Grid-Connected System: Simulation parameters

Project :	**BrightEnergy_CastleDonington**			
Geographical Site	**Derby**		**Country**	**United Kingdom**
Situation	Latitude	52.9°N	Longitude	1.5°W
Time defined as	Legal Time	Time zone UT+0	Altitude	100 m
	Albedo	0.20		
Meteo data :	Derby , synthetic hourly data			

Simulation variant :	**BE_CastleDonington_Mitsub_2kWp**			
	Simulation date	05/02/10 14h37		

Simulation parameters

Collector Plane Orientation	Tilt	30°	Azimuth	0°
Horizon	Free Horizon			
Near Shadings	No Shadings			

PV Array Characteristics

PV module	Si-poly	Model	**PV-TD180 MF5**		
		Manufacturer	Mitsubishi		
Number of PV modules		In series	12 modules	In parallel	1 strings
Total number of PV modules		Nb. modules	12	Unit Nom. Power	180 Wp
Array global power		Nominal (STC)	**2.16 kWp**	At operating cond.	1.93 kWp (50°C)
Array operating characteristics (50°C)		U mpp	262 V	I mpp	7 A
Total area		Module area	**16.6 m²**		

PV Array loss factors

Heat Loss Factor	ko (const)	29.0 W/m²K	kv (wind)	0.0 W/m²K / m/s
=> Nominal Oper. Coll. Temp. (800 W/m², Tamb=20°C, wind 1 m/s)			NOCT	45 °C
Wiring Ohmic Loss	Global array res.	1167.1 mOhm	Loss Fraction	3.0 % at STC
Serie Diode Loss	Voltage Drop	0.7 V	Loss Fraction	0.2 % at STC
Module Quality Loss			Loss Fraction	3.0 %
Module Mismatch Losses			Loss Fraction	2.0 % at MPP
Incidence effect, ASHRAE parametrization	IAM =	1-bo (1/cos i - 1)	bo Parameter	0.05

System Parameter	System type	**Grid-Connected System**		
Inverter	Model	**Sunny Boy SWR 2000**		
	Manufacturer	SMA		
Inverter Characteristics	Operating Voltage	125-500 V	Unit Nom. Power	1.8 kW AC

User's needs : Unlimited load (grid)

Grid-Connected System: Main results

Project : **BrightEnergy_CastleDonington**

Simulation variant : **BE_CastleDonington_Mitsub_2kWp**

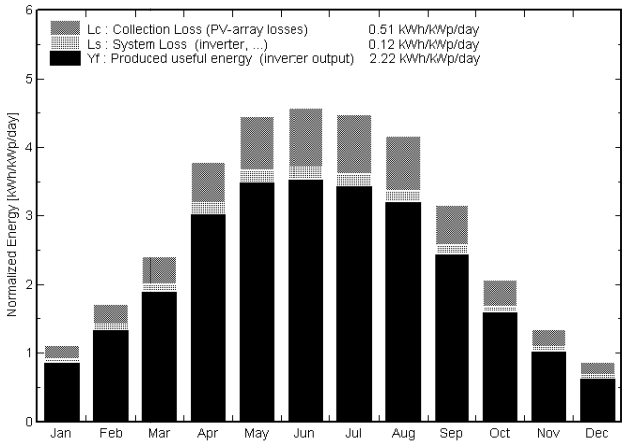
Main system parameters				
System type	**Grid-Connected**			
PV Field Orientation	tilt	30°	azimuth	0°
PV modules	Model	PV-TD180 MF5	Pnom	180 Wp
PV Array	Nb. of modules	12	Pnom total	**2.16 kWp**
Inverter	Model	Sunny Boy SWR 2000	Pnom	1.80 kW ac
User's needs	Unlimited load (grid)			

Main simulation results

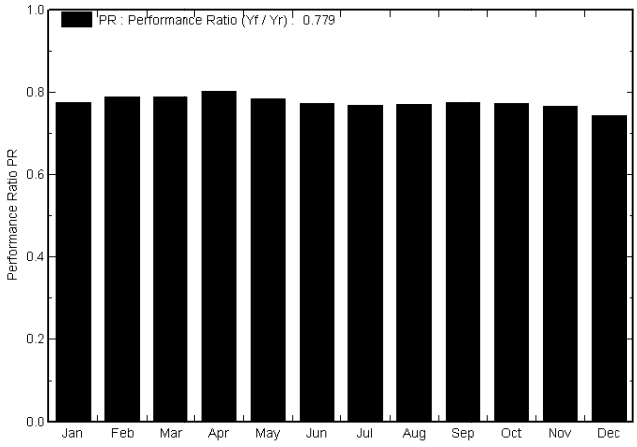
System Production — **Produced Energy** **1747 kWh/year** — Specific 809 kWh/kWp/year

Performance Ratio PR 77.9 %

Normalized productions (per installed kWp): Nominal power 2.16 kWp



Performance Ratio PR



BE_CastleDonington_Mitsub_2kWp

Balances and main results

	GlobHor kWh/m²	T Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray kWh	EOutInv kWh	EffArrR %	EffSysR %
January	20.0	3.40	34.6	33.4	61.6	58.0	10.72	10.08
February	33.0	3.60	47.8	46.2	86.2	81.5	10.86	10.27
March	63.0	5.70	74.6	72.0	134.4	127.4	10.85	10.29
April	105.0	8.00	113.7	109.8	206.8	196.9	10.97	10.44
May	136.0	11.20	137.9	133.2	245.9	233.9	10.75	10.22
June	138.0	14.10	137.1	132.4	240.9	228.9	10.59	10.07
July	139.0	16.00	138.6	133.7	242.2	230.4	10.53	10.02
August	120.0	15.90	129.1	124.8	226.1	215.0	10.56	10.04
September	81.0	13.70	94.8	91.6	167.1	158.8	10.63	10.10
October	47.0	10.40	63.9	61.7	112.9	106.9	10.65	10.08
November	25.0	6.70	40.4	38.9	70.9	66.8	10.59	9.98
December	15.0	4.60	26.6	25.7	45.7	42.8	10.33	9.68
Year	922.0	9.48	1039.0	1003.4	1840.8	1747.2	10.68	10.13

Legends:

GlobHor	Horizontal global irradiation	EArray	Effective energy at the output of the array
T Amb	Ambient Temperature	EOutInv	Available Energy at Inverter Output
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 : **BrightEnergy_CastleDonington**

Simulation variant : **BE_CastleDonington_Mitsub_2kWp**

Main system parameters		**Grid-Connected**		
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Loss diagram over the whole year