Section 6 - Renewables

Key results show:

Renewables' share of electricity generation was 26.6 per cent in 2017 Q1, up 1.0 percentage points on the share in 2016 Q1, reflecting increased capacity. Wind speeds and rainfall were lower than last year. **(Chart 6.1)**

Renewable electricity generation was a record 24.8 TWh in 2017 Q1, an increase of 5.1 per cent on the 23.6 TWh in 2016 Q1. **(Chart 6.2)**

Onshore wind increased by 1.3 TWh (20 per cent) to 7.7 TWh in 2017 Q1, the highest increase across the technologies. Total wind generation increased by 10 per cent to 12.7 TWh; the increase in capacity was partially offset by lower wind speeds. Solar increased by 16 per cent, from 1.5 TWh in 2016 Q1 to 1.7 TWh in 2017 Q1 due to increased capacity. **(Chart 6.2)**

Renewable electricity capacity was 36.9 GW at the end of 2017 Q1, a 12 per cent increase (4.0 GW) on a year earlier, and a 3.3 per cent increase (1.2 GW) on the previous quarter. Of both increases in 2017 Q1, over half was due to new onshore wind capacity. **(Chart 6.3)**

In 2017 Q1, just 54 MW of capacity eligible for the Feed in Tariff scheme was installed, increasing the total to 6.1 GW, across 897,135 installations. **(Chart 6.5)**

Liquid biofuels consumption provisionally rose by 6.7 per cent, from 327 million litres in 2016 Q1 to 349 million litres in 2017 Q1. This represented 3.1 per cent of petrol and diesel consumed in road transport. **(Chart 6.6)**

Relevant tables

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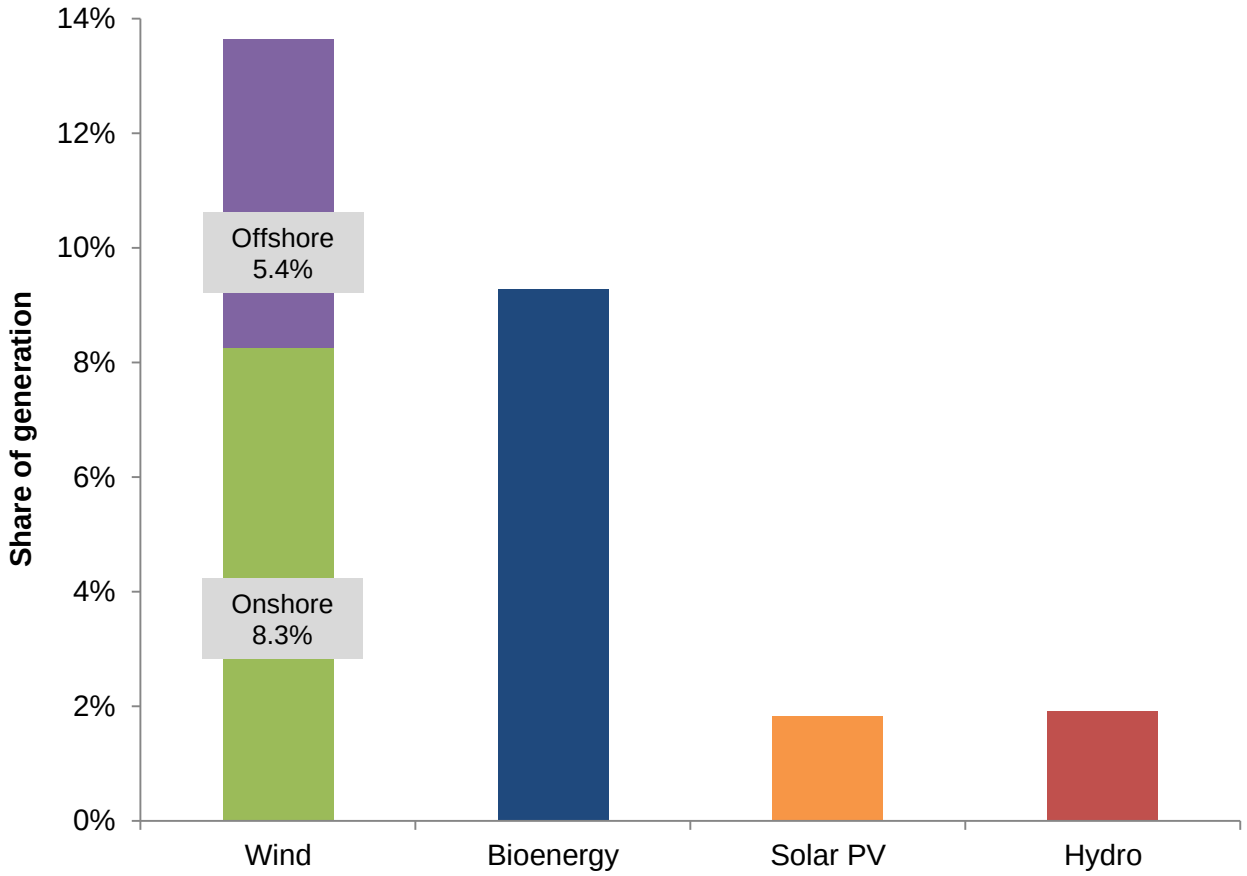
Chart 6.1 Renewables' share of electricity generation (Table 6.1)



Renewables' share of electricity generation increased from 25.6 per cent in 2016 Q1 to 26.6 per cent in 2017 Q1, but remained 0.2 percentage points lower than 2015 Q4's record 26.8 per cent.

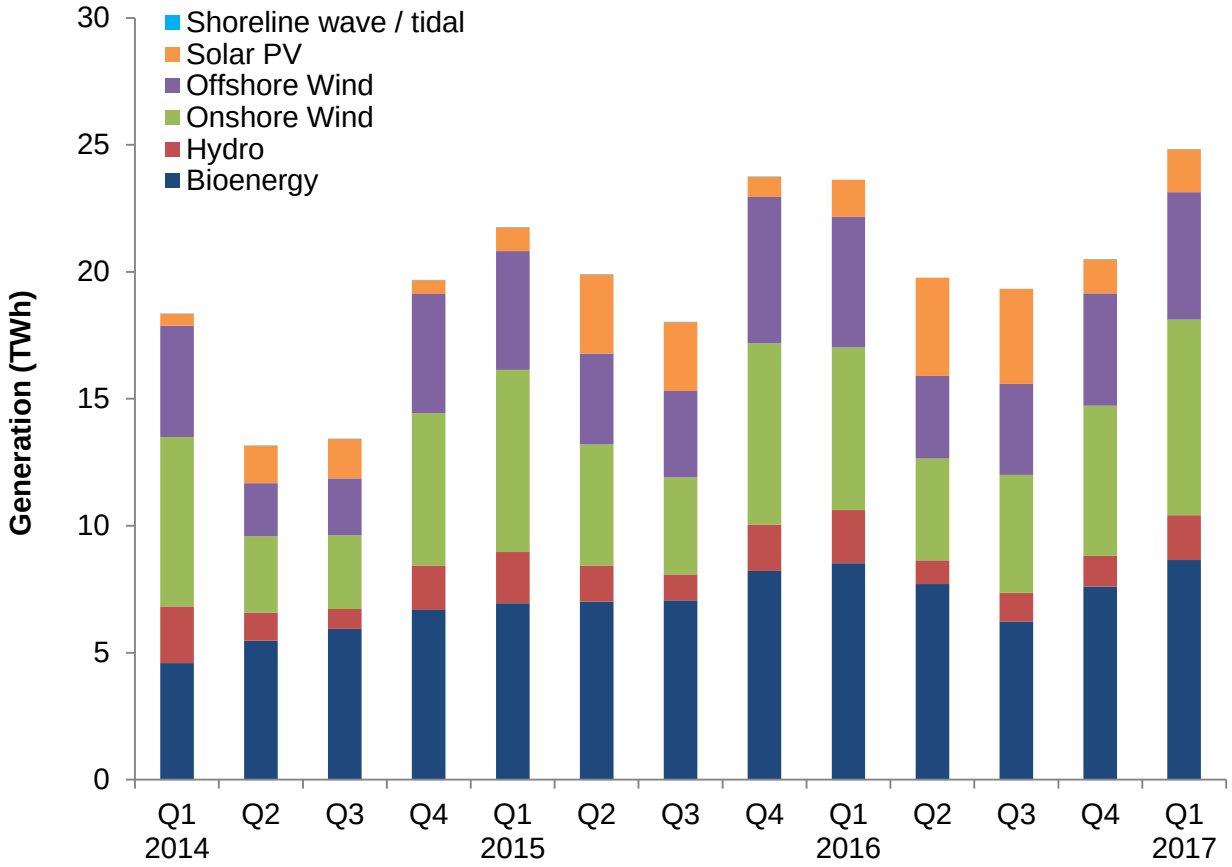
The increase on a year earlier reflects increased capacity, particularly in onshore wind and solar PV. Average wind speeds and rainfall were both lower than last year.

Total electricity generated from renewables in 2017 Q1 was up by 5.1 per cent on 2016 Q1, from 23.6 TWh to a new record of 24.8 TWh.

Overall electricity generation was 93.2 TWh in 2017 Q1, up 1.0 per cent on a year earlier (92.3 TWh). This increase in overall generation partly offset the increase in renewables' share of electricity generation by 0.3 percentage points.

Total electricity generation figures (all generating companies) can be found in table ET 5.1, at: www.gov.uk/government/statistics/electricity-section-5-energy-trends

Chart 6.2 Renewable electricity generation (Table 6.1)



In 2017 Q1, electricity generated from onshore wind increased by 20 per cent, from 6.4 TWh in 2016 Q1 to 7.7 TWh, though generation from offshore wind fell by 2.7 per cent to 5.0 TWh. The far higher increase in capacity for onshore wind, compared to offshore wind, offset the lower wind speeds during the quarter. Wind speeds in 2017 Q1, at 9.2 knots, were down 0.6 knots on both the long term mean and 2016 Q1 - see Energy Trends table 7.2 at: www.gov.uk/government/statistics/energy-trends-section-7-weather.

Generation from solar photovoltaics increased by 16 per cent (0.2 TWh) to 1.7 TWh compared to 2016 Q1, due to increased capacity.

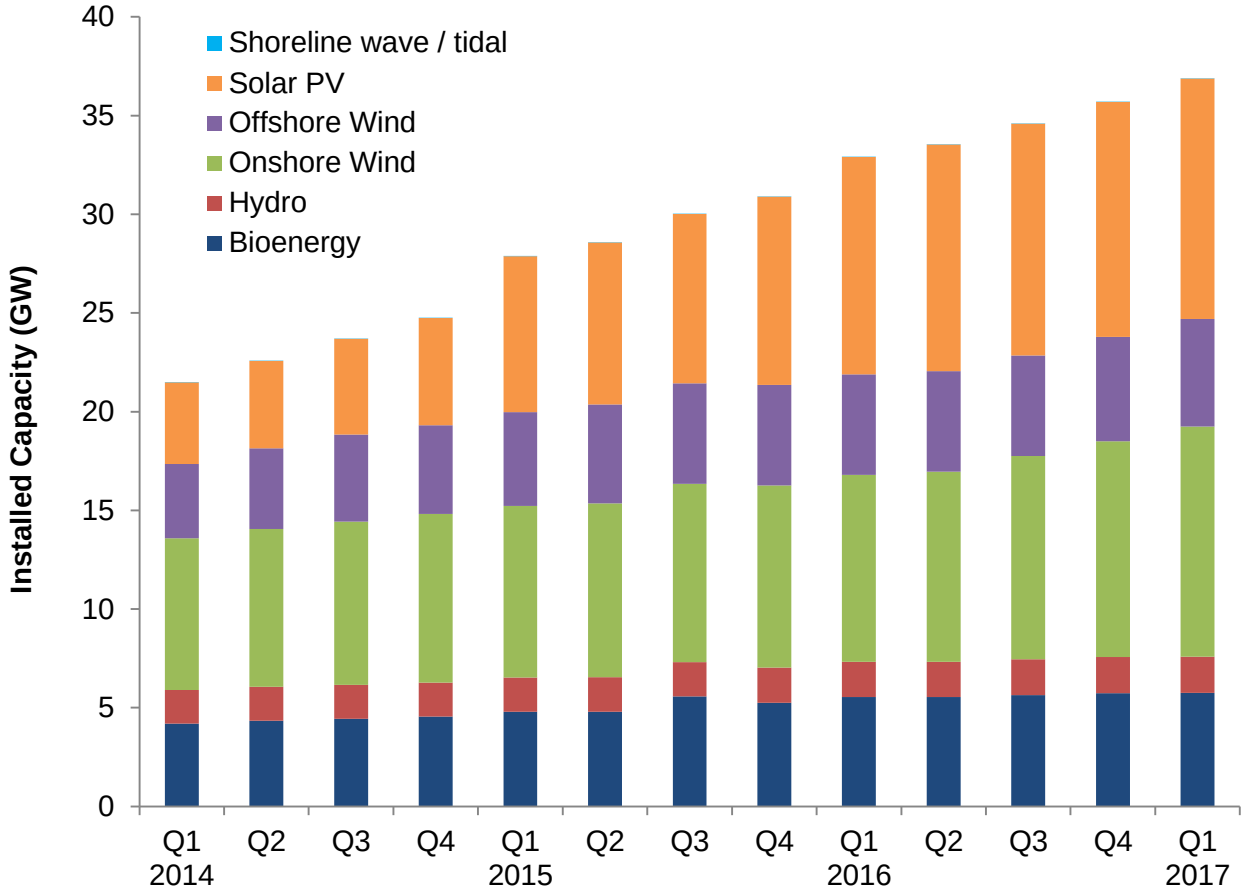
Hydro generation fell by 15 per cent on a year earlier to 1.8 TWh; average rainfall (in the main hydro catchment areas) fell by 24 per cent during the quarter, which included the driest January since 2010 - see Energy Trends table 7.4 at: www.gov.uk/government/statistics/energy-trends-section-7-weather.

In 2017 Q1, generation from bioenergy[1] increased by 1.4 per cent on a year earlier, from 8.5 TWh to 8.6 TWh, with small increases in generation from plant biomass and biodegradable waste partly offset by reduced generation from landfill gas.

Bioenergy had the largest share of generation (36 per cent) with, 27 per cent from onshore wind, 22 per cent from offshore wind, 8.8 per cent from hydro and 6.2 per cent from solar PV.

[1] Bioenergy consists of: landfill gas, sewage gas, energy from waste, plant biomass, animal biomass, anaerobic digestion and co-firing (generation only)

Chart 6.3 Renewable electricity capacity (as at end of quarter) (Table 6.1)



At the end of 2017 Q1, the UK's renewable electricity capacity totalled 36.9 GW, an increase of 12 per cent (4.0 GW) on that installed at the end of 2016 Q1, and 3.3 per cent (1.2 GW) higher than the previous quarter.

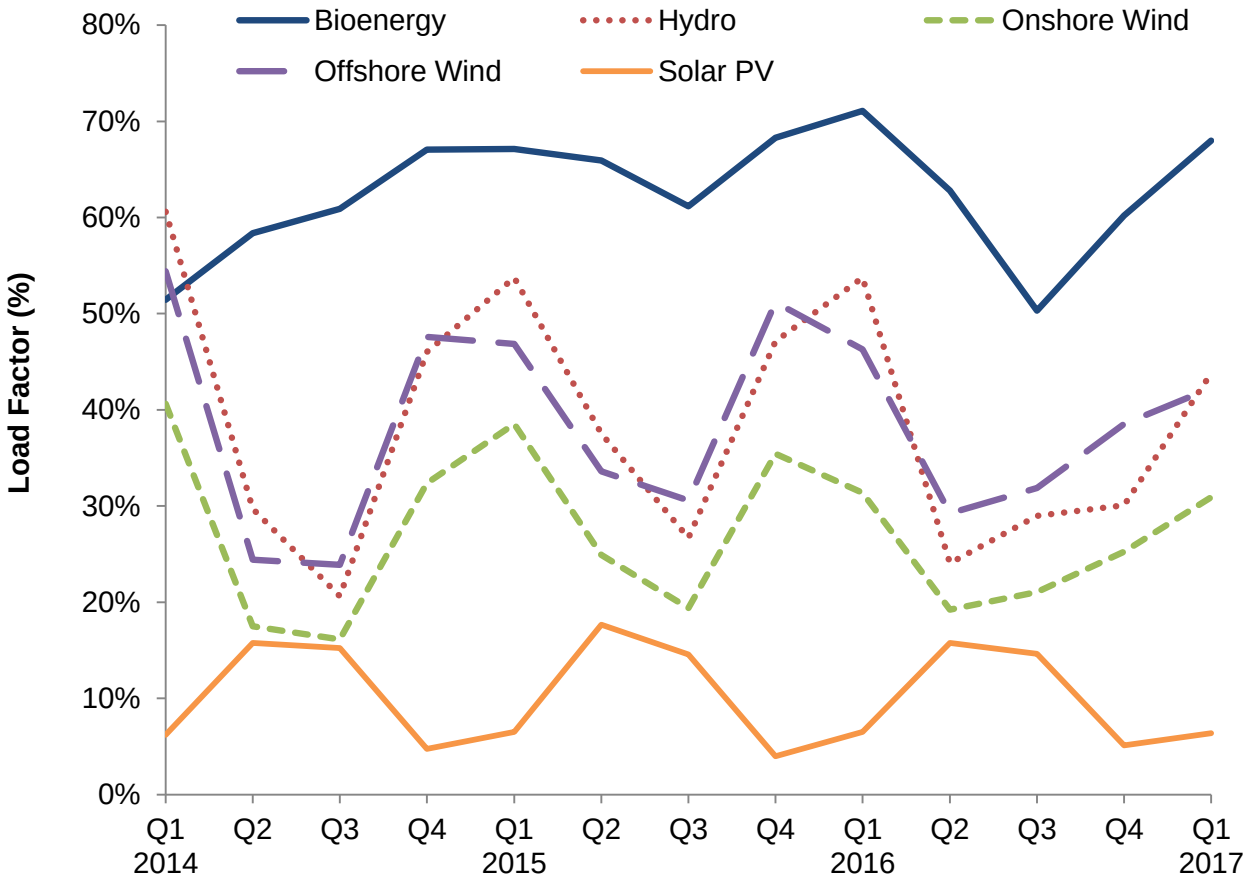
At the end of 2017 Q1, solar PV, at 12.2 GW, represented one-third of all renewable capacity, the highest share of renewable technologies. This was followed by onshore wind (32 per cent), bioenergy (16 per cent) and offshore wind (15 per cent).[2]

Compared with a year ago, onshore wind capacity increased by 2.2 GW (23 per cent), and offshore wind by 0.4 GW (7.1 per cent). Solar PV increased by 1.2 GW, with 0.3 GW of this deployed in the latest quarter, with the closure of the Renewables Obligation (RO) to the remaining new (grace period) solar schemes on 31 March 2017. During the quarter, a second solar PV scheme registered for support under Contracts for Differences (CfDs), the 10 MW, Triangle, began generating.

During 2017 Q1, onshore wind capacity increased by 742 MW, with the opening of many new wind farms, including the 69 MW Corriegarth, 54 MW Ray and 45 MW Corriemollie sites – all in Scotland - and a further 39 MW of the Pen y Cymoedd wind farm in Wales (raising capacity to 195 MW). Offshore wind capacity increased by 160 MW, with the completion of Burbo Bank Extension (increasing from 200 MW to 258 MW) and generation beginning at the first 102 MW (across two phases) of Dudgeon (402 MW when complete).

[2] To note that renewable generation and capacity figures include installations accredited on all support schemes (Renewables Obligation, Feed in Tariffs, Contracts for Difference), as well as those not eligible for support or are commissioned but awaiting support accreditation. This should particularly be noted for solar PV (and onshore wind), where figures consist of many installations across several or all of these categories.

Chart 6.4 Renewable electricity load factors (Table 6.1)



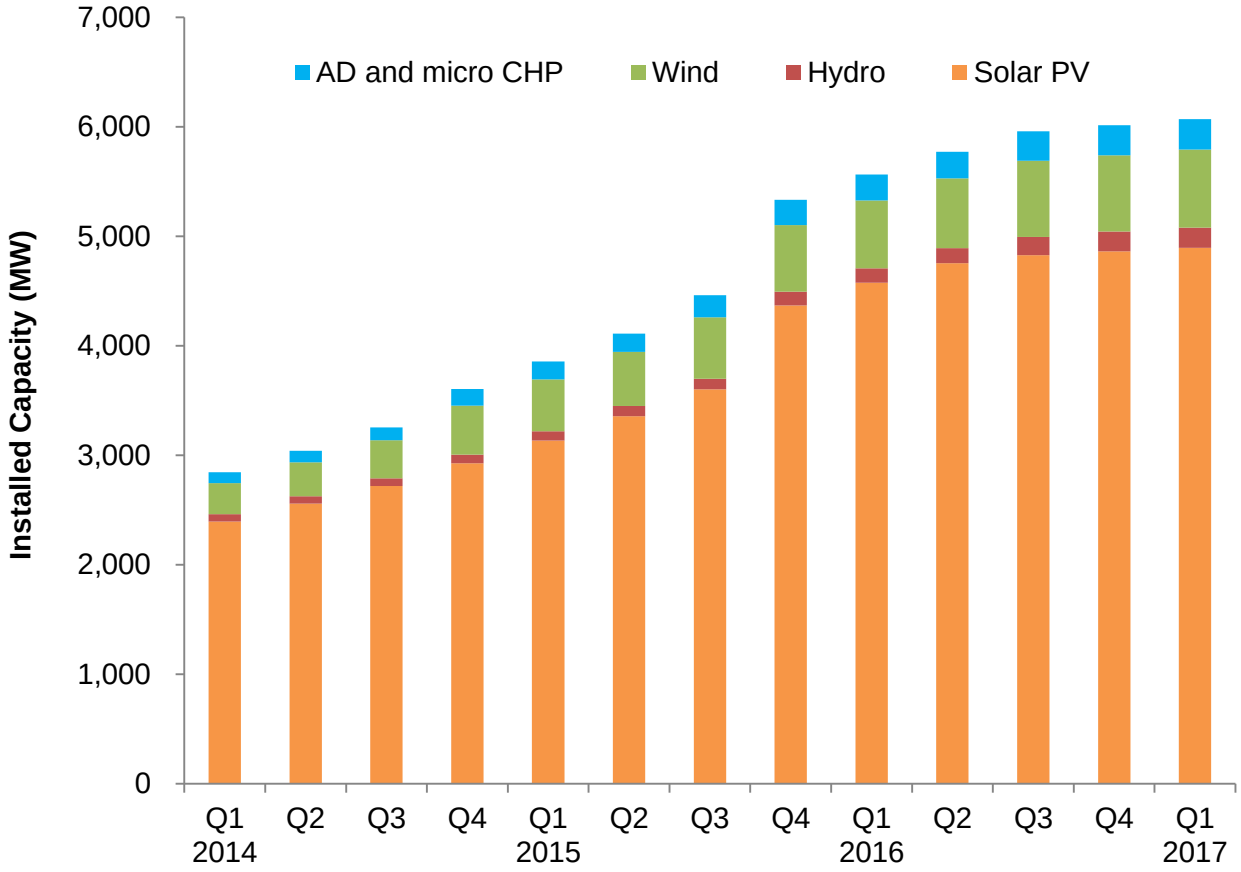
In 2017 Q1, onshore wind's load factor fell by 0.5 percentage points, from 31.4 per cent in 2016 Q1 to 30.9 per cent, due to lower onshore wind speeds. Meanwhile, offshore wind's load factor fell by 4.0 percentage points, from 46.3 per cent in 2016 Q1 to 42.3 per cent in 2017 Q1.[3] Compared with 2016 Q4 – the calmest Q4 in the last 16 years - onshore and offshore wind's load factors were up by 5.7 and 3.7 percentage points, respectively, with wind speeds up 1.6 knots.

Hydro's load factor in 2017 Q1 fell by ten percentage points, from 53.7 per cent in 2016 Q1 to 43.8 per cent, with average rainfall down by 24 per cent. Compared with 2016 Q4 – the driest Q4 in the last 16 years - hydro's load factor in 2017 Q1 was up by 14 percentage points, from 30.1 per cent, with average rainfall up by 23 per cent.

For bioenergy, the load factor in 2017 Q1 was 68.0 per cent, down 3.1 percentage points on the record 71.1 per cent in 2016 Q1, but up 7.8 percentage points on 2016 Q4, reflecting the full return to operation of the biomass units at Drax power station, following maintenance outages in the second half of 2016.

[3] Load Factors are calculated using an average of capacity at the start and end of the quarter. Therefore, they can be influenced by the time in the quarter when any new capacity came online. This may particularly be the case for large wind farms, such as London Array offshore, that come online incrementally throughout the quarter.

Chart 6.5 Feed in Tariffs: eligible installed capacity (as at end of quarter)



At the end of 2017 Q1, 6.1 GW of capacity was installed and eligible for the GB Feed in Tariff (FiT) scheme[4], a 9.1 per cent increase on that at the end of 2016 Q1. Much (0.2 GW) of this 0.5 GW increase occurred in 2016 Q2, with around 50 MW being installed in each of the last two quarters, reflecting the new CAPs mechanism.

In terms of number of installations, at the end of 2017 Q1, there were 897,135 eligible for the FiT scheme, a 1.1 per cent increase on the 887,493 confirmed at the end of the previous quarter, and 4.6 per cent higher than the 857,439 schemes confirmed at the end of 2016 Q1.

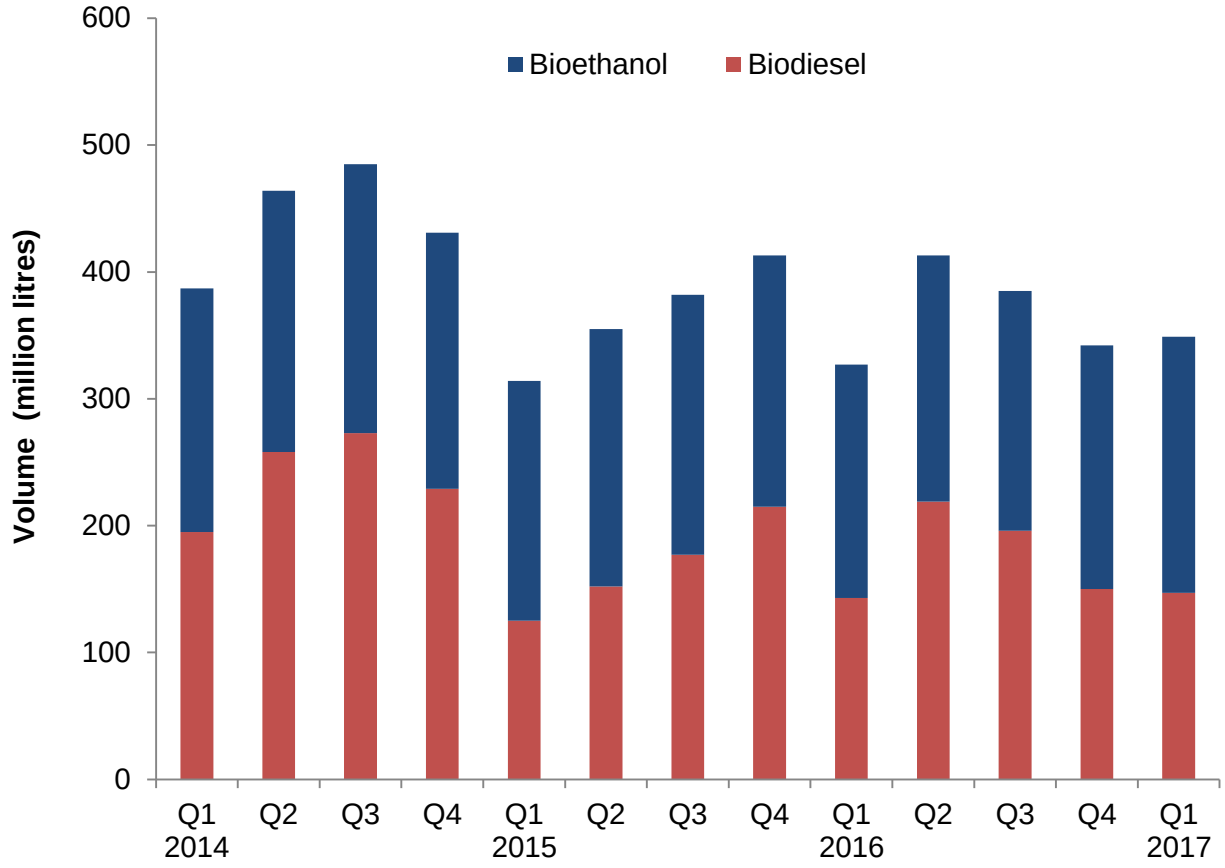
Solar photovoltaics (PVs) represent the majority of both installations and installed capacity confirmed on FiTs, with, respectively, 99 per cent and 81 per cent of the total. The majority of PV installations are sub-4 kW retrofitted schemes, which increased by 35,181 (82 MW) from 2016 Q1 to bring the total to 836,014 (2,421 MW) at the end of 2017 Q1.

Renewable installations confirmed on FiTs (all except MicroCHP) represented 16 per cent of all renewable installed capacity.

Statistics on Feed in Tariffs can be found at: www.gov.uk/government/collections/feed-in-tariff-statistics

[4] Data are for schemes accredited under the Microgeneration Certification Scheme (MCS) and ROOFIT, which are pre-requisites for registering for the FIT scheme; not all of these installations will eventually be confirmed onto the FIT scheme.

Chart 6.6 Liquid biofuels for transport consumption (Table 6.2)



In 2017 Q1, 349 million litres of liquid biofuels were consumed in transport, a rise of 6.7 per cent on the total in 2016 Q1 (327 million litres).

Bioethanol consumption increased by 9.8 per cent, from 184 million litres in 2016 Q1 to 202 million litres in 2017 Q1, while biodiesel consumption rose by 2.8 per cent, from 143 million litres in 2016 Q1 to 147 million litres in 2017 Q1.

In 2017 Q1, the largest share of consumption was from bioethanol (58 per cent), with the remaining 42 per cent coming from biodiesel, compared with 2016 Q1's shares of 56 per cent and 44 per cent respectively.

In 2017 Q1, biodiesel accounted for 2.0 per cent of total diesel consumed in transport, and bioethanol a record 5.0 per cent of motor spirit. The combined contribution of the two fuels was 3.1 per cent, 0.2 percentage points higher than 2016 Q1's share.

6 RENEWABLES

Table 6.1. Renewable electricity capacity and generation

	2015	2016 p	per cent change	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter	2016 4th quarter	2017 1st quarter p	per cent change [12]
Cumulative Installed Capacity [1]												**MW**	
Onshore Wind	9,222	10,924	*+18.5*	8,707	8,810	9,022	9,222	9,479r	9,633r	10,295r	10,924	11,655	*+23.0*
Offshore Wind	5,094	5,294	*+3.9*	4,739	5,014	5,094	5,094	5,094	5,094	5,094	5,294	5,453	*+7.1*
Shoreline wave / tidal	9	13	*+50.9*	9	9	9	9	8	8	8	13	13	*+73.2*
Solar photovoltaics	9,535	11,899	*+24.8*	7,900	8,206	8,581	9,535	11,008r	11,469r	11,742r	11,899	12,178	*+10.6*
Small scale Hydro	299	358	*+19.6*	260	266	271	299	307r	311r	343r	358	360	*+17.3*
Large scale Hydro	1,477	1,477	-	1,477	1,477	1,477	1,477	1,477	1,477	1,477	1,477	1,477	-
Landfill gas	1,061	1,062	*+0.1*	1,061	1,061	1,061	1,061	1,062r	1,062r	1,062r	1,062	1,062	-
Sewage sludge digestion	231	257	*+11.3*	231	231	231	231	257	257	257	257	257	*+0.2*
Energy from waste	925	1,017	*+9.9*	826	834	902	925	934r	934r	983r	1,017	1,032	*+10.6*
Animal Biomass (non-AD) [2]	111	129	*+17.0*	111	111	111	111	129	129	129	129	129	-
Anaerobic Digestion	323	420	*+29.9*	263	266	299	323	370r	377r	405r	420	426	*+15.1*
Plant Biomass [3]	2,607	2,850	*+9.3*	2,297	2,298	2,963	2,607	2,787r	2,787r	2,796r	2,850	2,850	*+2.3*
Total	30,893	35,700	*+15.6*	27,880	28,582	30,021	30,893	32,909r	33,537r	34,591r	35,700	36,894	*+12.1*
Co-firing [4]	21	13	*-35.9*	21	21	21	21	13r	13r	13r	13	2	*-83.1*
Generation [5]												**GWh**	
Onshore Wind [6]	22,894	20,962	*-8.4*	7,176	4,767	3,817	7,135	6,406r	4,010r	4,631r	5,915	7,703	*+20.2*
Offshore Wind [6, 7]	17,423	16,406	*-5.8*	4,676	3,578	3,412	5,757	5,150r	3,253r	3,584r	4,419	5,014	*-2.7*
Shoreline wave / tidal [6]	2	0	*-99.6*	1	0	0	0	-	-	-	0	0	
Solar photovoltaics [6]	7,546	10,420	*+38.1*	938	3,109	2,701	798	1,464r	3,872r	3,750r	1,335	1,691	*+15.6*
Hydro [6]	6,299	5,395	*-14.4*	2,011	1,425	1,028	1,834	2,089r	938r	1,154r	1,214	1,774	*-15.1*
Landfill gas [6]	4,872	4,703	*-3.5*	1,240	1,212	1,201	1,220	1,218r	1,171r	1,158r	1,156	1,071	*-12.1*
Sewage sludge digestion [6]	894	950	*+6.3*	225	233	217	220	236r	251r	229r	234	235	*-0.4*
Energy from waste [8]	2,585	2,741	*+6.0*	607	603	687	688	728r	626r	677r	710	858	*+17.8*
Co-firing with fossil fuels	183	117	*-35.9*	36	36	57	55	51	15	5r	47	20	*-61.3*
Animal Biomass (non-AD) [2, 6]	648	650	*+0.4*	170	171	142	165	171	165	140r	173	198	*+15.6*
Anaerobic Digestion	1,471	2,052	*+39.5*	325	349	371	426	482r	492r	524r	554	507	*+5.1*
Plant Biomass [3, 6]	18,587	18,829	*+1.3*	4,351	4,409	4,383	5,443	5,637r	4,981r	3,481r	4,730	5,757	*+2.1*
Total	83,403	83,225	*-0.2*	21,755	19,893	18,015	23,741	23,633r	19,773r	19,333r	20,485	24,827	*+5.1*
Non-biodegradable wastes [9]	2,586	2,742	*+6.0*	607	604	687	688	728r	626r	678r	710	858	*+17.8*
Load Factors [10]													
Onshore Wind	29.4%	23.7%		38.5%	24.9%	19.4%	35.4%	31.4%r	19.2%r	21.0%	25.2%	31.6%	
Offshore Wind	41.5%	36.0%		46.9%	33.6%	30.6%	51.2%	46.3%r	29.2%r	31.9%	38.5%	43.2%	
Solar photovoltaics	11.5%	11.1%		6.5%	17.7%	14.6%	4.0%	6.5%r	15.8%r	14.6%	5.1%	6.5%	
Hydro	41.0%	34.0%		53.7%	37.5%	26.7%	47.1%	53.7%r	24.1%r	29.0%	30.1%	44.7%	
Landfill gas	52.5%	50.4%		54.2%	52.3%	51.2%	52.1%	52.5%r	50.5%r	49.4%	49.3%	46.7%	
Sewage sludge digestion	45.7%	44.3%		46.6%	46.1%	42.4%	43.1%	44.3%r	44.7%r	40.3%	41.3%	42.3%	
Energy from waste	36.8%	32.1%		37.3%	33.3%	35.8%	34.1%	35.9%r	30.7%r	32.0%	32.1%	38.8%	
Animal Biomass (non-AD)	66.9%	61.7%		71.1%	70.9%	58.1%	67.7%	65.4%r	58.5%r	49.2%	60.7%	70.9%	
Anaerobic Digestion	59.8%	62.8%		60.1%	60.6%	59.5%	61.9%	63.7%r	60.4%r	60.7%	60.8%	55.5%	
Plant Biomass	87.5%	78.6%		88.7%	87.9%	75.5%	88.5%	95.7%r	81.8%r	56.5%	75.9%	93.5%	
Total (excluding co-firing and non-biodegradable wastes)	34.1%	28.4%		38.2%	32.2%	27.8%	35.2%	33.8%r	27.2%r	25.7%	26.3%	31.6%	

1. Cumulative capacity at the end of the quarter/year
2. Includes the use of poultry litter and meat and bone.
3. Includes the use of straw and energy crops. Also includes high-range co-firing (>85% biomass).
4. This is the amount of fossil fuelled capacity used for co-firing of renewables based on the proportion of generation accounted for by the renewable source over the course of the year.
5. Generation figures for the latest quarter are highly provisional, particularly for the thermal renewable technologies (such as landfill gas) in the lower half of the table.
6. Actual generation figures are given where available, but otherwise are estimated using a typical load factor or the design load factor, where known. Generation from FiT schemes is estimated this way.
7. For 2009, shoreline wave and tidal are included in offshore wind.
8. Biodegradable part only, which accounts for 50% from 2015.
9. Non-biodegradable (50%, from 2015) part of Energy from Waste, plus a small quantity of generation from waste tyres, hosptal waste and general industrial waste.
10. Load factors are calculated based on installed capacity at the beginning and the end of the quarter/year. These can be influenced by the time in the period when new capacity came online.
Load factors on an *unchanged configuration* basis, which consider just those sites operational throughout the year, are available annually in table DUKES 6.5, at:
www.gov.uk/government/publications/renewable-sources-of-energy-chapter-6-digest-of-united-kingdom-energy-statistics-dukes
11. Percentage change between the most recent quarter and the same quarter a year earlier; (+) represents a positive percentage change greater than 100%.

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Table 6.2. Liquid biofuels for transport consumption

	2015	2016	*per cent change*	2015 1st quarter	2015 2nd quarter	2015 3rd Quarter	2015 4th Quarter	2016 1st quarter	2016 2nd quarter	2016 3rd Quarter	2016 4th Quarter	2017 1st Quarter p	*per cent change*[1]
Volume (million litres)												**Million litres**	
Bioethanol	795	759	*-4.5*	189	203	205	198	184	194	189	192	202	*9.8%*
Biodiesel	669	708	*+5.8*	125	152	177	215	143	219	196	150	147	*2.8%*
Total biofuels for transport	1,464	1,467	*+0.2*	314	355	382	413	327	413	385	342	349	*6.7%*
Energy (thousand toe)													
Bioethanol	448	428	*-4.5*	107	114	116	112	104	109	107	108	114	*9.8%*
Biodiesel	550	582	*+5.8*	103	125	145	177	117	180	161	123	121	*2.8%*
Total biofuels for transport	998	1,010	*+1.2*	209	239	261	288	221	289	268	231	235	*6.1%*
Shares of road fuels (volume basis)													
Bioethanol as per cent of Motor Spirit	4.6%	0.0%		4.6%	4.6%	4.7%	4.5%	4.5%	4.4%	4.4%	4.5%	5.0%	
Biodiesel as per cent of DERV	2.3%	0.0%		1.8%	2.1%	2.4%	2.9%	2.0%	2.9%	2.6%	1.9%	2.0%	
Total biofuels as per cent of road fuels	3.2%	0.0%		2.9%	3.0%	3.3%	3.5%	2.9%	3.4%	3.2%	2.8%	3.1%	

1. Percentage change between the most recent quarter and the same quarter a year earlier.
Source: HM Revenue and Customs Hydrocarbon Oils Bulletin, available at:
www.uktradeinfo.com/Statistics/Pages/TaxAndDutybulletins.aspx

Shares of road fuels - % change on quarter in previous year								**% change on quarter in previous year (-ve value is decrease)**	
Bioethanol as per cent of Motor Spirit	0.1%	0.1%	-0.1%	0.0%	-0.1%	-0.2%	-0.3%	-0.1%	0.5%
Biodiesel as per cent of DERV	-1.1%	-1.6%	-1.4%	-0.3%	0.2%	0.8%	0.2%	-0.9%	0.0%
Total biofuels as per cent of road fuels	-0.7%	-1.0%	-0.9%	-0.2%	0.0%	0.4%	0.0%	-0.7%	0.2%