

Section 6 - Renewables

Key results show:

Renewables' share of electricity generation was a record 29.8 per cent in 2017 Q2, up 4.4 percentage points on the share in 2016 Q2, reflecting both increased wind capacity and wind speeds, as well as lower overall electricity generation. **(Chart 6.1)**

Renewable electricity generation was 22.5 TWh in 2017 Q2, an increase of 13.6 per cent on the 19.8 TWh in 2016 Q2, but 10.3 per cent lower than the peak quarterly generation of 2017 Q1 (25.0 TWh). **(Chart 6.2)**

Onshore wind generation increased by 50 per cent (2.0 TWh), the highest increase across the technologies, to 6.0 TWh, while offshore wind rose by 22 per cent (0.7 TWh), to 4.0 TWh. Generation from biodegradable waste was up 30 per cent (0.2 TWh) to 0.8 TWh, due to much increased capacity. **(Chart 6.2)**

Renewable electricity capacity was 38.0 GW at the end of 2017 Q2, a 13.2 per cent increase (4.4 GW) on a year earlier, and a 1.5 per cent (0.6 GW) increase on the previous quarter, with over half of the annual increase coming from onshore wind, and around one quarter from solar photovoltaics (driven by growth in 2017 Q1). **(Chart 6.3)**

In 2017 Q2, just 39 MW of capacity eligible for the Feed in Tariff scheme was installed, increasing the total to 6.1 GW, across 905,000 installations. **(Chart 6.5)**

Liquid biofuels consumption fell by 6.1 per cent, from 413 million litres in 2016 Q2 to 388 million litres in 2017 Q2, with a 13 per cent fall in biodiesel consumption. In 2017 Q2, liquid biofuels represented 3.2 per cent of petrol and diesel consumed in road transport, down from 3.4 per cent a year earlier. **(Chart 6.6)**

Relevant tables

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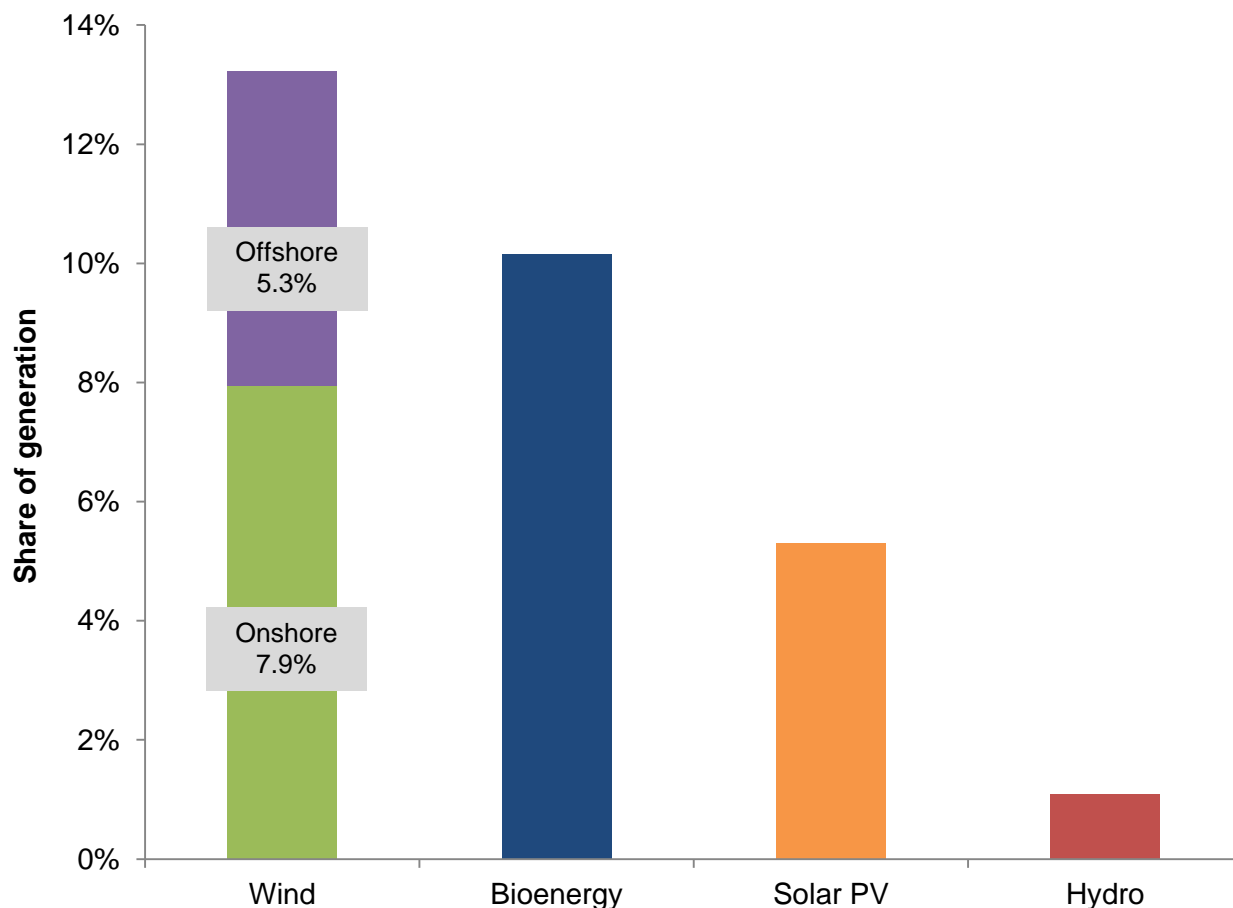
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Chart 6.1 Renewables' share of electricity generation ([Table 6.1](#))



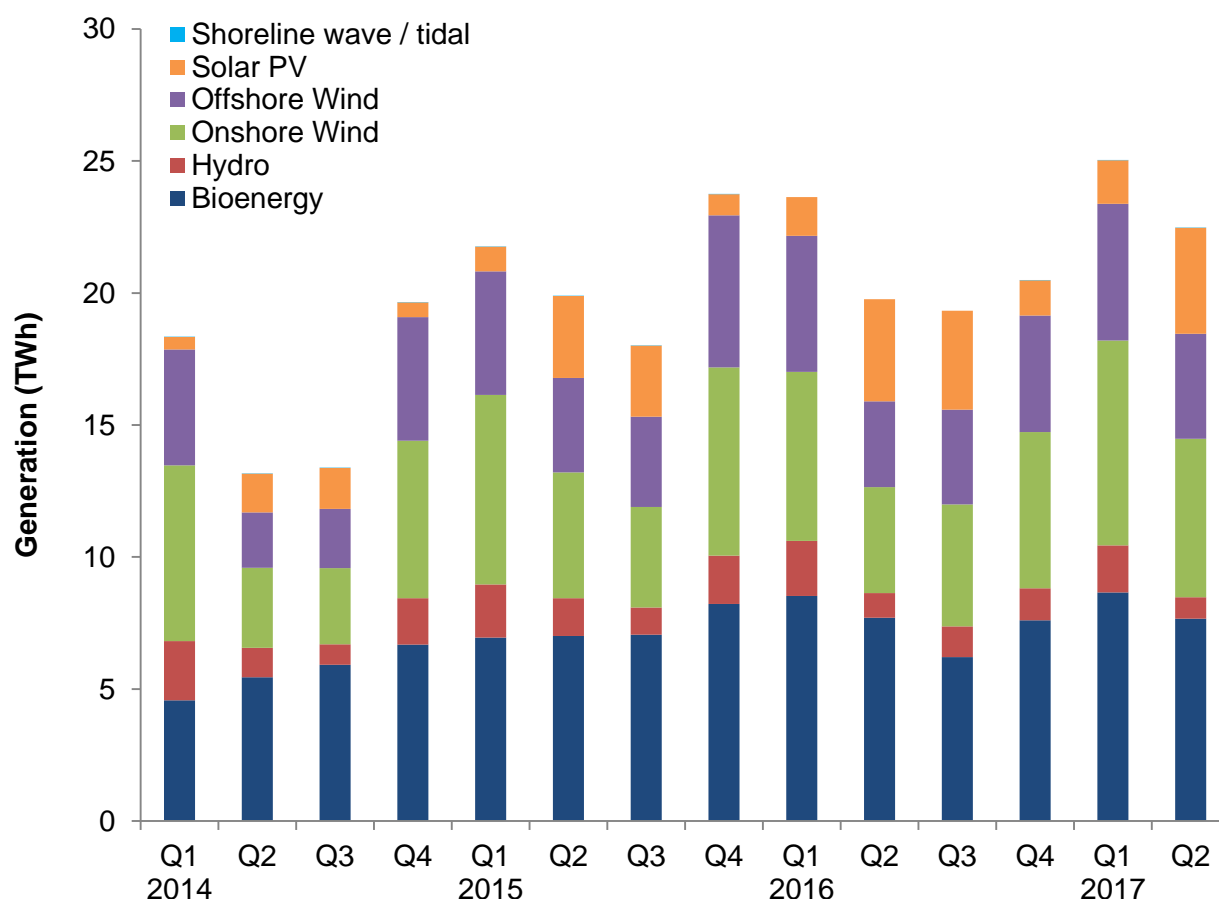
Renewables' share of electricity generation increased from 25.3 per cent in 2016 Q2 to a record 29.8 per cent in 2017 Q2, up from the previous record 26.9 per cent in 2017 Q1.

The increased share on a year earlier mostly reflects increased capacity, particularly onshore wind and solar PV, as well as higher wind speeds and lower overall generation.

Total electricity generated from renewables in 2017 Q2 was up by 2.7 TWh (14 per cent) on 2016 Q2, to 22.5 TWh, but remained 2.6 TWh (10.3 per cent) lower than the record of 25.0 TWh in 2017 Q1.

Overall electricity generation was 3.3 per cent lower in 2017 Q2 (75.5 TWh) compared to 2016 Q2 (78.0 TWh). This decrease accounted for one percentage point of the 4.4 percentage point increase in the share of renewable generation.

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 Q2, electricity generated from onshore wind increased by 50 per cent, from 4.0 TWh in 2016 Q2 to 6.0 TWh, with generation from offshore wind up by 22 per cent to 4.0 TWh. Large increases in capacity over the year, particularly for onshore wind, were accentuated by increased wind speeds during the quarter. Wind speeds in 2017 Q1, at 8.3 knots, were up 0.6 knots on 2016 Q2, but slightly lower than the long term mean - see Energy Trends table 7.2 at:

www.gov.uk/government/statistics/energy-trends-section-7-weather.

Generation from solar photovoltaics increased by 3.4 per cent (0.1 TWh) to a record 4.0 TWh compared to 2016 Q2, due to increased capacity.

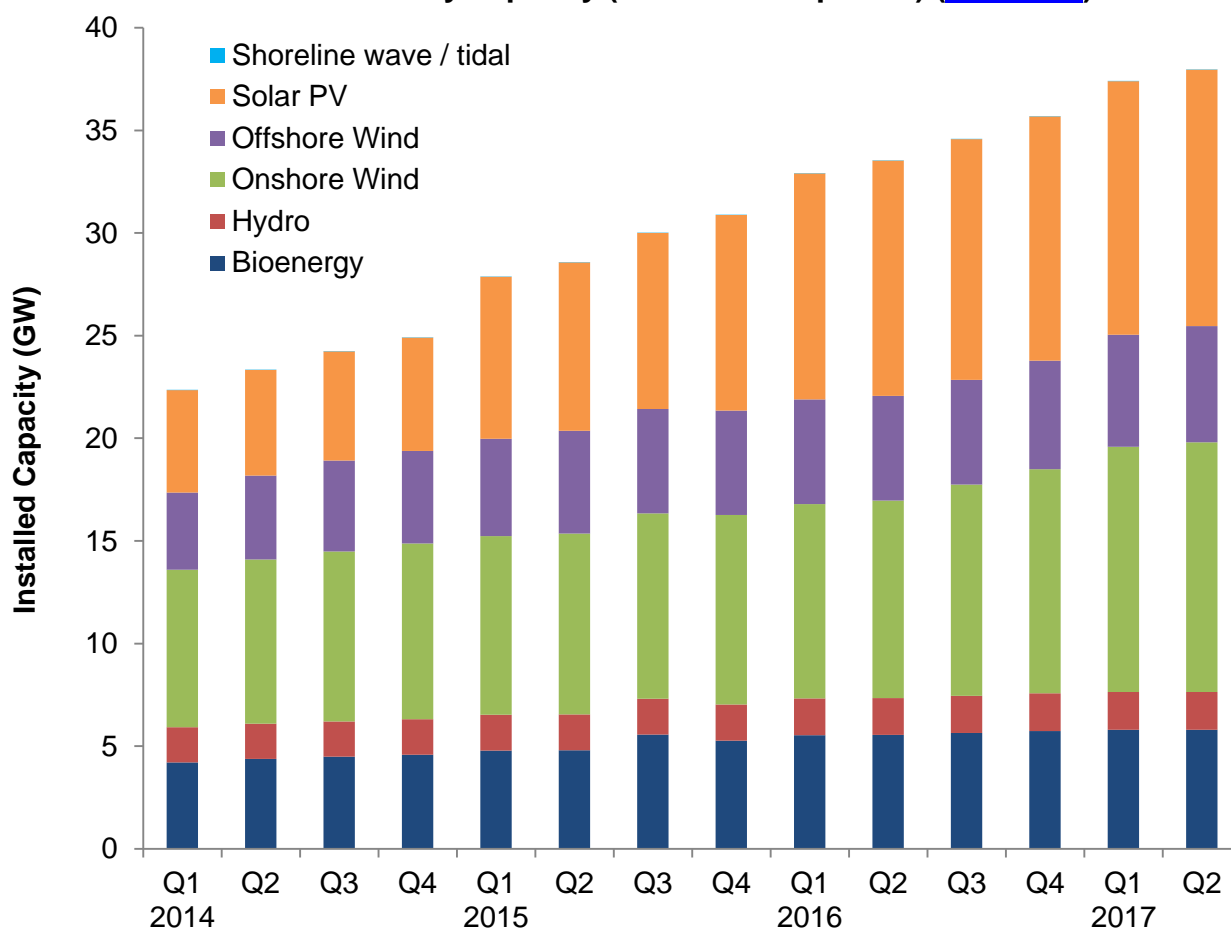
Hydro generation fell by 12.4 per cent on a year earlier to 0.8 TWh; average rainfall (in the main hydro catchment areas) fell by 1.9 per cent during the quarter; however, within this, rainfall in the more critical first two months was around half that of a year earlier, and included the driest April since 2003 - see Energy Trends table 7.4 at:

www.gov.uk/government/statistics/energy-trends-section-7-weather.

In 2017 Q2, generation from bioenergy¹, at 7.7 TWh, was down slightly (0.5 per cent) on a year earlier. Within this, generation from biodegradable waste was up 30 per cent (0.2 TWh), due to increased capacity; however, this was offset by reduced generation from landfill gas and plant biomass.

Bioenergy had the largest share of generation (34 per cent) with, 27 per cent from onshore wind, 18 per cent from each of offshore wind and solar PV, and 3.7 per cent from hydro.

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 Q2, the UK's renewable electricity capacity totalled 38.0 GW, an increase of 13 per cent (4.4 GW) on that installed at the end of 2016 Q2, and 1.5 per cent (0.6 GW) higher than the previous quarter.

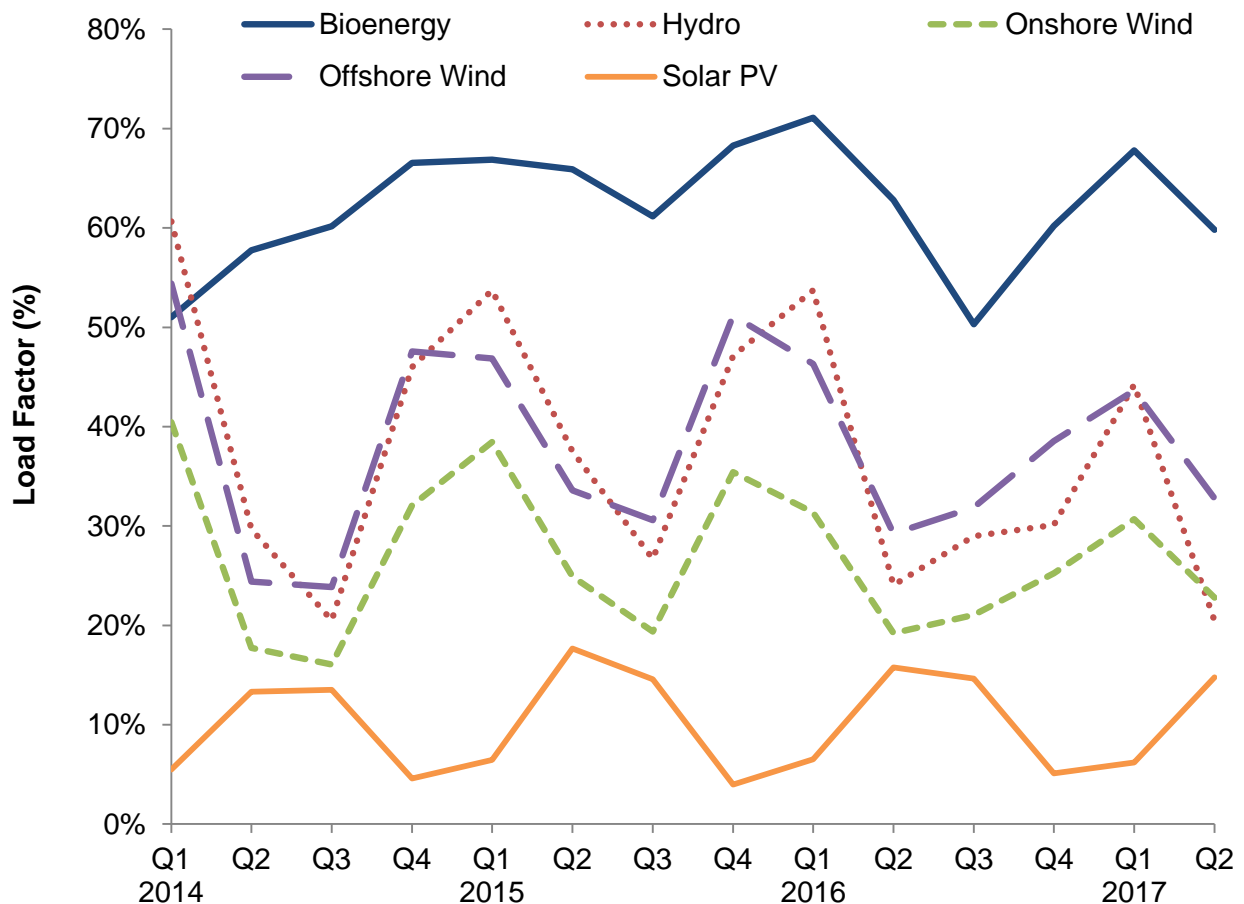
At the end of 2017 Q2, solar PV, at 12.5 GW, represented one-third of all renewable capacity, the highest share of renewable technologies. This was followed by onshore wind (32 per cent), bioenergy (15 per cent) and offshore wind (15 per cent).²

Compared with 2016 Q2, onshore wind capacity increased by 2.5 GW (26 per cent), and offshore wind by 0.6 GW (11 per cent). During 2017 Q2, onshore wind capacity increased by 202 MW, with a further 73 MW installed at Scotland's Kilgallioch (increasing capacity to 118 MW, of the final 239 MW), the final 33 MW of the 228 MW Pen y Cymoedd wind farm in Wales installed, as well as the opening of Auchrobert (39 MW, Scotland) and Beckburn (31 MW, England). Meanwhile, offshore wind capacity increased by 216 MW, with a further 138 MW installed at Dudgeon (238 MW of the final 402 MW now installed) and the first 78 MW (of 573 MW final capacity) installed at Race Bank.

Solar PV increased by 1.0 GW on a year ago, with almost half deployed in 2017 Q1, with the closure of the Renewables Obligation (RO) to the remaining new (grace period) solar schemes on 31 March 2017. During 2017 Q2, just 141 MW was deployed, with reduced RO/FiT support levels.

Across the year, bioenergy capacity increased by 256 MW, including the 50 MW Wilton 11 and the 27 MW Cornwall Energy Recovery Centre waste schemes.

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)

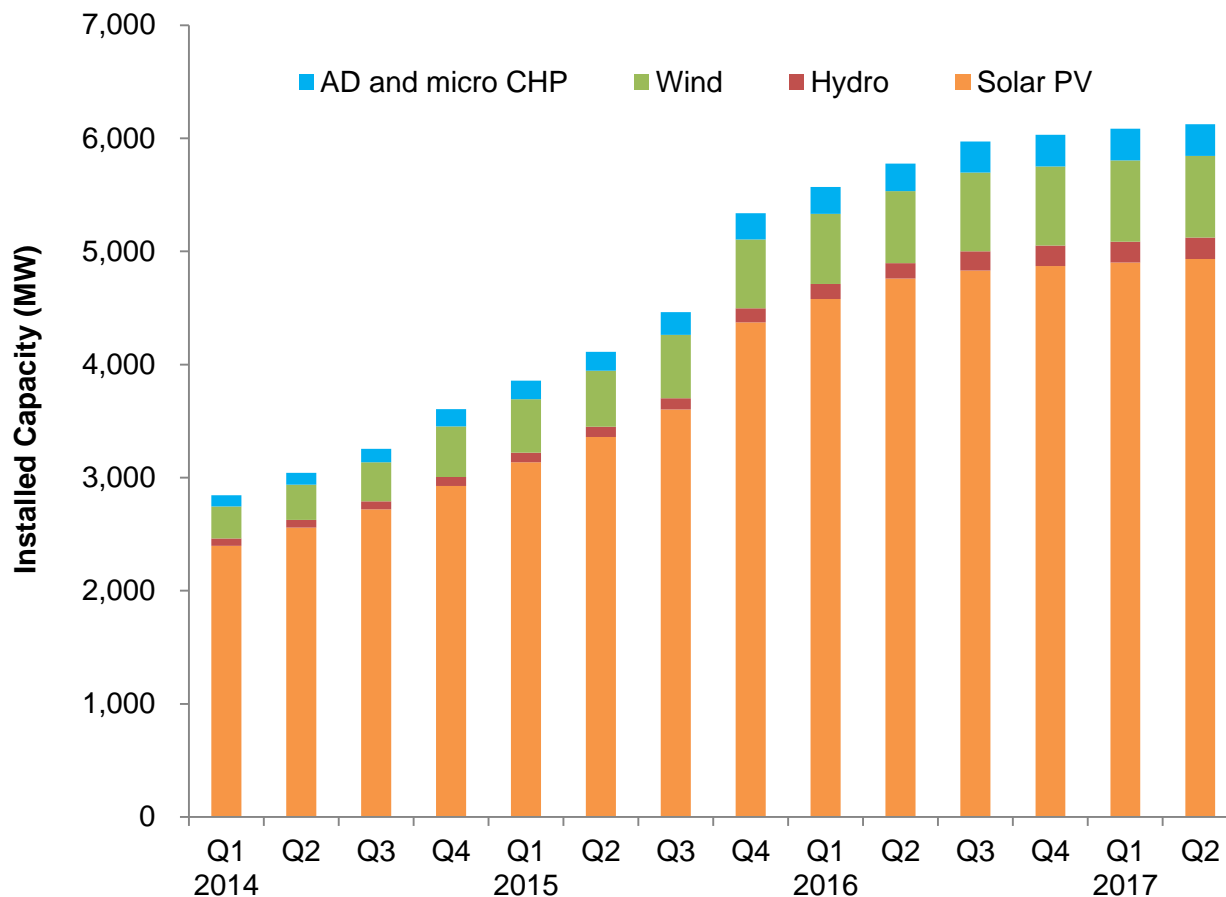
In 2017 Q2, onshore wind's load factor rose by 3.6 percentage points, from 19.2 per cent in 2016 Q2 to 22.8 per cent, due to higher onshore wind speeds. Offshore wind's load factor increased by 3.5 percentage points, from 29.2 per cent in 2016 Q2 to 32.8 per cent in 2017 Q2.³

Compared with 2017 Q1, onshore wind's load factor was down by 7.9 percentage points, while offshore wind's load factor was 10.9 percentage points lower, with wind speeds 0.6 knots higher, at 8.3 knots.

Hydro's load factor in 2017 Q2 decreased by 3.6 percentage points, from 24.1 per cent in 2016 Q2 to 20.5 per cent, the lowest since 2013 Q3, due to lower rainfall. Compared with 2017 Q1, hydro's load factor in 2017 Q2 was 24 percentage points lower, with 37 per cent less rainfall in the main hydro areas.

For bioenergy, the load factor in 2017 Q2, at 59.8 per cent, was down by 3.0 percentage points on a year earlier, and down by 8.0 percentage points on 2017 Q1, due to an outage at Drax, the largest generator within the bioenergy category, in June.

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 Q2, 6,124 MW of capacity was installed and eligible for the GB Feed in Tariff (FiT) scheme⁴. This was a 6.0 per cent increase on that installed at the end of 2016 Q2, but just 0.6 per cent (39 MW) up on the previous quarter.

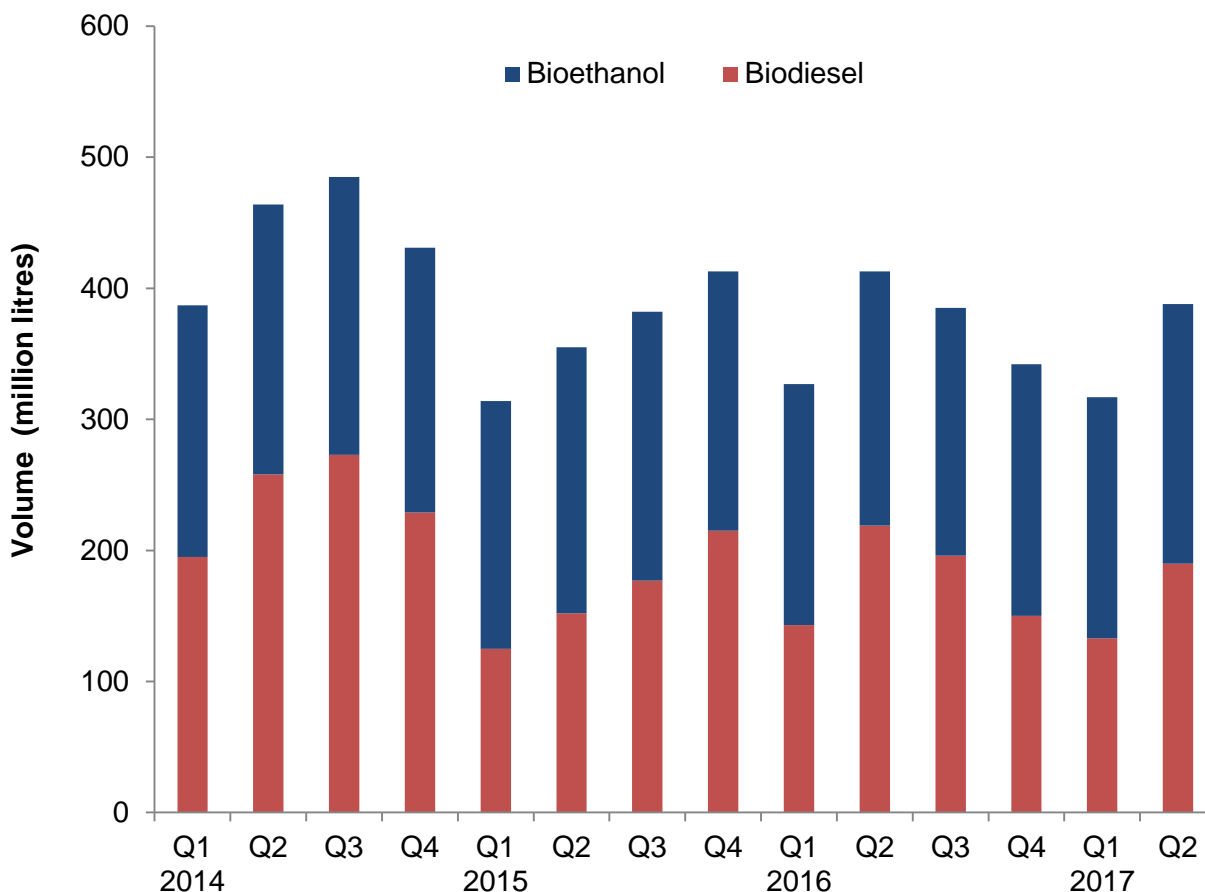
In terms of number of installations, at the end of 2017 Q2, there were over 905,000 installed and eligible for the FiT scheme, a 4.2 per cent increase on the number installed a year earlier.

Solar photovoltaics (PVs) represent the majority of both installations and installed capacity on FiTs, with, respectively, 99 per cent and 81 per cent of the total. The majority of FiT-eligible PV installations are sub-4 kW retrofitted schemes, 2,436 MW (49 per cent) in 2017 Q2.

Renewable installations eligible for FiTs (all except MicroCHP) represented 17 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 Q2, 388 million litres of liquid biofuels were consumed in transport, a fall of 6.1 per cent on the total in 2016 Q2 (25 million litres).

In 2017 Q2, biodiesel accounted for 2.5 per cent of diesel, and bioethanol 4.6 per cent of motor spirit. The combined contribution of the two fuels was 3.2 per cent, 0.2 percentage points lower than 2016 Q2's share.

Bioethanol consumption rose by 0.4 per cent, from 194 million litres in 2016 Q2 to 198 million litres in 2017 Q2, while biodiesel consumption fell by 29 million litres (13 per cent), to 190 million litres over the same period.

Biofuel consumption was split broadly equally between bioethanol and biodiesel, with bioethanol taking the slightly larger share at 51 per cent.

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Table 6.1. Renewable electricity capacity and generation

	2015	2016	per cent change	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter	2016 4th quarter	2017 1st quarter	2017 2nd quarter p	per cent change ¹³
Cumulative Installed Capacity¹													MW
Onshore Wind	9,222	10,924	+18.5	8,810	9,022	9,222	9,479	9,633	10,295	10,924	11,952r	12,154	+26.2
Offshore Wind	5,094	5,294	+3.9	5,014	5,094	5,094	5,094	5,094	5,094	5,294	5,455	5,671	+11.3
Shoreline wave / tidal	9	13	+50.9	9	9	9	8	8	8	13	17	17	(+)
Solar photovoltaics	9,535	11,899	+24.8	8,206	8,581	9,535	11,008	11,469	11,742	11,899	12,352r	12,493	+8.9
Small scale Hydro	299	358	+19.6	266	271	299	307	311	343	358	361r	365	+17.6
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	1,062	1,062	1,062	1,062	1,065r	1,067	+0.4
Sewage sludge digestion	231	257	+11.3	231	231	231	257	257	257	257	259	259	+0.7
Energy from waste	925	1,017	+9.9	834	902	925	934	934	983	1,017	1,033r	1,033	+10.6
Animal Biomass (non-AD) ²	111	129	+17.0	111	111	111	129	129	129	129	129	129	-
Anaerobic Digestion	323	420	+29.9	266	299	323	370	377	405	420	434r	434	+15.3
Plant Biomass ³	2,607	2,850	+9.3	2,298	2,963	2,607	2,787	2,787	2,796	2,850	2,880r	2,880	+3.3
Total	30,893	35,700	+15.6	28,582	30,021	30,893	32,909	33,537	34,591	35,700	37,415r	37,980	+13.2
Co-firing ⁴	21	13	-35.9	21	21	21	13	13	13	13	2r	2	-81.9
Generation⁵													GWh
Onshore Wind ⁶	22,894	20,962	-8.4	4,767	3,817	7,135	6,406	4,010	4,631	5,915	7,749r	5,997	+49.6
Offshore Wind ^{6,7}	17,423	16,406	-5.8	3,578	3,412	5,757	5,150	3,253	3,584	4,419	5,180r	3,984	+22.4
Shoreline wave / tidal ⁶	2	0	-99.6	0	0	0	-	-	-	0	0	0	-
Solar photovoltaics ⁶	7,546	10,420	+38.1	3,109	2,701	798	1,464	3,872	3,750	1,335	1,657r	4,005	+3.4
Hydro ⁶	6,298	5,395	-14.3	1,425	1,028	1,834	2,089	938	1,214	1,154	1,793r	822	-12.4
Landfill gas ⁶	4,872	4,703	-3.5	1,212	1,201	1,220	1,218	1,171	1,158	1,156	1,093r	1,042	-11.0
Sewage sludge digestion ⁶	894	950	+6.3	233	217	220	236	251	229	234	253r	290	+15.8
Energy from waste ⁸	2,585	2,741	+6.0	603	687	688	728	626	677	710	791r	812	+29.8
Co-firing with fossil fuels	183	117	-35.9	36	57	55	51	15	5	47	21r	0	-97.6
Animal Biomass (non-AD) ^{2,6}	648	650	+0.4	171	142	165	171	165	140	173	173r	181	+9.4
Anaerobic Digestion	1,471	2,052	+39.5	349	371	426	482	492	524	554	544r	465	-5.4
Plant Biomass ^{3,6}	18,587	18,829	+1.3	4,409	4,383	5,443	5,637	4,981	3,481	4,730	5,779r	4,869	-2.2
Total	83,403	83,225	-0.2	19,893	18,015	23,741	23,633	19,773	19,333	20,485	25,034r	22,467	+13.6
Non-biodegradable wastes ⁹	2,586	2,742	+6.0	604	687	688	728	626	678	710	791r	811	+29.6
Load Factors¹⁰													
Onshore Wind	29.4%	23.7%		24.9%	19.4%	35.4%	31.4%	19.2%	21.0%	25.2%	31.4%r	22.8%	
Offshore Wind	41.5%	36.0%		33.6%	30.6%	51.2%	46.3%	29.2%	31.9%	38.5%	44.6%r	32.8%	
Solar photovoltaics	11.4%	11.1%		17.7%	14.6%	4.0%	6.5%	15.8%	14.6%	5.1%	6.3%r	14.8%	
Hydro	41.0%	34.0%		37.5%	26.7%	47.1%	53.7%	24.1%	29.0%	30.1%	45.2%r	20.5%	
Landfill gas	52.5%	50.4%		52.3%	51.2%	52.1%	52.5%	50.5%	49.4%	49.3%	47.6%r	44.8%	
Sewage sludge digestion	44.2%	44.3%		46.1%	42.4%	43.1%	44.3%	44.7%	40.3%	41.3%	45.4%r	51.3%	
Energy from waste	36.8%	32.1%		33.3%	35.8%	34.1%	35.9%	30.7%	32.0%	32.1%	35.7%r	36.0%	
Animal Biomass (non-AD)	66.9%	61.7%		70.9%	58.1%	67.7%	65.4%	58.5%	49.2%	60.7%	62.0%r	64.0%	
Anaerobic Digestion	59.3%	62.8%		60.6%	59.5%	61.9%	63.7%	60.4%	60.7%	60.8%	58.9%r	49.1%	
Plant Biomass	87.2%	78.6%		87.9%	75.5%	88.5%	95.7%	81.8%	56.5%	75.9%	93.4%r	77.4%	
Total (excluding co-firing and non-biodegradable wastes)	34.0%	28.4%		32.2%	27.8%	35.2%	33.8%	27.2%	25.7%	26.3%	31.7%r	27.3%	

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, hospital 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 2nd quarter	2015 3rd Quarter	2015 4th Quarter	2016 1st quarter	2016 2nd quarter	2016 3rd Quarter	2016 4th Quarter	2017 1st Quarter	2017 2nd Quarter p	per cent change ¹
Volume (million litres)													
Bioethanol	795	759	-4.5	203	205	198	184	194	189	192	184	198	2.1%
Biodiesel	669	708	+5.8	152	177	215	143	219	196	150	133	190	-13.2%
Total biofuels for transport	1,464	1,467	+0.2	355	382	413	327	413	385	342	317	388	-6.1%
Energy (thousand toe)													
Bioethanol	448	428	-4.5	114	116	112	104	109	107	108	104	112	2.1%
Biodiesel	550	582	+5.8	125	145	177	117	180	161	123	109	156	-13.2%
Total biofuels for transport	998	1,010	+1.2	239	261	288	221	289	268	231	213	268	-7.5%
Shares of road fuels													
Bioethanol as per cent of Motor Spirit	4.6%	4.4%		4.6%	4.7%	4.5%	4.5%	4.4%	4.4%	4.5%	4.6%	4.6%	
Biodiesel as per cent of DERV	2.3%	2.4%		2.1%	2.4%	2.9%	2.0%	2.9%	2.6%	1.9%	1.9%	2.5%	
Total biofuels as per cent of road fuels	3.2%	3.1%		3.0%	3.3%	3.5%	2.9%	3.4%	3.2%	2.8%	2.8%	3.2%	

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

Bioethanol as per cent of Motor Spirit

Biodiesel as per cent of DERV

Total biofuels as per cent of road fuels

% change on quarter in previous year (-ve value is decrease)

0.1%

-0.1%

0.0%

-0.1%

-0.2%

-0.3%

-0.1%

0.1%

0.1%

-1.6%

-1.4%

-0.3%

0.2%

0.8%

0.2%

-0.9%

-0.1%

-0.4%

-1.0%

-0.9%

-0.2%

0.0%

0.4%

0.0%

-0.7%

-0.1%

-0.2%