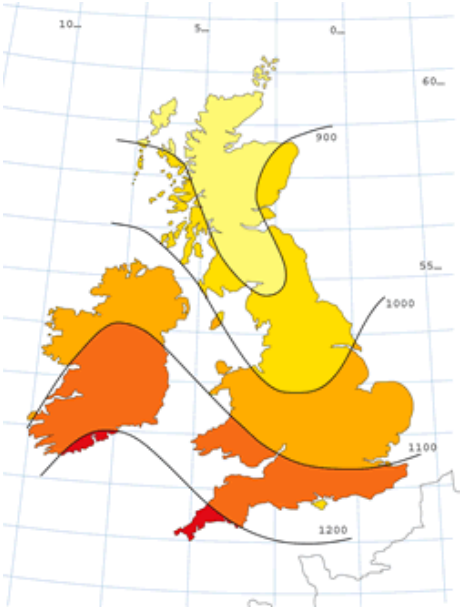


Wessex Energy and Environment Management Group

7th March 2011

Feed-in Tariffs

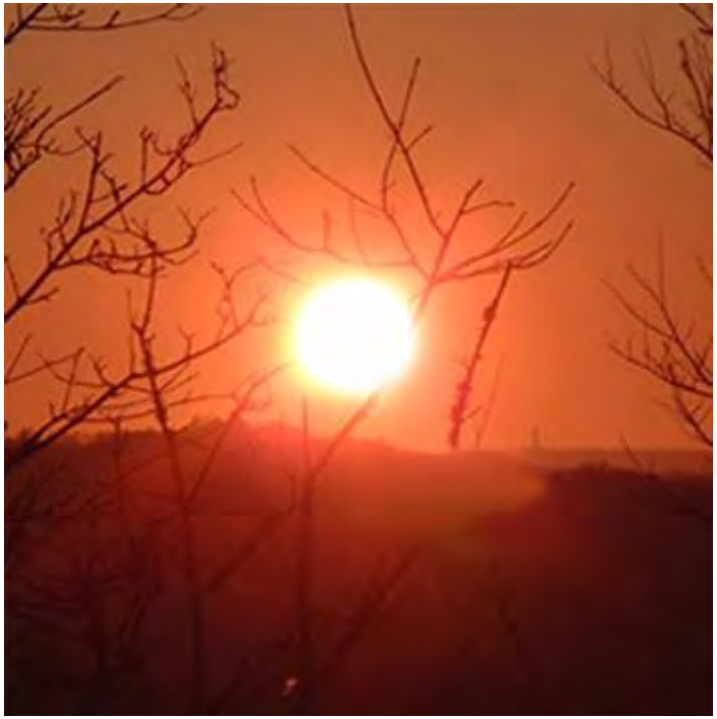
Pete West

Renewable Energy Development Officer

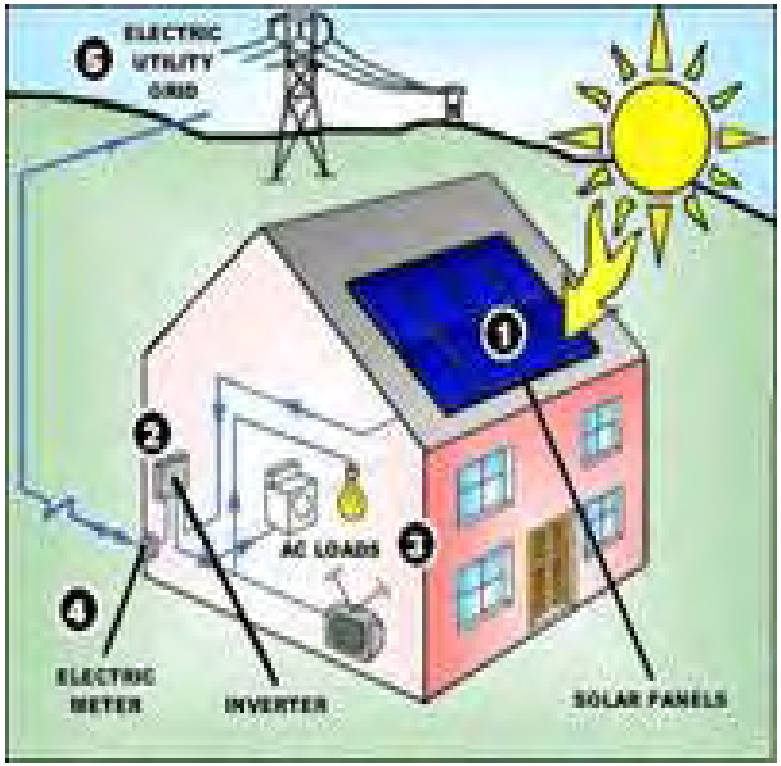
Dorset County Council

Topics to be covered

- My background
- Solar PV basics
- Feed-in tariffs (FITs)
- The politics of FITs
- Questions and discussion at the end



How solar photovoltaic (PV) panels work



West Wales Eco Centre- first grid connected domestic scale PV installation in UK (1995)

Support rails and PV modules in series

Inverter and generation meter

Note PV modules not connected until internal wiring has been completed

Inverter supplies AC a few volts above the incoming mains voltage

Factors affecting PV performance- orientation and roof pitch

	WEST								SOUTH									EAST
	(Degrees from south)																	
TILT FROM FLAT	90	80	70	60	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60	-70	-80	-90
0	87	88	90	91	92	92	93	93	93	93	93	93	92	92	91	90	89	87	86
10	84	87	90	92	94	95	95	96	96	97	97	96	95	94	93	91	89	87	84
20	82	85	90	93	94	96	97	98	99	99	98	97	96	95	93	91	88	84	81
30	78	83	87	91	93	96	97	98	99	100	98	97	96	95	93	89	85	81	78
40	75	79	84	87	92	94	95	96	96	96	96	95	94	92	90	86	82	77	72
50	70	74	79	83	87	90	91	93	94	94	94	93	91	88	83	80	76	73	70
60	65	69	73	77	80	83	86	87	87	87	88	87	85	82	78	74	71	67	63
70	59	63	76	70	72	75	78	79	79	79	79	79	78	75	72	68	64	61	56
80	50	56	60	64	76	68	69	70	71	72	72	71	70	67	66	60	57	54	50
90	41	49	44	58	80	61	60	61	63	65	65	63	62	59	60	52	50	47	44

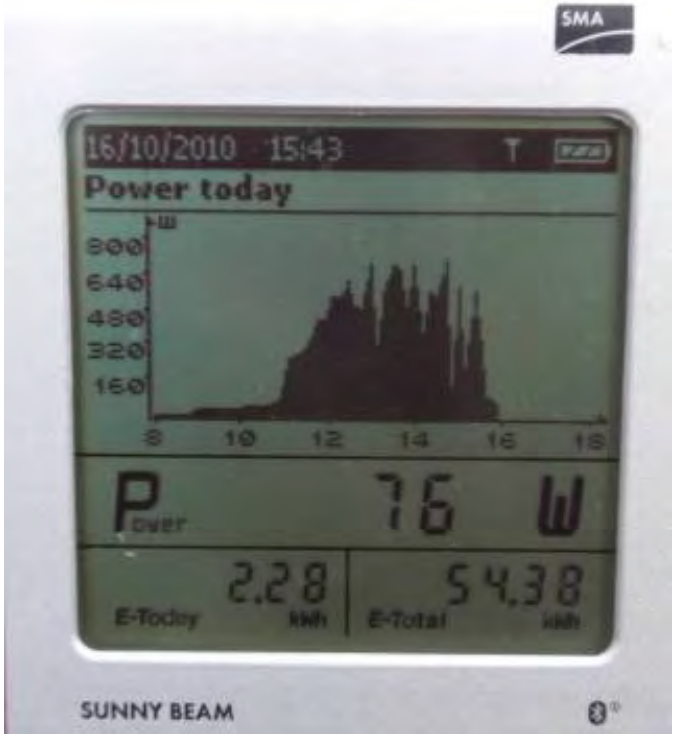
Factors affecting performance- shading

Pre-installation photos

10:30am 21st March

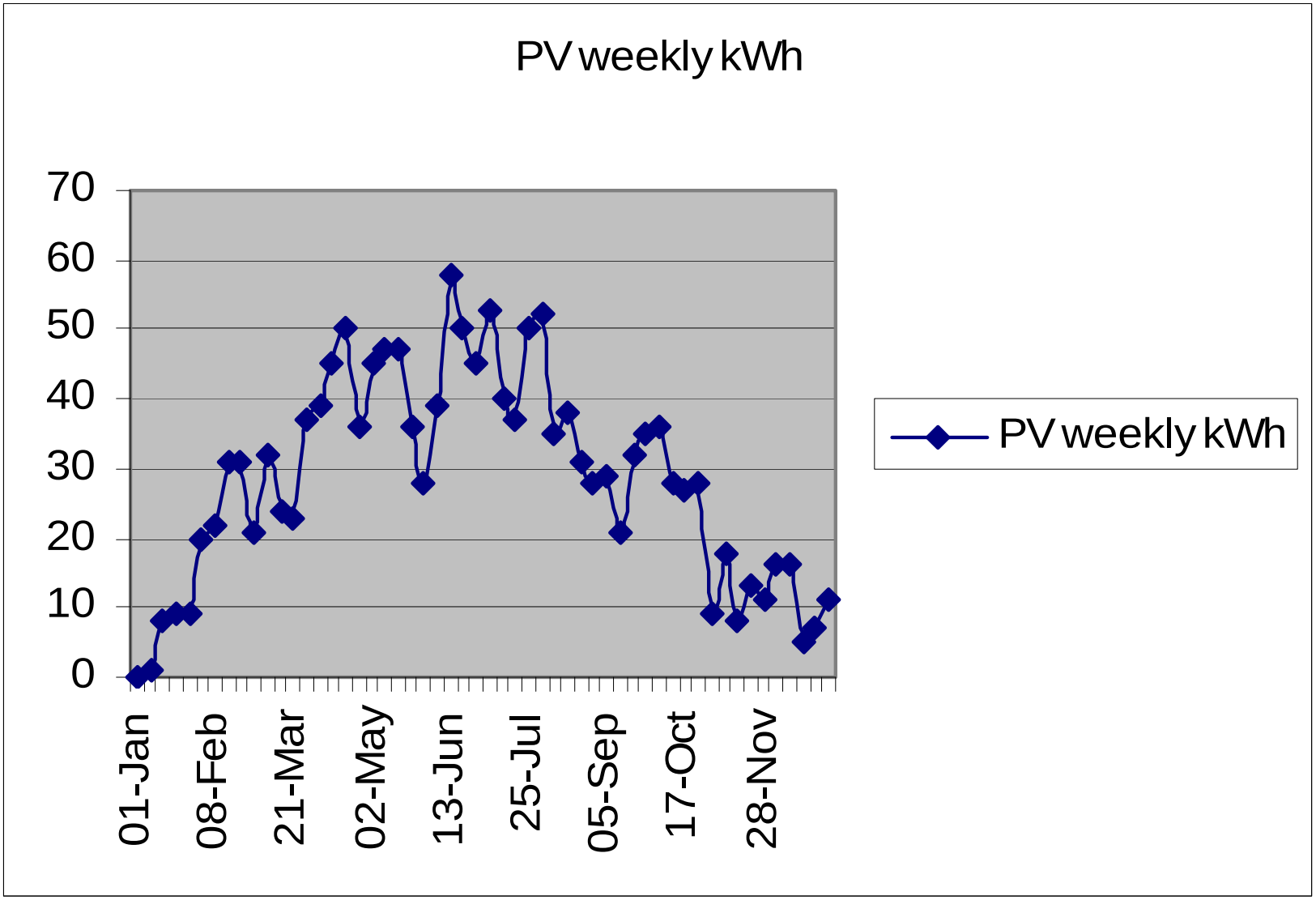
12 noon 18th December

Actual performance 16th October

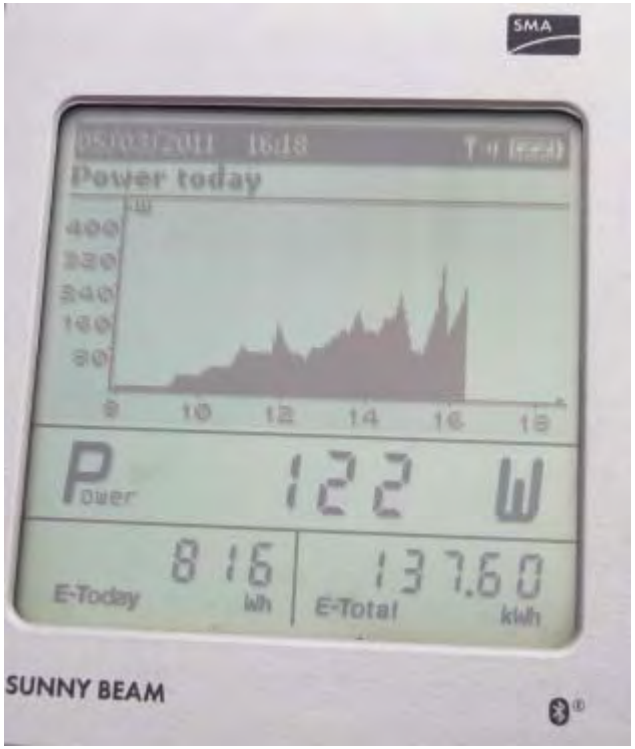


Shading 10:30am 16th Oct

Seasonal PV performance



Output on sunny and cloudy days



4th March 2011-sunny all day

5th March grey cloud all day

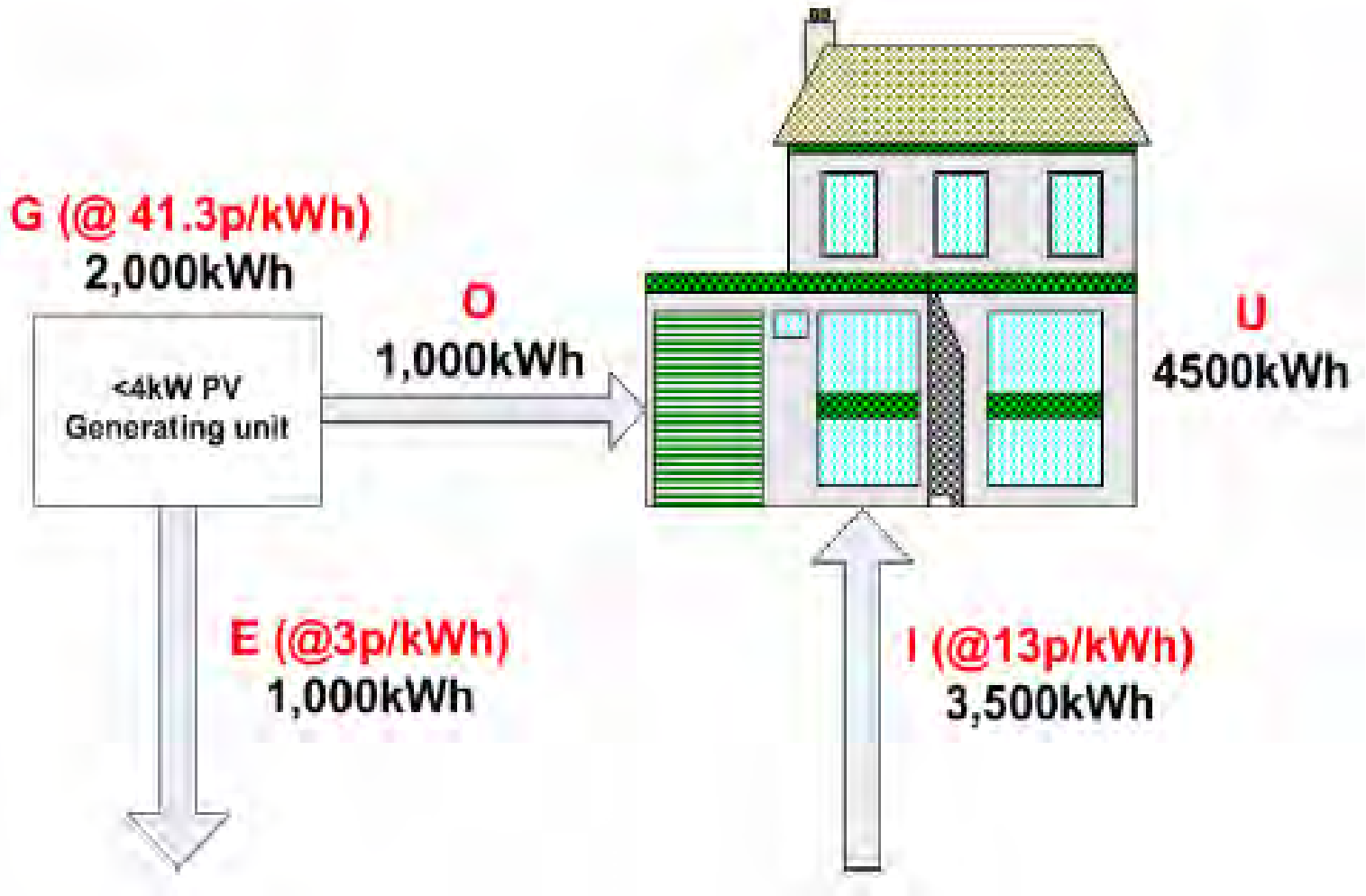
What are solar PV feed-in tariffs?

- A government guaranteed payment for 25 years per kWh of renewable electricity generated for installations less than 5MW.
- Payments are tax free for householders (not for organisations) and increase annually in line with the retail price index.
- There is a price “degression” as capital costs of installations fall due to the volume of the market.
- The cost of feed-in tariffs is passed to all electricity users and is estimated to add £3 per year to household electricity bills

Feed–in tariff rates

Technology	Size	2010	2011	2012	Years FIT
Hydro	>15-100 kW	17.8	17.8	17.8	20
Hydro	>100 kW-2 MW	11.0	11.0	11.0	20
Hydro	>2 MW – 5 MW	4.5	4.5	4.5	20
MicroCHP pilot*	<2 kW*	10*	10*	10*	10*
PV	≤4 kW (new build)	36.1	36.1	33.0	25
PV	≤4 kW (retrofit)	41.3	41.3	37.8	25
PV	>4-10 kW	36.1	36.1	33.0	25
PV	>10-100 kW	31.4	31.4	28.7	25
PV	>100kW-5MW	29.3	29.3	26.8	25
PV	Stand alone system	29.3	29.3	26.8	25
Wind	≤1.5kW	34.5	34.5	32.6	20
Wind	>1.5-15kW	26.7	26.7	25.5	20
Wind	>15-100kW	24.1	24.1	23.0	20
Wind	>100-500kW	18.8	18.8	18.8	20
Wind	>500kW-1.5MW	9.4	9.4	9.4	20
Wind	>1.5MW-5MW	4.5	4.5	4.5	20

How the feed-in tariff works (eg PV)



Net electricity bill is minus £400 per year, ie £100 / quarter net income

Example of potential FIT income for solar photovoltaic installation using real data from an existing installation

Paul and Claire Sheridan, Stroud 1.8kWp photovoltaic installation

Total generation from PV 1620 kWh/year of which 620kWh is used on site in the house and 1000kWh/ year exported

Annual income with feed- in tariff for 25 years

Generation 1620 kWh X 41.3p = £670

Exported 1000 kWh X 3.0p = £30

Value of own use = 620 kWh X 14p = £87

TOTAL annual income = £787

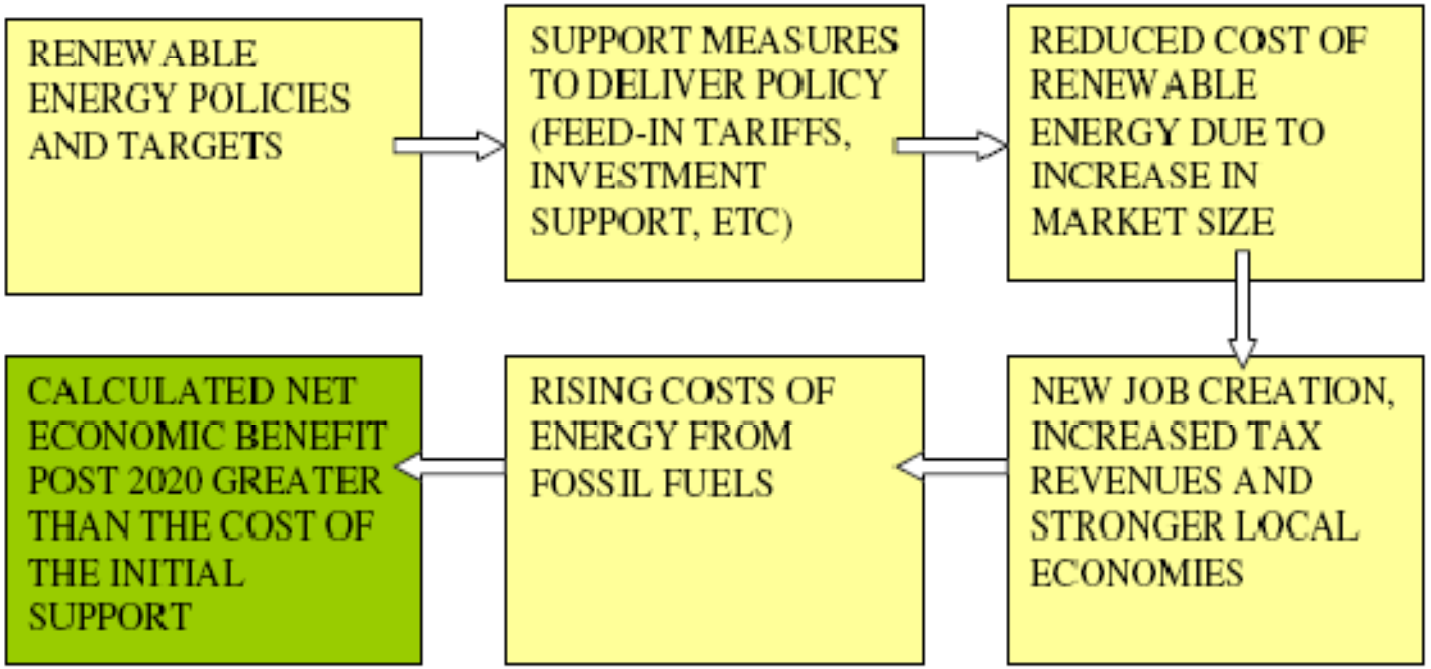
Initial capital cost = £11,300 (note in practice installed in 2005 – pre FITS)

Simple payback period = 14.3 years, guaranteed lifetime 25 years

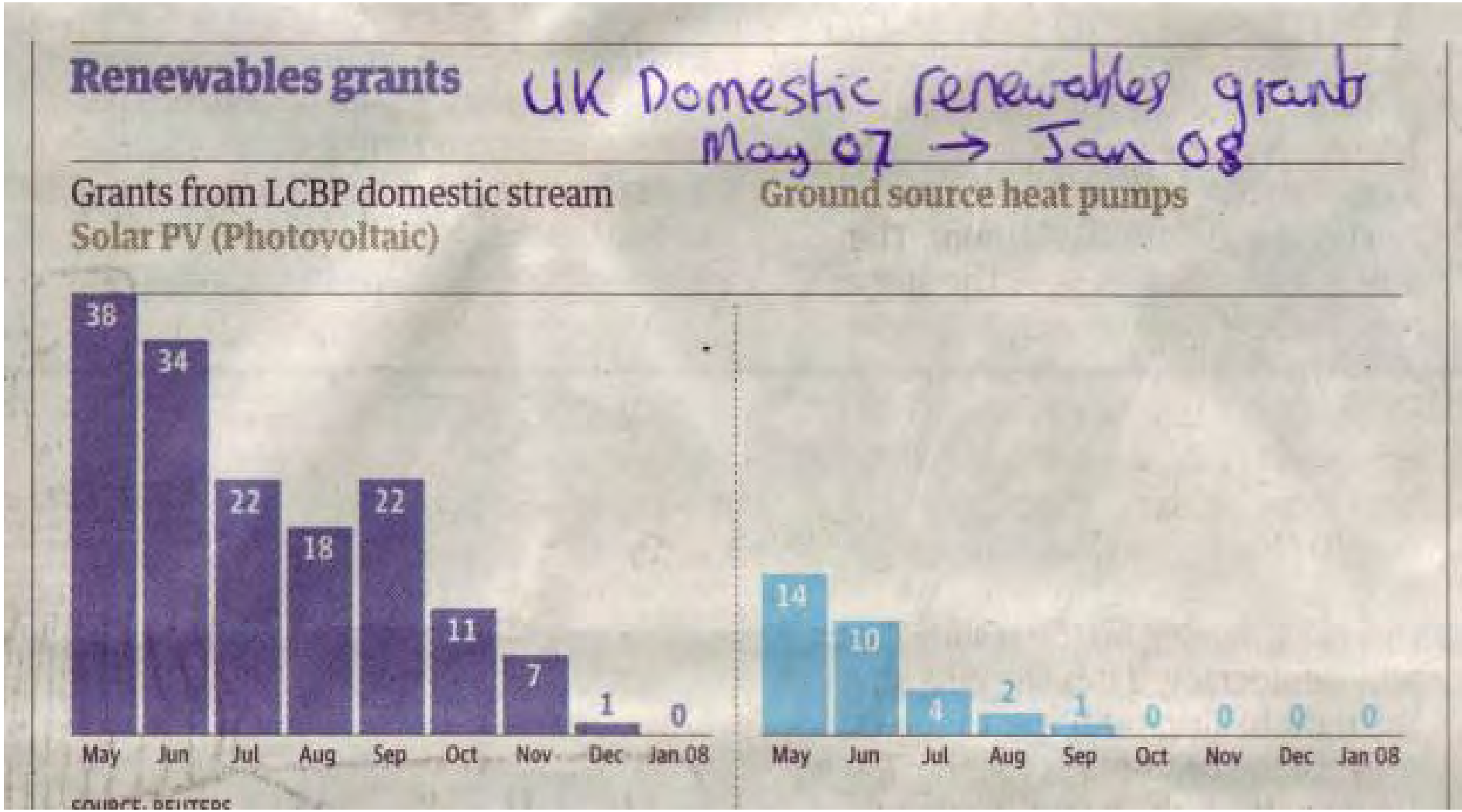
Simple rate of return = 7% pa linked to the retail price index

The politics of feed-in tariffs

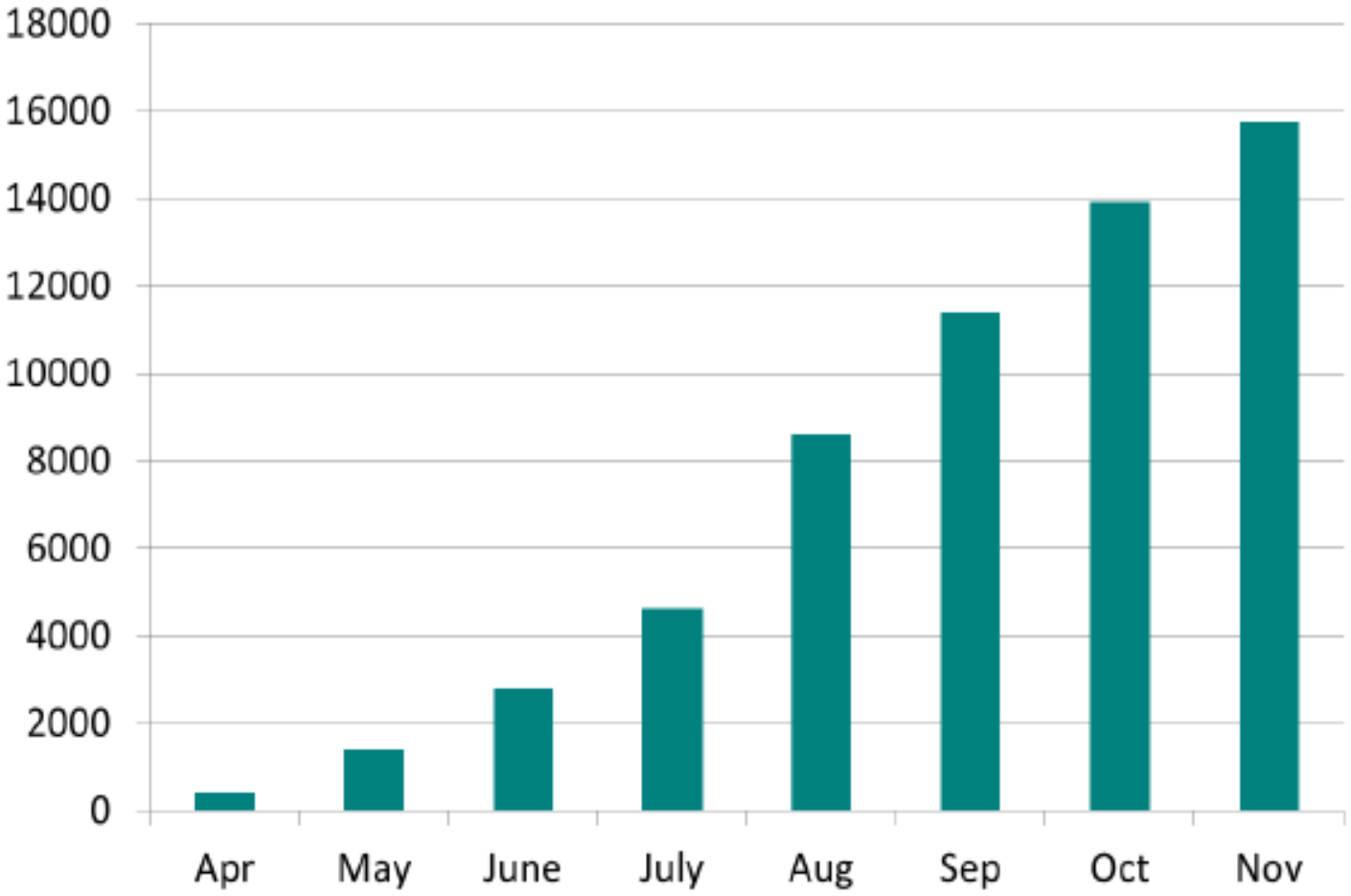
FITs are now used in 21 countries out of the 27 members of the EU and usually for all scales of renewable electricity technology



UK Domestic renewable energy grants- a policy failure?



Cumulative FITs installations April – Nov 2010 (national)

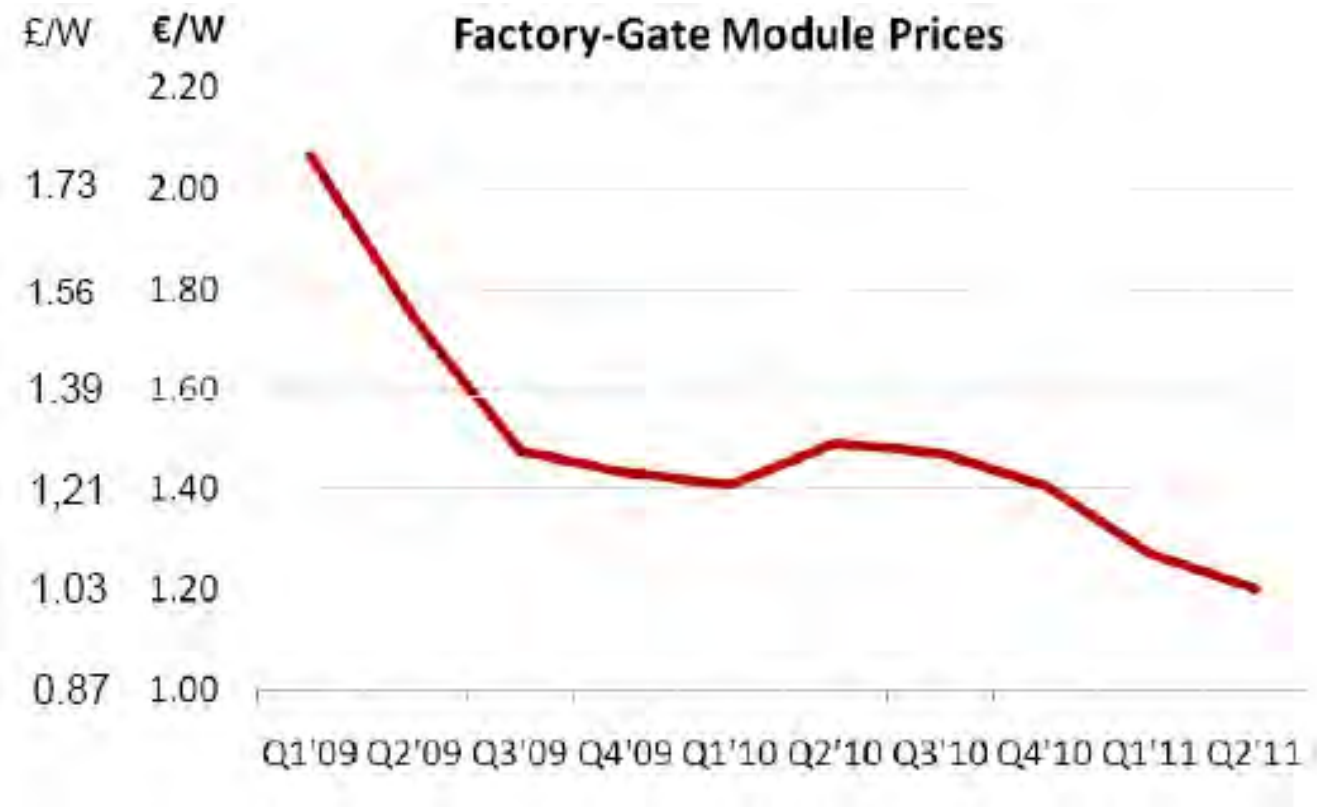


Of which 95% were solar PV, including approx 3000 in the SW

South west based MCS installers

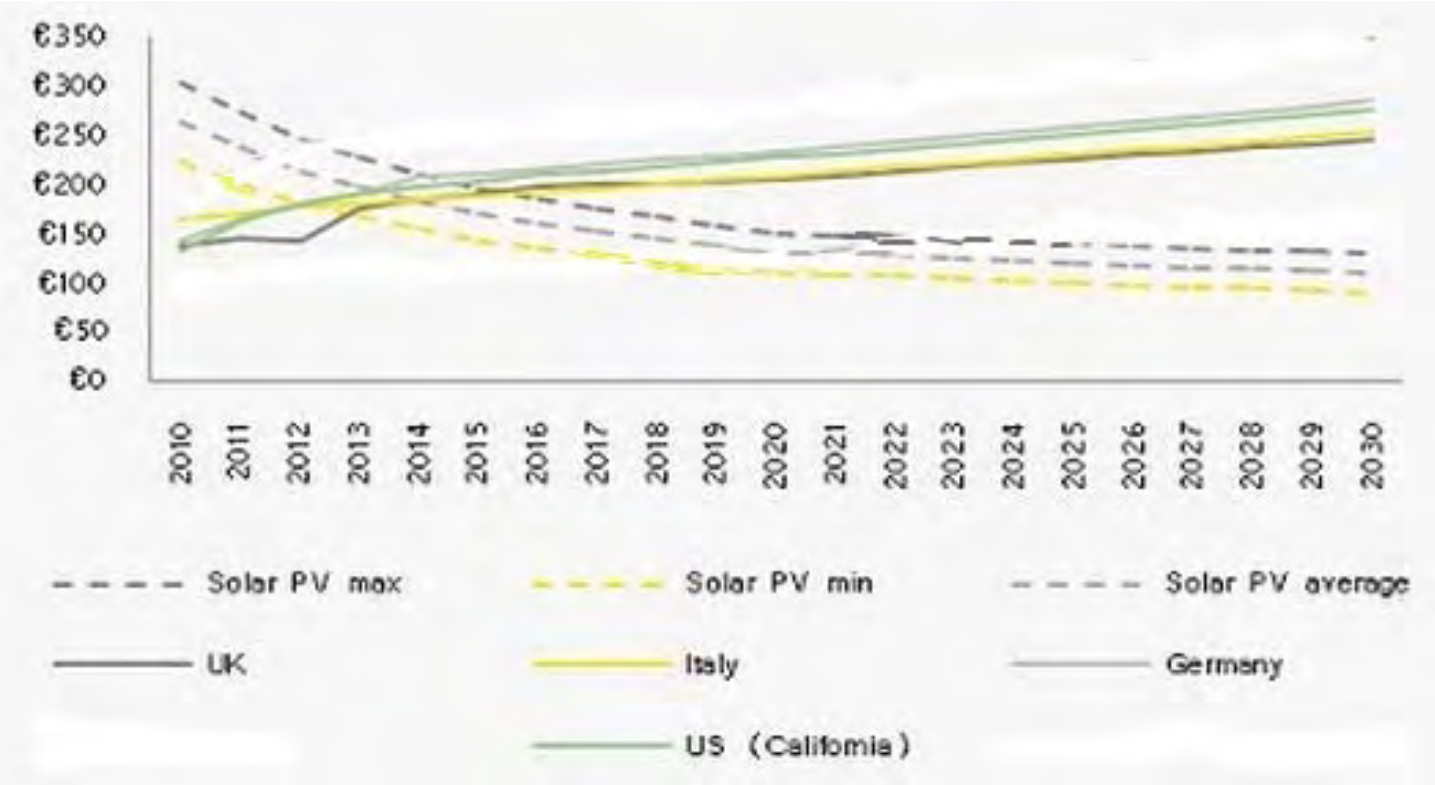
Technology	12.3.10	7.1.11
Biomass	12	26
Heat Pumps	33	76
Hydro	1	5
Micro-CHP	0	2
Solar PV	35	186
Solar Thermal	58	107
Wind	9	12
Total number of SW-based MCS installers	**85**	**254**

PV manufacturing costs are falling globally



Solar PV retail grid parity by 2015 ?

£
MWh



A recent article by Jonathan Johns in an Ernst and Young publication speculates that solar PV could be competitive with retail grid electricity by 2015 with net metering, without subsidy following initial support through FITs

Cost of FITs to householders

FITs has a cap of £900m over 3 years to 2013-12

= £150m in new FITs payments per year = 150,000 PV installations p.a.

Year 1	Year 2	Year 3
£150m	£150m	£150m
	£150m	£150m
		£150m

Assuming 50% cost of FITS passed to domestic households + 50% to commercial and industrial electricity users.

There are approx 25m homes in the UK, therefore cost of FITS on domestic energy bills = £3 per year added each year to 2013. There will be FIT degression starting from April 2012 down to 19p kWh in 2020.

Note a recent report from Ofgem that average home energy bills (heating plus electricity) are likely to rise from £1247 p.a in 2009 to £1995 in 2016, i.e a rise of 60%, or £745

Birmingham- ambitious low carbon targets

The Birmingham Declaration on Climate Change

The Declaration states that by 2015:

All vehicles procured by the Council should be electrically powered or run on liquefied petroleum gas

There will be at least 500 electric cars running on the streets of the city as we develop the electric charging infrastructure

50% of electric used by the council should be generated from renewable sources

The city Council's energy consumption will be reduced by 25%

10% of Birmingham homes will be linked to district heating systems

10% of Birmingham homes will have retrofit insulation

There will be at least 10 - "low carbon communities" similar to the successful example of Summerfield Eco-neighbourhood

PV in social housing Birmingham

Main benefits to poorest and most vulnerable

Direct
Lower fuel bills and more cash

Indirect
Local SKILLED jobs
Opportunities for enterprise
Health
Political and economic engagement

Wider
City leadership

ENERGY SAVERS HOME
ENERGY SAVERS BUSINESS

BIRMINGHAM GLOBAL CITY LOCAL HEART

PV in social housing - Birmingham

Phase 2

- £13m prudential borrowing;
- January 2010 – September 2013;
- C. 2000 Solar PV installations;
- Focus on existing BCC customers:
  - Tenants; Vulnerable Households; Commercial tenants;
- Using procurement to realise social and economic objectives.

Phase 3

- £100m
- Jan 2012 – Mar 2015
- Public/ private partnership;
  - Council, Utilities & Banks
- Full house retrofit:
  - Variety of measures;
- Low cost loans via green deal;
- Rolling programme of 10,000 Households;
- 2015 onwards; up to £2bn = 200,000 properties.

Birmingham Energy Savers HOME

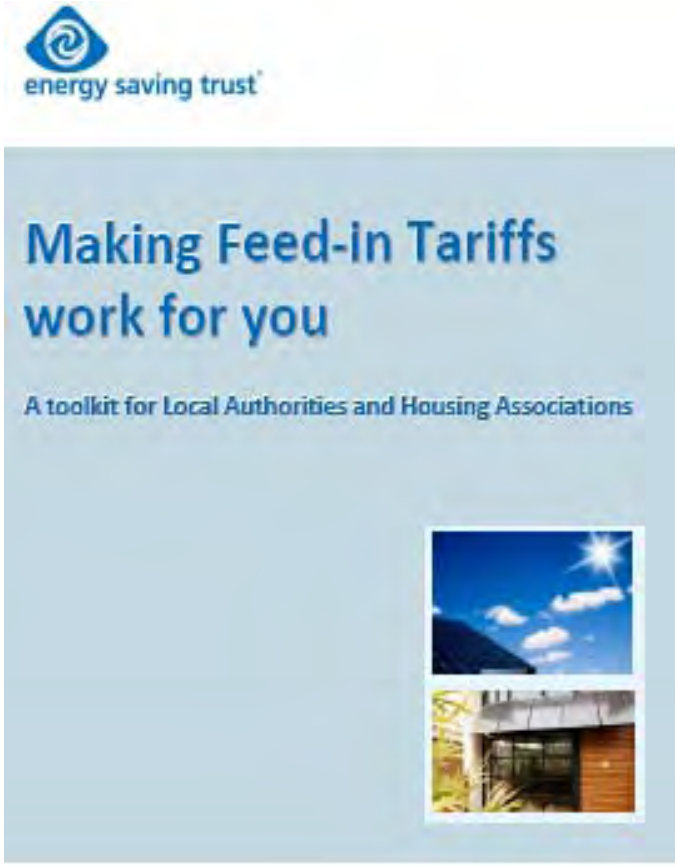
Birmingham Energy Savers BUSINESS

BIRMINGHAM GLOBAL CITY LOCAL HEART

Energy Saving Trust Feed-in Tariffs toolkit for Local Authorities and Housing associations

Toolkit: Making Feed-in Tariffs work for you

- The Energy Saving Trust has produced a guide to help make it easier to take advantage of FITs by providing information on the tariffs, as well as finance, ownership issues, a step-by-step guide, and some real life case studies. Whilst there are a number of technologies which are eligible to receive FITs, this document focuses primarily on solar electricity (PV). This technology is well suited to a large scale roll out by local authorities and housing associations.
- Download our guide to Making Feed-in Tariffs work for you
- Download our FIT PV calculator



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