

Reporting electricity Feed in Tariff data in DECC's Energy Statistics

This article outlines how data on DECC's new Feed in Tariff scheme for renewable electricity is to be incorporated in its production of energy statistics.

The Feed in Tariff (FiT) scheme

The Feed in Tariff scheme (FiTs) was introduced on 1st April 2010 and is a financial support scheme for eligible low-carbon electricity technologies, aimed at small-scale installations up to a maximum capacity of 5 Megawatts (MW). FiTs support new anaerobic digestion, hydro, solar photovoltaic and wind projects up to that 5 MW limit, by requiring electricity suppliers to make payments (generation tariffs) to generators based on the number of kilowatt hours (kWh) they generate. In addition to the tariff paid for generation, a fixed export tariff of 3p per kWh is paid for electricity generated that is not used on site and exported to the national grid. The scheme will also support the first 30,000 micro combined heat and power (CHP) installations with an electrical capacity of 2 kW or less, as a pilot programme.

Publication of Feed in Tariff data by DECC

Data for Feed in Tariff (FiTs) installations will be available for both capacity and generation. Both capacity and generation measures will be published in two new Energy Trends internet only tables, ET5.6 (capacity data) and ET5.7 (generation data). These figures will then feed into the calculations for the relevant tables in Chapter 5 and 7 of the Digest of UK Energy Statistics (DUKES). The capacity data (ET5.6) will be published on a quarterly basis and the generation data (ET5.7) will be published on an annual basis.

Section 1: Capacity data

To aid administration of the scheme, Ofgem will be maintaining a 'Central FiT Register' which will record details of all FiT eligible installations. It is possible for members of the public to produce aggregated summary reports down to Local Authority level on a 'real-time' basis from this register¹. At the end of each quarter Ofgem will provide DECC with an anonymised extract of the Central FiT Register. The extract will provide information on each installation, including capacity, tariff type², technology (wind, hydro, solar photovoltaics, anaerobic digestion and micro CHP), location (down to lower layer super-output area³), industrial sector, date of commissioning, and date of entry to the FiT scheme. This extract will be used to produce table ET5.6 and also for the estimation of calendar year/regional generation data (see section 2 of this article).

On a quarterly basis, tables presenting the cumulative amount of FiT capacity installed at the end of the quarter (rather than capacity only installed during the quarter), as well as the total number of installations, will be published on the DECC Energy Statistics website as table ET5.6⁴, starting with 2010 quarter two. For quarter 3 2010 onwards this table will be updated two months after the end of each quarter. The publication timetable is given in table 1. These totals will be disaggregated by the 20 tariff types, covering all five supported technologies and a tariff for installations that have transferred to the FiT scheme from the Renewables Obligation scheme. A breakdown of the totals between domestic and non-domestic installations will also be presented.

The data will also be used in the calculations for capacity tables in the annual DUKES publication. The aggregated annual capacity data will be included in the 'Other generators' capacity figures in table 5.7 in Chapter 5, as well as the Chapter 7 tables 7.4 and 7.1.1.

¹ www.renewablesandchp.ofgem.gov.uk/

² The tariff band – determined by the technology and size of installation

³ Super Output Areas are statistical geographies developed by the Office for National Statistics. Lower layer super output areas have a minimum population of 1,000

⁴ Table ET 5.6 will be available on the following webpage

www.decc.gov.uk/en/content/cms/statistics/source/electricity/electricity.aspx

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The following table shows the dates for inclusion of FiT capacity data in DECC's energy statistics.

Table 1: Proposed publication of FiT capacity data by DECC

FiT capacity data	Table(s)	Publication date
2010 Q2	ET5.6	30 September 2010
2010 Q3	ET5.6	25 November 2010
2010 Q4	ET5.6	24 February 2011
2011 Q1	ET5.6	26 May 2011
2010	DUKES Chapters 5 and 7	28 July 2011

Summary of 2010 Q2 Capacity Data

Quarter 2 2010 (1st April to 30th June 2010) marked the first quarter of the Feed in Tariff (FiT) scheme. At the end of this quarter, 15.2 MW of capacity, across 2,771 installations, had been included under the FiT scheme. The figures are based on 'date of confirmation' so will include schemes installed prior to Q2 2010 (but after 15th July 2009). Schemes under 50kW that were installed prior to 15th July 2009 and were accredited under the Renewables Obligation (RO) will have this accreditation transferred to FiTs under an RO tariff (9p/kWh). None of these schemes are included in the figures for Q2. These schemes are currently being processed by Ofgem and will appear in the statistics from Q3 onwards.

At the end of quarter 2, the domestic sector has the most installations covered by the FiT scheme, with 2,730 of the 2,771 total. However, these are typically smaller sized installations, and represent less than half of the overall installed capacity. The 41 non-domestic installations represent 54 per cent of overall installed capacity, at 8.3 MW.

Over 2,700 (98 per cent) of all installations were Solar Photovoltaics, with the majority of these being retrofitted sub-4 kW arrays (mainly on domestic premises). However, given the smaller size of these installations, this translates to 44 per cent of total capacity, at 6.7 MW.

Hydro had just four installations covered by FiT by the end of the quarter. These were larger-sized non-domestic schemes however, and represented 3.3 MW of capacity, 22 per cent of the total.

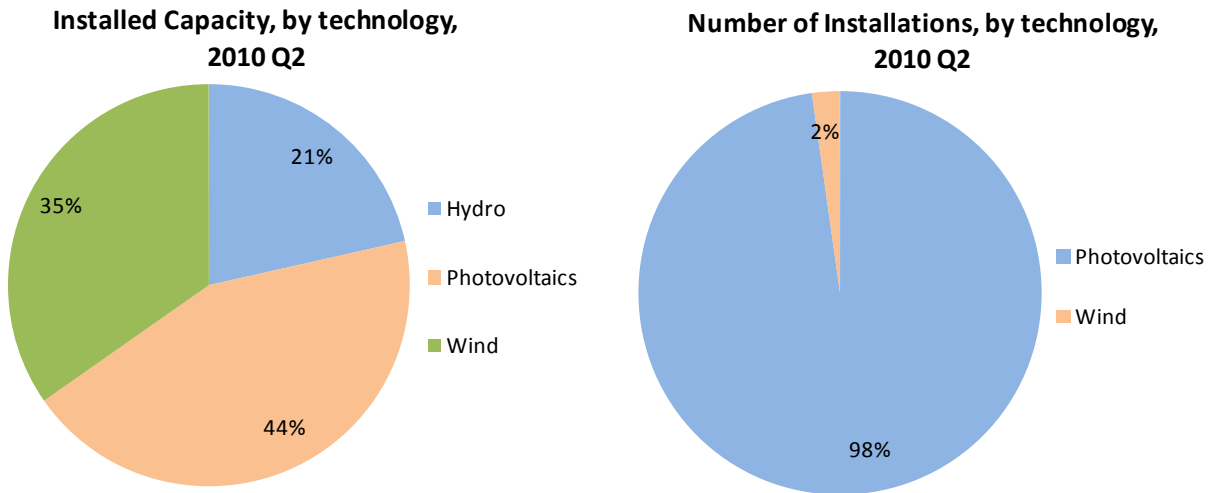
Of overall capacity, Wind turbines represented 35 per cent, or 5.3 MW, from 63 installations. At the end of quarter 2 no anaerobic digestion or micro CHP schemes have joined the FiT scheme.

Table 2 and Chart 1 compares the shares of the three technologies that have so far joined the FiT scheme, by installed capacity and number of installations.

Table 2 – Number and capacity of FiT installations at the end of Q2 2010

Technology	Number		Capacity	
	N	%	MW	%
Photovoltaic	2,704	97.6%	6.7	43.8%
Hydro	4	0.1%	3.3	21.5%
Wind	63	2.3%	5.3	34.7%
Total	2,771	100%	15.2	100%

Chart 1



Section 2: Availability of generation data from FiT installations

Data on generation by FiT installations will be collected from electricity supply companies by Ofgem at the end of each financial year for inclusion in their annual report. The data will be collected by tariff code and will consist of an aggregated generation figure for all installations in Great Britain (for example, in 2010/11 PV installations of 4kW or less generated xkWh).

The proposed methodology for reporting generation from FiT installations is outlined in this article. To minimise the burden on electricity supply companies DECC plan to use the data provided to Ofgem rather than setting up its own data collection system. Ofgem are collecting data on a financial year basis which will be converted to calendar year data by DECC in order to tie in with other energy statistics and EU reporting requirements. Data for each supply company will be aggregated by Ofgem before being passed onto DECC.

It is planned that DECC will publish an annual table on a calendar year basis summarising generation by FiT tariff code. This will be available on the same section of the website as the quarterly FiT capacity data which was released in September 2010⁵ and will be known as ET5.7.

The FiT generation data will also be included in DECC's main annual energy statistics publication (the Digest of UK Energy Statistics). The generation by each technology will be included within the relevant category in chapter 7. The figures will also be included in the overall electricity data published in chapter 5 under 'other generators'. The FiT data will be combined with the renewables data collected via other sources in chapter 5, so won't be explicitly identified as 'FiT generation' in these tables.

DECC also publishes overall electricity generation figures on a quarterly basis. The FiT generation will be included within quarterly table ET5.1 under 'other generators' in the relevant technology group. This table is published in TWh so the FiT generation figures will appear small, it is therefore planned that the annual figures will initially be divided by 4 and spread out equally over each quarter. The quarterly figures will also be carried forward into the next year until the annual figures are available at which point they will be revised. This methodology will be kept under review.

Future timing of generation data publication

The first generation figures will be published by Ofgem towards the end of 2011 covering the 2010/11 financial year. This will be after the publication of DUKES 2011 (which will contain energy statistics for 2010). Therefore it is proposed that FiT generation for this publication will be

⁵ www.decc.gov.uk/en/content/cms/statistics/source/electricity/electricity.aspx

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calculated by working out the maximum theoretical generation from the FiT central register (as described in table 3) and then assuming a load factor 0.1 for all technologies. In DUKES 2012 we will then update the 2010 figures using the load factors calculated from the actual generation figures published by Ofgem (see next section of this article). We will also include 2011 figures (calculated using the same 2010/11 load factors). Table 2 below outlines the key publication dates and the FiT generation data that will be included.

Table 2: Main publication dates

Publication and date	FiT generation data
DUKES 2011 July	Estimated 2010 data
Ofgem annual report - end 2011	2010/11 financial year
Energy Trends 2012 March (ET5.7)	Updated 2010 and 2011 (based on 2010/11 load factors)
Energy Trends 2012 June	2010 and 2011 data (as published in ET5.7) included in renewable energy article ⁶
DUKES 2012 July	2010 and 2011 (as published in Energy Trends)
Energy Trends 2012 September	Regional 2010 and 2011 FiT data included in overall regional renewable figures
Ofgem annual report – end 2012	2011/12 financial year
Energy Trends March 2013 (ET5.7)	Updated 2011 and 2012 (based on 2011/12 load factors)

The remainder of this article describes the proposed methodology for calculating load factors for technologies within each tariff and how these will be used to convert the generation data received from Ofgem into calendar years. A methodology for calculating sub-national FiT generation is also outlined.

Proposed Methodology for Calculating Load Factors

It has been well documented that electricity generating installations do not operate at their maximum output throughout the year, this is particularly true for technologies dependent on the weather (e.g. wind turbines and pv panels).

The load factor is the average hourly output over the course of the year as a proportion of the maximum expected and is calculated by taking the annual output, dividing by the installed capacity and multiplying by the number of hours in the year (8,760).

However, in reality the calculation is not this simple as installations are installed throughout the year so some may only have been running for a few months when their 'annual' generation figures are collected. To overcome this the month of confirmation, i.e. the month the installation joined the FiT scheme as recorded on the central FiT register, will be used to work out the maximum generation expected from each installation over the year⁷. Table 3 sets out the calculation for the first year (2010/11). In the following years the total capacity installed in the previous year will also be included, all of which is multiplied by 8,760 as it would have been generating for the full year.

⁶ For the most recent version of this annual article see here www.decc.gov.uk/assets/decc/statistics/publications/trends/articles_issue/1_20100621152210_e_@@_renewableenergy.pdf

⁷ This methodology for calculating load factors only relates to FiT technologies, larger technologies have a well established methodology outlined in the following article www.decc.gov.uk/assets/decc/statistics/publications/trends/articles_issue/file43950.pdf

Table 3: Calculating maximum annual generation for each tariff (example given for two tariffs – data are hypothetical)

Month of confirmation on to FiT scheme (2010/11)	Maximum hours available to generate in financial year (Col A)*	PV<=4kW		Wind <=1.5kW	
		Sum of capacity installed during the month (kW) (Col B)	Maximum theoretical generation (kWh) (Col A x B)	Sum of capacity installed during the month (kW) (Col C)	Maximum theoretical generation (kWh) (Col C x A)
April	8,400	500	4,200,000	50	420,000
May	7,680	600	4,608,000	100	768,000
June	6,936	1,000	6,936,000	75	520,200
July	6,216	300	1,864,800	90	559,440
August	5,472	200	1,094,400	30	164,160
September	4,728	400	1,891,200	45	212,760
October	4,008	600	2,404,800	30	120,240
November	3,264	800	2,611,200	60	195,840
December	2,544	1,000	2,544,000	20	50,880
January	1,800	600	1,080,000	50	90,000
February	1,056	400	422,400	30	31,680
March	384	300	115,200	50	19,200
Total		6,700	29,772,000	630	3,152,400

* It is assumed that installations are installed in the middle of each month

After calculating the maximum generation expected over the year the actual generation figures collected are used to calculate the load factor (see table 4). In this example Photovoltaic (PV) units of 4kW or less generated on average 25% of the maximum possible throughout the year.

Table 4: Calculating annual load factor by tariff (data are hypothetical)

Tariff	Actual annual generation (MWh) (Col A)	Maximum theoretical generation (MWh) (Col B)	Annual load factor (Col A / B)
PV<=4kW	7,443	29,772	0.25
Wind <=1.5kW	945	3,152.4	0.30
Other tariffs			

This information will then be used to adjust the financial year figures into calendar year and to provide generation estimates for the most recent year. They can also be used to apportion the overall generation figures to the devolved administrations and English regions.

Converting financial year data into calendar year

Table 3 will be repeated for each calendar year using the installed capacities in the central FiT register to work out the maximum generation that you would expect in that year. Using the hypothetical data for April to December given in table 3 above, this gives an expected maximum theoretical generation of 28,154,400kWh generated by PV installations of 4kW or less during the first calendar year of FiTs (which only covered 9 months as the scheme was introduced part way through 2010). Assuming a load factor of 0.25 as calculated in table 4 then we can estimate that 7,039MWh was generated by installations in this tariff band in 2010 (28,154,400 multiplied by 0.25).

As the latest generation data will not be available from Ofgem until after the publication of DUKES then generation for the latest year will be estimated by using the load factors for the previous year and the installed capacities added to the central FiT register to calculate a maximum expected

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generation figure. Once the latest data becomes available the load factors will be updated and the data revised the following year.

Calculating sub-national generation figures

In the September editions of Energy Trends we publish renewable electricity generation by region⁸. As generation data will only be collected at a national level regional figures will have to be derived. This will be calculated using the load factors in table 4 multiplied by the maximum theoretical generation for each region. The maximum theoretical generation will be calculated using the methodology in table 3 (on a calendar year basis) using the installed capacities for each region as contained in the central FiT register. A worked example is given in table 5.

Table 5: Calculating annual generation for individual regions (data are hypothetical)

Tariff	Maximum theoretical generation (kWh) (Col A)*	Annual load factor (Col B)	Calculated generation (Col A x B)
PV<=4kW	120,000	0.25	30,000
Wind <=1.5kW	16,000	0.30	4,800
Other tariffs			
Total region A			34,800

* This is calculated by repeating the calculations in table 3 for each region

It is also possible to use this methodology to derive generation figures for sub-regional areas (e.g. Local Authorities). Before carrying this out DECC will need to assess the numbers in each local authority to assess how robust these calculations would be.

Potential issues

Potential issues with the methodology are outlined below. The proposed methodology will be reviewed once the first set of generation data are received to ensure the calculations look sensible, any resulting changes to the methodology will be set out in DUKES.

Load factors may be underestimated for PV installations as generation is likely to show marked seasonal variation, with higher generation in summer than winter. If a large number of installations are installed during winter (a few months before the end of the financial year), their recorded annual generation will be low (after taking into account the number of days installed) as they will not have been generating for any summer months. This is an issue for installations installed during the year, so the effect on the load factor calculation should lessen over time (as the ratio of new installation to those in place for the whole year decreases). One way of overcoming this would be to base the calculation only on installations that are in place for the whole year (as per methodology outlined in the article referenced in footnote 3). However as generation data are only collected on an aggregated basis it will not be possible to remove the generation figures for installations that are installed during the year.

This methodology for producing sub-national generation estimates also assumes that the load factor for each technology is the same in all areas of the country, which may not be true.

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⁸ See for example,

www.decc.gov.uk/assets/decc/statistics/publications/trends/articles_issue/1_20090921165601_e_@@_renewableelectricityarticle.pdf