



David Hunt- Eco Environments Ltd

NWEF 22nd September 2011



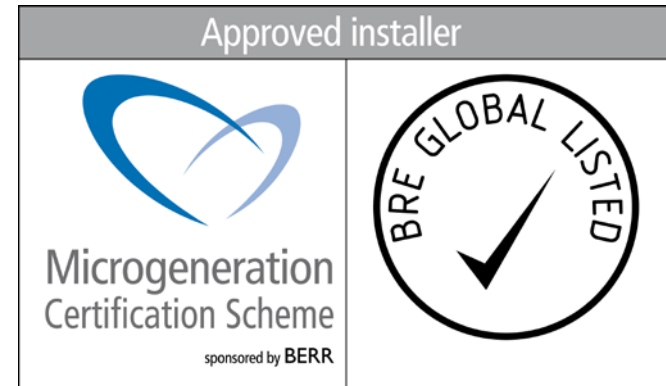
Who are We?

- **A UK award-winning 4x Microgeneration Certified Scheme (MCS) accredited company**
- **We design, install and commission renewable energy and energy conservation solutions. Our clients range from house builders, social landlords, architects and property developers, to businesses, both PLC's and SME's to a broad and happy range of domestic customers**

What Do We Do?

- **We design, install and commission renewable energy systems, from feasibility and planning, to operation and maintenance.**
- **Solar Photovoltaic (PV), Solar Thermal, Air-source heating and Wind turbines are our speciality**

What is MCS?



‘The Microgeneration Certification Scheme (MCS) is owned by the department for Business, Enterprise and Regulatory Reform (BERR formerly DTI) and is designed to evaluate products and installers against robust criteria for microgeneration technologies, providing greater protection for consumers and ensuring that the Government’s (i.e. taxpayers) grant money is spent in an effective manner’ - BERR

Why is MCS important?



- To ensure a quality installation and service.
- You **WILL NOT** be eligible for any feed in tariffs if you don't use an MCS approved product, and an MCS approved installer.



How Businesses can use Renewables

1. Reduce energy costs.
2. Reduce CO² emissions.
3. Improve reputation.
4. Earn a guaranteed income.



Clean Energy Cashback Scheme

From 1st April 2010 Feed in Tariffs (FIT's) became the main mechanism for encouraging renewable energy installation for electricity generating technologies. October 2012 sees the introduction of the Renewable Heat Incentive (RHI), for heat generating technologies.

Feed in tariffs are geared to provide an 8-10% annual return. However currently we are seeing 15% ROI for solar PV, and greater still for wind.

This is a scheme where you will be paid for every Kilowatt hour (kwh) of electricity you generate, whether you use it or not. You will also save the equivalent amount by not having to buy the amount of electricity you have generated. You will also be paid for any electricity you export. These tariffs are dependent on you using MCS approved products and installers.

Why and How?

The new Feed-in Tariff (FIT) scheme, sometimes referred to as ‘Clean Energy Cashback’, is available through licensed electricity suppliers. The scheme is intended to encourage the uptake of small-scale low carbon technologies up to 5MW, through tariff payments made on both generation and export of produced renewable energy.

The Energy Act 2008 contained enabling powers for the introduction of a Feed-in Tariff for small-scale low-carbon electricity generation in Great Britain, up to a maximum limit of 5 megawatts (MW) capacity, The Secretary of State for Energy and Climate Change has used those enabling powers to introduce the FIT scheme through changes to electricity supply licenses. The Feed-in Tariffs (Specified Maximum Capacity and Functions) Order 2010 (“the FITs Order”) came into effect on 1 April 2010

After index linked increase of 4.8% from 1st April 2011

Solar Photovoltaic with total installed capacity of 4kW or less, where installed on a new building before first occupation	36.1 pence per kilowatt hour	37.8 pence per kilowatt hour	37.8 pence per kilowatt hour
Solar Photovoltaic with total installed capacity of 4kW or less, where installed on a building which is already occupied	41.3 pence per kilowatt hour	43.3 pence per kilowatt hour	43.3 pence per kilowatt hour
Solar Photovoltaic with total installed capacity greater than 4kW but not exceeding 10kW	36.1 pence per kilowatt hour	37.8 pence per kilowatt hour	37.8 pence per kilowatt hour
Solar Photovoltaic with total installed capacity greater than 10kW but not exceeding 100kW	31.4 pence per kilowatt hour	32.9 pence per kilowatt hour	32.9 pence per kilowatt hour
Solar Photovoltaic with total installed capacity greater than 100kW	29.3 pence per kilowatt hour	30.7 pence per kilowatt hour	30.7 pence per kilowatt hour
Stand-alone (autonomous) solar photovoltaic (not attached to a building and not wired to provide electricity to an occupied building)	29.3 pence per kilowatt hour	30.7 pence per kilowatt hour	30.7 pence per kilowatt hour
Wind with total installed capacity of 1.5kW or less	34.5 pence per kilowatt hour	36.2 pence per kilowatt hour	36.2 pence per kilowatt hour
Wind with total installed capacity greater than 1.5kW but not exceeding 15kW	26.7 pence per kilowatt hour	28 pence per kilowatt hour	28 pence per kilowatt hour
Wind with total installed capacity greater than 15kW but not exceeding 100kW	24.1 pence per kilowatt hour	25.3 pence per kilowatt hour	25.3 pence per kilowatt hour



Solar

“The earth receives more energy from the sun in just one hour than the world uses in a whole year ”



Solar Photovoltaic's?

SOLAR PV- Solar is a far more predictable source of electricity, as such it is easier to look at numbers. PV could provide nationally

Every roof space- 460Twh, 116% of UK consumption!

A typical domestic installation will cover about 2/3 to 3/4 of household needs, commercially it depends on your roof size and energy use.

Benson Signs

System overview (United Kingdom / Merseyside)



PV-module

SUNGRID
SG-215M6
Angle of inclination: 30° (Optimized)
Azimuth angle: 0°
Module x String: 15 x 1

Inverter

3 x Sunny Boy SB 3000
Max. efficiency: 95 %; EU-efficiency: 93.6 %
Max. DC power: 3.2 kW; Max. AC power: 3 kW
Grid voltage/frequency: 230 V / 50 Hz

Technical data

PV peak power :	9.68 kW
Total number of modules :	45
Area of PV-generator :	67.5 m ²
Number of inverters :	3
Max. DC power of inverter :	9.60 kW
Max. AC power of inverter :	9.00 kW
Inverter effectiveness :	92.5 %

Nominal power ratio :	99 %
Yearly en. yield * :	7971 kWh
Energy usability factor :	100.0 %
Performance Ratio * :	80 %
Spec. energy yield * :	824 kWh/kWp
Cable losses (% in PV-Energy) :	Not considered

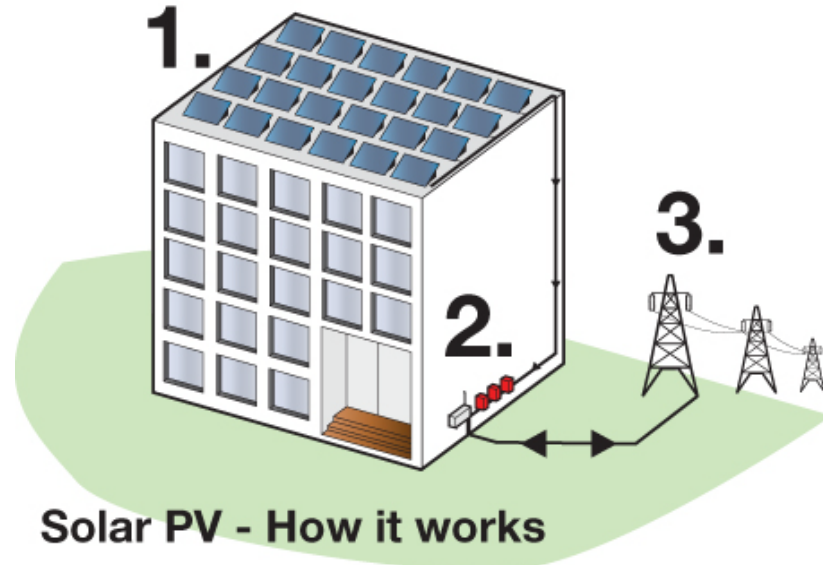
Solar Photovoltaic's (PV)

Solar panels work on daylight, rather than sunlight, though do perform better, the more sun there is.

Solar PV is very simple to integrate into the household electricity supply.

You must notify the DNO when connecting to the grid, beforehand if your system is of a reasonable size.

Grid systems export surplus electricity to the grid, for which you are paid.



Solar PV - How it works

1. Photovoltaic modules can be mounted on the roof of buildings in many different ways. The cells in the modules convert daylight into DC electricity. This process is silent and has no moving parts.
2. The DC electricity is wired to a set of inverters, usually installed in the plant room. The inverters convert the DC electricity to AC. The AC electricity is then sent through the main distribution board for use in the building.
3. When more electricity is generated than is being used in the building, the excess can be exported to the grid. At night, or when the demand is higher than the PV system can supply, electricity is imported from the grid.

Solar Photovoltaic's (PV)



Solar Photovoltaic's (PV)





Lydiate Village Centre

Lydiate Village Centre had a 7.31kwp system installed, generating 5,965 kwh's a year (£22,684 install cost)

The estimated income from generation is $5,965 \times 37.8p = £2,254.77$

Saving around £607 on the annual electricity bills (based on using 80% of generation and a 12p cost per kwh)

The estimated income from export is £36.98 (based 20% of generation and an export tariff of 3.1p per kWh.)

A total income/saving of £2,898.75 per year, and £131,262.72 over 25 years.

This equates to a 478.66% return on investment, or an average of 17.86% annually. (Based on annual inflation of 4% and annual energy price increases of 6% pa)+ Save 3,244.96kg of CO² PA

Benson Signs



Eco Environments added a 9.68kWp system, generating 7,971 kWh's a year (£27,600 install cost)

The estimated income from generation is $7,971 \times 37.8p = £3,013.03$

Saving around £675.94 on the annual electricity bills (based on using 80% of generation and a 10p typical cost per kWh)

The estimated income from export is £49.00 (based 20% of generation and an export tariff of 3.1p per kWh.)

A total income/saving of £3,738.40 per year, and £167,813.77 over 25 years.

This equates to a 508% return on investment, or an average of 23.1% annually. (Based on annual inflation of 4% and annual energy price increases of 6% pa)+ Save 4,336kg of CO² PA

Sandy Lane Nurseries



We installed a 7.848kWp Hyundai system at Sandy Lane Nurseries, generating 5,965kwh's a year (£23,050 install cost)

The estimated income from generation is $6,494 \times 37.8p = £2,254.77$

Saving around £481.85 on the annual electricity bills (based on using 70% of generation and a 10p typical cost per kwh)

The estimated income from export is £36.98 (based 30% of generation and an export tariff of 3.1p per kWh.)

A total income/saving of £2,996.98 per year, and £135,293.27 over 25 years.

This equates to a 486.96% return on investment, or an average of 23% annually. (Based on annual inflation of 4% and annual energy price increases of 6% pa)+ Save 3,532.74kg of CO² PA

Solar PV Payback Calculation - Commercial

Average Cost per kW Installed (£)	2,579
Estimated Installed Cost (£)	126,373
Size of the Array (kWp)	49
Load Factor	0.8
Solar Radiation Factor	1027
Overshading Factor	1
10-100 KW	32.9
100.1-500 KW	30.7

Enter your own figures in ORANGE boxes
PAYBACK reached in year where cells turn GREEN in Accumulative Total

Notes:
 > Calculations ignore the time value of money
 > Assumes inverter lasts 25 years

Estimated Output (kWh/annum)	40258	Assumed Annual Rate of Inflation	4%	% of Energy Used on Site	80%	Annual Increase in Energy Cost	6%	Annual Maintenance Cost (£)	500	1000
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Year	Estimated Output Taking Degradation at 1% loss/year into Account (kWh/annum)	Efficiency of Cells	inflation compound factor	FIT including inflation (p/kWh)	Total Generation annual income (£)	Energy Used on Site (kWh)	Energy Cost (p)	Savings from Energy Used (£)	Total Income & Saving per year (£)	Accumulative Total (£)	Year
1	40258	100%	1	32.9	13,245	32207	10.00	3221	15,966	15,966	1
2	40258	100%	1.04	34.2	13,775	32207	11	3414	16,689	32,654	2
3	40258	100%	1.08	35.6	14,326	32207	11	3619	17,445	50,099	3
4	39856	99%	1.12	37.0	14,750	31885	12	3798	18,047	68,146	4
5	39457	98%	1.17	38.5	15,186	31566	13	3985	18,672	86,818	5
6	39063	97%	1.22	40.0	15,636	31250	13	4182	19,318	106,136	6
7	38672	96%	1.27	41.6	16,099	30938	14	4389	19,987	126,123	7
8	38285	95%	1.32	43.3	16,575	30628	15	4605	20,681	146,804	8
9	37902	94%	1.37	45.0	17,066	30322	16	4833	21,399	168,203	9
10	37523	93%	1.42	46.8	17,571	30019	17	5072	22,143	190,345	10
11	37148	92%	1.48	48.7	18,091	29719	18	5322	22,913	213,259	11
12	36777	91%	1.54	50.6	18,627	29421	19	5585	23,712	236,970	12
13	36409	90%	1.60	52.7	19,178	29127	20	5861	24,539	261,509	13
14	36045	90%	1.67	54.8	19,746	28836	21	6150	25,396	286,906	14
15	35684	89%	1.73	57.0	20,330	28548	23	6454	26,285	313,190	15
16	35328	88%	1.80	59.3	20,932	28262	24	6773	27,205	340,395	16
17	34974	87%	1.87	61.6	21,552	27979	25	7108	28,159	368,555	17
18	34625	86%	1.95	64.1	22,189	27700	27	7459	29,148	397,703	18
19	34278	85%	2.03	66.6	22,846	27423	29	7827	30,174	427,877	19
20	33936	84%	2.11	69.3	23,523	27148	30	8214	31,237	459,113	20
21	33596	83%	2.19	72.1	24,219	26877	32	8620	32,339	491,452	21
22	33260	83%	2.28	75.0	24,936	26608	34	9046	33,481	524,933	22
23	32928	82%	2.37	78.0	25,674	26342	36	9492	34,666	559,599	23
24	32598	81%	2.46	81.1	26,434	26079	38	9961	35,895	595,495	24
25	32272	80%	2.56	84.3	27,216	25818	40	10453	37,170	632,664	25

This show 500% ROI or 20% annually



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