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Feed in Tariffs for Renewable Energy

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This Briefing Note was produced on behalf of Willmott Dixon by WD Re-Thinking Ltd

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Overview

Feed in Tariffs (FIT) were introduced in the UK on 1 April 2010 to encourage a more rapid uptake of renewable electricity-generating technologies. Only installations made after the 15 July 2009 are eligible for FIT, provided the product and installer were certified under the (Microgeneration Certification Scheme (MCS).

All equipment below 50kW is required to be certified by MCS and the installer also required to be accredited via the MCS. Installations greater than 50 kW are required to be accredited under ROO FIT (Renewables Obligation Order Feed in Tariffs).

The tariff structure supports renewable energy technologies for electricity generation of up to 5MW while the RO (Renewables Obligation) remains the primary mechanism to support larger scale renewable energy. The renewable electricity-generating technologies supported by FITs are as listed below:

- Anaerobic Digestion (electricity generation only)
- Micro combined heat and power (mCHP) of 2kW$_{electric}$ or less (electricity generation only). Tariff only available for first 30,000 units
- Hydroelectricity
- Solar electricity (PV) (roof mounted or stand-alone)
- Wind turbine (building mounted or free standing)

How Feed in Tariffs work

There are three ways in which income can be generated and money saved from the chosen technology installed.

1. **Generation tariff -** A fixed price is paid for every kWh of electricity generated. This price varies depending upon rated power and type of renewable energy system (Appendix A). The generation tariff is a guaranteed for 10 years for Micro CHP and 20 years for all other eligible technologies. The price allocated in the first year of installation remains fixed for the guaranteed income period but is adjusted each year to account for inflation via indexation (known as 'degression' this is explained further in a separate section below). Tariffs are updated every quarter. Always refer to https://www.ofgem.gov.uk/environmental-programmes/feed-tariff-fit-scheme/tariff-tables for the latest figures.

2. **Export tariff -** A fixed price is paid for all electricity exported directly to the grid. This rate only applies to the quantity of excess energy which has been generated by the installed technology (and isn't used on site). The price is fixed for all sizes and types of systems. Always refer to Ofgem (as above) for the latest tariffs. Generators have the option to opt out of this tariff and sell their electricity generated on the open market. The export tariff like the generation tariff is linked to the Retail Price Index and is adjusted accordingly in order to account for inflation.

3. **Offsetting Cost of Grid Electricity (onsite use of generated electricity) -** The energy generated from the renewable energy technology that is used on site reduces, or even eliminates, the amount of electricity that needs to be imported from the grid. This reduces the total cost of imported electricity which is, on average, approximately 15p/kWh for domestic customers and around 10p/kWh for commercial

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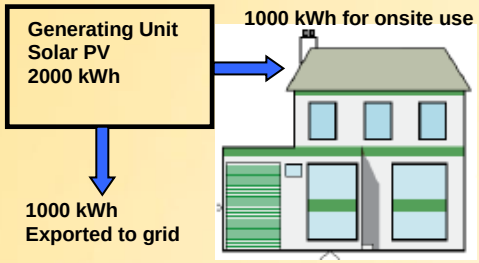
premises[1]. It is therefore more financially beneficial for customers to use the energy on-site rather than exporting it. It's also worth noting that households who generate electricity mainly for their own use will not be subjected to income tax on the generated tariff. Commercial installations will be subject to Corporation Tax. For public sector organisations, OFGEM should be consulted in each case to establish whether tax is payable.

Figure 1 below indicates a possible scenario for a domestic installation assuming 50% of the electricity generated is used on site.



	Tariff	Income
Generation	2,000kWh @ 12.92 p/kWh	£258
Export	1,000 kWh @ 4.85 p/kWh	£49
Onsite use (avoided costs)	1,000 kWh @ 15 p/kWh	£150
Total		**£457**

Figure 1: Illustration of total income (from kWh) over one year for a Photovoltaic system of (2.3 kWp - based on SAP)

1 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/296011/QEP_March_2014.pdf

In reality, on site use will vary for different installations according to occupancy pattern which will impact the cost-effectiveness of the system. For instance, for the example above, if 100% of the electricity generated was used on-site then the annual income would rise 22% to £558.

Degression

Degression is where new tariffs for new installations are set at a slightly lower level each year than for installations made in previous years. This is done in order to reflect and encourage price decreases for the technology and its installation. Degression does not affect installations made in previous years. For example, an installation made in Year 1 of the introduction of FiT's receives the same fixed price for the entire guaranteed income period, subject to adjustment for inflation each year via indexation. An installation made in Year 2 receives a tariff which is degressed from Year 1 (i.e. slightly decreased from Year 1) and this tariff is fixed for the entire guaranteed income period (likewise, subject to annual adjustments for inflation via indexation). This process continues for all consecutive years. The table in Appendix A shows the current and historic tariffs.

Indexation

Tariffs are indexed each year (i.e. adjusted at the beginning of each year) to account for inflation. Indexation is calculated by percentage increase or decrease in the retail prices over a 12 month period ending 31st December in the previous year.

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Incomes, payback periods and individual tariffs

For Solar PV systems, there are three tariff bands: higher, medium and lower (Appendix A). The lower rate is payable where:

- The system provides power to a building, but the building does **not** have an EPC certificate showing its energy efficiency in bands A to D

The medium rate (90% of the higher rate, rounded to two decimal places) is payable where:

- The system owner has a total of 25 FIT-registered PV installations

The higher rate prevails if neither of those two conditions apply.

The tables in Appendix B and C provide some typical revenues expected over the guaranteed income period as well as payback time period for Solar PV, Wind and Micro CHP. The technology capacities chosen within Appendix B and C are those typically found on domestic buildings, schools, leisure centres and other similar sized buildings. The calculations are based on the latest tariffs provided in Appendix A. The effects of indexation have not been taken into account.

From the table in Appendix B it can be seen that it is possible to obtain a payback from a solar PV system within an 8 year period. Whilst the table in Appendix C shows payback for wind energy can be under 10 years in some scenarios. The income from wind energy is highly dependent on the wind resource available on site. The table in Appendix C shows income generated and payback periods for 3 different AMWS (Annual Mean Wind Speed) for the same wind turbine. The income generated is approximately twice as much for an AMWS of 7m/s when compared with an AMWS of 5m/s. It is critical to ensure that wind turbines are sited correctly to ensure maximum yield.

NB all income from FITs is directly related to: annual and local weather conditions, building orientation, installation cost and building user profiles. Any income figures quoted must be taken as indicative.

Other renewable technology funding

With its introduction much of the other funding available for FIT eligible renewables, such as the Low Carbon Building Programme, has been wound up. The FITs offer a reduced payback period via the guaranteed income from the generation tariff which is regarded as equivalent to receiving a grant plus potential to generate revenue through exporting electricity and reduction of the electricity bill via on site use of electricity.

Some companies are offering alternative funding arrangements if the client has limited capital available. For Solar PV installations these predominately fall into two categories, free-install and rent-a-roof/lease hire;

- Free-install: Installation of the solar array is at zero capital cost to the client and the solar company recuperates their costs by claiming the FIT and any export tariff. The client receives the full benefit of any offset electricity that they receive. Typically, the client will be contracted to this arrangement for 20 years (the duration of the FIT tariff)
- Rent-a-roof/Lease Hire: Installation of the solar array is at zero capital cost to the client and the solar company recuperates their costs through a lease arrangement. The cost of funding in previous projects has been

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approximately 4%. The client receives all of the benefit of the FIT, export tariff and offset electricity (minus the annual lease cost)

Over the lifetime of a solar installation, direct capital expenditure typically yields the greatest savings to the client, followed by rent-a-roof and then free-install options. However, where capital expenditure is earmarked for other developments, these other funding routes may be more cost effective.

Some local authorities continue to offer grants to assist technology installation and there are also a number of alternative funding sources available, mainly for community or local projects. Their existence should be checked on a case by case basis at local level. A good source of information on sources of funding can be found at http://www.energyshare.com/pages/funding-and-grants-information/

Feed in Tariff Summary

- Commencement date of 1st April 2010. Prior installations with a declared net capacity of 50kW or less, commissioned on or before 14 July 2009, and accredited under the ROO on or before 31 March 2010 are also eligible.
- A guaranteed generation tariff applied to each kWh produced. This varies dependent upon the technology.
- A further export tariff will be applied to all unused electricity sent out to the national grid.
- Applies to renewable technologies that generate electricity up to 5MW only. Those generating heat such as biomass and solar hot water panels will apply to the Renewable Heat Incentive which came into effect on April 2010 (non-domestic) and 2014 (domestic).

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References and further information

1. http://www.energysavingtrust.org.uk/domestic/feed-tariff-scheme
2. https://www.gov.uk/government/publications/2010-to-2015-government-policy-low-carbon-technologies/2010-to-2015-government-policy-low-carbon-technologies#appendix-8-feed-in-tariffs-scheme
3. http://www.hmrc.gov.uk/manuals/bimmanual/bim40510.htm

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APPENDIX A: PV Only Tariffs

Description	2015/16			
	For Eligible Installations with an Eligibility Date on or After 1 April 2015 and before 1 July 2015		For Eligible Installations with an Eligibility Date on or After 1 July 2015 and before 1 October 2015	
	(p/kWh)		(p/kWh)	
Solar photovoltaic with Total Installed Capacity of 4kW or less, where attached to or wired to provide electricity to a new building before first occupation	Higher rate Middle rate Lower rate	13.39 12.05 6.16	Higher rate Middle rate Lower rate	12.92 11.63 5.94
Solar photovoltaic with Total Installed Capacity of 4kW or less, where attached to or wired to provide electricity to a building which is already occupied	Higher rate Middle rate Lower rate	13.39 12.05 6.16	Higher rate Middle rate Lower rate	12.92 11.63 5.94
Solar photovoltaic (other than stand-alone) with Total Installed Capacity greater than 4kW but not exceeding 10kW	Higher rate Middle rate Lower rate	12.13 10.92 6.16	Higher rate Middle rate Lower rate	11.71 10.54 5.94
Solar photovoltaic (other than stand-alone) with Total Installed Capacity greater than 10kW but not exceeding 50kW	Higher rate Middle rate Lower rate	11.71 10.54 6.16	Higher rate Middle rate Lower rate	11.71 10.54 5.94
Solar photovoltaic (other than stand-alone) with Total Installed Capacity greater than 50kW but not exceeding 100kW	Higher rate Middle rate Lower rate	9.98 8.98 6.16	Higher rate Middle rate Lower rate	9.63 8.67 5.94
Solar photovoltaic (other than stand-alone) with Total Installed Capacity greater than 100kW but not exceeding 150kW	Higher rate Middle rate Lower rate	9.98 8.98 6.16	Higher rate Middle rate Lower rate	9.63 8.67 5.94
Solar photovoltaic (other than stand-alone) with Total Installed Capacity greater than 150kW but not exceeding 250kW	Higher rate Middle rate Lower rate	9.54 8.59 6.16	Higher rate Middle rate Lower rate	9.21 8.29 5.94
Solar photovoltaic (other than stand-alone) with Total Installed Capacity greater than 250kW	6.16		5.94	
Stand-alone	6.16		4.44	
EXPORT TARIFF	4.85		4.85	

Note: FIT Payment rates for solar photovoltaic installations have been determined by the Gas and Electricity Markets Authority (Ofgem) under Article 13 of the Feed-in Tariffs (Specified Maximum Capacity and Functions) Order 2012, in accordance with Annex 3 to Schedule A to Standard Licence Condition 33.

Please always refer to https://www.ofgem.gov.uk/environmental-programmes/feed-tariff-fit-scheme/tariff-tables for latest tariffs

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APPENDIX A: Example Non-PV Technologies

Check https://www.ofgem.gov.uk/environmental-programmes/feed-tariff-fit-scheme/tariff-tables for latest tariffs

Description — Anaerobic Digestion	Period in which Tariff Date falls	Tariff (p/kWh)
Anaerobic digestion with total installed capacity of 250kW or less	1 April 2010 to 29 September 2011	13.66
	30 September 2011 to 31 March 2014	15.82
	1 April 2014 to 30 September 2014	12.66
	1 October 2014 to 31 March 2015	11.39
	1 April 2015 to 31 March 2016	10.13
Anaerobic digestion with total installed capacity greater than 250kW but not exceeding 500kW	1 April 2010 to 29 September 2011	13.66
	30 September 2011 to 31 March 2014	14.63
	1 April 2014 to 30 September 2014	11.70
	1 October 2014 to 31 March 2015	10.54
	1 April 2015 to 31 March 2016	9.36
Anaerobic digestion with total installed capacity greater than 500kW	1 April 2010 to 30 November 2012	10.66
	1 December 2012 to 31 March 2014	9.64
	1 April 2014 to 30 September 2014	9.64
	1 October 2014 to 31 March 2015	9.16
	1 April 2015 to 31 March 2016	8.68

Description — Micro CHP	Period in which Tariff Date falls	Tariff (p/kWh)
Combined Heat and Power with total installed electrical capacity of 2kW or less (tariff only available for 30,000 units)	1 April 2010 to 14 March 2013	11.84
	15 March 2013 to 31 March 2016	13.45

Description — Migrated Installations	Period in which Tariff Date falls	Tariff (p/kWh)
Eligible Installations with a declared net capacity of 50kW or less Commissioned on or before 14 July 2009 and accredited under the ROO on or before 31 March 2010	1 April 2010 to 31 March 2014	10.66

Description — Wind	Period in which Tariff Date falls	Tariff (p/kWh)
Wind with total installed capacity of 1.5kW or less	1 April 2010 to 31 March 2012	40.76
	1 April 2012 to 30 November 2012	38.52
	1 December 2012 to 31 March 2014	22.59
	1 April 2014 to 30 September 2014	18.06
	1 October 2014 to 31 March 2015	16.26
	1 April 2015 to 31 March 2016	14.45
Wind with total installed capacity greater than 1.5kW but not exceeding 15kW	1 April 2010 to 31 March 2012	31.53
	1 April 2012 to 30 November 2012	30.12
	1 December 2012 to 31 March 2014	22.59
	1 April 2014 to 30 September 2014	18.06
	1 October 2014 to 31 March 2015	16.26
	1 April 2015 to 31 March 2016	14.45
Wind with total installed capacity greater than 15kW but not exceeding 100kW	1 April 2010 to 31 March 2012	28.51
	1 April 2012 to 30 November 2012	27.33
	1 December 2012 to 31 March 2014	22.59
	1 April 2014 to 30 September 2014	18.06
	1 October 2014 to 31 March 2015	16.26
	1 April 2015 to 31 March 2016	14.45
Wind with total installed capacity greater than 100kW but not exceeding 500kW	1 April 2010 to 30 November 2012	22.16
	1 December 2012 to 31 March 2014	18.83
	1 April 2014 to 30 September 2014	15.06
	1 October 2014 to 31 March 2015	13.55
	1 April 2015 to 31 March 2016	12.05
Wind with total installed capacity greater than 500kW but not exceeding 1.5MW	1 April 2010 to 30 November 2012	11.19
	1 December 2012 to 31 March 2014	10.21
	1 April 2014 to 30 September 2014	8.17
	1 October 2014 to 31 March 2015	7.36
	1 April 2015 to 31 March 2016	6.54
Wind with total installed capacity greater than 1.5MW	1 April 2010 to 30 November 2012	5.27
	1 December 2012 to 31 March 2013	4.82
	1 April 2013 to 31 March 2014	4.33
	1 April 2014 to 30 September 2014	3.46
	1 October 2014 to 31 March 2015	3.12
	1 April 2015 to 31 March 2016	2.77

*Annual RPI has been applied to these tariffs.
Please note this was corrected as of 12/02/2014.

Appendix B: Table of examples indicating income generated and payback periods for Solar PV (May 2014 Rates)

Technology Type	Construction Type	Rated power output (kWp)	Estimated Total Energy Output(kWh p.a)	Estimated Installed Cost of System (£'s)	Generation Tariff (£/kWh)	Estimated Generation Tariff Income for this Construction Type (£)	Export Tariff (£/kWh)	Estimated % of Total Energy Output Exported to Grid	Estimated Export Tariff Income for this Construction Type (£)	Estimated savings from offset electricity (assume electricity cost 15p/kWh)	Total Guaranteed Income Annually (£)	Total Guaranteed Income over 20 yr period (£)	Profit made over the 20 year Guaranteed Income Period (£'s)	Years to Breakeven on a Simple Payback
Solar PV < 4kW (New build/ Retrofit)	House (88m2 GIFA)	2.0	1,660	£4,000	0.1438	£239	0.0477	20%	£16	£199	£454	£9,080	**£6,080**	**8.8**
	Flat (57m2 GIFA)	1.0	830	£2,500	0.1438	£119	0.0477	20%	£8	£100	£227	£4,540	**£3,040**	**11.0**
Solar PV 4 - 10 kW	House (88m2 GIFA)	4.0	3,320	£6,000	0.1438	£477	0.0477	20%	£32	£398	£907	£18,140	**£12,140**	**6.6**
	Extra Care Home	10.0	8,300	£15,000	0.1303	£1,081	0.0477	20%	£79	£996	£2,156	£43,120	**£28,120**	**7.0**
Solar PV 10 - 100 kW	Leisure Centre	55.0	45,650	£82,500	0.1034	£4,720	0.0477	20%	£436	£5,478	£10,634	£212,680	**£130,180**	**7.8**
	School/Academy	19.0	15,770	£28,500	0.1213	£1,913	0.0477	20%	£150	£1,892	£3,955	£79,100	**£50,600**	**7.2**
	Extra Care Home	24.0	19,920	£36,000	0.1213	£2,416	0.0477	20%	£190	£2,390	£4,996	£99,920	**£63,920**	**7.2**
	Theatre	71.0	58,930	£106,500	0.1034	£6,093	0.03	20%	£562	£7,072	£13,727	£274,540	**£168,040**	**7.8**

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Appendix C: Table of examples indicating income generated and payback periods for Wind & Micro CHP (May 2014 Rates)

Technology Type	Construction Type	Rated power output (@ ~ 12m/s for Wind)	Average Annual Mean Wind Speed (m/s)	Estimated Total Energy Output(kWh/yr)	Estimated Installed Cost of System (£'s)	Estimated annual maintenance cost (£)	Generation Tariff (£/kWh)	Estimated Generation Tariff Income for this Construction Type (£)	Export Tariff (£/kWh)	Estimated % of Total Energy Output Exported to Grid	Estimated Export Tariff Income (£)	Estimated on-site elec. use savings (assume elec. cost 15p/kWh)	Total Guaranteed Income Annually (£)	Total Guaranteed Income over 20 yr period (£)	Profit made over the 20 year Guaranteed Income Period (£'s)	Years to Breakeven on a Simple Payback
Wind < 1.5 kW	N/A	0.698kW	5	1,232	5,000	£100	0.1778	£219	0.0477	50%	£29	£92	£340	£6,800	**- £200**	**20.8**
	N/A	0.698kW	6	1,848	5,000	£100	0.1778	£329	0.0477	50%	£44	£139	£512	£10,240	**£3,420**	**12.1**
	N/A	0.698kW	7	2,458	5,000	£100	0.1778	£437	0.0477	50%	£58	£184	£679	£13,580	**£6,580**	**8.6**
Wind 1.5-15 kW	N/A	2.5kW	5	4,770	10,000	£350	0.1778	£848	0.0477	50%	£113	£358	£1,319	£26,380	**£9,380**	**10.3**
	N/A	2.5kW	6	7,249	10,000	£350	0.1778	£1,289	0.0477	50%	£173	£544	£2,006	£40,120	**£23,120**	**6.0**
	N/A	2.5kW	7	9,657	10,000	£350	0.1778	£1,717	0.0477	50%	£230	£724	£2,671	£53,420	**£36,420**	**4.3**
	N/A	6kW	5	7,985	20,000	£350	0.1778	£1,419	0.0477	65%	£247	£419	£2,085	£41,700	**£14,700**	**11.5**
	N/A	6kW	6	12,504	20,000	£350	0.1778	£2,223	0.0477	65%	£388	£656	£3,267	£65,340	**£38,340**	**6.9**
	N/A	6kW	7	16,991	20,000	£350	0.1778	£3,021	0.0477	65%	£527	£892	£4,440	£88,800	**£61,800**	**4.9**
	N/A	15kW	5	26,791	50,000	£350	0.1778	£4,763	0.0477	65%	£831	£1,407	£7,001	£140,020	**£83,020**	**7.5**
	N/A	15kW	6	38,280	50,000	£350	0.1778	£6,806	0.0477	65%	£1,187	£2,010	£10,003	£200,060	**£143,060**	**5.2**
	N/A	15kW	7	48,388	50,000	£350	0.1778	£8,603	0.0477	65%	£1,546	£2,540	£12,689	£253,780	**£196,780**	**4.1**
Micro CHP	House (88m2 GIFA)	1.1	N/A	1,980	2,500	£50	0.1324	£262	0.0477	35%	£33	£193	£488	£4,880	**£1,880**	**5.7**

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