Grid-Connected System: Simulation parameters

Project : **1096-SOU Chalk Farm Road**

Geographical Site	**Ckalk Farm Road**		Country	**United Kingdom**
Situation	Latitude	51.5°N	Longitude	0.1°W
Time defined as	Legal Time	Time zone UT	Altitude	32 m
	Albedo	0.20		
Meteo data:	**Ckalk Farm Road**	Synthetic - PVGIS_SAF 1998-2011		

Simulation variant : **Simulation variant (Tilted 7 deg rev_1)**

Simulation date 19/06/14 18h03

Simulation parameters

Collector Plane Orientation	Tilt	7°	Azimuth	20°
Models used	Transposition	Perez	Diffuse	Erbs, Meteonorm
Horizon	Free Horizon			
Near Shadings	Detailed electrical calculations	(acc. to module layout)		

PV Arrays Characteristics (2 kinds of array defined)

PV module	Si-poly	Model	**TSM-250 P05A**	
		Manufacturer	Trina Solar	
Sub-array "Sub-array #1"		In series	12 modules	In parallel 2 strings
Total number of PV modules		Nb. modules	24	Unit Nom. Power 250 Wp
Array global power		Nominal (STC)	**6.00 kWp**	At operating cond. 5.39 kWp (50°C)
Array operating characteristics (50°C)		U mpp	327 V	I mpp 16 A
Sub-array "Sub-array #2"		In series	16 modules	In parallel 1 strings
Total number of PV modules		Nb. modules	16	Unit Nom. Power 250 Wp
Array global power		Nominal (STC)	**4000 Wp**	At operating cond. 3592 Wp (50°C)
Array operating characteristics (50°C)		U mpp	436 V	I mpp 8.2 A
Total	Arrays global power	Nominal (STC)	**10 kWp**	Total 40 modules
		Module area	**65.5 m²**	

Inverter		Model	**Symo 8.2-3-M**	
		Manufacturer	Fronius International	
		Operating Voltage	150-800 V	Unit Nom. Power 8.20 kW AC
Sub-array "Sub-array #1"		Nb. of inverters	1 * MPPT 1/2	Total Power 4.1 kW AC
Sub-array "Sub-array #2"		Nb. of inverters	1 * MPPT 1/2	Total Power 4.1 kW AC
Total		Nb. of inverters	1	Total Power 8 kW AC

PV Array loss factors

Thermal Loss factor	Uc (const)	20.0 W/m²K	Uv (wind)	0.0 W/m²K / m/s
Wiring Ohmic Loss	Array#1	334 mOhm	Loss Fraction	1.5 % at STC
	Array#2	890 mOhm	Loss Fraction	1.5 % at STC
	Global		Loss Fraction	1.5 % at STC
Module Quality Loss			Loss Fraction	-0.8 %
Module Mismatch Losses			Loss Fraction	1.0 % at MPP
Incidence effect, ASHRAE parametrization	IAM =	1 - bo (1/cos i - 1)	bo Param.	0.05

Grid-Connected System: Simulation parameters (continued)

System loss factors

Wiring Ohmic Loss	Wires	112 m 3x10 mm²	Loss Fraction	1.5 % at STC

User's needs : Unlimited load (grid)

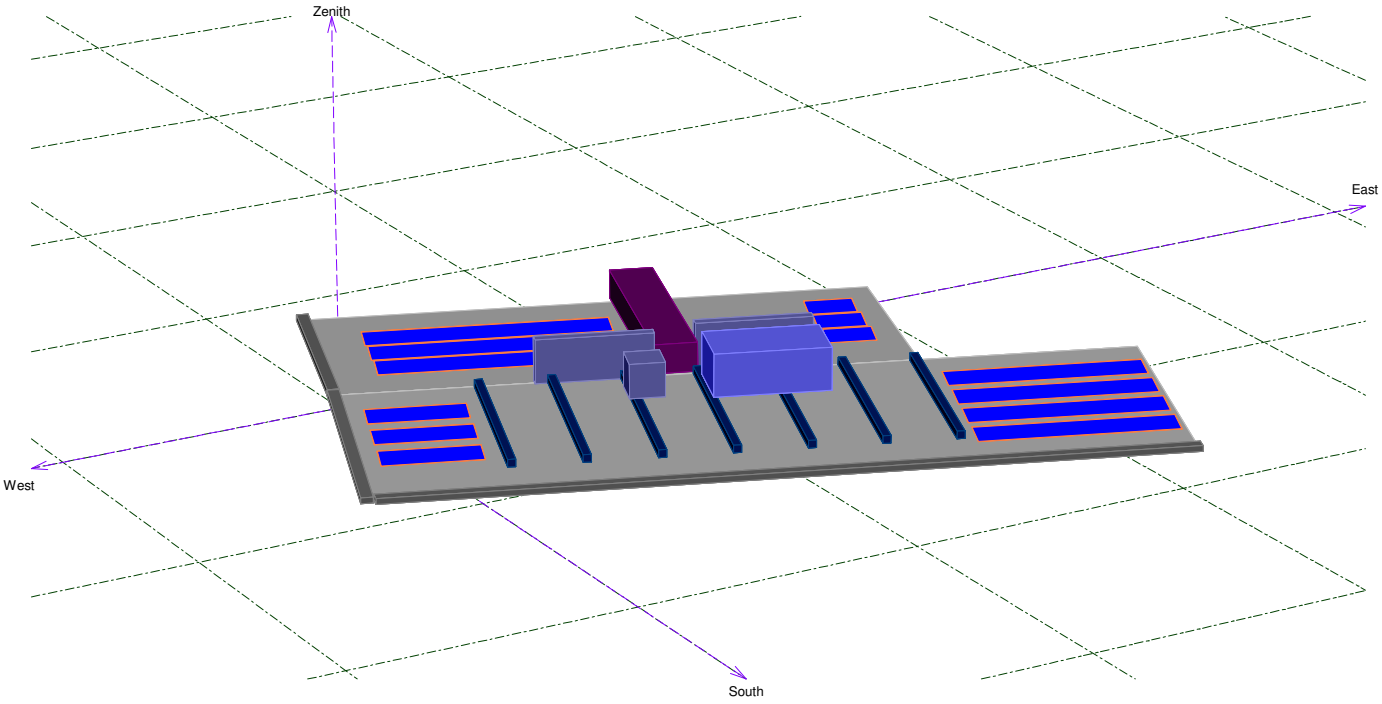
Grid-Connected System: Near shading definition

Project : **1096-SOU Chalk Farm Road**

Simulation variant : **Simulation variant (Tilted 7 deg rev_1)**

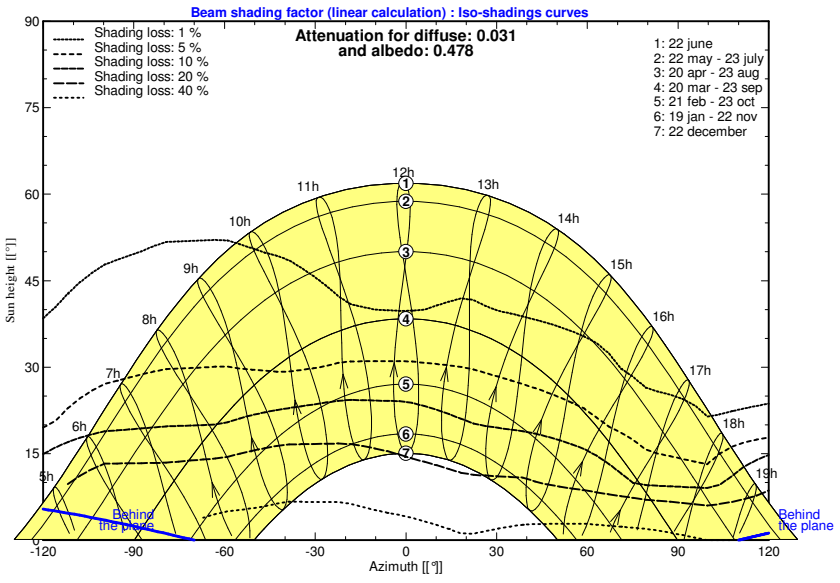
Main system parameters	System type	**Grid-Connected**		
Near Shadings	Detailed electrical calculations	(acc. to module layout)		
PV Field Orientation	tilt	7°	azimuth	20°
PV modules	Model	TSM-250 P05A	Pnom	250 Wp
PV Array	Nb. of modules	40	Pnom total	**10.00 kWp**
Inverter	Model	Symo 8.2-3-M	Pnom	8.20 kW ac
User's needs	Unlimited load (grid)			

Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram

1096-SOU Chalk Farm Road



Grid-Connected System: Main results

Project : **1096-SOU Chalk Farm Road**

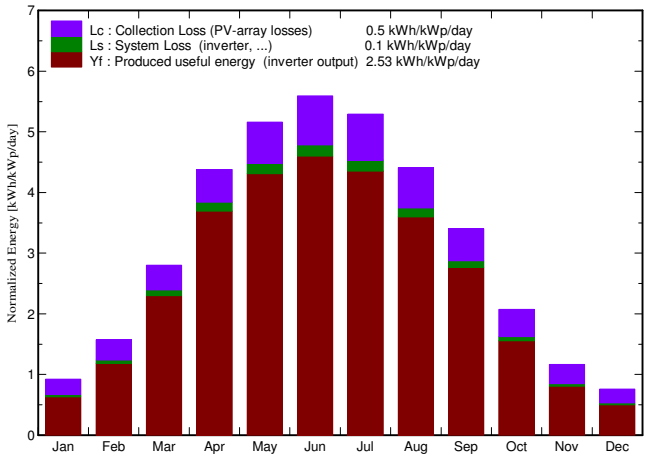
Simulation variant : **Simulation variant (Tilted 7 deg rev_1)**

Main system parameters	System type	**Grid-Connected**		
Near Shadings	Detailed electrical calculations	(acc. to module layout)		
PV Field Orientation	tilt	7°	azimuth	20°
PV modules	Model	TSM-250 P05A	Pnom	250 Wp
PV Array	Nb. of modules	40	Pnom total	**10.00 kWp**
Inverter	Model	Symo 8.2-3-M	Pnom	8.20 kW ac
User's needs	Unlimited load (grid)			

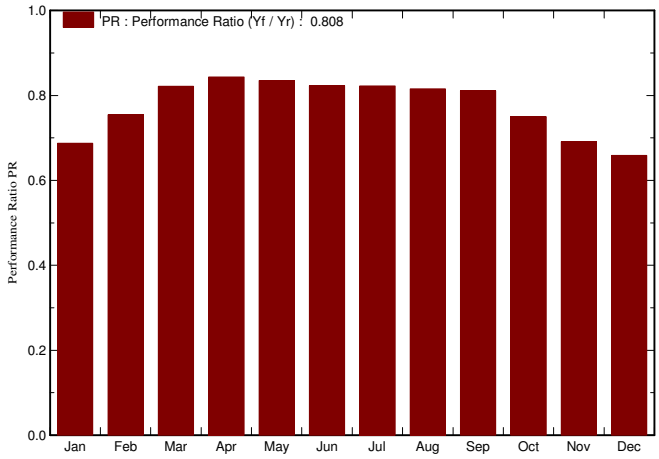
Main simulation results

System Production				
	Produced Energy	**9.24 MWh/year**	Specific prod.	924 kWh/kWp/year
	Performance Ratio PR	80.8 %		

Normalized productions (per installed kWp): Nominal power 10.00 kWp



Performance Ratio PR



Simulation variant (Tilted 7 deg rev_1)

Balances and main results

	GlobHor kWh/m²	T Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray MWh	E_Grid MWh	EffArrR %	EffSysR %
January	24.1	5.20	28.5	24.1	0.207	0.196	11.07	10.50
February	39.2	5.80	44.1	39.0	0.347	0.332	12.04	11.53
March	79.7	7.10	86.8	79.9	0.742	0.713	13.06	12.55
April	124.5	9.30	131.3	123.0	1.152	1.108	13.40	12.89
May	156.6	12.50	159.9	150.3	1.389	1.336	13.26	12.76
June	165.3	15.60	167.8	158.2	1.436	1.381	13.08	12.57
July	160.9	17.80	164.1	154.6	1.404	1.350	13.07	12.56
August	131.7	18.20	136.8	128.3	1.161	1.116	12.96	12.46
September	95.4	15.50	102.2	94.7	0.862	0.829	12.89	12.39
October	57.4	12.20	64.3	57.6	0.503	0.482	11.96	11.46
November	29.7	8.00	35.0	29.9	0.254	0.242	11.08	10.56
December	19.5	5.40	23.6	19.4	0.165	0.156	10.67	10.07
Year	1083.9	11.08	1144.3	1058.8	9.623	9.241	12.84	12.33

Legends:

GlobHor	Horizontal global 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	EffArrR	Effic. Eout array / rough area
GlobEff	Effective Global, corr. for IAM and shadings	EffSysR	Effic. Eout system / rough area

Grid-Connected System: Loss diagram

Project : **1096-SOU Chalk Farm Road**

Simulation variant : **Simulation variant (Tilted 7 deg rev_1)**

Main system parameters	System type	**Grid-Connected**		
Near Shadings	Detailed electrical calculations	(acc. to module layout)		
PV Field Orientation	tilt	7°	azimuth	20°
PV modules	Model	TSM-250 P05A	Pnom	250 Wp
PV Array	Nb. of modules	40	Pnom total	**10.00 kWp**
Inverter	Model	Symo 8.2-3-M	Pnom	8.20 kW ac
User's needs	Unlimited load (grid)			

Loss diagram over the whole year