Section 6 - Renewables

Key results show:

Almost a third (33.1 per cent) of electricity was generated by renewables in 2018 Q3, a new record. This was up 3.1 percentage points on the share in 2017 Q3, largely due to increased renewable capacity, as well as overall generation being slightly lower. **(Chart 6.1)**

Renewable electricity generation was 25.0 TWh in 2018 Q3, an increase of 10 per cent on the 22.7 TWh in 2017 Q3. However, renewable electricity generation was still down on the previous three quarters. **(Chart 6.2)**

Bioenergy generation rose by 15 per cent (1.2 TWh), the highest increase across the technologies, to 9.0 TWh, as a result of plant biomass capacity. Onshore wind generation decreased slightly, by 0.6 per cent, due to lower wind speeds. However, offshore wind increased from 4.0 TWh to 5.0 TWh, an increase of 26 per cent, due to a 30 per cent increase in capacity. **(Chart 6.2)**

Renewable electricity capacity was 43.2 GW at the end of 2018 Q3, a 10 per cent increase (3.9 GW) on a year earlier, and a 2.3 per cent (1.0 GW) increase on the previous quarter, with nearly a half of the annual increase coming from offshore wind, and around one quarter from bioenergy. **(Chart 6.3)**

In 2018 Q3, just 38 MW of capacity eligible for the Feed in Tariff scheme was installed, increasing the total to 6.4 GW, across 949,000 installations. **(Chart 6.5)**

Liquid biofuels consumption increased by 45 per cent, from 357 million litres in 2017 Q3 to 519 million litres in 2017 Q3. Bioethanol consumption increased by 9.4 per cent while biodiesel consumption increased by 83 per cent. In 2017 Q3, liquid biofuels represented 4.3 per cent of petrol and diesel consumed in road transport, up from 3.0 per cent a year earlier. **(Chart 6.6)**

Relevant tables

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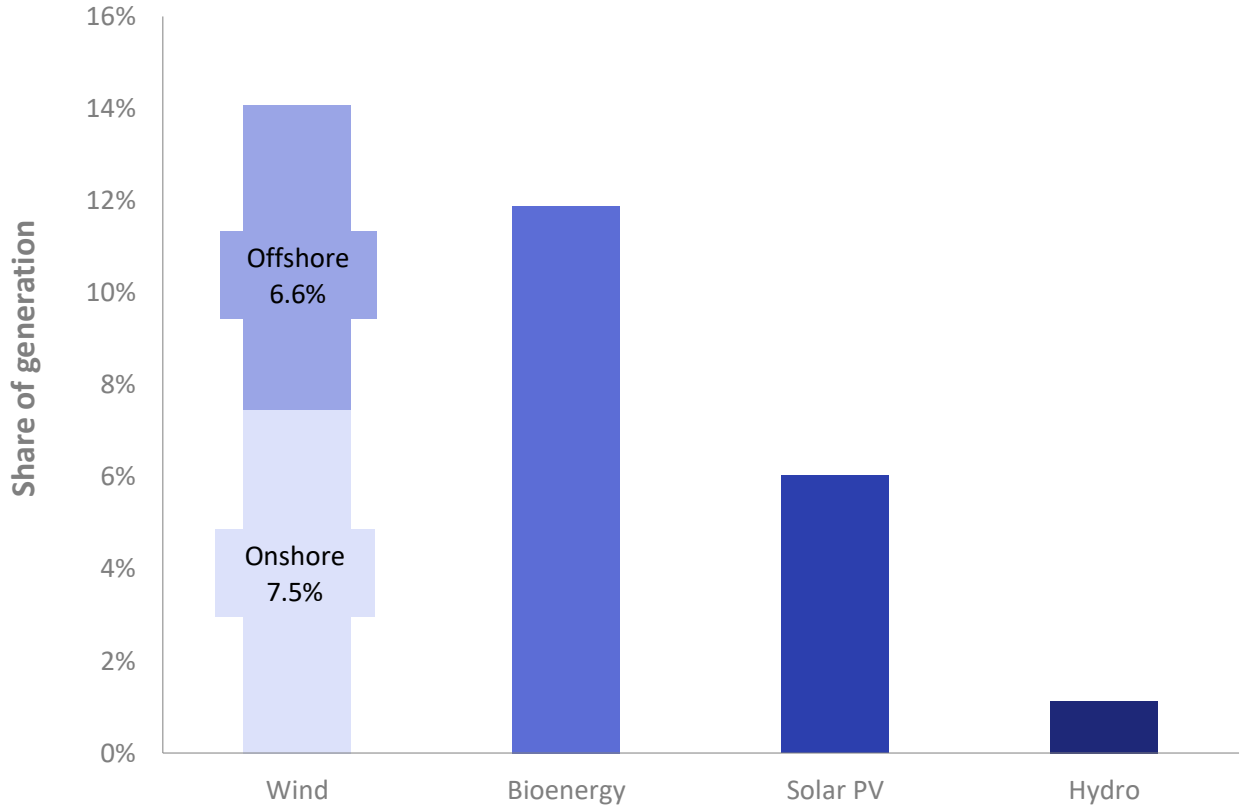
Chart 6.1 Renewables' share of electricity generation (Table 6.1)



Renewables' share of electricity generation increased from 30.0 per cent in 2017 Q3 to a record 33.1 per cent in 2018 Q3.

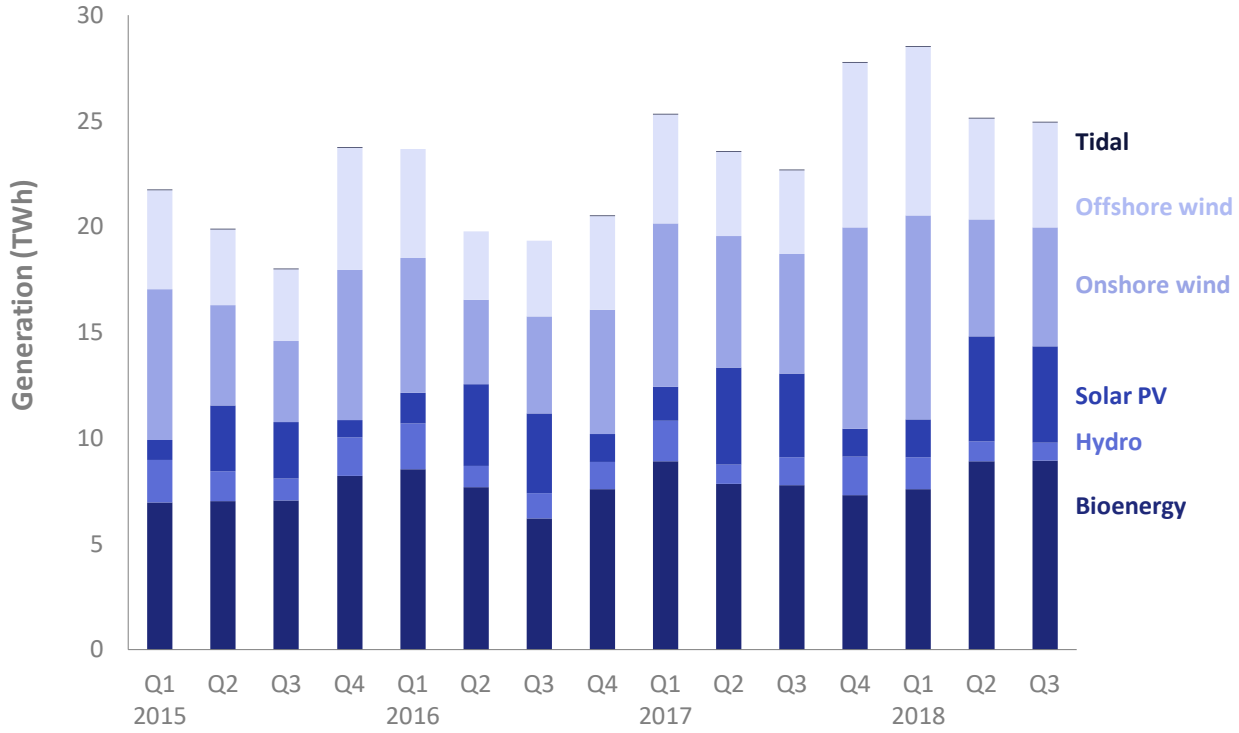
The increased share on a year earlier reflects the increase in renewables generation in addition to a decrease (0.4 per cent) in total electricity generation.

Total electricity generated from renewables in 2018 Q3 was 25.0 TWh, an increase of 2.3 TWh (10 per cent) compared to 2017 Q3, but 12.5 per cent lower than the record of 28.5 TWh in 2018 Q1.

Overall electricity generation fell by 0.4 per cent (0.3 TWh) from 75.6 TWh in 2017 Q3 to 75.3 TWh in 2018 Q3.

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 2018 Q3, generation from bioenergy[1], at 7.8 TWh, was up by 1.2 TWh (15 per cent) on a year earlier. Within this, generation from plant biomass was up 27 per cent (1.3 TWh), due to new plants coming online.

In 2018 Q3, electricity generated from onshore wind decreased by 0.6 per cent to 5.6 TWh, due to lower average wind speeds. However, generation from offshore wind up by more a quarter to 5.0 TWh. Large increases in capacity over the year, for offshore wind, more than out-weighed reduced wind speeds during the quarter. Wind speeds in 2017 Q3, at 7.6 knots, were down 0.2 knots on 2017 Q3, and 0.3 knots down on the long term mean - see Energy Trends table 7.2 at: www.gov.uk/government/statistics/energy-trends-section-7-weather.

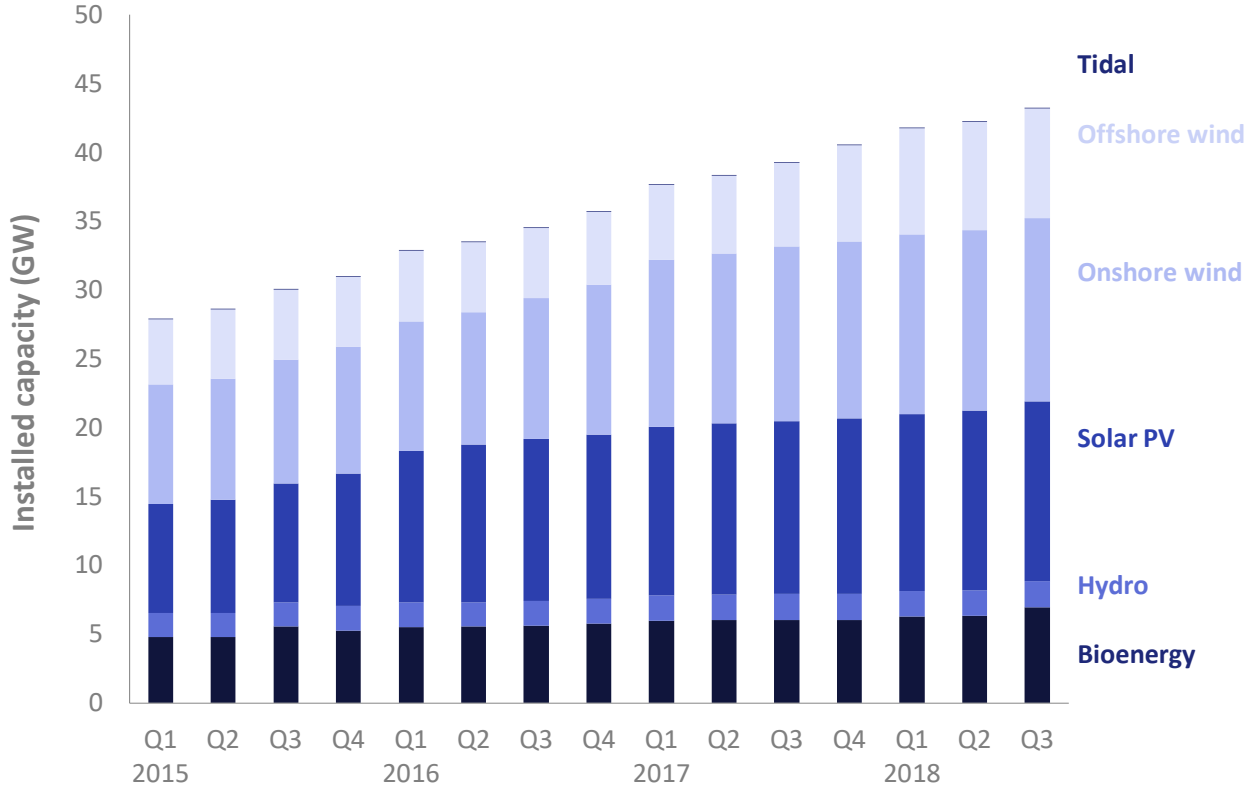
Generation from solar photovoltaics increased by 14 per cent (0.6 TWh) to 4.5 TWh, compared to 2017 Q3, due to increased capacity and an increase in average sunlight hours on the third quarter of 2017. Average daily sun hours were 0.8 hours higher than a year earlier and 0.9 hours higher than the long-term mean. Solar generation was down by 8.7 per cent on the previous quarter, however, this had been a record quarter for solar generation.

Hydro generation fell by more than a third on a year earlier to 0.8 TWh; average rainfall (in the main hydro catchment areas) fell by 2.2 per cent during the quarter; however, within this, rainfall in the more critical first two months was down 16 per cent - see Energy Trends table 7.4 at: www.gov.uk/government/statistics/energy-trends-section-7-weather.

Bioenergy had the largest share of generation (36 per cent) with, 23 per cent from onshore wind, 20 per cent from offshore wind, 18 per cent from solar PV and 3.4 per cent from hydro.

[1] Bioenergy consists of: landfill gas, sewage gas, biodegradable municipal solid 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 2018 Q3, the UK's renewable electricity capacity totalled 43.2 GW, an increase of 10 per cent (3.9 GW) on that installed at the end of 2017 Q3, and 2.3 per cent (1.0 GW) higher than the previous quarter.

At the end of 2018 Q3, onshore wind at 13.3 GW represented 30.8 per cent of all renewable capacity, the highest share of renewable technologies. This was followed by solar PV (30.3 per cent), offshore wind (18.4 per cent) and bioenergy (16.1 per cent).[2]

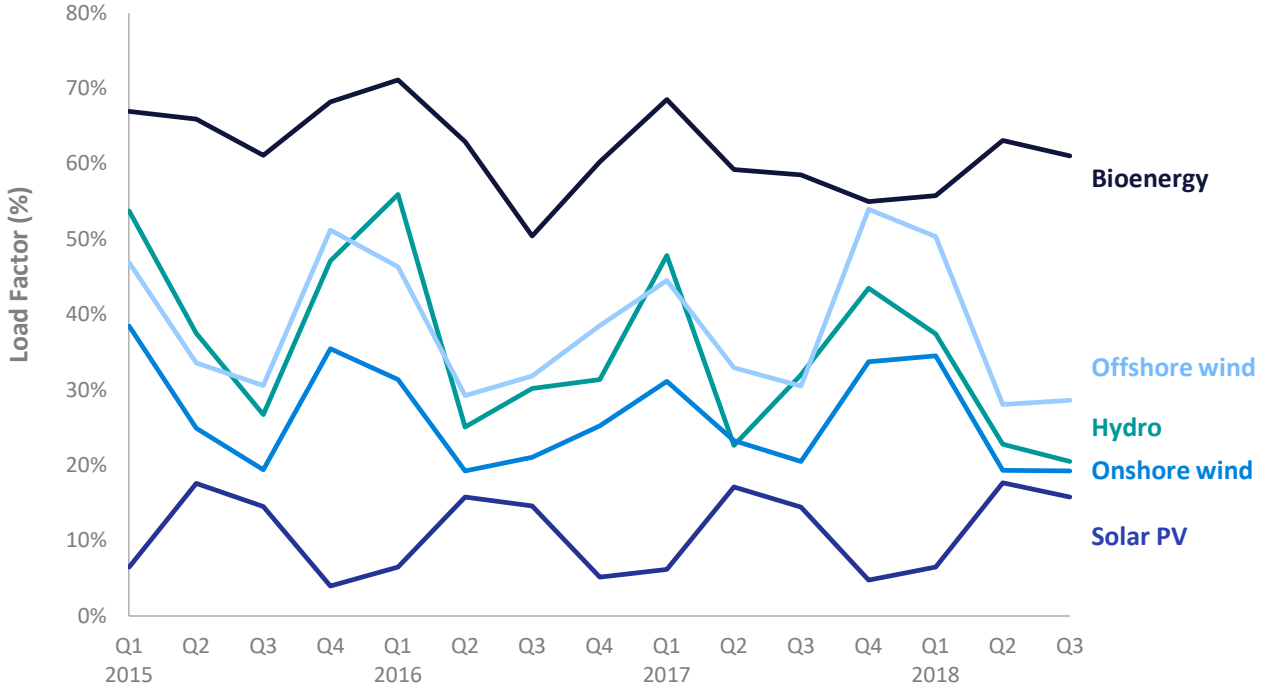
Compared with 2017 Q3, the largest change in capacity was for offshore wind which increased by 1.8 GW (30 per cent). This increase includes the extension at Walney which has added over 300 MW of capacity.

Solar PV increased by 4.1 per cent (0.5 GW) on a year ago. Around 150 MW of increased capacity was under FiTs as the scheme is coming towards a close.

Bioenergy capacity increased by 10 per cent on the previous quarter, almost all of the increase was from plant biomass (645 MW out of 649 MW). This includes the conversion of a unit to use biomass at Drax.

[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)



At 26.5 per cent, the load factor for all renewables was level with the previous year. However, within this, some technologies showed higher load factors and some showed falls.

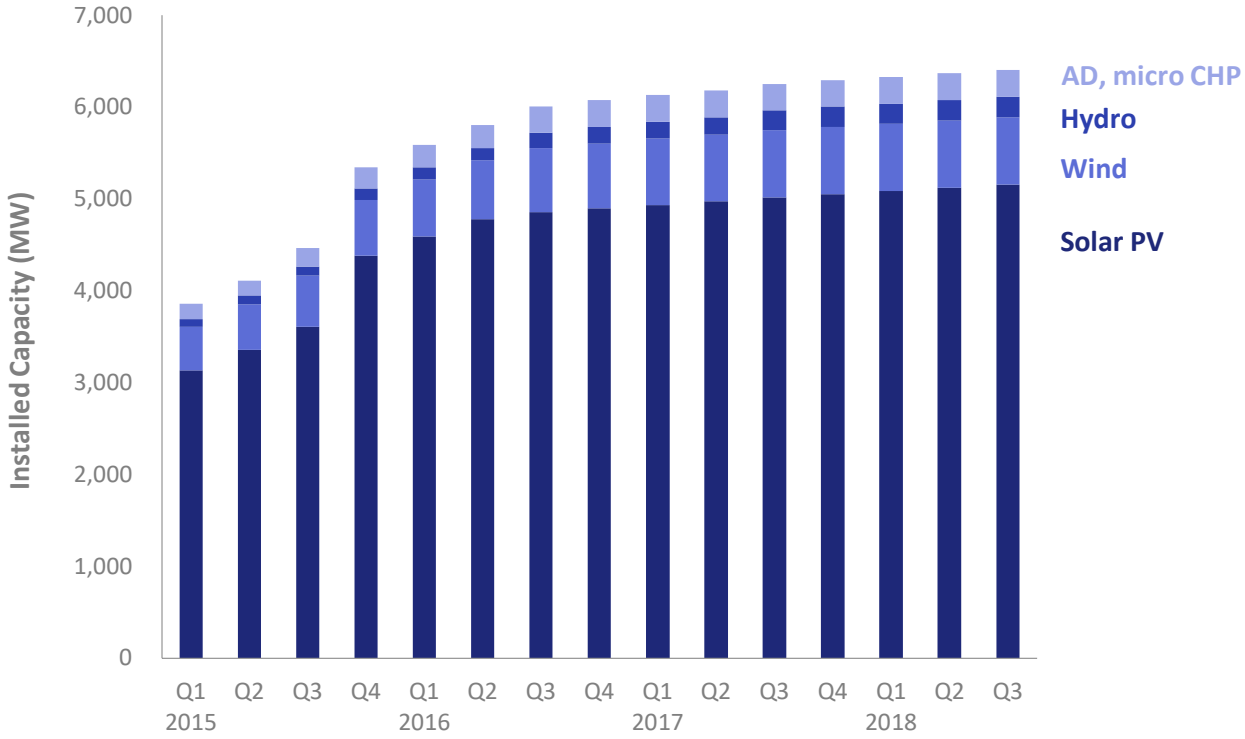
In 2018 Q3, onshore wind's load factor fell by 1.2 percentage points, from 20.5 per cent in 2017 Q3 to 19.3 per cent, due to lower onshore wind speeds. Offshore wind's load factor fell by 1.9 percentage points, from 30.5 per cent in 2017 Q3 to 28.6 per cent in 2018 Q3. [3]

Hydro's load factor in 2018 Q3 decreased by 11.5 percentage points, driven by lower rainfall in the first two months of the quarter, and a very dry June. Compared with 2018 Q2, hydro's load factor in the latest quarter was down by 2.2 percentage points.

For plant biomass, the load factor in 2018 Q3, at 76.0 per cent, was up by 4.3 percentage points on a year earlier. Generation in 2017 had been affected by an outage at Drax, the largest generator of electricity from biomass. Despite an increase on last year, the load factor was down by 4.7 percentage points on 2018 Q2.

[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.

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



At the end of 2018 Q3, 6,405 MW of capacity was installed and eligible for the GB Feed in Tariff (FiT) scheme[4]. This was a 3.1 per cent increase on that installed at the end of 2017 Q3, but just 0.6 per cent up on the previous quarter.

In terms of number of installations, at the end of 2018 Q3, there were over 949,000 installed and eligible for the FiT scheme, a 3.9 per cent increase on the number installed a year earlier.

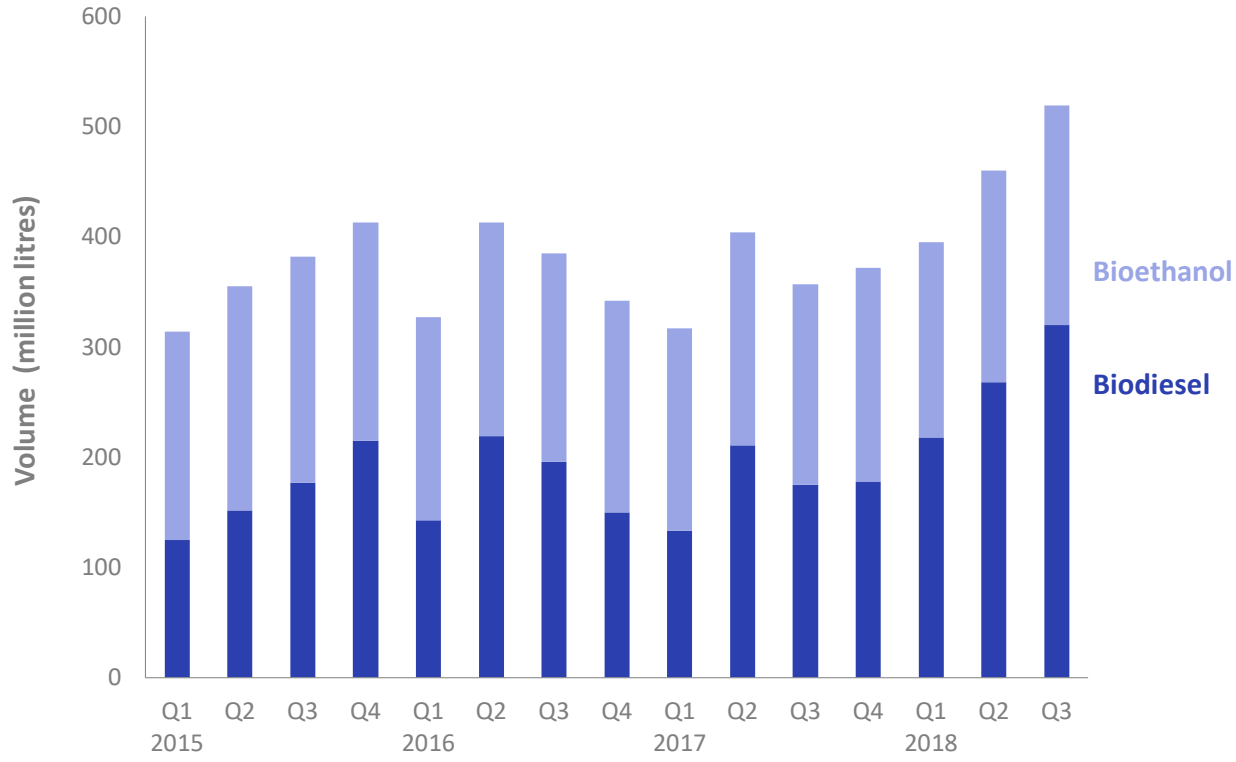
Solar photovoltaics (PVs) represent the majority of both installations and installed capacity on FiTs, with, respectively, 99 per cent and 81 per cent of the total. The majority of FiT-eligible PV installations are sub-4 kW retrofitted schemes, 2,529 MW (49 per cent) across 881,000 installations at the end of 2017 Q3.

Renewable installations eligible for FiTs (all except MicroCHP) represented 15 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 the third quarter of 2018, 519 million litres of liquid biofuels were consumed in transport, an increase of 45 per cent on the total of 357 million litres in the third quarter of 2017.

Bioethanol consumption increased by 9.4 per cent from 182 million litres in the third quarter of 2017 to 199 million litres. Biodiesel consumption increased by 83 per cent, from 175 million litres in Q3 2017 to 320 million litres in Q3 2018.

Bioethanol represented 38 per cent of biofuels consumption, with biodiesel accounting for the remaining 62 per cent.

In the third quarter of 2018, bioethanol accounted for 4.7 per cent of motor spirit, higher than its share in the same quarter in 2017 (4.3 per cent). Biodiesel represented 4.1 per cent of diesel (DERV) consumption, an increase on the 2.3 per cent in the third quarter of 2017. Their combined contribution was 4.3 per cent, an increase from 3.0 per cent in the same quarter in 2017.

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Table 6.1. Renewable electricity capacity and generation

	2016	2017	*per cent change*	2016 3rd quarter	2016 4th quarter	2017 1st quarter	2017 2nd quarter	2017 3rd quarter	2017 4th quarter	2018 1st quarter	2018 2nd quarter	2018 3rd quarter p	*per cent change* [11]
Cumulative Installed Capacity [1]												**MW**	
Onshore Wind	10,880	12,847	*+18.1*	10,236	10,880	12,103	12,345	12,682	12,847	13,043	13,122	13,303	*4.9*
Offshore Wind	5,293	6,988	*+32.0*	5,095	5,293	5,455	5,653	6,101	6,988	7,690	7,844	7,940	*30.1*
Shoreline wave / tidal	13	18	*+36.4*	8	13	18	18	18	18	18	20	20	*10.9*
Solar photovoltaics	11,912	12,776	*+7.3*	11,748	11,912	12,263	12,442	12,568	12,776	12,852	13,032	13,082	*4.1*
Small scale Hydro	359	396	*+10.4*	343	359	361	366	406	396	399	399	400	*-1.6*
Large scale Hydro	1,477	1,479	*+0.1*	1,477	1,477	1,479	1,479	1,479	1,479	1,479	1,479	1,479	-
Landfill gas	1,062	1,066	*+0.4*	1,062	1,062	1,066	1,066	1,066	1,066	1,067	1,067	1,067	*0.1*
Sewage sludge digestion	257	245	*-4.6*	257	257	245	245	245	245	246	246	246	*0.3*
Energy from waste	1,028	1,091	*+6.1*	988	1,028	1,077	1,077	1,077	1,091	1,120	1,130	1,130	*4.9*
Animal Biomass (non-AD) [2]	129	129	-	129	129	129	129	129	129	129	129	129	-
Anaerobic Digestion	426	460	*+7.9*	385	426	445	448	449	460	412	415	418	*-6.7*
Plant Biomass [3]	2,852	3,055	*+7.1*	2,798	2,852	3,003	3,055	3,055	3,055	3,308	3,340	3,985	*30.4*
Total	35,690	40,551	*+13.6*	34,526	35,690	37,645r	38,324r	39,276r	40,551	41,764	42,225	43,199	*10.0*
Co-firing [4]	13	9	*-34.5*	13	13	9	9	9	9	16	16	16	*87.4*
Generation [5]												**GWh**	
Onshore Wind [6]	20,857	29,088	*+39.5*	4,604	5,877	7,723	6,204	5,655	9,506	9,647	5,527	5,620	*-0.6*
Offshore Wind [6, 7]	16,406	20,916	*+27.5*	3,584	4,419	5,166	3,993	3,961	7,795	7,972	4,757	4,979	*25.7*
Shoreline wave / tidal [6]	0	4	*(+)*	-	0	0	0	2	1	3	3	1	*-55.5*
Solar photovoltaics [6]	10,411	11,525	*+10.7*	3,747	1,333	1,610	4,606	3,972	1,336	1,801	4,980	4,545	*14.4*
Hydro [6]	5,617	5,928	*+5.5*	1,201	1,264	1,898	909	1,317	1,803	1,516	933	849	*-35.5*
Landfill gas [6]	4,703	4,284	*-8.9*	1,158	1,156	1,093	1,055	1,065	1,071	1,012	975	968	*-9.1*
Sewage sludge digestion [6]	950	967	*+1.8*	229	234	241	247	235	244	239	261	230	*-2.2*
Energy from waste [8]	2,740	3,386	*+23.6*	678	710	848	823	871	844	890	923	897	*3.0*
Co-firing with fossil fuels	117	54	*-54.1*	5	47	52	0	1	-	-	145	-	*-100.0*
Animal Biomass (non-AD) [2, 6]	650	649	*-0.2*	141	173	172	164	141	173	192	190	157	*11.8*
Anaerobic Digestion	2,082	2,470	*+18.6*	531	561	601	619	629	621	556	576	559	*-11.2*
Plant Biomass [3, 6]	18,822	20,059	*+6.6*	3,479	4,728	5,916	4,933	4,838	4,373	4,701	5,856	6,149	*27.1*
Total	83,354	99,330	*+19.2*	19,356	20,503	25,321	23,554	22,687	27,768	28,531	25,123	24,954	*10.0*
Non-biodegradable wastes [9]	2,742	3,485	*+27.1*	678	710	809	859	911	905	891	923	897	*-1.6*
Load Factors [10]													
Onshore Wind	23.6%	28.0%		21.0%	25.2%	31.1%	23.2%	20.5%	33.7%	34.5%	19.3%	19.3%	
Offshore Wind	36.0%	38.9%		31.9%	38.5%	44.5%	32.9%	30.5%	53.9%	50.3%	28.0%	28.6%	
Solar photovoltaics	11.0%	10.7%		14.6%	5.1%	6.2%	17.1%	14.4%	4.8%	6.5%	17.6%	15.8%	
Hydro	35.4%	36.5%		30.2%	31.3%	47.8%	22.6%	32.0%	43.5%	37.4%	22.7%	20.5%	
Landfill gas	50.4%	46.0%		49.4%	49.3%	47.6%	45.3%	45.2%	45.5%	43.9%	41.8%	41.1%	
Sewage sludge digestion	44.3%	43.9%		40.3%	41.3%	44.3%	46.1%	43.3%	45.1%	45.1%	48.6%	42.3%	
Energy from waste	31.9%	36.5%		31.8%	31.9%	37.3%	35.0%	36.6%	35.3%	37.3%	37.6%	35.9%	
Animal Biomass (non-AD)	61.7%	57.3%		49.2%	60.7%	61.4%	58.1%	49.2%	60.6%	68.6%	67.1%	55.0%	
Anaerobic Digestion	62.2%	63.6%		64.0%	62.7%	63.9%	63.5%	63.6%	61.9%	59.1%	63.7%	60.7%	
Plant Biomass	78.5%	77.5%		56.4%	75.8%	93.6%	74.6%	71.7%	64.8%	68.4%	80.7%	76.0%	
Total (excluding co-firing and non-biodegradable wastes)	28.4%	29.7%		25.8%	26.4%	31.9%	28.4%	26.5%	31.5%	32.1%	27.2%	26.5%	
Renewable share of electricity generation (%)													
Onshore wind	6.1%	8.6%		6.1%	6.3%	8.3%	8.1%	7.5%	10.1%	10.3%	7.1%	7.5%	
Offshore wind	4.8%	6.2%		4.7%	4.8%	5.5%	5.2%	5.2%	8.4%	8.5%	6.1%	6.6%	
Shoreline wave / tidal	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Solar photovoltaics	3.1%	3.4%		4.9%	1.4%	1.7%	6.0%	5.3%	1.4%	1.9%	6.4%	6.0%	
Hydro	1.7%	1.8%		1.5%	1.3%	1.9%	1.1%	1.7%	2.1%	1.6%	1.2%	1.1%	
Bioenergy	8.9%	9.4%		8.2%	8.2%	9.5%	10.2%	10.3%	7.9%	8.1%	11.5%	11.9%	
All renewables	**24.6%**	**29.3%**		**25.4%**	**22.0%**	**27.0%**	**30.6%**	**30.0%**	**30.1%**	**30.5%**	**32.5%**	**33.1%**	

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:
https://www.gov.uk/government/statistics/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

	2016	2017	*per cent change*	2016 3rd Quarter	2016 4th Quarter	2017 1st Quarter	2017 2nd Quarter	2017 3rd Quarter	2017 4th Quarter	2018 1st Quarter	2018 2nd Quarter	2018 3rd Quarter p	*per cent change*[1]
Volume (million litres)												**Million litres**	
Bioethanol	759	753	*-0.8*	189	192	184	193	182	194	177	192	199	*9.4%*
Biodiesel	708	697	*-1.6*	196	150	133	211	175	178	218	268	320	*82.8%*
Total biofuels for transport	1,467	1,450	*-1.2*	385	342	317	404	357	372	395	460	519	*45.4%*
Energy (thousand toe)												**Thousand tonnes of oil equivalent**	
Bioethanol	428	424	*-0.8*	107	108	104	109	103	109	100	108	112	*9.4%*
Biodiesel	582	573	*-1.6*	161	123	109	173	144	146	179	220	263	*82.8%*
Total biofuels for transport	1,010	997	*-1.2*	268	231	213	282	246	256	279	328	375	*52.2%*
Shares of road fuels													
Bioethanol as per cent of Motor Spirit	4.4%	4.5%		4.4%	4.5%	4.6%	4.5%	4.3%	4.6%	4.6%	4.5%	4.7%	
Biodiesel as per cent of DERV	2.4%	2.3%		2.6%	1.9%	1.9%	2.7%	2.3%	2.3%	3.0%	3.4%	4.1%	
Total biofuels as per cent of road fuels	3.1%	3.1%		3.2%	2.8%	2.8%	3.4%	3.0%	3.1%	3.6%	3.8%	4.3%	

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	-0.3%	-0.1%	0.1%	0.1%	-0.1%	0.1%	0.0%	0.0%	0.4%
Biodiesel as per cent of DERV	0.2%	-0.9%	-0.1%	-0.1%	-0.3%	0.3%	1.2%	0.7%	1.8%
Total biofuels as per cent of road fuels	0.0%	-0.7%	-0.1%	-0.1%	-0.2%	0.2%	0.7%	0.4%	1.3%