

Guide to Calculating the Output of your PV System using the SAP Calculation

We at The Little Green Energy Company are trying to make PV easy to understand for everybody. For every system quoted in the UK the following SAP calculation must be used, to comply with the MCS Accreditation and the REAL Scheme. It must also be accompanied by the following statement:

Disclaimer: *The performance of solar PV systems is impossible to predict with certainty due to the variability in the amount of solar radiation (sunlight) from location to location and from year to year. This estimate is based upon the Government's standard assessment procedure for energy rating of buildings (SAP) and is given as guidance only. It should not be considered as a guarantee of performance.*

Failing to follow this code can result in the company losing its MCS Accreditation.

$$\text{Output of System (kWh/year)} = 0.8 \times \text{kWp} \times S \times Z_{PV}$$

Where,

kWh/year – Kilowatt Hours of Electricity per Year (A Unit as billed by the electricity company)

kWp – Kilowatt Peak (Size of PV System ie. 5 x 200W panels = 1000W = 1kWp)

S – Annual Solar Radiation kWh/m² (See Table 1)

Z_{PV} – Overshading Factor (See Table 2)

Example:

For a 1kWp system installed South Facing on a 30° roof pitch, with no shading the output would be:

$$\text{kWh/yr} = 0.8 \times 1.0 \times 1073 \times 1 = 858.4\text{kWh/yr}$$

Tilt of Panel	Orientation of Panel				
	South	SE/SW	E/W	NE/NW	North
Horizontal	961				
30°	1073	1027	913	785	730
45°	1054	997	854	686	640
60°	989	927	776	597	500
Vertical	746	705	582	440	371

Table 1: Annual Solar Radiation, kWh/m²

Overshading	% of Sky Blocked by Obstacles	Overshading Factor (Z _{PV})
Heavy	>80%	0.5
Significant	60-80%	0.65
Modest	20-60%	0.8
None or Very Little	<20%	1.0

Table 2: Overshading Factor

References:

1. The Government's Standard Assessment Procedure for Energy Rating of Dwellings 2009 edition rev. 2, BRE
2. REAL Scheme – Renewable Energy Assurance Code - <http://www.realassurance.org.uk/real-assurance-consumer-code>
3. MCS – Microgeneration Certification Scheme - <http://www.microgenerationcertification.org/>