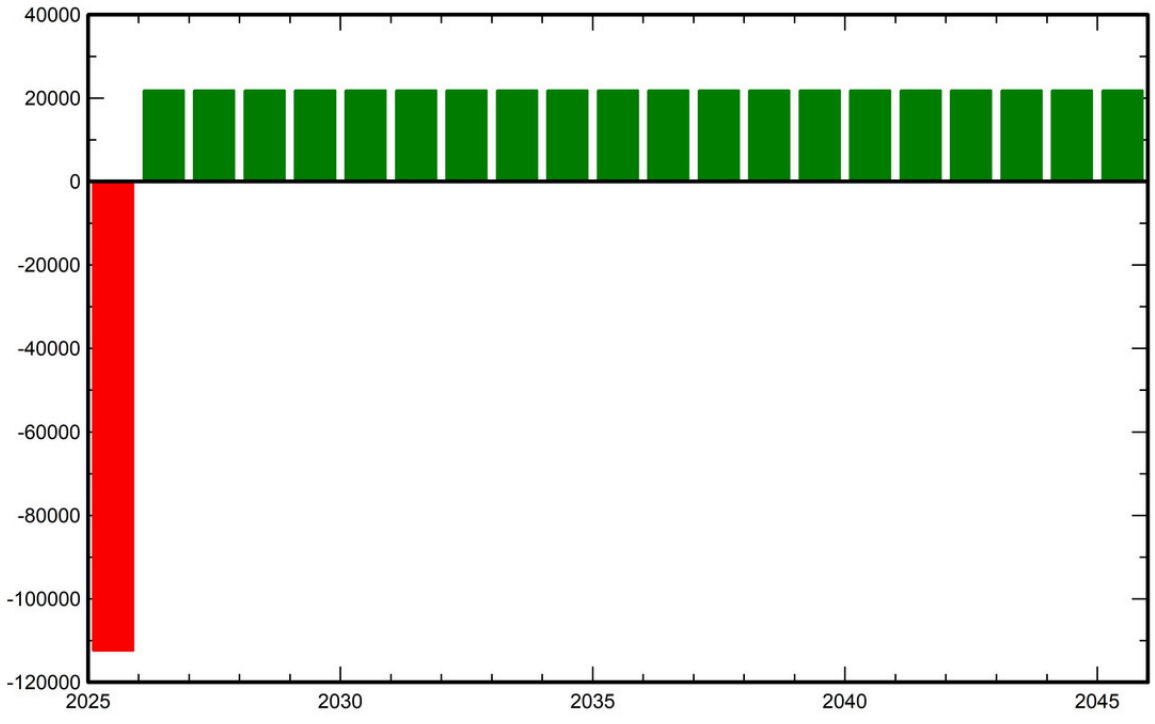
Payback period	5.1 years
Net present value (NPV)	324,441.25 GBP
Internal rate of return (IRR)	18.81 %
Return on investment (ROI)	288.4 %

Financial analysis

Detailed economic results (GBP)

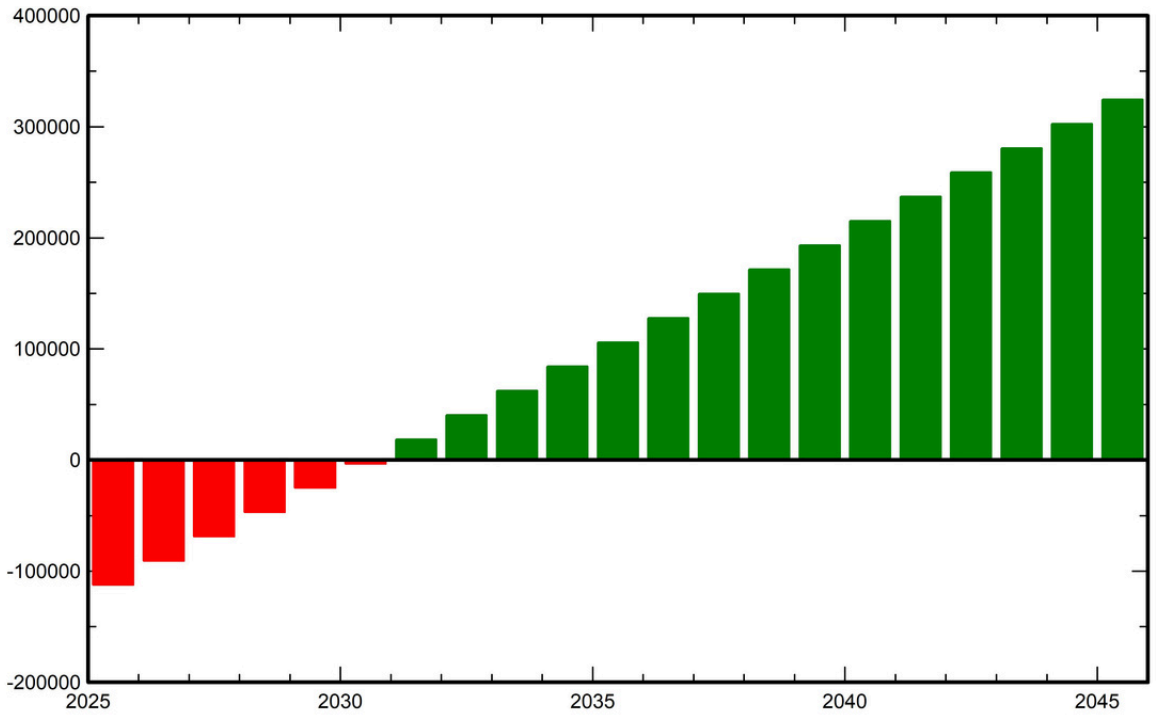
Year	Electricity sale	Own funds	Run. costs	Deprec. allow.	Taxable income	Taxes	After-tax profit	Self-cons. saving	Cumul. profit	% amorti. 0.0%
0	0	112,500	0	0	0	0	0	0	-112,500	19.4%
1	62	0	2,250	0	0	0	-2,188	24,035	-90,653	38.8%
2	62	0	2,250	0	0	0	-2,188	24,035	-68,806	58.3%
3	62	0	2,250	0	0	0	-2,188	24,035	-46,959	77.7%
4	62	0	2,250	0	0	0	-2,188	24,035	-25,112	97.1%
5	62	0	2,250	0	0	0	-2,188	24,035	-3,265	116.5%
6	62	0	2,250	0	0	0	-2,188	24,035	18,582	135.9%
7	62	0	2,250	0	0	0	-2,188	24,035	40,429	155.4%
8	62	0	2,250	0	0	0	-2,188	24,035	62,277	174.8%
9	62	0	2,250	0	0	0	-2,188	24,035	84,124	194.2%
10	62	0	2,250	0	0	0	-2,188	24,035	105,971	213.6%
11	62	0	2,250	0	0	0	-2,188	24,035	127,818	233.0%
12	62	0	2,250	0	0	0	-2,188	24,035	149,665	252.5%
13	62	0	2,250	0	0	0	-2,188	24,035	171,512	271.9%
14	62	0	2,250	0	0	0	-2,188	24,035	193,359	291.3%
15	62	0	2,250	0	0	0	-2,188	24,035	215,206	310.7%
16	62	0	2,250	0	0	0	-2,188	24,035	237,053	330.1%
17	62	0	2,250	0	0	0	-2,188	24,035	258,900	349.6%
18	62	0	2,250	0	0	0	-2,188	24,035	280,747	369.0%
19	62	0	2,250	0	0	0	-2,188	24,035	302,594	388.4%
20	62	0	2,250	0	0	0	-2,188	24,035	324,441	388.4%
Total	1,238	112,500	45,000	0	0	0	-43,762	480,703	324,441	

Yearly net profit (GBP)



Financial analysis

Cumulative cashflow (GBP)



CO_2 Emission Balance

Total: 121.9 tCO_2

Generated emissions

Total: 268.82tCO_2

Source: Detailed calculation from table below

Replaced Emissions

Total: 450.3 tCO_2

System production: 121.06 MWh/yr

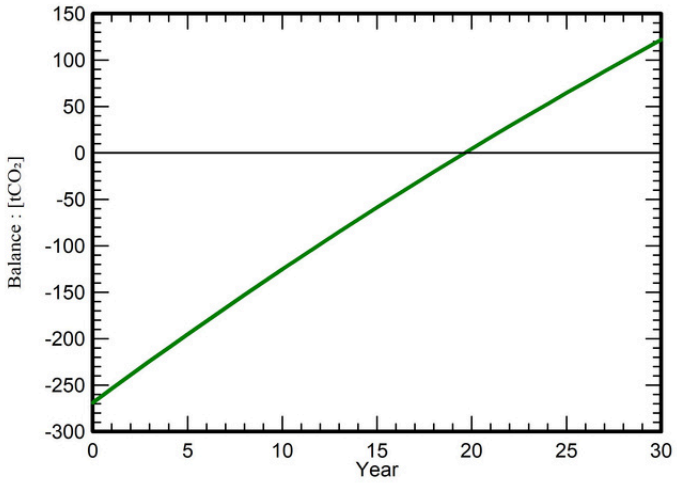
Grid Lifecycle Emissions: 124 gCO_2/kWh

Source: Custom value supplied by user

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	150 kWp	257422
Supports	3.13 kgCO2/kg	3340 kg	10471
Inverters	311 kgCO2/units	3.00 units	932