



Department for  
Business, Energy  
& Industrial Strategy



# ENERGY TRENDS

## MARCH 2018



March 2018

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This publication is available for download at [www.gov.uk/government/statistics/energy-trends-march-2018](http://www.gov.uk/government/statistics/energy-trends-march-2018).

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# Introduction

Energy Trends and Energy Prices are produced by the Department for Business, Energy and Industrial Strategy (BEIS) on a quarterly basis. Both periodicals are published concurrently in June, September, December and March. The March editions cover the fourth quarter of the previous year and also the previous year as a whole.

Energy Trends includes information on energy as a whole and by individual fuels. The text and charts provide an analysis of the data in the tables. The tables are mainly in commodity balance format, as used in the annual Digest of UK Energy Statistics. The 2017 edition of the Digest was published on 27 July 2017 and is available on the BEIS section of the GOV.UK website at: [www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes](http://www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes)

The balance format shows the flow of a commodity from its sources of supply, through to its final use. The articles provide in-depth information on current issues within the energy sector.

The text and tables included in this publication represent a snapshot of the information available at the time of publication. However, the data collection systems operated by BEIS, which produce this information, are in constant operation. New data are continually received and revisions to historic data made. To ensure that those who use the statistics have access to the most up-to-date information, revised data will be made available as soon as possible. The tables are available free of charge from the BEIS section of the GOV.UK website. In addition to quarterly tables, the main monthly tables continue to be updated and are also available on the BEIS section of the GOV.UK website. Both sets of tables can be accessed at: [www.gov.uk/government/organisations/department-for-business-energy-and-industrial-strategy/about/statistics](http://www.gov.uk/government/organisations/department-for-business-energy-and-industrial-strategy/about/statistics)

Annual data for 2017 included within this edition is on a provisional basis. New data are continually received and revisions to previous data made. Finalised figures for 2017 will be published on the 26 July 2018 in the annual Digest of UK Energy Statistics.

Energy Trends does not contain information on Foreign Trade, Weather (temperature, wind speed, sun hours and rainfall) and Prices. Foreign Trade and Weather tables are however available on the BEIS section of the GOV.UK website at: [www.gov.uk/government/organisations/department-for-business-energy-and-industrial-strategy/about/statistics](http://www.gov.uk/government/organisations/department-for-business-energy-and-industrial-strategy/about/statistics). Information on Prices can be found in the Energy Prices publication and on the BEIS section of the GOV.UK website at: [www.gov.uk/government/collections/quarterly-energy-prices](http://www.gov.uk/government/collections/quarterly-energy-prices)

**Please note that the hyperlinks to tables within this document will open the most recently published version of a table. If you require a previously published version of a table please contact Kevin Harris (see details below).**

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### The main points for 2017:

- Total energy production was 0.4 per cent higher than in 2016. This increase, though modest, is the third in successive years, and was due to rises in output from gas, bioenergy and wind, solar and hydro. Coal output fell to a record low level, whilst output from oil and nuclear also fell.
- Imports in 2017 were 0.9 per cent higher than in 2016, whilst exports rose by 4.4 per cent. As a result, net import dependency fell back from 36.2 per cent to 35.8 per cent.
- Crude oil & NGL production was 2.0 per cent lower than in 2016.
- Natural gas production was 0.3 per cent higher than in 2016. Gas exports were 8.8 per cent higher, whilst imports were 1.8 per cent lower; net imports fell 4.1 per cent on 2016.
- Coal production was 27 per cent lower than in 2016, and at a record low level, due to a number of mines not operating due to restoring and some other mines producing less coal as they are coming to the end of production. Imports of coal in 2017 were at a similar value to 2016. Coal stocks fell and were 40 per cent lower, as a result of generators using more stocks for electricity generation while purchasing less coal from the UK coal mines.
- Total primary energy consumption for energy uses was 1.3 per cent lower than in 2016. However, when adjusted to take account of weather differences between 2016 and 2017, primary energy consumption fell by 0.2 per cent.
- Temperatures in 2017 were on average 0.3 degrees warmer than a year earlier.
- Final energy consumption (excluding non-energy use) was 1.0 per cent lower than in 2016, with rises in the industry and transport sectors offset by falls in the domestic and services sectors. On a seasonally and temperature adjusted basis it is estimated to have risen by 0.5 per cent.
- Gas demand was 2.6 per cent lower than in 2016, driven by less use of gas in electricity generation, whilst electricity consumption was 1.9 per cent lower due to the warmer weather.
- Electricity generation in 2017 fell by 1.0 per cent, from 339.4 TWh a year earlier to 335.9 TWh, with falls in generation from coal and gas offset by an increase from renewables, primarily wind generation.
- Of electricity generated in 2017, gas accounted for 39.7 per cent (down 2.5 percentage points compared to 2016) and coal 6.7 per cent (a fall of 2.3 percentage points on 2016). Nuclear's share decreased by 0.2 percentage points on 2016 to 20.9 per cent.
- Renewable electricity generation was 98.9 TWh in 2017, a record high, an increase of 18.8 per cent on the 83.2 TWh in 2016, due to increased capacity and higher wind speeds. Renewables' share of electricity generation increased by 4.9 percentage points on 2016 to 29.4 per cent. Renewable electricity capacity was 40.5 GW at the end of 2017, a 13.3 per cent increase (4.8 GW) on a year earlier.
- Low carbon electricity's share of generation increased from 45.7 per cent in 2016 to a record high of 50.4 per cent in 2017, driven by increased renewable capacity and more favourable weather conditions.
- Provisional estimates show that carbon dioxide emissions fell between 2016 and 2017 by 3 per cent; the key factor leading to this decrease was the switch in generation from coal and gas to renewable sources. A separate BEIS statistical release published at: [www.gov.uk/government/statistics/provisional-uk-greenhouse-gas-emissions-national-statistics-2017](http://www.gov.uk/government/statistics/provisional-uk-greenhouse-gas-emissions-national-statistics-2017) provides more detail.

### **The main points for the fourth quarter of 2017:**

- Total energy production was 1.3 per cent higher when compared with the fourth quarter of 2016.
- Crude oil production fell by 0.2 per cent when compared with the fourth quarter of 2016, whilst NGL production fell by 5.7 per cent.
- Natural gas production was 0.4 per cent higher than the fourth quarter of 2016, despite the closure of the Forties Pipeline System for maintenance in December 2017. Gas imports fell by 2.8 per cent, whilst exports rose by 8.8 per cent; net imports rose by 4.1 per cent compared to the fourth quarter of 2016.
- Coal production in the fourth quarter of 2017 was 39 per cent lower than the fourth quarter of 2016. Coal imports were 8.2 per cent lower as generators' demand for coal was down by 0.8 per cent.
- Total primary energy consumption for energy uses fell by 0.8 per cent. However, when adjusted to take account of weather differences between the fourth quarter of 2016 and the fourth quarter of 2017, primary energy consumption also fell by 0.8 per cent.
- Temperatures in the quarter were on average 0.4 degrees warmer than a year earlier, with average temperatures in October and November 2017 being noticeably warmer than a year earlier, but December 2017 being noticeably colder.
- Final energy consumption (excluding non-energy use) was 0.5 per cent lower than in the fourth quarter of 2016. Domestic consumption fell by 3.1 per cent driven by the warmer weather in October and November 2017. On a seasonally and temperature adjusted basis final energy consumption rose by 0.7 per cent.
- Gas demand was 4.2 per cent lower and electricity consumption was 0.9 per cent lower than the fourth quarter of 2016, driven by warmer temperatures in October and November 2017.
- Electricity generated in the fourth quarter of 2017 decreased by 1.4 per cent, from 93.0 TWh a year earlier to 91.7 TWh.
- Of electricity generated in the fourth quarter of 2017, gas accounted for 39.4 per cent, whilst coal accounted for 9.2 per cent. Nuclear generation accounted for 18.2 per cent of total electricity generated in the fourth quarter of 2017.
- Renewables' share of electricity generation increased from 22.0 per cent in the fourth quarter of 2016 to 30.2 per cent in the fourth quarter of 2017, reflecting higher renewable generation and slightly lower overall electricity generation in the fourth quarter of 2017.
- Low carbon electricity's share of generation increased from 42.3 per cent in the fourth quarter of 2016 to 48.4 per cent in the fourth quarter of 2017, due to a large rise in renewables generation compared with 2016 Q4.

## Section 1 - Total Energy

### Key results show:

#### Provisional 2017

Total energy production was 0.4 per cent higher than in 2016. This increase, though modest, is the third in successive years, and was mainly due to rises in bioenergy and wind, solar and hydro. Gas output rose slightly, up 0.3 per cent, and together with oil accounts for over 70 per cent of UK production. Coal output fell to a record low level, whilst output from oil and nuclear also fell, albeit slightly. The output from bioenergy and wind, solar and hydro is now nearly 10 times higher than coal, notable when coal was higher in 2012. **(Chart 1.1)**

Total primary energy consumption for energy uses was 1.3 per cent lower than in 2016. However, when adjusted to take account of weather differences between 2016 and 2017, primary energy consumption fell by 0.2 per cent. **(Chart 1.3)**

Final energy consumption (excluding non-energy use) was 1.0 per cent lower than in 2016. On a seasonally and temperature adjusted basis it is estimated to have risen by 0.5 per cent with rises in industrial consumption and increased transport demand offsetting falls in the domestic and services sector. **(Chart 1.5)**

Net import dependency was 35.8 per cent in 2017. Imports and exports both rose in 2017. Fossil fuel dependency was at a record low in 2017 at 80.6 per cent. **(Charts 1.6 & 1.7)**

#### Quarter 4 2017

Total energy production was 1.3 per cent higher than in the fourth quarter of 2016. **(Chart 1.2)**

Total primary energy consumption for energy uses fell by 0.8 per cent. However, when adjusted to take account of weather differences between the fourth quarter of 2016 and the fourth quarter of 2017, primary energy consumption also fell by 0.8 per cent. **(Chart 1.3)**

Final consumption fell by 0.7 per cent compared to the fourth quarter of 2016, with the warmer weather in October and November 2017 compared to a year earlier a significant factor, resulting in domestic consumption falling by 3.1 per cent. **(Chart 1.4)**

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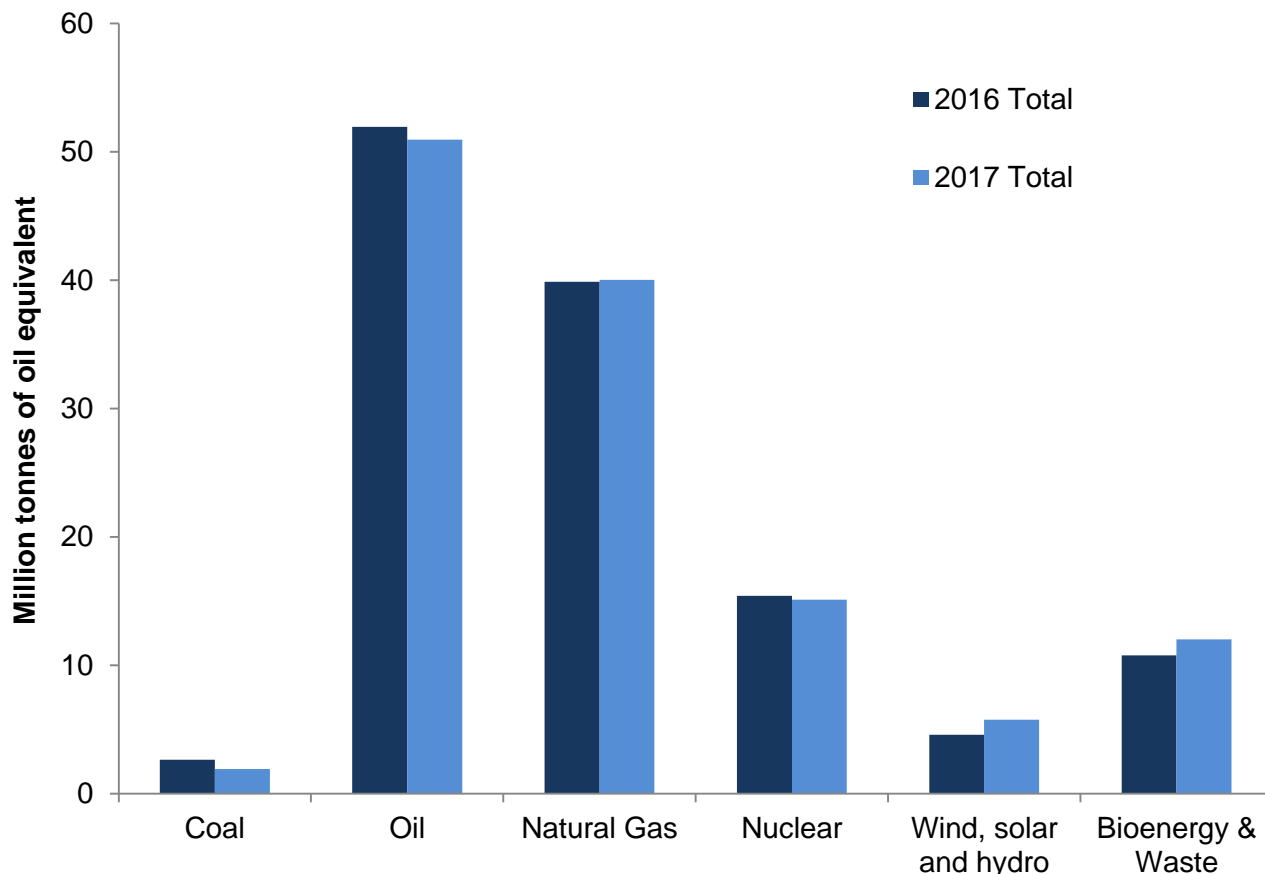
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**Chart 1.1 Production of indigenous primary fuels** [\(Table 1.1\)](#)



Total production in 2017 was 125.8 million tonnes of oil equivalent, 0.4 per cent higher than in 2016. This increase, though modest, is the third in successive years, and was mainly due to rises in output from bioenergy and wind, solar and hydro which more than offset the decline in UK coal production and reduced output from oil and nuclear. Output from bioenergy and waste and Wind, solar and hydro is now nearly 10 times that of coal when as recently as 2012 coal was the larger.

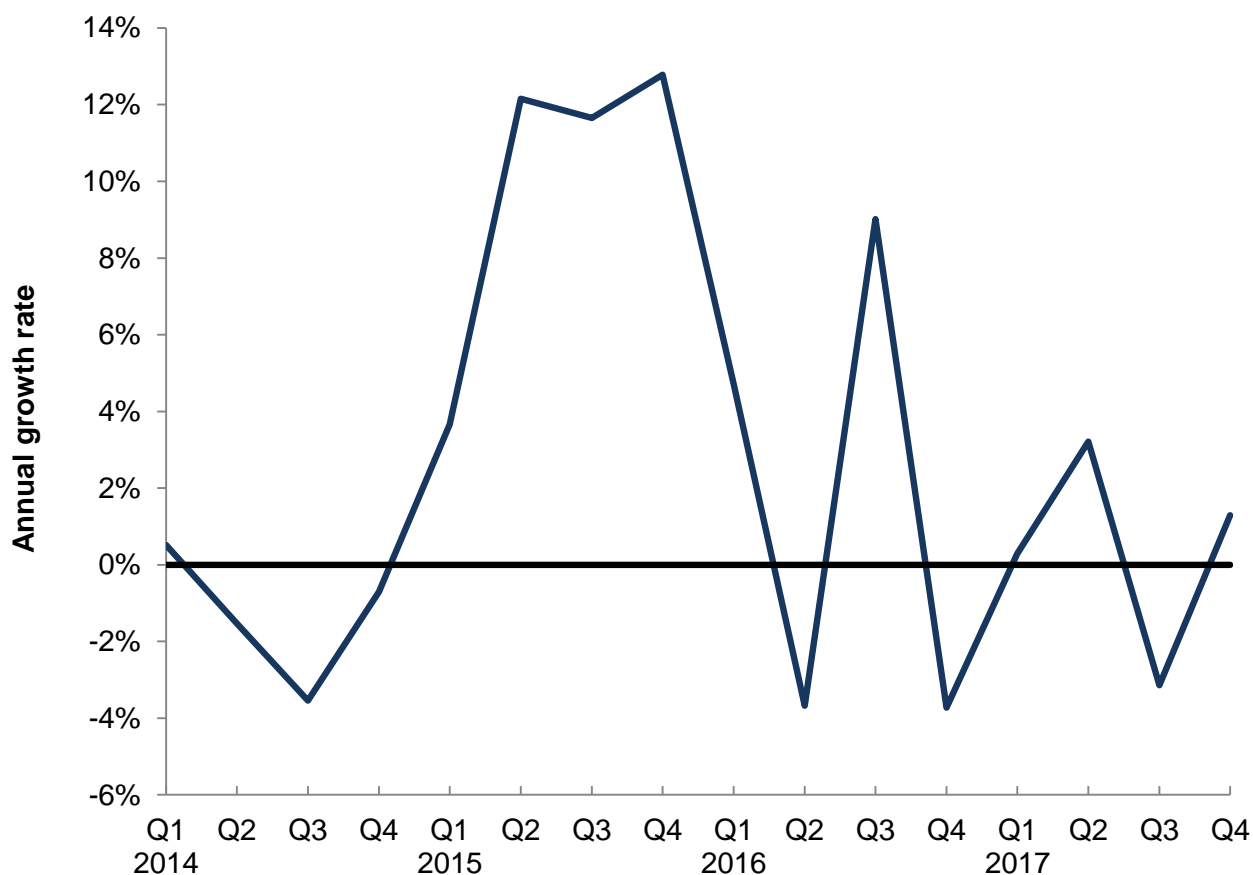
Production of oil fell by 1.9 per cent despite increased NGLs production, whilst gas rose by 0.3 per cent. Oil and gas production levels in December 2017 were significantly lower than in December 2016 due to the closure of the Forties Pipeline System for repair.

Production of bioenergy & waste rose by 11.6 per cent between 2016 and 2017.

Primary electricity output rose by 4.5 per cent between 2016 and 2017, within which nuclear output fell by 1.9 per cent due to outages in the fourth quarter of 2017, whilst output from wind, solar and natural flow hydro rose by 26 per cent to a record high level, due to increased wind and solar capacity, as well as higher wind speeds.

Production of coal fell by 27 per cent, to a new record low.



**Chart 1.2 UK production (annual growth rate) ([Table 1.1](#))**

Total production in the fourth quarter of 2017 at 32.0 million tonnes of oil equivalent was 1.3 per cent higher than in the fourth quarter of 2016.

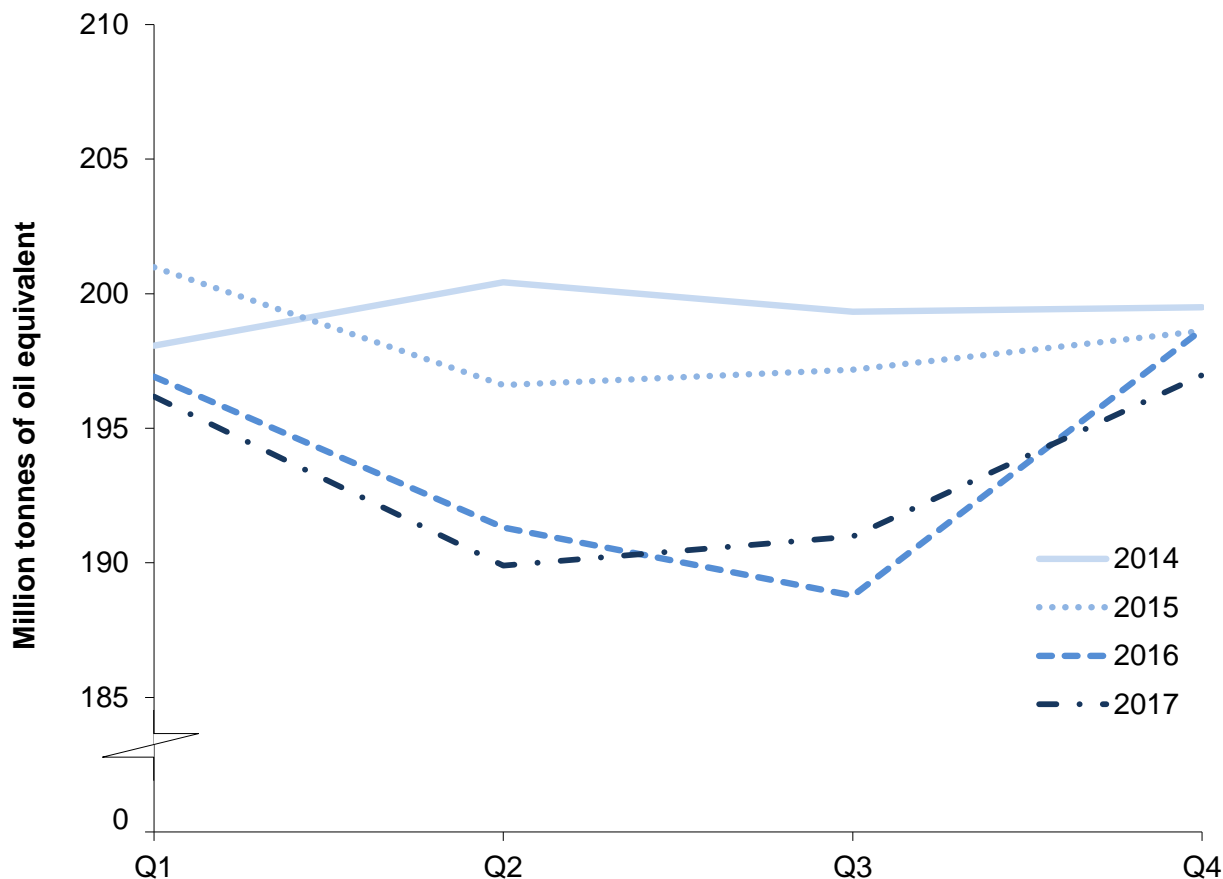
Production of oil fell by 0.7 per cent, whilst gas rose by 0.4 per cent compared to the fourth quarter of 2016. Oil and gas production levels in December 2017 were 21 per cent lower than in December 2016 due to the closure of the Forties Pipeline System for repair.

Primary electricity output in the fourth quarter of 2017 was 3.3 per cent higher than in the fourth quarter of 2016, within which nuclear electricity output was 11.6 per cent lower following outages in 2017, whilst output from wind, solar and natural flow hydro was 58 per cent higher due to increased wind capacity and wind speeds.

Production of bioenergy and waste was 22 per cent higher compared to the fourth quarter in 2016.

In the fourth quarter of 2017 production of coal and other solid fuels was 39 per cent lower than the corresponding period of 2016.

**Chart 1.3 Total inland consumption (primary fuel input basis) <sup>(1)</sup> [\(Table 1.2\)](#)**

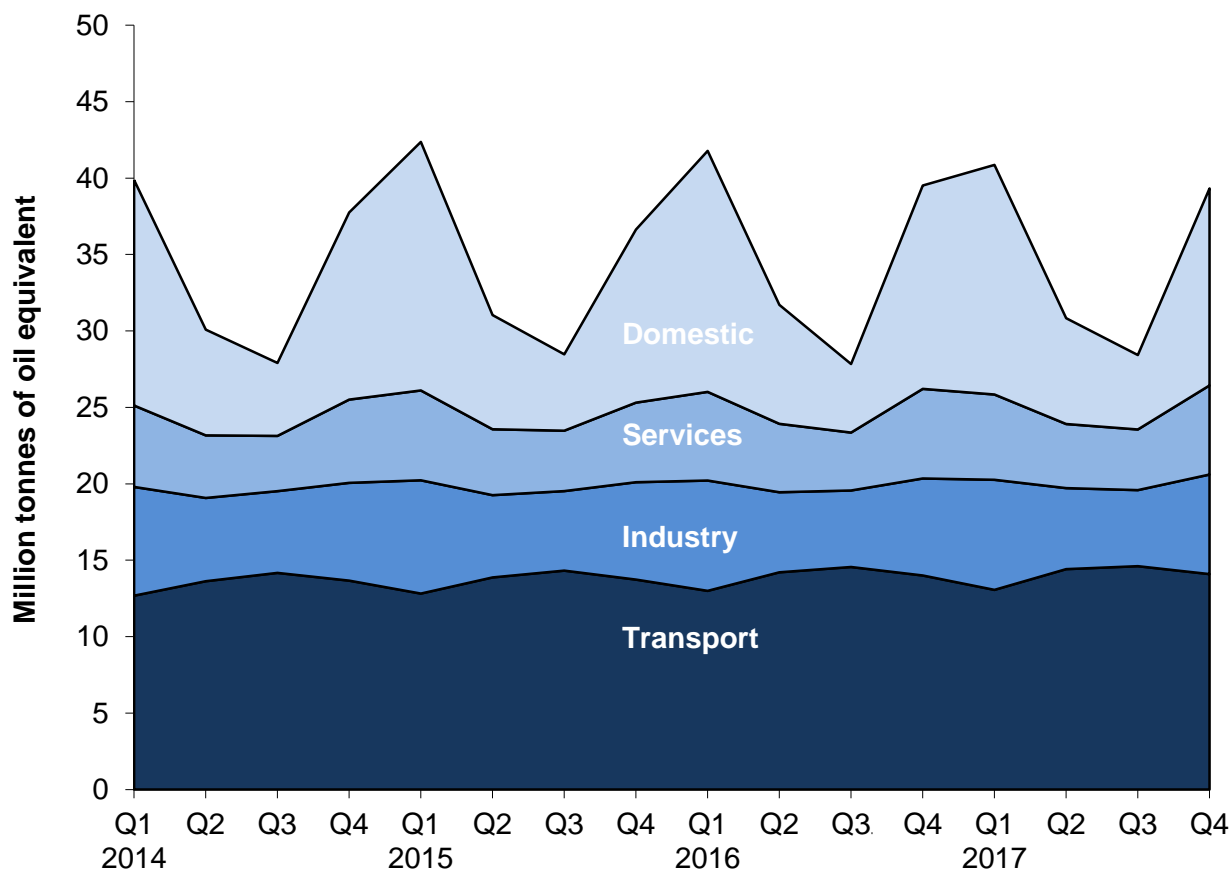


Total inland consumption on a primary fuel input basis (temperature corrected, seasonally adjusted annualised rate), was 193.5 million tonnes of oil equivalent in 2017, a fall of 0.2 per cent from 2016. On an unadjusted basis, consumption was down 1.3 per cent. The average temperature in 2017 was 0.3 degrees higher than in 2016, and BEIS estimate that the number of heating degree days decreased by 6.6 per cent from 2,021 to 1,889.

Between 2016 and 2017 (on a seasonally adjusted and temperature corrected basis) oil consumption rose by 0.7 per cent, gas fell by 0.1 per cent as electricity generators made more use of renewable sources, and bioenergy rose by 4.8 per cent. Primary electricity consumption rose by 3.1 per cent, driven by increased use of renewables, primarily wind and solar, whilst coal consumption fell by 16.8 per cent, to a record low.

Total inland consumption on a primary fuel input basis (temperature corrected, seasonally adjusted annualised rate), was 197.0 million tonnes of oil equivalent in the fourth quarter of 2017, a fall of 0.8 per cent compared to the fourth quarter of 2016. On an unadjusted basis, consumption also fell by 0.8 per cent; average temperatures in the fourth quarter of 2017 were 8.1 degrees Celsius, 0.4 degrees higher than the same period a year earlier. Average temperatures in October and November 2017 were respectively 1.5 and 1.2 degrees higher than the equivalent months in 2016; whilst in December 2017 the daily average temperature was 5.1 degrees Celsius, 1.4 degrees Celsius lower than December 2016, and the coldest December since 2012.

Consumption of coal fell by 0.6 per cent on an unadjusted basis in the fourth quarter of 2017 compared to a year earlier, whilst gas consumption fell by 3.4 per cent. Primary electricity consumption rose by 3.4 per cent, driven by increased use of renewables, primarily wind and solar, due to increased capacity and more favourable weather conditions. These changes in consumption levels reflect the switch from coal and gas to renewable sources for electricity generation in 2017 (see sections 5 and 6).

**Chart 1.4 Final energy consumption by user** ([Table 1.3a](#))

In 2017, total final consumption (including non-energy use) was 1.1 per cent lower than in 2016, and 10 per cent lower than 2007.

Total final energy consumption fell by 0.7 per cent between the fourth quarter of 2016 and the fourth quarter of 2017.

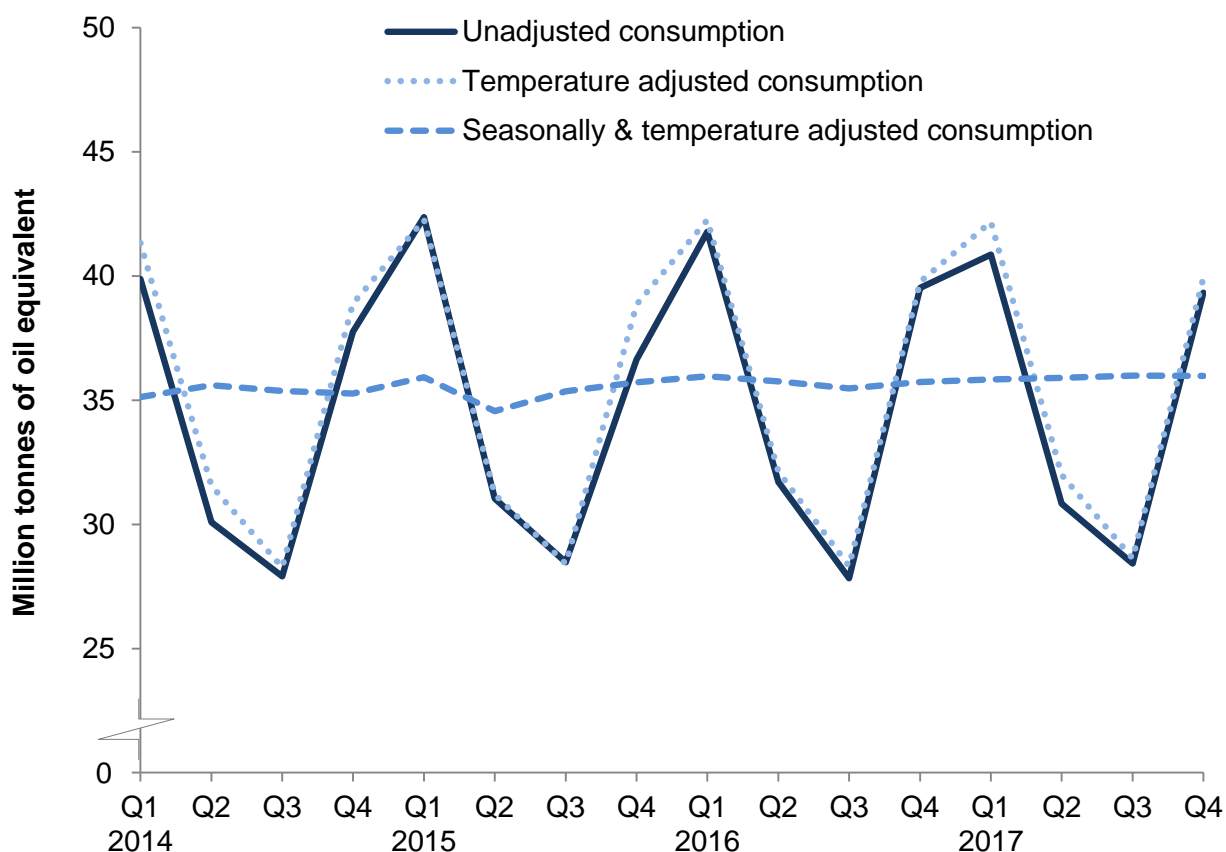
Domestic sector energy consumption fell by 3.1 per cent between the fourth quarter of 2016 and the fourth quarter of 2017 reflecting the warmer weather in the quarter; annually it fell by 4.0 per cent.

Service sector energy consumption fell by 0.6 per cent between the fourth quarter of 2016 and the fourth quarter of 2017; annually it fell by 1.8 per cent.

Industrial sector energy consumption rose by 2.6 per cent between the fourth quarter of 2016 and the fourth quarter of 2017; annually it rose by 0.8 per cent.

Transport sector energy consumption rose by 0.6 per cent between the fourth quarter of 2016 and the fourth quarter of 2017; annually it rose by 0.7 per cent.

**Chart 1.5 Seasonally adjusted and temperature corrected final energy consumption**  
**(Table 1.3c)**



Total unadjusted final energy consumption (excluding non-energy use) fell by 1.0 per cent between 2016 and 2017, and 10 per cent on 2007.

On a seasonally and temperature adjusted basis final energy consumption (excluding non-energy use) is estimated to have risen by 0.5 per cent driven by increases in industrial use and transport. Published [data](#) indicate that industrial output is up on 2016, and the rate of increase in industrial production is greater than that seen in energy use suggesting there remain gains in efficiency. Transport demand continues to be robust with [data](#) showing an increase in mileage driven for much of 2017.

Total unadjusted final energy consumption (excluding non-energy use) fell by 0.5 per cent between the fourth quarter of 2016 and the fourth quarter of 2017. On a seasonally and temperature adjusted basis final energy consumption (excluding non-energy use) is estimated to have risen by 0.7 per cent between the fourth quarter of 2016 and the fourth quarter of 2017.

**Chart 1.6 Net import dependency** ([Table 1.3a](#))

Annually, total imports rose by 0.9 per cent to 151.0 million tonnes of oil equivalent, and exports rose by 4.4 per cent to 79.1 million tonnes of oil equivalent. As a result, net import dependency fell 0.5 percentage points from 2016 to 35.8 per cent.

In the fourth quarter of 2017, imports fell by 1.4 per cent, whilst exports rose by 3.2 per cent. As a result, net import dependency fell 1.7 percentage points from the fourth quarter of 2016 to 41.3 per cent.

Total Energy

**Chart 1.7 Fossil fuel dependency** ([Table 1.3a](#))



Annually fossil fuel dependency was at a record low of 80.6 per cent, down 0.9 percentage points from 2016.

Dependency on fossil fuels in the fourth quarter of 2017 was 82.2 per cent, down 0.6 percentage points from the fourth quarter of 2016.

# 1 TOTAL ENERGY

**TABLE 1.1. Indigenous production of primary fuels**

		<i>Million tonnes of oil equivalent</i>						
		Total	Coal <sup>1</sup>	Petroleum <sup>2</sup>	Natural gas <sup>3</sup>	Bioenergy & waste <sup>4,5</sup>	Primary electricity	
							Nuclear	Wind, solar and hydro <sup>6</sup>
2013		113.9	8.0	44.5	35.3	7.7	15.4	3.02
2014		112.5	7.3	43.7	35.8	8.3	13.9	3.60
2015		123.7	5.4	49.5	38.8	9.8	15.5	4.66
2016		125.2r	2.6	52.0	39.9r	10.8	15.4	4.57
2017 p		125.8r	1.9r	51.0r	40.0r	12.0r	15.1	5.76r
<i>Per cent change</i>		<i>+0.4</i>	<i>-27.2</i>	<i>-1.9</i>	<i>+0.3</i>	<i>+11.6</i>	<i>-1.9</i>	<i>+26.0</i>
2016	Quarter 4	31.6r	0.7	12.6	10.5	2.7r	4.1	1.11
2017	Quarter 1	33.3r	0.6	13.2r	10.7	3.6r	3.8	1.40r
	Quarter 2	31.7r	0.4	13.0r	10.3	2.7r	3.8	1.34r
	Quarter 3	28.8r	0.5	12.3r	8.4	2.4r	3.9	1.28r
	Quarter 4 p	32.0r	0.5r	12.5r	10.5r	3.3r	3.6	1.75r
<i>Per cent change</i> <sup>7</sup>		<i>+1.3</i>	<i>-39.0</i>	<i>-0.7</i>	<i>+0.4</i>	<i>+21.6</i>	<i>-11.6</i>	<i>+57.6</i>

1. Includes an estimate of slurry.

2. Crude oil, offshore and land, plus condensates and petroleum gases derived at onshore treatment plants.

3. Includes colliery methane, excludes gas flared or re-injected.

4. Includes solid renewable sources (wood, straw and waste), a small amount of renewable primary heat sources (solar, geothermal etc), liquid biofuels and sewage gas and landfill gas.

5. Bioenergy & waste introduced as a separate category from March 2014 - see special feature article in the March 2014 edition of Energy Trends at:

[www.gov.uk/government/collections/energy-trends-articles](http://www.gov.uk/government/collections/energy-trends-articles)

6. Includes solar PV and natural flow hydro.

7. Percentage change between the most recent quarter and the same quarter a year earlier.

# 1 TOTAL ENERGY

**TABLE 1.2 Inland energy consumption: primary fuel input basis**

*Million tonnes of oil equivalent*

		Unadjusted <sup>7</sup>							Seasonally adjusted and temperature corrected <sup>8,9</sup> (annualised rates)								
		Total	Coal <sup>1</sup>	Petroleum <sup>2</sup>	Natural gas <sup>3</sup>	Bioenergy & waste <sup>4,5</sup>	Primary electricity		Total	Coal	Petroleum	Natural gas	Bioenergy & waste	Primary electricity			
							Nuclear	Wind, solar and hydro <sup>6</sup>	Net imports					Nuclear	Wind, solar and hydro	Net imports	
2013		206.8	39.0	65.8	72.6	9.6	15.4	3.02	1.24	204.0	38.3	65.8	70.5	9.6	15.4	3.03	1.24
2014		194.0	31.5	66.0	66.1	11.2	13.9	3.60	1.76	199.3	33.1	66.0	69.9	11.2	13.9	3.61	1.76
2015		195.5	25.1	67.3	68.1	13.1	15.5	4.66	1.80	198.3	25.6	67.3	70.5	13.1	15.5	4.66	1.80
2016		193.0r	12.4	68.1r	76.8r	14.2	15.4	4.57	1.51	193.9r	12.6	68.1r	77.5r	14.2	15.4	4.57	1.51
2017 p		190.5r	10.2r	68.5r	74.7r	14.9r	15.1	5.76r	1.27	193.5r	10.5r	68.5r	77.5r	14.9r	15.1	5.76r	1.27
<i>Per cent change</i>		-1.3	-18.0	+0.7	-2.6	+4.8	-1.9	+26.0	-15.6	-0.2	-16.8	+0.7	-0.1	+4.8	-1.9	+26.0	-15.6
2016	Quarter 4	53.2r	3.3	17.3	23.4	3.9r	4.1	1.11	0.13	198.7r	11.7	69.4	81.6	15.5r	16.1	3.90	0.52
2017	Quarter 1	54.9r	3.7r	16.4r	24.9	4.4r	3.8	1.40r	0.22	196.2r	12.6r	65.7r	79.5	17.5r	15.1	4.82r	0.89
	Quarter 2	42.7r	1.6r	17.2r	14.9	3.4r	3.8	1.34r	0.45	189.9r	9.0r	68.8r	74.9	13.6r	15.7	6.12r	1.80
	Quarter 3	40.1r	1.6r	17.4r	12.3r	3.2r	3.9	1.28r	0.46	191.0r	9.5r	69.7r	75.7r	12.7r	15.6	6.03r	1.83
	Quarter 4 p	52.7r	3.3r	17.5r	22.6r	3.9r	3.6	1.75r	0.14	197.0r	10.9r	69.9r	79.8r	15.6r	14.1	6.08r	0.57
<i>Per cent change<sup>10</sup></i>		-0.8	-0.6	+0.8	-3.4	+1.1	-11.6	+57.6	+9.7	-0.8	-6.6	+0.8	-2.2	+1.1	-12.8	+56.0	+9.7

1. Includes net foreign trade and stock changes in other solid fuels.

2. Inland deliveries for energy use, plus refinery fuel and losses, minus the differences between deliveries and actual consumption at power stations.

3. Includes gas used during production and colliery methane. Excludes gas flared or re-injected and non-energy use of gas.

4. Includes solid renewable sources (wood, straw and waste), a small amount of renewable primary heat sources (solar, geothermal, etc.), liquid biofuels, landfill gas and sewage gas.

5. Bioenergy & waste introduced as a separate category from March 2014 - see special feature article in the March 2014 edition of Energy Trends at:

[www.gov.uk/government/collections/energy-trends-articles](http://www.gov.uk/government/collections/energy-trends-articles)

6. Includes natural flow hydro, but excludes generation from pumped storage stations.

7. Not seasonally adjusted or temperature corrected.

8. Coal and natural gas are temperature corrected; petroleum, bioenergy and waste, and primary electricity are not temperature corrected.

9. For details of temperature correction see the June and September 2011 editions of Energy Trends; Seasonal and temperature adjustment factors were reassessed in June 2013

[www.gov.uk/government/collections/energy-trends](http://www.gov.uk/government/collections/energy-trends)

10. Percentage change between the most recent quarter and the same quarter a year earlier.



# 1 TOTAL ENERGY

Table 1.3a Supply and use of fuels

Thousand tonnes of oil equivalent

	2016	2017 p	per cent change	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter	2016 4th quarter	2017 1st quarter	2017 2nd quarter	2017 3rd quarter	2017 4th quarter p	per cent change <sup>1</sup>
<b>SUPPLY</b>													
Indigenous production	125,226r	125,784	+0.4	32,859	33,206r	30,687r	29,699r	31,633r	33,304r	31,672r	28,767r	32,042	+1.3
Imports	149,748r	151,028	+0.9	40,183	39,607r	35,323r	33,178r	41,639r	39,913r	34,498r	35,575r	41,042	-1.4
Exports	-75,763r	-79,110	+4.4	-19,924	-19,510r	-18,174	-20,473r	-17,606	-18,514r	-20,843r	-21,582r	-18,172	+3.2
Marine bunkers	-2,840	-2,597	-8.6	-611	-574r	-777	-816r	-674	-545r	-639r	-779	-633	-6.1
Stock change <sup>2</sup>	+4,907	+3,413	-30.4	+819	+5,649	-1,028	+37	+250	+2,763r	+28r	+189r	+433	+73.6
<b>Primary supply</b>	<b>201,277r</b>	<b>198,517</b>	<b>-1.4</b>	<b>53,327</b>	<b>58,378r</b>	<b>46,032r</b>	<b>41,626r</b>	<b>55,242r</b>	<b>56,921r</b>	<b>44,715r</b>	<b>42,169r</b>	<b>54,712</b>	<b>-1.0</b>
Statistical difference <sup>3</sup>	-77r	67		43	31r	69r	-64r	-113r	-142r	36r	55r	119	
<b>Primary demand</b>	<b>201,354r</b>	<b>198,450</b>	<b>-1.4</b>	<b>53,283</b>	<b>58,347r</b>	<b>45,963r</b>	<b>41,690r</b>	<b>55,354r</b>	<b>57,063r</b>	<b>44,679r</b>	<b>42,115r</b>	<b>54,593</b>	<b>-1.4</b>
Transfers <sup>4</sup>	-14	17		-4	-5	-1	-2	-7	-9	35r	-14r	5	
<b>TRANSFORMATION</b>													
Electricity generation	-37,352r	-35,965	-3.7	-10,492	-10,531r	-8,497r	-8,191r	-10,134r	-10,212r	-8,191r	-8,039r	-9,523	-6.0
Heat generation	-34,214	-32,955	-3.7	-9,648	-9,687r	-7,736r	-7,483r	-9,309r	-9,332r	-7,460r	-7,423r	-8,740	-6.1
Heat generation	-1,152	-1,152	-	-287	-357	-256	-215	-324	-357	-256	-215	-324	+0.0
Petroleum refineries	-103r	-76	-26.4	-20	-27r	-39	-18r	-20	-52r	-6r	0r	-18	-6.0
Coke manufacture	-81	-84	+3.6	-24	-20	-20	-21	-20	-23	-20	-21	-21	+4.3
Blast furnaces	-1,692	-1,585	-6.3	-480	-407	-425	-432	-428	-418	-419	-363	-385	-10.0
Patent fuel manufacture	-64	-71	+12.0	-21	-21	-11	-10	-22	-19	-19	-9	-24	+12.5
Other <sup>5</sup>	-46	-41	-10.6	-12	-12r	-11	-11	-11	-11	-11	-9	-10	-15.0
Energy industry use	12,030r	12,223	+1.6	3,179	3,143r	2,962r	2,962r	2,964r	3,091r	3,060r	2,992r	3,080	+3.9
Losses	2,823	2,813	-0.4	852	870r	666r	595r	692r	869r	633r	597r	713	+3.1
<b>FINAL CONSUMPTION</b>													
Iron & steel	149,134r	147,466	-1.1	38,755	43,802r	33,837r	29,936r	41,558r	42,884r	32,831r	30,468r	41,282	-0.7
Iron & steel	895r	864	-3.5	261	234r	222r	218r	220r	239r	216r	205r	203	-7.8
Other industries	22,908r	23,125	+0.9	6,107	6,981r	5,016r	4,786r	6,125r	6,961r	5,083r	4,771r	6,310	+3.0
Transport	55,767	56,183	+0.7	13,734	12,998	14,210	14,558	14,002	13,062r	14,417r	14,611r	14,093	+0.6
Domestic	41,334r	39,693	-4.0	11,321	15,766r	7,782r	4,483r	13,303r	15,017r	6,921r	4,868r	12,886	-3.1
Other Final Users	19,927r	19,569	-1.8	5,207	5,800r	4,476r	3,789r	5,863r	5,580r	4,194r	3,967r	5,828	-0.6
Non energy use	8,303	8,033	-3.3	2,125	2,024r	2,132	2,102r	2,045	2,025r	1,999r	2,047r	1,962	-4.0
<b>DEPENDENCY<sup>6</sup></b>													
Net import dependency	36.2%r	35.8%		37.6%	34.1%r	36.6%r	29.9%r	43.0%r	37.2%r	30.1%r	32.6%r	41.3%	
Fossil fuel dependency	81.5%r	80.6%		81.4%	82.5%r	80.8%r	79.1%r	82.8%r	82.1%r	78.9%r	78.0%r	82.2%	
Low carbon share	17.0%r	18.1%		17.3%	16.0%r	17.4%r	19.1%r	16.4%r	16.9%r	19.3%r	20.0%r	16.9%	

1. Percentage change between the most recent quarter and the same quarter a year earlier; (+) represents a positive percentage change greater than 100%.

2. Stock change + = stock draw, - = stock build.

3. Primary supply minus primary demand.

4. Annual transfers should ideally be zero. For manufactured fuels differences occur in the rescreening of coke to breeze.

For oil and petroleum products differences arise due to small variations in the calorific values used.

5. Back-flows from the petrochemical industry - see article in the June 2016 edition of Energy Trends.

6. See article in the December 2010 edition of Energy Trends.

# 1 TOTAL ENERGY

Table 1.3b Supply and use of fuels

Thousand tonnes of oil equivalent

	2016 Quarter 4									2017 Quarter 4 p								
	Coal	Manufactured fuels <sup>4</sup>	Primary oil	Petroleum Products	Natural gas <sup>5</sup>	Bioenergy & waste <sup>6</sup>	Primary electricity	Electricity	Heat sold	Coal	Manufactured fuels <sup>4</sup>	Primary oil	Petroleum Products	Natural gas <sup>5</sup>	Bioenergy & waste <sup>6</sup>	Primary electricity	Electricity	Heat sold
<b>SUPPLY</b>																		
Indigenous production	749	-	12,562	-	10,477	2,682	5,163	-	-	456	-	12,477	-	10,515	3,262	5,332	-	-
Imports	1,882	282	14,398	9,223	14,353	1,262	-	240	-	1,705	225	14,278	9,857	13,945	719	-	313	-
Exports	-96	-4	-9,383	-6,496	-1,439	-77	-	-110	-	-100	-6	-9,811	-6,449	-1,565	-70	-	-171	-
Marine bunkers	-	-	-	-674	-	-	-	-	-	-	-	-	-633	-	-	-	-	-
Stock change <sup>1</sup>	+626	-93	-94	-267	+77	-	-	-	-	+1,087	-42	-198	-196	-217	-	-	-	-
<b>Primary supply</b>	<b>3,161</b>	<b>185</b>	<b>17,482</b>	<b>1,785</b>	<b>23,469</b>	<b>3,867</b>	<b>5,163</b>	<b>130</b>	<b>-</b>	<b>3,148</b>	<b>177</b>	<b>16,746</b>	<b>2,578</b>	<b>22,677</b>	<b>3,911</b>	<b>5,332</b>	<b>143</b>	<b>-</b>
Statistical difference <sup>2</sup>	-31	-0	+10	+6	-95	+0	-	-2	-	+29	+1	-58	+7	+113	-	-	+27	-
<b>Primary demand</b>	<b>3,192</b>	<b>185</b>	<b>17,473</b>	<b>1,779</b>	<b>23,563</b>	<b>3,867</b>	<b>5,163</b>	<b>132</b>	<b>-</b>	<b>3,119</b>	<b>177</b>	<b>16,804</b>	<b>2,571</b>	<b>22,564</b>	<b>3,911</b>	<b>5,332</b>	<b>116</b>	<b>-</b>
Transfers <sup>3</sup>	-	3	-590	+585	+46	-50	-1,108	+1,108	-	-	+3	-561	+567	63	-66	-1,746	+1,746	-
<b>TRANSFORMATION</b>	<b>-2,804</b>	<b>74</b>	<b>-16,882</b>	<b>16,663</b>	<b>-8,060</b>	<b>-2,286</b>	<b>-4,056</b>	<b>6,821</b>	<b>397</b>	<b>-2,759</b>	<b>89</b>	<b>-16,242</b>	<b>16,042</b>	<b>-7,271</b>	<b>-2,270</b>	<b>-3,586</b>	<b>6,077</b>	<b>397</b>
Electricity generation	-2,087	-148	-	-145	-7,431	-2,263	-4,056	6,821	-	-2,072	-130	-	-141	-6,642	-2,246	-3,586	6,077	-
Heat generation	-40	-13	-	-15	-629	-23	-	-	397	-40	-13	-	-15	-629	-23	-	-	397
Petroleum refineries	-	-	-16,999	16,979	-	-	-	-	-	-	-	-16,351	16,333	-	-	-	-	-
Coke manufacture	-361	341	-	-	-	-	-	-	-	-351	330	-	-	-	-	-	-	-
Blast furnaces	-271	-157	-	-	-	-	-	-	-	-248	-137	-	-	-	-	-	-	-
Patent fuel manufacture	-44	51	-	-28	-	-	-	-	-	-47	39	-	-16	-	-	-	-	-
Other <sup>7</sup>	-	-	117	-128	-	-	-	-	-	-	-	109	-119	-	-	-	-	-
Energy industry use	-	119	-	1,055	1,182	-	-	539	68	-	115	-	1,091	1,301	-	-	505	68
Losses	-	18	-	-	104	-	-	570	-	-	32	-	-	136	-	-	546	-
<b>FINAL CONSUMPTION</b>	<b>388</b>	<b>125</b>	<b>-</b>	<b>17,971</b>	<b>14,263</b>	<b>1,531</b>	<b>-</b>	<b>6,952</b>	<b>328</b>	<b>360</b>	<b>122</b>	<b>-</b>	<b>18,089</b>	<b>13,919</b>	<b>1,575</b>	<b>-</b>	<b>6,887</b>	<b>328</b>
Iron & steel	5	64	-	0	89	-	-	63	-	5	62	-	0	74	-	-	63	-
Other industries	249	-	-	1,062	2,320	377	-	1,964	153	229	-	-	1,222	2,369	382	-	1,955	153
Transport	3	-	-	13,668	-	231	-	100	-	3	-	-	13,729	-	261	-	100	-
Domestic	128	48	-	795	9,020	696	-	2,599	17	120	47	-	786	8,674	674	-	2,567	17
Other final users	4	-	-	524	2,725	226	-	2,226	158	4	-	-	512	2,692	259	-	2,202	158
Non energy use	-	13	-	1,923	110	-	-	-	-	-	13	-	1,840	110	-	-	-	-

1. Stock fall +, stock rise -.

2. Primary supply minus primary demand.

3. Annual transfers should ideally be zero. For manufactured fuels differences occur in the rescreening of coke to breeze. For oil and petroleum products differences arise due to small variations in the calorific values used.

4. Includes all manufactured solid fuels, benzole, tars, coke oven gas and blast furnace gas.

5. Includes colliery methane.

6. Includes geothermal, solar heat and biofuels for transport; wind and wave electricity included in primary electricity figures.

7. Back-flows from the petrochemical industry - see article in the June 2016 edition of Energy Trends.

# 1 Total Energy

Table 1.3c Seasonally adjusted and temperature corrected final energy consumption data<sup>1</sup>

Thousand tonnes of oil equivalent													
	2016	2017 p	per cent change	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter	2016 4th quarter	2017 1st quarter	2017 2nd quarter	2017 3rd quarter	2017 4th quarter p	per cent change <sup>2</sup>
<b>By consuming sector</b>													
<b>Final Consumption (unadjusted)</b>													
Industry	23,802r	23,989	+0.8	6,368	7,215r	5,238r	5,005r	6,345r	7,200r	5,300r	4,976r	6,513	+2.6
Transport	55,767	56,183	+0.7	13,734	12,998	14,210	14,558	14,002	13,062r	14,417r	14,611r	14,093	+0.6
Domestic	41,334r	39,693	-4.0	11,321	15,766r	7,782r	4,483r	13,303r	15,017r	6,921r	4,868r	12,886	-3.1
Other final users	19,927r	19,569	-1.8	5,207	5,800r	4,476r	3,789r	5,863r	5,580r	4,194r	3,967r	5,828	-0.6
<b>Total</b>	<b>140,830r</b>	<b>139,433</b>	<b>-1.0</b>	<b>36,630</b>	<b>41,778r</b>	<b>31,705r</b>	<b>27,835r</b>	<b>39,513r</b>	<b>40,859r</b>	<b>30,832r</b>	<b>28,422r</b>	<b>39,320</b>	<b>-0.5</b>
<b>Final Consumption (Seasonally and temperature adjusted)<sup>3</sup></b>													
Industry	23,964	24,304	+1.4	6,223	6,135r	5,937r	5,971r	5,921r	6,140r	6,108r	5,943r	6,113	+3.2
Transport	55,610r	56,016	+0.7	13,664	13,902r	13,873r	13,881r	13,955r	13,878r	14,078r	14,017r	14,044	+0.6
Domestic	42,870r	42,901	+0.1	10,793	10,826r	10,816r	10,485r	10,743r	10,740r	10,666r	10,836r	10,658	-0.8
Other final users	20,474r	20,472	-0.0	5,042	5,104r	5,134r	5,130r	5,107r	5,076r	5,040r	5,196r	5,159	+1.0
<b>Total</b>	<b>142,918r</b>	<b>143,693</b>	<b>+0.5</b>	<b>35,723</b>	<b>35,967r</b>	<b>35,759r</b>	<b>35,466r</b>	<b>35,726r</b>	<b>35,835r</b>	<b>35,892r</b>	<b>35,992r</b>	<b>35,974</b>	<b>+0.7</b>
<b>By fuel</b>													
<b>Final Consumption (unadjusted)</b>													
Gas	43,593r	42,278	-3.0	11,813	16,815r	8,131r	4,495r	14,153r	16,170r	7,254r	5,045r	13,810	-2.4
Electricity	26,122r	25,628	-1.9	6,705	7,108r	6,095r	5,966r	6,952r	6,906r	5,951r	5,884r	6,887	-0.9
Other	71,115r	71,527	+0.6	18,112	17,855r	17,479r	17,374r	18,407r	17,784r	17,627r	17,493r	18,623	+1.2
<b>Total</b>	<b>140,830r</b>	<b>139,434</b>	<b>-1.0</b>	<b>36,630</b>	<b>41,778r</b>	<b>31,705r</b>	<b>27,835r</b>	<b>39,513r</b>	<b>40,859r</b>	<b>30,832r</b>	<b>28,422r</b>	<b>39,321</b>	<b>-0.5</b>
<b>Final Consumption (Seasonally and temperature adjusted)<sup>3</sup></b>													
Gas	45,306r	45,737	+1.0	11,247	11,437r	11,391r	11,085r	11,393r	11,441r	11,307r	11,592r	11,397	+0.0
Electricity	26,311r	25,952	-1.4	6,554	6,606r	6,574r	6,595r	6,536r	6,500r	6,481r	6,457r	6,514	-0.3
Other	71,301r	72,004	+1.0	17,921	17,924r	17,795r	17,786r	17,796r	17,895r	18,105r	17,943r	18,062	+1.5
<b>Total</b>	<b>142,918r</b>	<b>143,693</b>	<b>+0.5</b>	<b>35,723</b>	<b>35,967r</b>	<b>35,759r</b>	<b>35,466r</b>	<b>35,726r</b>	<b>35,835r</b>	<b>35,892r</b>	<b>35,992r</b>	<b>35,974</b>	<b>+0.7</b>

1. For methodology see articles in Energy Trends (June 2011 and September 2011 editions)

2. Percentage change between the most recent quarter and the same quarter a year earlier.

3. Seasonally and temperature adjusted series revised back to 2016 Q1 in March 2018.

## Section 2 – Solid Fuels and Derived Gases

### Key results show:

#### Provisional 2017

Overall coal production in 2017 was 3.0 million tonnes, the lowest on record, and down 27 per cent (-1.1 million tonnes) compared to 2016. Deep-mined output was down 7.8 per cent (-2 thousand tonnes) and surface mined output was down 27 per cent (-1.1 million tonnes) mainly due to one of the large surface mines not producing since April 2017 (it is under 'care and maintenance'), along with lower demand. **(Chart 2.1)**

Coal imports at 8.5 million tonnes were nearly identical to 2016. **(Chart 2.1)**

The demand for coal by electricity generators in 2017 was 8.7 million tonnes (a new record low). This was 28 per cent (-3.3 million tonnes) below the demand in 2016. The decline was due to the carbon price per GWh pushing the cost of coal generation above gas, leading production to favour gas over coal. Additionally coal-fired capacity had fallen with the closure of Longannet and Ferrybridge C in 2016. **(Chart 2.3)**

Total stocks at the end of 2017 were 4.9 million tonnes (lowest value for at least 19 years), 40 per cent lower than at the end of 2016 (8.3 million tonnes). This was due to generators reducing stocks held due to closures and lower coal-fired demand. **(Chart 2.4)**

#### Quarter 4 2017

In the fourth quarter of 2017, overall production was down 39 per cent (-0.5 million tonnes) compared to the fourth quarter of 2016 due to the further contraction of surface mined coal (-0.5 million tonnes). Deep mined coal remains only a small component of coal production as only a few small deep mines are still operational. **(Chart 2.1)**

Coal imports were down 8.2 per cent (-0.2 million tonnes) on the levels in quarter 4 2016. **(Chart 2.1)**

The demand for coal by electricity generators in the fourth quarter of 2017 was 0.8 per cent (-27 thousand tonnes) lower than demand in the fourth quarter of 2016. This was the smallest decline for over four years as coal generation supplied the seasonal peak in demand over the colder months, with Fiddler's Ferry and Eggborough operating as part of the UK's winter capacity measures. **(Chart 2.3)**

### Relevant tables

2.1: Supply and consumption of coal	Page 24
2.2: Supply and consumption of coke oven coke, coke breeze and other manufactured solid fuels	Page 25
2.3: Supply and consumption of coke oven gas, blast furnace gas, benzole and tars	Page 26

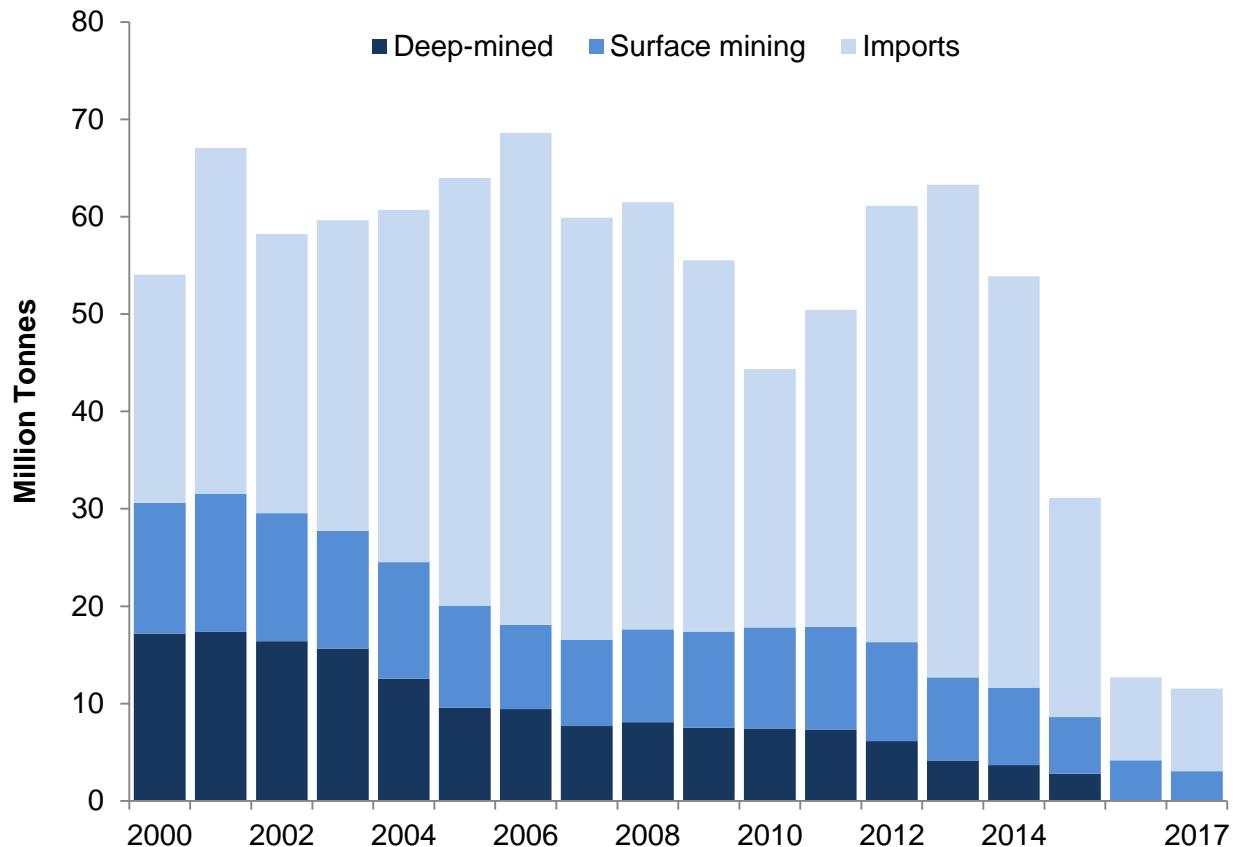
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**Chart 2.1 Coal supply** ([Table 2.1](#))

Provisional figures for 2017 show that coal production was 27 per cent down on 2016 at 3.0 million tonnes. Following the closure of the last three deep mines in 2015 (Hatfield, Thoresby and Kellingley), production remains a fraction of the values seen two years ago. At 20 thousand tonnes deep mined coal comprises less than 1 per cent of total production. Surface mine production was down by 27 per cent at 3.0 million tonnes (a new record low). This was mainly due to one of the large surface mines not producing since April 2017 (it is under 'care and maintenance'), along with lower demand. Coal use has declined since the early seventies as new fuels have entered the market. In the last ten years UK coal production has fallen by 82 per cent.

Provisional figures for the fourth quarter of 2017 show that coal production fell to 0.7 million tonnes, down 39 per cent on the fourth quarter of 2016. However, compared to the third quarter of 2017 overall supply increased, responding to the seasonal increase in demand. This was mainly due to an increase in overall electricity demand in colder weather, along with Fiddlers Ferry and Eggborough operating to make up a shortfall in demand as part of the UK's winter capacity measures. In the last ten years UK coal consumption has fallen by 77 per cent.

Imports of coal in 2017 as a whole were near identical to the values in 2016. Imports in 2016 were the lowest value in 34 years due to lower demand from electricity generators.

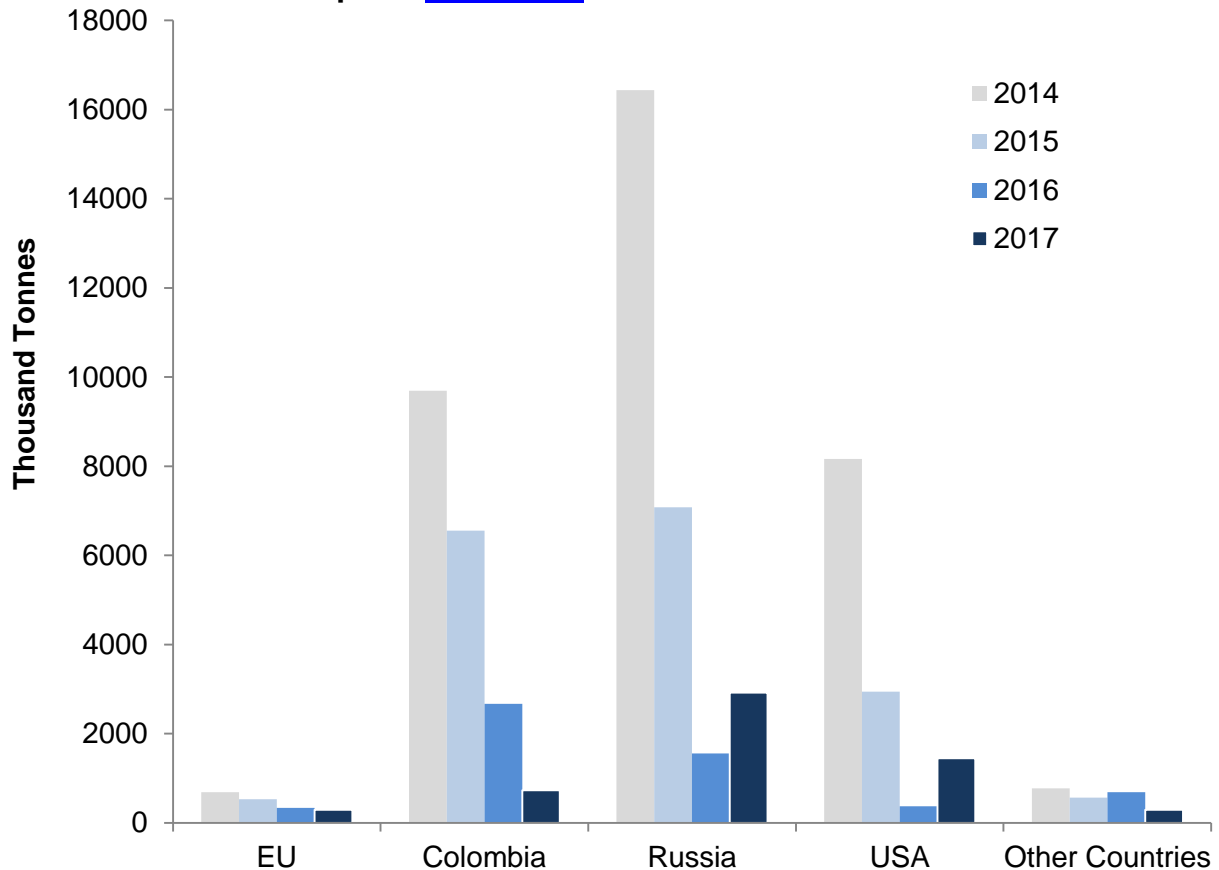
The decrease in demand reflects the fact that consumption by electricity generators was down by 28 per cent to 8.7 million tonnes (a new record) in 2017.

**Table 2A Coal imports by origin**

	Thousand Tonnes			
	2016	2017p	2016 Q4	2017 Q4p
European Union	439	350	102	88
Russia	2,292	3,882	585	1,091
Colombia	2,667	731	808	428
USA	1,420	2,355	678	602
Australia	778	750	443	242
Other Countries	898	427	150	89
<b>Total Imports</b>	<b>8,494</b>	<b>8,495</b>	<b>2,768</b>	<b>2,539</b>

Coal imports of 8.5 million tonnes in 2017 were almost identical to the value in 2016. Steam coal imports rose by 1.2 per cent to 5.7 million tonnes, while coking coal imports fell 3.2 per cent to 2.7 million tonnes. Steam coal accounted for 67 per cent of total coal imports in 2017 and coking coal accounted for 32 per cent of coal imports.

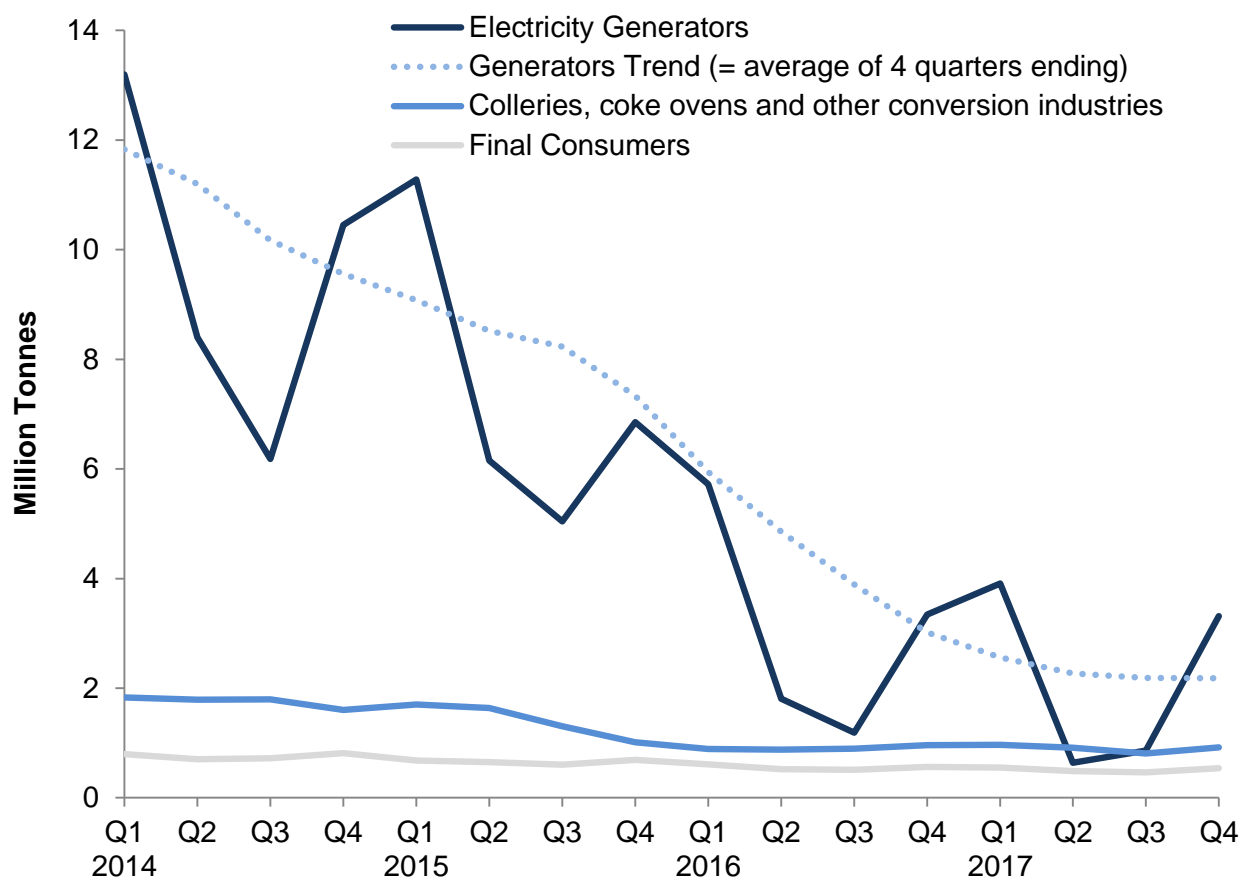
In the fourth quarter of 2017, total coal imports decreased by 8.2 per cent to 2.5 million tonnes. Russia (43 per cent) and the USA (24 per cent) accounted for 67 per cent of total coal imports. Steam coal imports in the fourth quarter of 2017 rose by 11.9 per cent to 2.0 million tonnes and accounted for 77 per cent of total coal imports. Coking coal imports in the fourth quarter of 2017 fell by 44 per cent to 0.5 million tonnes and accounted for 21 per cent of total coal imports.

**Chart 2.2 Steam coal imports** ([Table 2.4](#))

In 2017, 5.7 million tonnes of the coal imported (67 per cent) was steam coal, largely for the power stations market. Russia (51 per cent) and the USA (26 per cent) in 2016 represented 77 per cent of steam coal imports.

Steam coal imports from the USA were nearly four times higher in 2017 than in 2016, increasing to 1.5 million tonnes (+1.1 million tonnes). There was also an increase of steam coal imports from Russia of 88 per cent to 2.9 million tonnes (+1.4 million tonnes). Steam coal imports from Colombia fell by 73 per cent to 731 thousand tonnes (-1.9 million tonnes).

In the fourth quarter of 2017 all but 6 per cent of UK steam coal imports came from just three countries: Russia (51 per cent), Colombia (22 per cent) and the USA (21 per cent). Steam coal imports from Russia rose from 404 thousand tonnes in the fourth quarter of 2016 to 1,013 thousand tonnes in the fourth quarter of 2017. Steam coal imports from the USA rose by 21 per cent from 334 thousand tonnes in the fourth quarter of 2016 to 404 thousand tonnes in the fourth quarter of 2017. Steam coal imports from Colombia fell by 47 per cent from 808 thousand tonnes in the fourth quarter of 2016 to 428 thousand tonnes in the fourth quarter of 2017.

**Chart 2.3 Coal consumption** [\(Table 2.1\)](#)

Total demand for coal in 2017 was 14.4 million tonnes, 20 per cent lower than in 2016, with consumption by electricity generators down by 28 per cent (-3.3 million tonnes) to a new record low of 8.7 million tonnes. The decline was due to the carbon price per GWh pushing the cost of coal generation above gas, leading production to favour gas over coal. Additionally coal-fired capacity had fallen with the closure of Longannet and Ferrybridge C in 2016. Electricity generators accounted for 61 per cent of total coal use in 2017; compared with 67 per cent in 2016.

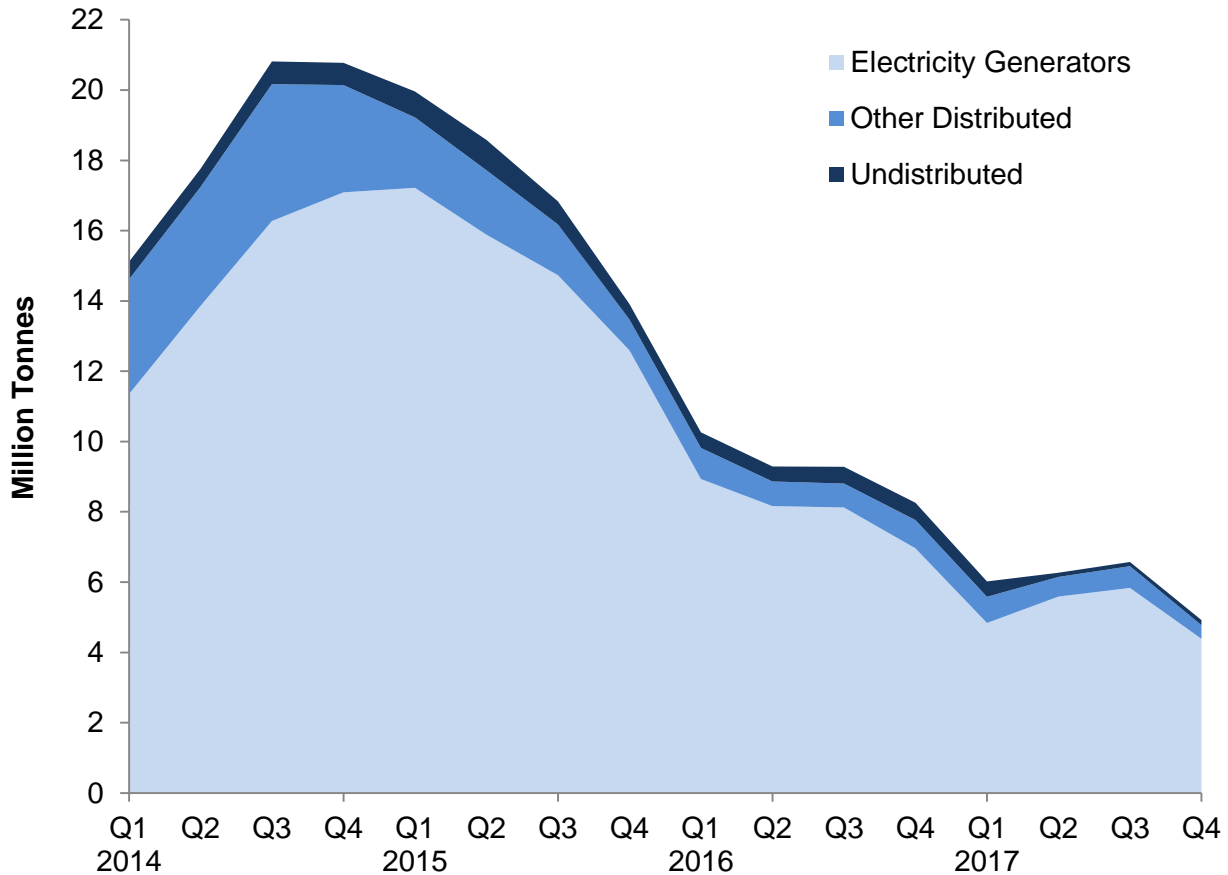
Coal used for coke manufacture rose 3.7 per cent to 1.9 million tonnes, while coal used in blast furnaces fell 4.6 per cent to 1.3 million tonnes.

Total demand for coal in the fourth quarter of 2017, at 4.8 million tonnes, was 1.8 per cent lower than in the fourth quarter of 2016. Consumption by electricity generators was down by only 0.8 per cent to 3.3 million tonnes. This was the smallest quarter-on-quarter drop for five years as coal-fired generation met seasonally higher electricity demand in the cold weather as part of the UK's winter capacity measures. Electricity generators accounted for 69 per cent of total coal use in the fourth quarter of 2017; unchanged compared to a year earlier.

Sales to final consumers (as measured by disposals to final consumers) fell by 3.1 per cent in 2017. Sales to industrial users fell by 9.1 per cent. Sales to final consumers were up by 3.6 per cent in the fourth quarter of 2017. Sales to industrial users decreased by 3.7 per cent.

Coal used in blast furnaces was 0.3 million tonnes in the fourth quarter of 2017, a decrease of 8.5 per cent compared to the fourth quarter of 2016.



**Chart 2.4 Coal stocks** ([Table 2.1](#))

Coal stocks showed a fall of 3.3 million tonnes during the fourth quarter of 2017 compared to the end of December 2016 and stood at 4.9 million tonnes (the lowest value for at least 19 years).

The level of coal stocks at power stations at the end of the fourth quarter of 2017 was 4.4 million tonnes (a new record), 2.6 million tonnes lower than at the end of December 2016, due to generators reducing stocks held due to closures and lower coal-fired demand.

Stocks held by coke ovens halved to 0.3 million tonnes at the end of the fourth quarter of 2017, 0.3 million tonnes lower than at the end of the December 2016.

Stocks held by producers (undistributed stocks) decreased during the fourth quarter of 2017 to 0.1 million tonnes and were 0.3 million tonnes lower than at the end of December 2016.

## 2 SOLID FUEL AND DERIVED GASES

Table 2.1 Supply and consumption of coal

	Thousand tonnes												
	2016	2017 p	per cent change	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter	2016 4th quarter	2017 1st quarter	2017 2nd quarter	2017 3rd quarter	2017 4th quarter p	per cent change <sup>1</sup>
<b>SUPPLY</b>													
Indigenous production	4,178	3,041	-27.2	1,612	1,001	962	1,027	1,188	888	708	721	724	-39.0
Deep mined	22	20	-7.8	504	7	6	5	5	5	5	5	5	-
Surface mining <sup>2</sup>	4,156	3,021	-27.3	1,108	994	957	1,022	1,183	883	702	716	720	-39.2
Imports <sup>4</sup>	8,494	8,495	-	4,103	2,675	1,356	1,694	2,768	2,412	1,681r	1,862	2,539	-8.2
Exports <sup>5</sup>	443	495	+11.6	96	103	76	137	128	120	100	142	133	+4.1
Stock change <sup>6</sup>	+5,655	+3,334	-41.0	+2,920	+3,651	+971	+9	+1,023	+2,234r	-247r	-306	+1,653	+61.5
<b>Total supply</b>	17,883	14,375	-19.6	8,539	7,225	3,213	2,594	4,851	5,414r	2,042r	2,136r	4,783	-1.4
Statistical difference	-6	-7		-16	+2	+4	-1	-11	-13r	+1r	-2r	+7	
<b>Total demand</b>	17,889	14,382	-19.6	8,555	7,223	3,209	2,595	4,863	5,428r	2,041r	2,137r	4,776	-1.8
<b>TRANSFORMATION</b>	15,678	12,337	-21.3	7,865	6,611	2,685	2,081	4,301	4,875r	1,553r	1,674r	4,235	-1.5
Electricity generation	12,058	8,724	-27.6	6,851	5,722	1,808	1,187	3,341	3,907r	638r	864r	3,315	-0.8
Heat generation <sup>7</sup>	213	213	-	58	76	43	29	65	76	43	29	65	-
Coke manufacture	1,821	1,888	+3.7	545	443	438	464	475	482	469	474	462	-2.8
Blast furnaces	1,364	1,301	-4.6	344	316	345	346	357	350	354	270	326	-8.5
Patent fuel manufacture	223	210	-5.6	66	55	51	55	62	59	48	36	67	+7.6
Energy industry use	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>FINAL CONSUMPTION</b>	2,211	2,046	-7.5	691	612	524	514	562	553	488	464	541	-3.7
Iron & steel	35	32	-7.0	10	10	10	7	7	9	9	8	6	-4.7
Other industries	1,580	1,436	-9.1	519	431	381	393	376	373	358	342	362	-3.7
Domestic	550	534	-2.9	154	156	123	101	171	156	112	103	163	-4.2
Other final users	47	44	-5.8	8	15	11	12	9	14	10	10	10	+7.2
<b>Stocks at end of period</b>													
Distributed stocks	7,766	4,774	-38.5	13,471	9,817	8,863	8,805	7,766	5,583r	6,148r	6,454r	4,774	-38.5
Of which:													
Major power producers <sup>8</sup>	6,962	4,387	-37.0	12,595	8,933	8,163	8,125	6,962	4,838r	5,589r	5,834	4,387	-37.0
Coke ovens	605	325	-46.3	547	457	488	322	605	445	464	454	325	-46.3
Undistributed stocks	492	146	-70.3	441	444	427	476	492	436	119	119	146	-70.3
<b>Total stocks<sup>9</sup></b>	8,258	4,920	-40.4	13,913	10,261	9,291	9,281	8,258	6,020r	6,267r	6,573r	4,920	-40.4

1. Percentage change between the most recent quarter and the same quarter a year earlier.

2. The term 'surface mining' has now replaced opencast production. Opencast production is a surface mining technique.

3. Not produced since 2013 as the only mine producing slurry has ceased trading

4. For a detailed breakdown of UK Imports by country and grade of coal refer to Table 2.4 Coal imports (internet table only).

5. Trade is counted as an export under three conditions, when it is recorded as an import and is subsequently exported; it enters the UK port with the intention of being imported but due to a change of ownership at the port it is exported without having cleared the port; and when items leave the warehouse and are exported. Trade is not classified as exports when it is resting at a UK port and the UK is not the intended final destination.

6. Stock change + = stock draw, - = stock build.

7. Heat generation is based on an annual figure and is then split over a quarterly period. The 2017 heat generation figures currently shown are the 2016 figures carried forward - these will be updated in June 2018.

8. This includes stocks held at ports.

9. For some quarters, closing stocks may not be consistent with stock changes, due to additional stock adjustments

## 2 SOLID FUEL AND DERIVED GASES

Table 2.2 Supply and consumption of coke oven coke, coke breeze and other manufactured solid fuels

<i>Thousand tonnes</i>													
	2016	2017 p	<i>per cent change</i>	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter	2016 4th quarter	2017 1st quarter	2017 2nd quarter	2017 3rd quarter	2017 4th quarter p	<i>per cent change<sup>3</sup></i>
<b>SUPPLY</b>													
Indigenous production	1,593	1,580	-0.8	474	376	385	409	424	408	384	395	393	-7.2
Coke Oven Coke	1,332	1,361	+2.2	404	320	319	344	348	346	337	343	334	-4.1
Coke Breeze	16	18	+11.8	5	4	4	4	4	4	4	5	4	+12.0
Other MSF	245	201	-17.9	66	51	61	61	71	57	42	47	55	-23.1
Imports	1,251	1,000	-20.0	325	287	284	284	397	187	233	264r	316	-20.2
Exports	22	20	-12.3	8	6	4	6	6	7	1	4	8	+23.9
Stock change <sup>1</sup>	-126	-3	-97.7	+4	-2	+21	-15	-130	+65	+17	-25	-60	-54.4
Transfers	-4	-4		-	-1	-1	-0	-2	-1	-1	-1	-1	
<b>Total supply</b>	2,691	2,554	-5.1	796	654	685	671	682	652	632	628	642	-5.9
Statistical difference	0	-1		-0	-0	-	0	-0	-0	-	-0	-0	
<b>Total demand</b>	2,691	2,554	-5.1	796	654	685	671	682	652	632	628	642	-5.8
<b>TRANSFORMATION</b>	2,140	2,017	-5.8	635	525	548	533	535	508	507	502	499	-6.7
Coke manufacture	-	-		-	-	-	-	-	-	-	-	-	
Blast furnaces	2,140	2,017	-5.8	635	525	548	533	535	508	507	502	499	-6.7
Energy industry use	-	-		-	-	-	-	-	-	-	-	-	
<b>FINAL CONSUMPTION</b>	551	538	-2.5	161	130	137	138	146	144	126	125r	143	-2.7
Iron & steel	316	296	-6.5	98	75	79	84	78	76	70	74	76	-3.2
Other industries	-	-		-	-	-	-	-	0	0	0	-0	
Domestic	236	242	+2.9	63	55	58	55	68	68	56	51r	67	-2.0
<b>Stocks at end of period<sup>2</sup></b>	1,249	1,252	+0.2	1,124	1,126	1,108	1,142	1,249	1,187	1,170	1,200	1,252	+0.2

1. Stock change + = stock draw, - = stock build.

2. For some quarters, closing stocks may not be consistent with stock changes, due to additional stock adjustments

3. Percentage change between the most recent quarter and the same quarter a year earlier; (+) represents a positive percentage change greater than 100%.

## 2 SOLID FUEL AND DERIVED GASES

Table 2.3 Supply and consumption of coke oven gas, blast furnace gas, benzole and tars

	<i>GWh</i>												
	2016	2017 p	<i>per cent change</i>	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter	2016 4th quarter	2017 1st quarter	2017 2nd quarter	2017 3rd quarter	2017 4th quarter p	<i>per cent change</i> <sup>1</sup>
<b>SUPPLY</b>													
Indigenous production	14,089	14,064	-0.2	3,874	3,406	3,603	3,424	3,656	3,541	3,543	3,403	3,577	-2.1
Coke oven gas	3,468	3,745	+8.0	1,000	870	836	855	907	960	946	949	891	-1.8
Blast furnace gas	10,090	9,763	-3.2	2,713	2,403	2,645	2,439	2,603	2,444	2,451	2,332	2,536	-2.6
Benzole & tars	531	556	+4.7	161	134	123	129	145	138	146	122	150	+3.3
Transfers	344	148	-56.9	132	127	106	64	47	56	24	29	39	-17.0
<b>Total supply</b>	14,433	14,213	-1.5	4,006	3,534	3,709	3,487	3,703	3,597	3,568	3,431	3,616	-2.3
Statistical difference	+9	+29		+17	-6	+10	+10	-5	+5	+3	+10	+12	
<b>Total demand</b>	14,424	14,183	-1.7	3,989	3,540	3,699	3,477	3,708	3,592	3,565	3,421	3,605	-2.8
<b>TRANSFORMATION</b>	6,875	6,585	-4.2	1,880	1,669	1,682	1,653	1,871	1,716	1,651	1,560	1,658	-11.3
Electricity generation	6,278	5,987	-4.6	1,731	1,520	1,533	1,504	1,721	1,566	1,502	1,410	1,509	-12.3
Heat generation <sup>2</sup>	598	598	-	149	149	149	149	149	149	149	149	149	-
Energy industry use	5,446r	5,324	-2.2	1,497	1,376r	1,415r	1,270r	1,386r	1,350r	1,345r	1,293r	1,337	-3.5
Losses	1,116	1,272	+14.0	323	248	337	318	213	272	301	332	367	+72.6
<b>FINAL CONSUMPTION</b>	987r	1,001	+1.5	289	247r	265r	236r	239r	254r	268r	237r	243	+1.5
Iron & steel	456r	445	-2.3	128	114r	142r	107r	94r	117r	122r	115r	92	-1.4
Other industries <sup>3</sup>	-	-		-	-	-	-	-	-	-	-	-	
Non-Energy Use <sup>4</sup>	531	556	+4.7	161	134	123	129	145	138	146	122	150	+3.3

1. Percentage change between the most recent quarter and the same quarter a year earlier; (+) represents a positive percentage change greater than 100%.

2. Heat generation is based on an annual figure and is then split over a quarterly period. The 2017 heat generation figures currently shown are the 2016 figures carried forward - these will be updated in June 2018

3. The main industrial consumer of derived gases Monckton coke-works (also a producer of them) closed in December 2014.

4. From 2009, unclassified final consumption for benzole and tars has been recorded under non energy use

## Section 3 – Oil and Oil Products

### Key results show:

#### Provisional 2017

UK production of crude and Natural Gas Liquids (NGLs) was down 2.0 per cent in 2017 compared with 2016. Production has levelled off following growth in 2015 and 2016. Imports of crude and NGLs were up by 9.9 per cent in 2017, whilst exports were 11 per cent higher. **(Chart 3.1)**

Production of petroleum products was stable, down only 0.1 per cent compared with 2016. Refinery production has been relatively robust as capacity reductions have been offset against low feedstock prices. **(Chart 3.2)**

In 2017 net imports of primary oils (crude, NGLs and process oils) made up one-quarter of UK supply. The UK was a net importer of petroleum products by 10.1 million tonnes, down by 0.4 million. The UK is a net importer of road diesel and aviation turbine fuel but a net exporter of motor spirit. **(Chart 3.3)**

In 2017 final consumption of petroleum products was up by 0.5 per cent compared with 2016, mainly driven by an increase in transport fuel consumption, which more than offset the decrease in non-energy demand following growth in this sector over the last few years. **(Chart 3.4)**

In 2017 total deliveries of key transport fuels increased by 0.8 per cent compared with 2016. Road diesel deliveries increased by 1.0 per cent, aviation turbine fuel was up by 3.1 per cent, while motor spirit deliveries decreased by 1.5 per cent. **(Chart 3.5)**

#### Quarter 4 2017

In Q4 2017, UK production of crude oil was stable compared with Q4 2016 (down only 0.2 per cent). Production of NGLs decreased by 5.7 per cent in quarter 4 2017 compared to the same period last year. **(Chart 3.1)**

Refinery production was lower by 4.2 per cent in the latest quarter of 2017 compared with the same quarter in 2016. Production in 2017 was generally robust against a background of lower crude prices. **(Chart 3.2)**

Imports of petroleum products were 7.2 per cent higher in the latest quarter compared with a year ago, whilst exports were stable (down just 0.7 per cent). Over the last three months, the UK was a net importer of petroleum products by 3.1 million tonnes. **(Chart 3.2)**

Total deliveries of key transport fuels were higher in Q4 2017 by 0.5 per cent. Demand for road diesel increased by 0.9 per cent and aviation turbine fuel by 1.4 per cent. This was partially offset by a 0.8 per cent decrease in demand for motor spirit. **(Chart 3.5)**

Total stocks for the UK at the end of quarter 4 2017 were stable on last year (a decrease of 0.3 per cent). A decrease in stocks held in the UK was offset by an increase in stocks held abroad. **(Chart 3.6)**

## Oil and Oil Products

### Relevant tables

3.1: Supply and use of crude oil, natural gas liquids and feedstocks	Page 35
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3.6: Stocks of petroleum at end of period	Page 39

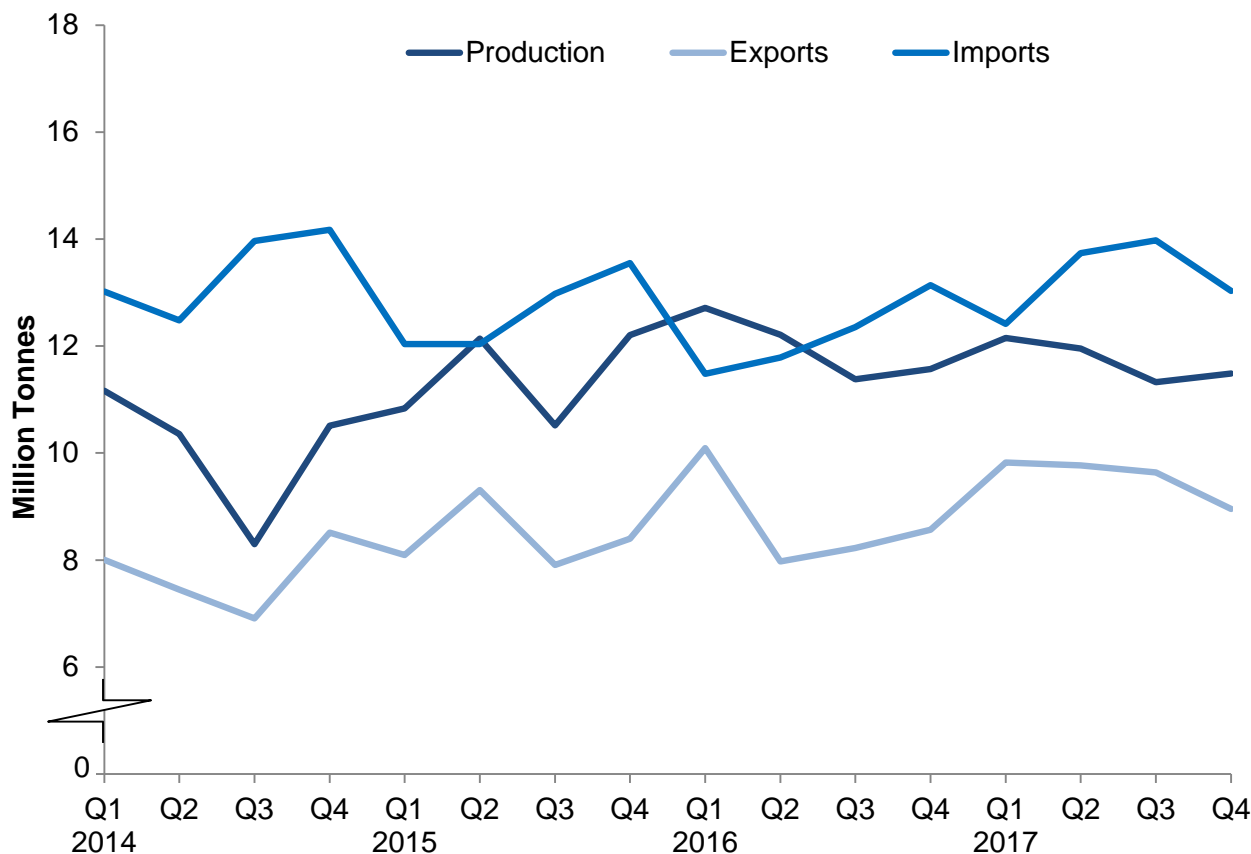
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**Chart 3.1 Production and trade of crude oil and NGLs (Table 3.1)**

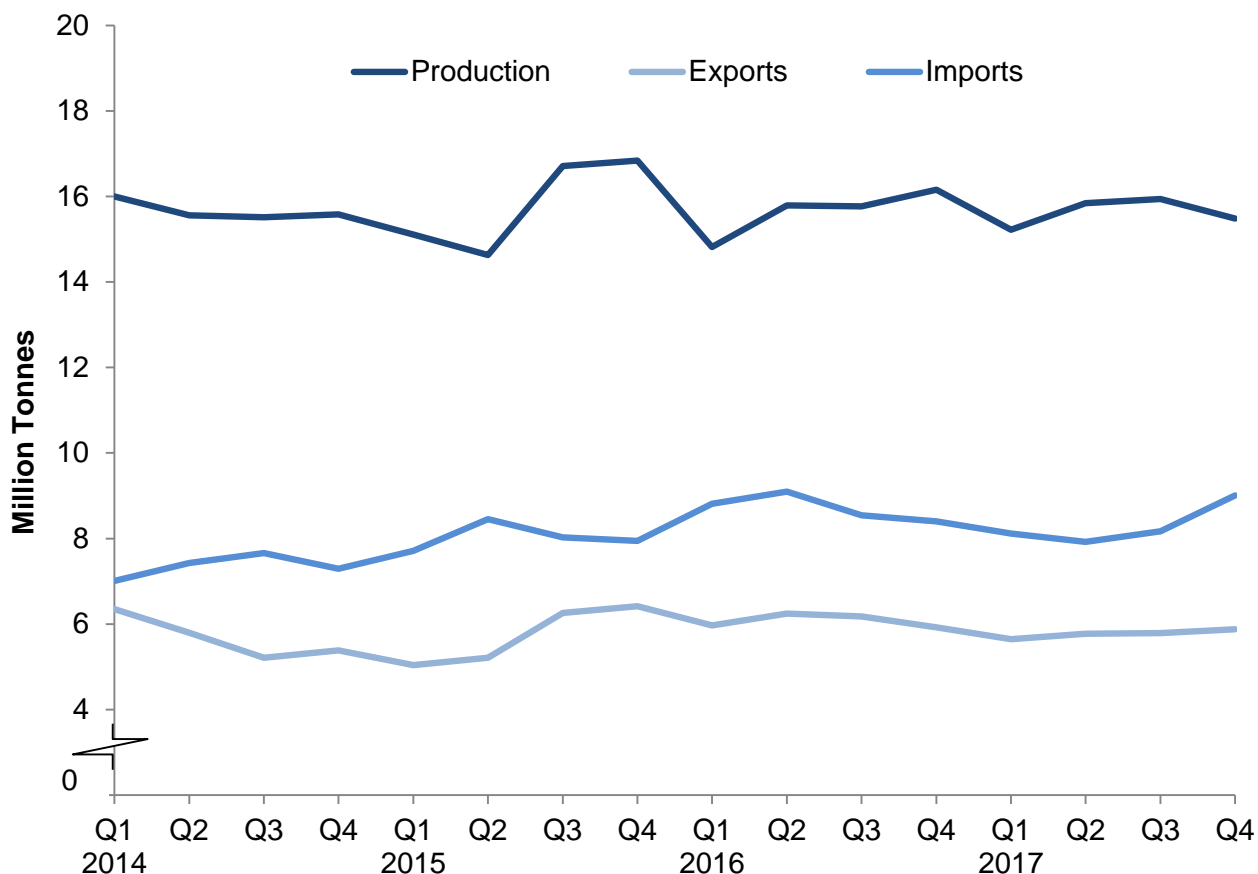
Provisional figures for 2017 show that UK crude oil and NGL production was 2.0 per cent lower than 2016. Production would likely have been similar to the previous year without disruption to the Forties Pipeline System in December. In the broader historical context, production now is around a third of the 1999 peak.

In 2017 imports of crude oil and NGLs increased by 9.9 per cent and exports increased by 11 per cent compared to 2016. In 2017 imports of process oils (which are primarily used by refineries as feedstocks) increased by 3.2 per cent and exports fell by 9.5 per cent. Refineries processed a lower volume of indigenous oil in 2017 compared to 2016 as refinery receipts of indigenous crude fell by one-third during the year. The price spread for Brent crude meant that much indigenously produced oil was exported to meet strong demand at Asian refineries, and UK refineries made use of imported crude and process oils as a cheaper alternative.

Following strong production through October and November 2017 (up 12 per cent on the same period on 2016), the closure of the Forties Pipeline system in December resulted in a decrease in production of one-quarter that month. Over the quarter production was stable on the year before.

Imports of crude oil and NGLs were stable in Q4 2017 compared to the same period last year, whilst exports were marginally higher by 4.5 per cent as refinery demand was lower in Q4 2017 compared to the year before.

**Chart 3.2 Production and trade of petroleum products (Table 3.2)**

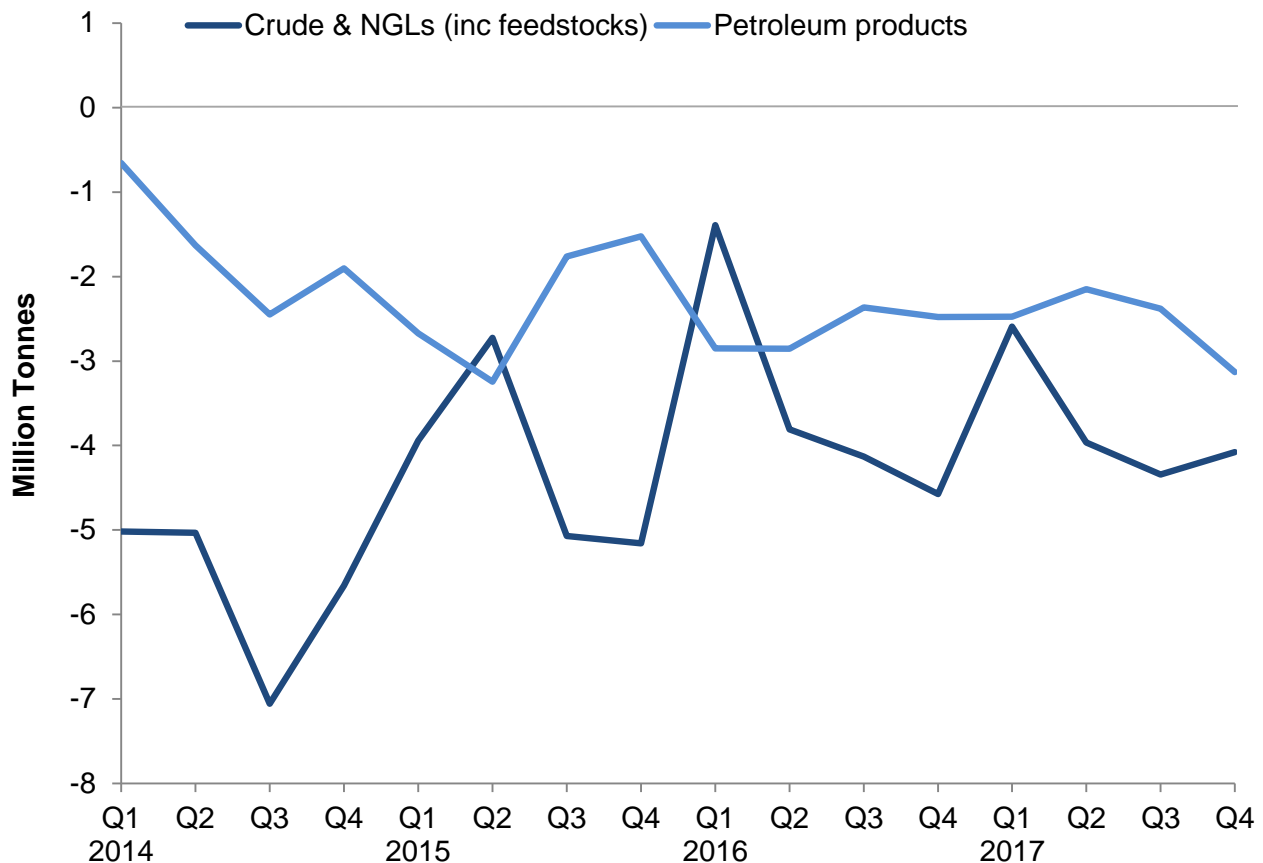


Indigenous production of petroleum products by refiners 2017 was stable on 2016. Production was robust through 2017 with refiners maintaining production against a background of low crude prices.

In 2017 imports of petroleum products decreased by 4.7 per cent and exports were down 5.0 per cent. The bulk of imports consist of middle distillates, mainly diesel road fuel and aviation turbine fuel where UK refinery production lags demand. The bulk of exports are petrol.

In Q4 2017 production of petroleum products was lower by 4.2 per cent compared with the same period last year, with imports making up the difference.



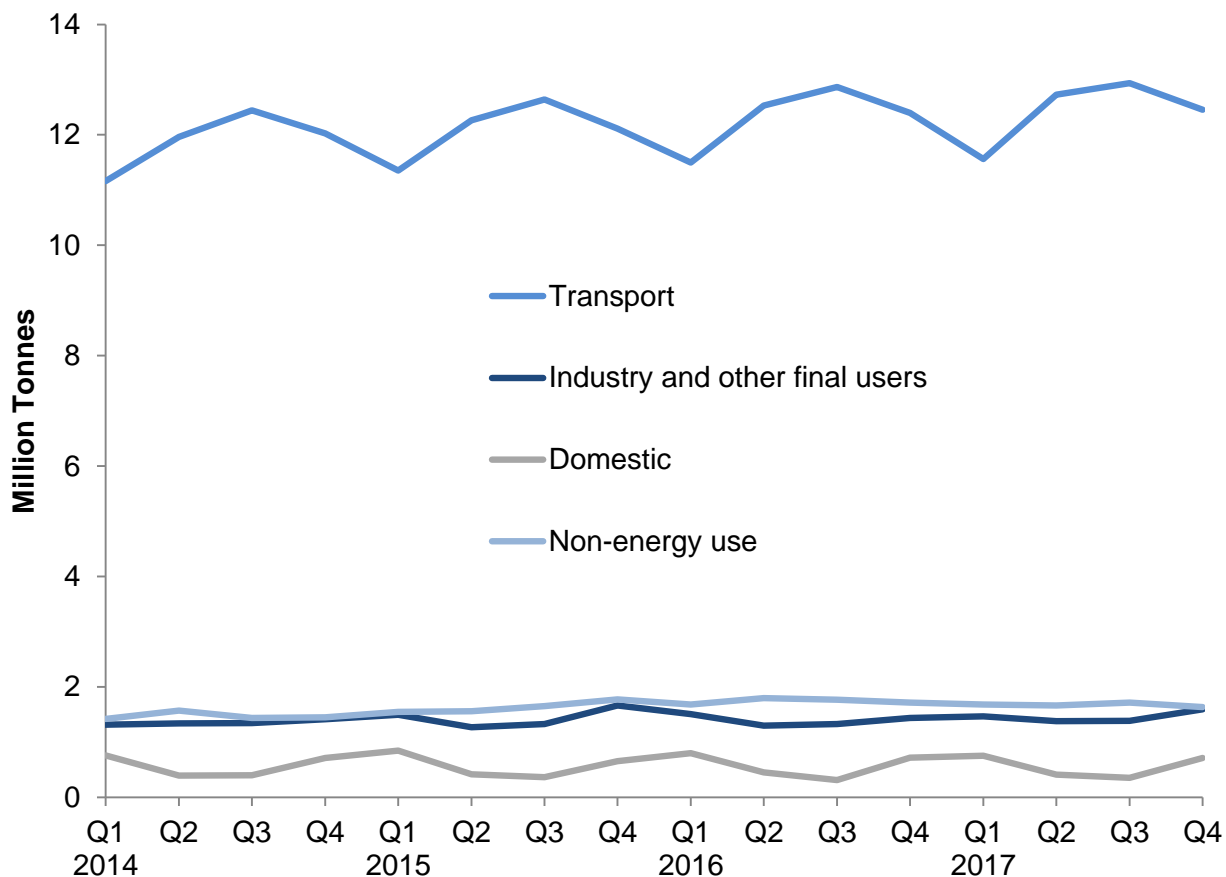
**Chart 3.3 Overall trade in primary oils and petroleum products (Table 3.1)**

Net imports of primary oils (crude, NGLs and feedstocks) widened by 1.1 million tonnes to 15.0 million tonnes in 2017, mainly due to lower intake of indigenous process oils by refiners which increased import dependency. In 2017 net imports of primary oils made up 25 per cent of UK supply, up from 23 per cent in 2016.

In 2017 the UK was a net importer of petroleum products by 10.1 million tonnes, down from 10.5 million tonnes in 2016.

In Q4 2017 net imports of all primary oils narrowed to 4.1 million tonnes, a decrease of 0.5 million tonnes on last year. Net imports of petroleum products increased to 3.1 million tonnes, an increase of 0.7 million tonnes compared with quarter 4 2016.

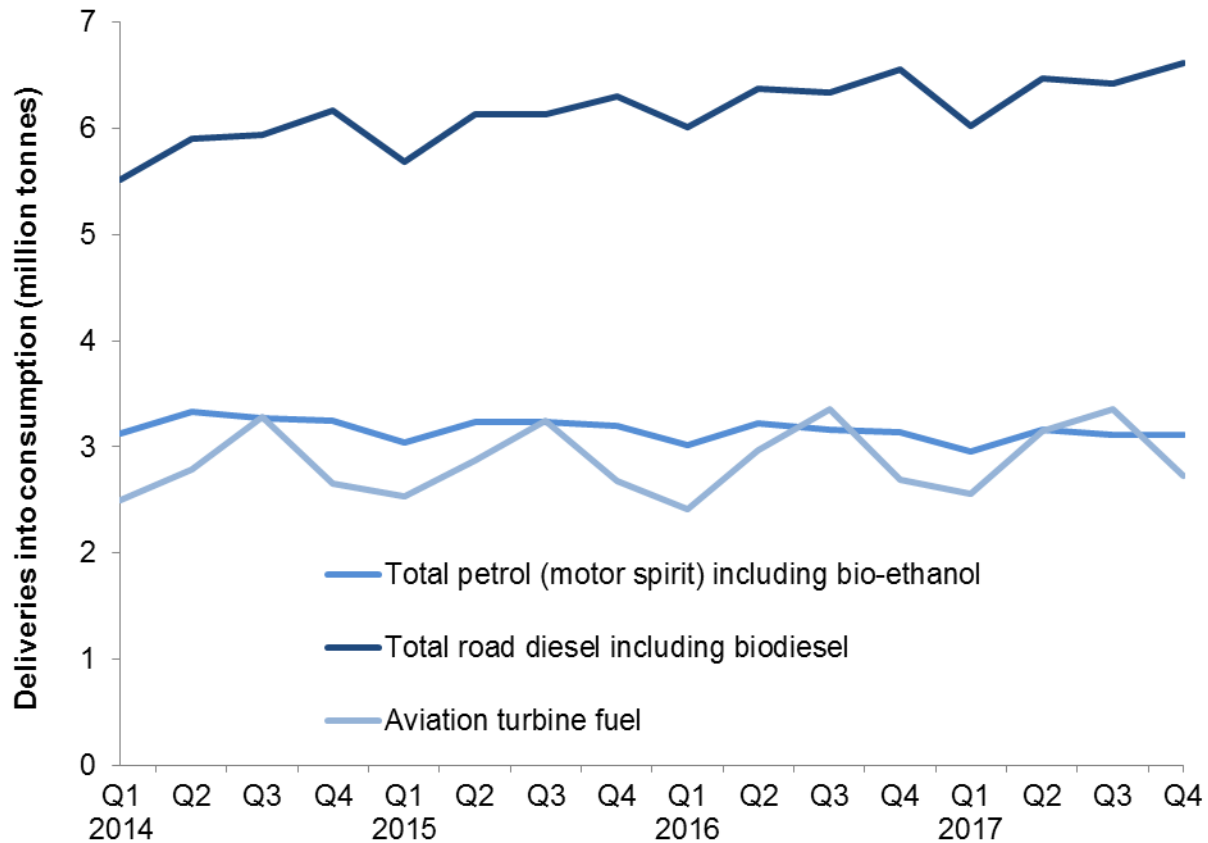
**Chart 3.4 Final consumption of oil (Table 3.4)**



Provisional data shows that final consumption of petroleum products was up by 0.5 per cent in 2017 compared with 2016. Within this:

- Transport use, which accounts for more than three-quarters of UK final consumption, was higher by 0.8 per cent. Sales of road diesel were up 1.0 per cent, and the decline in motor spirit consumption remained slow at 1.6 per cent (see Chart 3.5).
- Non-energy use of oil products was down 3.8 per cent compared with last year. This decrease has been driven primarily by a decrease in deliveries of petroleum gases to petrochemical plants where they are used as feedstocks.
- Domestic use was down 2.4 per cent. Although temperatures in Q4 2017 were overall colder than the year before, there were fewer heating degree days leading to lower demand for domestic use of fuels for heating.

In Q4 2017 final consumption of petroleum products was up 0.8 per cent on 2016. Transport – the main driver of petroleum demand – increased 0.5 per cent on the same period last year.

**Chart 3.5 Demand for key transport fuels (Table 3.4 and Table 3.5)**

Demand for aviation turbine fuel was higher - up 3.1 per cent - compared to 2016.

Annual demand for road fuels has now grown for four consecutive years, although the rate slowed to 0.2 per cent (excluding biofuels) in 2017. Following an increase of 1 per cent, vehicle miles in Great Britain reached a new record of 325.5 billion miles in the year to September 2017<sup>1</sup>.

Including biofuels, diesel road fuel sales in 2017 were higher by 1.0 per cent than 2016, compared with an average growth of 3.8 per cent in the previous 3 years. The rate of decline for petrol sales has slowed since 2014 and the decrease was just 1.5 per cent in 2017, contrasting with an average decline of around 4 per cent in recent years.

One factor affecting demand is the price paid at pumps, and the recent stabilisation in demand for motor spirit could reflect lower pump prices seen since 2014 (BEIS Quarterly Energy Prices, Table 4.1.2).

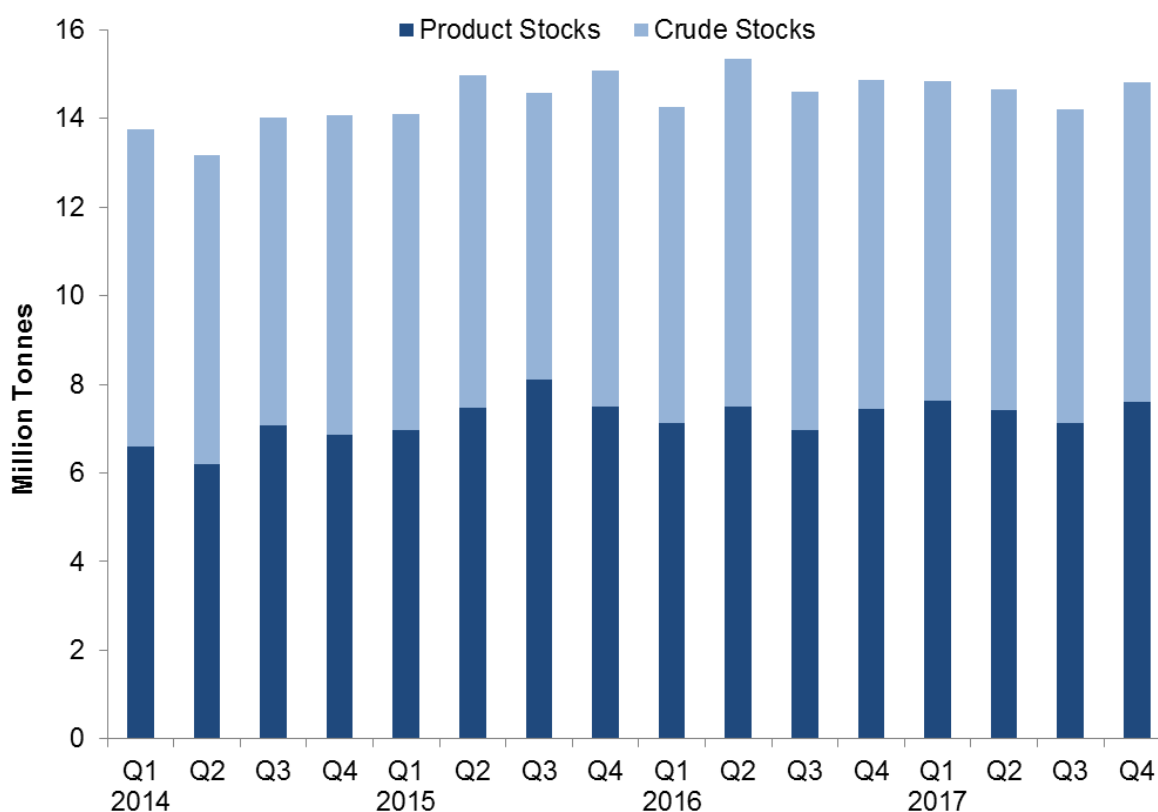
Another factor that affects demand for each road fuel is the composition of the car fleet. Motor spirit has been on a downward trend since 1990, reflecting a long-term shift to diesel engine vehicles. However recently the growth rate of the diesel fleet has been slowing following drop-offs in new diesel registrations<sup>2</sup>, which has reduced the growth in demand for road diesel. Conversely the number of new petrol registrations has been increasing, and the rate of contraction of the petrol car fleet has slowed to its lowest level since 2004<sup>2</sup>, contributing to the reduced rate of decline in demand for petrol.

In Q4 2017 total motor spirit sales including biofuels were lower by just 0.8 per cent compared with a year earlier whilst road diesel sales were higher by just 0.9 per cent.

<sup>1</sup> [Department for Transport road traffic estimates, November 2017](#)

<sup>2</sup> [www.gov.uk/government/collections/vehicles-statistics](http://www.gov.uk/government/collections/vehicles-statistics)

**Chart 3.6 UK oil stocks (Table 3.6)**



The UK holds oil stocks both for operational and commercial purposes and to meet obligations set out by the European Union (EU) and the International Energy Agency (IEA) to ensure the continuity of oil supply in times of significant disruption. The UK meets these obligations by directing companies to hold stocks of oil over and above what they would need for operational purposes. The UK is required to hold stock equivalent to 61 days of consumption to meet the EU requirements and stock equivalent to 90 days of net imports to meet IEA requirements.

At the end of Q4 2017 the UK held 14.8 million tonnes, equivalent to just under the 61 days of consumption with an additional 10 days of commercial stocks available on top of the obligation. The same volume is equivalent to around 180 days of net imports. UK total oil stocks were broadly stable (down 0.3 per cent on the same period last year), with primary oil stocks down 2.9 per cent and petroleum product stocks up 2.3 per cent.

There has been a 5.7 per cent increase to primary oils held for the UK elsewhere in the EU and a 2.1 per cent increase in petroleum products held overseas on the same period last year. The primary driver for this changes are prices as companies seek to minimise the cost of meeting their obligations by securing the best prices for oil held on their behalf. The result has been an increase in net stock held overseas on behalf of the UK, up 3.9 per cent.

Further information on how the UK meets its oil stocking obligations are set out at: [www.gov.uk/government/publications/uk-emergency-oil-stocking-international-obligations](http://www.gov.uk/government/publications/uk-emergency-oil-stocking-international-obligations)

# 3 OIL AND OIL PRODUCTS

**Table 3.1 Supply and use of crude oil, natural gas liquids and feedstocks<sup>1</sup>**

Thousand tonnes

	2016	2017 p	per cent change	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter	2016 4th quarter	2017 1st quarter	2017 2nd quarter	2017 3rd quarter	2017 4th quarter p	per cent change <sup>8</sup>
<b>SUPPLY</b>													
Indigenous production <sup>2</sup>	47,872	46,920	-2.0	12,206	12,716	12,210	11,377	11,570	12,150r	11,957r	11,325r	11,489	-0.7
Crude oil	44,306	43,037	-2.9	11,404	11,816	11,347	10,560	10,583	11,106r	10,913r	10,460r	10,559	-0.2
NGLs <sup>3</sup>	3,139	3,464	+10.4	688	784	757	717	881	929	940	765	830	-5.7
Feedstocks	428	419	-2.0	114	116	105	100	106	116	103	100	100	-6.3
Imports <sup>4</sup>	48,758r	53,160	+9.0	13,553	11,480	11,785	12,355r	13,138	12,414r	13,736r	13,977r	13,032	-0.8
Crude oil & NGLs	42,415	46,613	+9.9	12,006	9,842	10,171	10,681	11,721	10,965r	11,797r	12,397r	11,454	-2.3
Feedstocks	6,343r	6,547	+3.2	1,547	1,638	1,614	1,674r	1,417	1,449	1,939	1,580r	1,578	+11.4
Exports <sup>4</sup>	34,856	38,184	+9.5	8,396	10,090	7,976	8,225	8,565	9,824r	9,770	9,636r	8,955	+4.5
Crude Oil & NGLs	33,247	36,728	+10.5	8,083	9,460	7,544	7,931	8,312	9,470r	9,445	9,195r	8,618	+3.7
Feedstocks	1,609	1,456	-9.5	313	630	433	294	253	353	325	441	336	+33.1
Stock change <sup>5</sup>	-125	330	(-)	-626	355	-492	95	-83	414	-94	191r	-182	(+)
Transfers <sup>6</sup>	-1,282	-2,024	+57.8	-445	-225	-368	-209	-481	-574	-560	-429r	-461	-4.1
<b>Total supply</b>	60,367r	60,202	-0.3	16,292	14,236	15,159	15,393r	15,579	14,581r	15,269r	15,429r	14,923	-4.2
Statistical difference <sup>7</sup>	-25r	-42		-16	+14	-81	+24r	+17	-6r	-9r	23r	-50	
<b>Total demand</b>	60,392r	60,244	-0.2	16,308	14,221	15,240	15,369r	15,562	14,587	15,279	15,406r	14,973	-3.8
<b>TRANSFORMATION</b>													
Petroleum refineries	60,392r	60,244	-0.2	16,308	14,221	15,240	15,369r	15,562	14,587	15,279	15,406r	14,973	-3.8

1. As there is no use made of primary oils and feedstocks by industries other than the oil and gas extraction and petroleum refining industries, other industry headings have not been included in this table. As such, this table is a summary of the activity of what is known as the Upstream oil industry.
2. Includes offshore and onshore production.
3. Natural Gas Liquids (NGLs) are condensate and petroleum gases derived at onshore treatment plants.
4. Foreign trade as recorded by the Petroleum Industry which may differ from the figures published by HM Revenue and Customs in the Overseas Trade Statistics. Data are subject to further revision as revised information on imports and exports becomes available.
5. Stock fall (+), stock rise (-). Stocks include stocks held at refineries, at oil terminals and also those held in tanks and partially loaded vessels at offshore facilities.
6. Mostly direct disposals to petrochemical plants.
7. Total supply minus total demand.
8. Percentage change between the most recent quarter and the same quarter a year earlier.

# 3 OIL AND OIL PRODUCTS

Table 3.2 Supply and use of petroleum products

	Thousand tonnes												
	2016	2017 p	per cent change	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter	2016 4th quarter	2017 1st quarter	2017 2nd quarter	2017 3rd quarter	2017 4th quarter p	per cent change <sup>1</sup>
<b>SUPPLY</b>													
Indigenous production <sup>2</sup>	62,536r	62,494	-0.1	16,835	14,819	15,790	15,771r	16,156	15,223	15,845	15,943	15,483	-4.2
Imports <sup>3</sup>	34,859r	33,225	-4.7	7,940	8,814	9,098	8,544r	8,403	8,120	7,923	8,171	9,010	7.2
Exports <sup>3</sup>	24,312	23,088	-5.0	6,416	5,964	6,245	6,179	5,923	5,644	5,774	5,790r	5,880	-0.7
Marine bunkers	2,659	2,430	-8.6	573	538	727	763	632	511	597	729	593	-6.2
Stock change <sup>4</sup>	89	-122		-68	148	-278	460	-241	-301	124	253r	-197	
Transfers <sup>5</sup>	-1,268	-612		-184	-474	-300	-281	-212	-189	-75	-210	-138	
<b>Total supply</b>	<b>69,245r</b>	<b>69,467</b>	<b>0.3</b>	<b>17,534</b>	<b>16,805</b>	<b>17,337</b>	<b>17,552r</b>	<b>17,552</b>	<b>16,698r</b>	<b>17,447r</b>	<b>17,638r</b>	<b>17,685</b>	<b>0.8</b>
Statistical difference <sup>6</sup>	24r	-40		-30	32	-2	-14r	8	-20r	-0r	-24r	5	
<b>Total demand</b>	<b>69,221r</b>	<b>69,507</b>	<b>0.4</b>	<b>17,564</b>	<b>16,773</b>	<b>17,339</b>	<b>17,565r</b>	<b>17,544</b>	<b>16,718r</b>	<b>17,447r</b>	<b>17,662r</b>	<b>17,680</b>	<b>0.8</b>
<b>TRANSFORMATION</b>	<b>1,094</b>	<b>1,017</b>	<b>-7.1</b>	<b>314</b>	<b>302</b>	<b>254</b>	<b>250</b>	<b>288</b>	<b>272</b>	<b>241</b>	<b>242</b>	<b>261</b>	<b>-9.4</b>
Electricity generation	501	453	-9.7	158	146	110	115	130	119	102	106	126	-3.1
Heat generation	58	58	0.0	15	15	14	14	15	15	14	14	15	0.0
Other Transformation	535	506	-5.4	142	142	130	121	143	139	125	122	120	-15.6
<b>Energy industry use</b>	<b>4,040r</b>	<b>4,079</b>	<b>1.0</b>	<b>1,047</b>	<b>988</b>	<b>1,019</b>	<b>1,042r</b>	<b>990</b>	<b>991</b>	<b>1,026</b>	<b>1,037</b>	<b>1,025</b>	<b>3.5</b>
Petroleum Refineries	3,377r	3,417	1.2	872	823	854	876r	824	825	861	871	859	4.2
Blast Furnaces	0	0		0	0	0	0	0	0	0	0	0	
Others	662	662	0.0	175	166	166	166	166	166	166	166	166	0.0
<b>FINAL CONSUMPTION</b>	<b>64,088</b>	<b>64,411</b>	<b>0.5</b>	<b>16,203</b>	<b>15,482</b>	<b>16,066</b>	<b>16,273</b>	<b>16,266</b>	<b>15,455r</b>	<b>16,179r</b>	<b>16,383</b>	<b>16,394</b>	<b>0.8</b>
Iron & steel	4	5	28.8	2	3	1	0	0	3	2	0r	0	-29.6
Other industries	3,722	3,977	6.9	1,208	1,095	821	842	964	1,044r	922r	877	1,134	17.6
Transport	49,292	49,682	0.8	12,115	11,495	12,531	12,867	12,400	11,562r	12,727r	12,936r	12,457	0.5
Domestic	2,275	2,220	-2.4	652	799	447	313	716	751r	410r	349r	709	-0.9
Other final users	1,840	1,840	0.0	454	410	473	485	473	419r	456r	505r	461	-2.5
Non energy use	6,954	6,687	-3.8	1,773	1,681	1,794	1,766	1,714	1,677r	1,662r	1,715r	1,633	-4.7

1. Percentage change between the most recent quarter and the same quarter a year earlier; (+) represents a positive percentage change greater than 100%.
2. Includes refinery production and petroleum gases extracted as products during the production of oil and gas.
3. Foreign trade as recorded by the Petroleum Industry which may differ from the figures published by HM Revenue and Customs in the Overseas Trade Statistics.  
Data are subject for further revision as revised information on imports and exports becomes available.
4. Stock fall (+), stock rise (-).
5. Mainly transfers from product to feedstock.
6. Total supply minus total demand.

# 3 OIL AND OIL PRODUCTS

Table 3.4 Supply and use of petroleum products - latest quarter

Thousand tonnes

	2016 4th quarter									2017 4th quarter p								
	Total Petroleum Products	Motor spirit	DERV <sup>9</sup>	Gas oil <sup>1</sup>	Aviation turbine fuel	Fuel oils	Petroleum gases <sup>2</sup>	Burning oil	Other products <sup>3</sup>	Total Petroleum Products	Motor spirit	DERV <sup>9</sup>	Gas oil <sup>1</sup>	Aviation turbine fuel	Fuel oils	Petroleum gases <sup>2</sup>	Burning oil	Other products <sup>3</sup>
<b>SUPPLY</b>																		
Indigenous Production <sup>7</sup>	16,156r	4,529	3,747	1,675	1,012	1,027	1,699r	598	1,869	15,483	4,295	3,400	1,655	1,034	1,041	1,636	657	1,765
Imports <sup>8</sup>	8,403	866	3,468	507	2,340	274	171	163	614	9,010	947	3,774	454	2,275	115	229	236	980
Exports <sup>8</sup>	5,923	2,934	475	585	251	773	190	27	689	5,880	2,724	372	684	347	769	205	39	738
Marine bunkers	632	-	-	409	-	223	0	-	-	593	-	-	393	-	200	-	-	-
Stock change <sup>6</sup>	-241	+28	-194	-33	-104	+28	+37	+3	-6	-197	-37	-148	+72	+6	-10	+32	-28	-84
Transfers <sup>7</sup>	-212	+508	-116	+75	-308	-142	-21	+298	-506	-138	+472	-197	+199	-236	+1	-32	+227	-571
<b>Total supply</b>	<b>17,552r</b>	<b>2,998</b>	<b>6,430</b>	<b>1,232</b>	<b>2,690</b>	<b>190</b>	<b>1,696r</b>	<b>1,035</b>	<b>1,282</b>	<b>17,685</b>	<b>2,954</b>	<b>6,457</b>	<b>1,302</b>	<b>2,731</b>	<b>178</b>	<b>1,660</b>	<b>1,052</b>	<b>1,351</b>
Statistical difference <sup>8</sup>	+8	+10	-	+10	-	-1	-34	-2	+25	+5	+1	+4	-8	+3	+5	-2	-1	+2
<b>Total demand</b>	<b>17,544r</b>	<b>2,988</b>	<b>6,419</b>	<b>1,222</b>	<b>2,690</b>	<b>191</b>	<b>1,730r</b>	<b>1,036</b>	<b>1,268</b>	<b>17,680</b>	<b>2,953</b>	<b>6,452</b>	<b>1,309</b>	<b>2,728</b>	<b>173</b>	<b>1,662</b>	<b>1,053</b>	<b>1,349</b>
<b>TRANSFORMATION</b>	288	-	-	29	-	51	168	-	40	261	-	-	26	-	50	161	-	24
Electricity generation	130	-	-	27	-	40	63	-	-	126	-	-	24	-	39	63	-	-
Heat generation	15	-	-	1	-	11	2	-	-	15	-	-	1	-	11	2	-	-
Petroleum refineries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coke manufacture	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Blast furnaces	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Patent fuel manufacture	33	-	-	-	-	-	0	-	33	19	-	-	-	-	0	-	-	19
Other transformation <sup>9</sup>	109	-	-	-	-	-	103	-	6	102	-	-	-	-	97	-	-	5
Energy industry use	990	-	-	150	-	76	498	-	266	1,025	-	-	150	-	81	513	-	281
<b>FINAL CONSUMPTION</b>	<b>16,266</b>	<b>2,988</b>	<b>6,419</b>	<b>1,044</b>	<b>2,690</b>	<b>64</b>	<b>1,063</b>	<b>1,036</b>	<b>963</b>	<b>16,394</b>	<b>2,953</b>	<b>6,452</b>	<b>1,134</b>	<b>2,728</b>	<b>42</b>	<b>987</b>	<b>1,053</b>	<b>1,044</b>
Iron & steel	0	-	-	-	-	0	0	-	-	0	-	-	-	-	0	-	-	-
Other industries	964r	-	-	397	-	38	101r	423	5	1,134	-	-	468	-	36	80	426	124
Transport	12,400	2,988	6,419	284	2,690	0	17	-	3	12,457	2,953	6,452	305	2,728	0	16	-	2
Domestic	716	-	-	36	-	-	67	613	-	709	-	-	30	-	-	51	627	-
Other final users	473r	-	-	323	-	26	124r	-	-	461	-	-	326	-	6	128	-	-
Non energy use	1,714	-	-	4	-	-	754	-	955	1,633	-	-	4	-	-	711	-	918

1. Includes middle distillate feedstock destined for use in the petrochemical industry and marine diesel
2. Includes ethane, propane, butane and other petroleum gases.
3. Includes naphtha, industrial and white spirits, lubricants, bitumen, petroleum waxes, petroleum coke and other oil products.
4. Includes refinery production and petroleum gases extracted as products during the production of oil and gas.
5. Foreign trade as recorded by the Petroleum Industry which may differ from the figures published by HM Revenue and Customs in the Overseas Trade Statistics.  
Data are subject to further revision as revised information on imports and exports becomes available.
6. Stock fall (+), stock rise (-).
7. Mainly transfers from product to feedstock.
8. Total supply minus total demand.
9. Backflows from petrochemical companies have been placed on a separate row for the first time June 2016. Please see article in Energy Trend June 2016 for more information.

### 3 OIL AND OIL PRODUCTS

Table 3.5 Biofuel sales and sales through supermarkets<sup>1</sup>

*Thousand tonnes*

	2016	2017 p	per cent change	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter	2016 4th quarter	2017 1st quarter	2017 2nd quarter	2017 3rd quarter	2017 4th quarter p	per cent change <sup>2</sup>
<b>MOTOR SPIRIT</b>													
of which, Hydrocarbon <sup>3</sup>	11,951	11,756	-1.6%	3,040	2,877	3,072	3,014	2,988	2,815	3,015	2,972r	2,953	-1.1%
of which, Bio-ethanol <sup>4</sup>	603	606	0.6%	157	146	154	150	152	146	153	145r	163	6.7%
<b>Total Motor Spirit including Bio-ethanol</b>	<b>12,554</b>	<b>12,362</b>	<b>-1.5%</b>	<b>3,197</b>	<b>3,023</b>	<b>3,226</b>	<b>3,164</b>	<b>3,140</b>	<b>2,961</b>	<b>3,169</b>	<b>3,117r</b>	<b>3,116</b>	<b>-0.8%</b>
of which, sold through Supermarkets <sup>5</sup>	5,885	5,794	-1.6%	1,473	1,480	1,479	1,453	1,473	1,388	1,445	1,443	1,518	3.0%
<b>DIESEL ROAD FUEL</b>													
of which, Hydrocarbon <sup>3</sup>	24,648	24,901	1.0%	6,106	5,889	6,173	6,167	6,419	5,903	6,280	6,265r	6,452	0.5%
of which, Bio-diesel <sup>4</sup>	630	619	-1.7%	191	127	195	174	133	118	188	156r	157	17.9%
<b>Total Diesel Road Fuel including Bio-diesel</b>	<b>25,279</b>	<b>25,520</b>	<b>1.0%</b>	<b>6,298</b>	<b>6,016</b>	<b>6,368</b>	<b>6,342</b>	<b>6,552</b>	<b>6,022</b>	<b>6,467</b>	<b>6,421r</b>	<b>6,610</b>	<b>0.9%</b>
of which, sold through Supermarkets <sup>5</sup>	7,267	7,383	1.6%	1,685	1,793	1,802	1,814	1,858	1,761	1,811	1,863	1,948	4.8%

1. Monthly data for inland deliveries of oil products are available - See BEIS website: <https://www.gov.uk/government/collections/oil-statistics>

2. Percentage change between the most recent quarter and the same quarter a year earlier.

3. Demand excluding bioethanol. Based on HMRC data.

4. Bioethanol based on HMRC data and excludes other renewables

5. Data for sales by supermarkets collected by a monthly reporting system. Includes Asda, Morrisons, Sainsburys and Tesco only.



# 3 OIL AND OIL PRODUCTS

Table 3.6 Stocks of petroleum<sup>1</sup> at end of period

Thousand tonnes

	Crude oil and refinery process oil					Petroleum products							Total stocks		
	Refineries <sup>2</sup>	Terminals <sup>3</sup>	Offshore <sup>4</sup>	Net bilaterals of Crude and Process oil <sup>5</sup>		Motor Spirit <sup>6</sup>	Kerosene <sup>7</sup>	Gas/Diesel Oil <sup>8</sup>	Fuel oils	Other products <sup>9</sup>	Net bilaterals of products <sup>5</sup>	Total products	Total Net bilaterals <sup>5</sup>	Total Stocks in UK <sup>10</sup>	Total stocks
					Total <sup>5</sup>										
2013	3,592	1,102	513	1,469	6,677	1,041	1,419	1,539	404	693	2,432	7,528	3,901	10,304	14,205
2014	3,876	1,147	460	1,728	7,211	947	1,178	1,656	253	773	2,064	6,871	3,792	10,290	14,082
2015	3,156	1,629	499	2,289	7,574	1,084	1,425	1,858	314	792	2,022	7,497	4,312	10,759	15,070
2016	3,088	1,795	526	2,006	7,415	1,079	1,342	2,033	218	687	2,082	7,442	4,089	10,769	14,857
2017 p	3,244	1,235	600	2,121	7,200	1,129	1,298	2,028	239	794	2,126	7,614	4,246	10,568	14,814
2015 4th quarter	3,156	1,629	499	2,289	7,574	1,084	1,425	1,858	314	792	2,022	7,497	4,312	10,759	15,070
2016 1st quarter	3,081	1,370	478	2,193	7,122	1,085	1,456	1,767	247	763	1,812	7,130	4,005	10,247	14,253
2nd quarter	3,201	1,586	635	2,427	7,849	1,158	1,398	1,990	270	780	1,899	7,495	4,326	11,018	15,344
3rd quarter	3,238	1,473	615	2,323	7,650	1,107	1,241	1,809	261	718	1,826	6,964	4,150	10,464	14,614
4th quarter	3,088	1,795	526	2,006	7,415	1,079	1,342	2,033	218	687	2,082	7,442	4,089	10,769	14,857
2017 1st quarter	3,131	1,307	557	2,229	7,224	1,212	1,575	1,970	236	678	1,949	7,620	4,178	10,666	14,844
2nd quarter	3,003	1,549	542	2,129	7,222	1,112	1,430	2,083	226	698	1,876	7,425	4,005	10,642	14,647
3rd quarter	2,970	1,318r	610	2,197	7,094r	1,093	1,276	1,954r	229	742	1,826	7,120r	4,023	10,191r	14,214r
4th quarter p	3,244	1,235	600	2,121	7,200	1,129	1,298	2,028	239	794	2,126	7,614	4,246	10,568	14,814
<i>Per cent change</i> <sup>11</sup>	+5.1	-31.2	+14.1	+5.7	-2.9	+4.6	-3.3	-0.3	+9.8	+15.5	+2.1	+2.3	+3.9	-1.9	-0.3

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1. Stocks held at refineries, terminals and power stations. Stocks in the wholesale distribution system and certain stocks at offshore fields (UK Continental Shelf [UKCS]), and others held under approved bilateral agreements also included.

2. Stocks of crude oil, NGLs and process oil at UK refineries.

3. Stocks of crude oil and NGLs at UKCS pipeline terminals.

4. Stocks of crude oil in tanks and partially loaded tankers at offshore fields (UKCS).

5. The difference between stocks held abroad for UK use under approved bilateral agreements and the equivalent stocks held in the UK for foreign use. From 2013 onwards, EU Directive 2009/119/EC came into effect and this has led to changes in how UK companies manage their stock-holding. The increase in crude stocks held abroad was at the expense of a decrease in product stocks held under similar agreements.

6. Motor spirit and aviation spirit.

7. Aviation turbine fuel and burning oil.

8. Gas oil, DERV fuel, middle distillate feedstock (mdf) and marine diesel oil.

9. Ethane, propane, butane, other petroleum gases, naphtha (ldf), industrial and white spirits, bitumen, petroleum wax, lubricating oil, petroleum coke, and miscellaneous products.

10. Stocks held in the national territory or elsewhere on the UKCS

11. Percentage change between the most recent quarter and the same quarter a year earlier.

## Section 4 - Gas

### Key results show:

#### Provisional 2017

Gross gas production was flat on last year (up just 0.3 per cent) at 465 TWh. This figure includes gas from the Rough facility, which is currently drawing down on the last available reserves in preparation for closure. **(Chart 4.1)**

Overall imports were down 1.8 per cent in 2017, with LNG imports decreasing by one-third but pipeline imports increasing by 8.2 per cent. Exports were up, increasing 8.8 per cent as a result of an increase in exports to Belgium of nearly one-third. Net imports decreased by 4.1 per cent. **(Chart 4.4)**

Gas demand was down 2.6 per cent compared to 2016, with demand for gas used for electricity generation decreasing 3.6 per cent year-on-year due to the uptake in low carbon electricity sources such as renewables and nuclear. Similarly demand for final consumption was down by 3.0 per cent, with domestic and other final users down 4.6 and 2.5 per cent respectively. These decreases were driven by generally warmer temperatures throughout the year in comparison to 2016. **(Chart 4.6)**

#### Quarter 4 2017

UK production in Q4 2017 was stable (up just 0.4 per cent). The most notable development this quarter can be found in the monthly production data. The Forties Pipeline closure in December 2017 resulted in a sharp dip of one-fifth in what had been strong production through October and November 2017. **(Chart 4.1)**. Production of associated gas was down 11 per cent lower whilst dry gas production was 4.0 per cent higher **(Chart 4.2)**.

Imports in Q4 2017 fell by 2.8 per cent in comparison to the previous year and exports increased by 8.8 per cent. The observed 4.1 per cent increase in net imports in Q4 2017 is a reflection of the impact of the Forties closure in causing near record high imports in December 2017, and masks that the UK had been a net exporter of gas during October and November 2017. **(Chart 4.4)**

Demand for natural gas decreased by 4.2 per cent in Q4 2017 in comparison to Q4 2016, to 263 TWh. With strong performance from renewable sources, demand for electricity generation fell for the third quarter in a row, by 11 per cent. Similarly final consumption was down 2.4 per cent, with domestic and other final users down 3.8 and 1.2 per cent respectively, driven by warmer temperatures in October and November 2017. **(Chart 4.6)**.

### Relevant table

4.1: Natural gas supply and consumption

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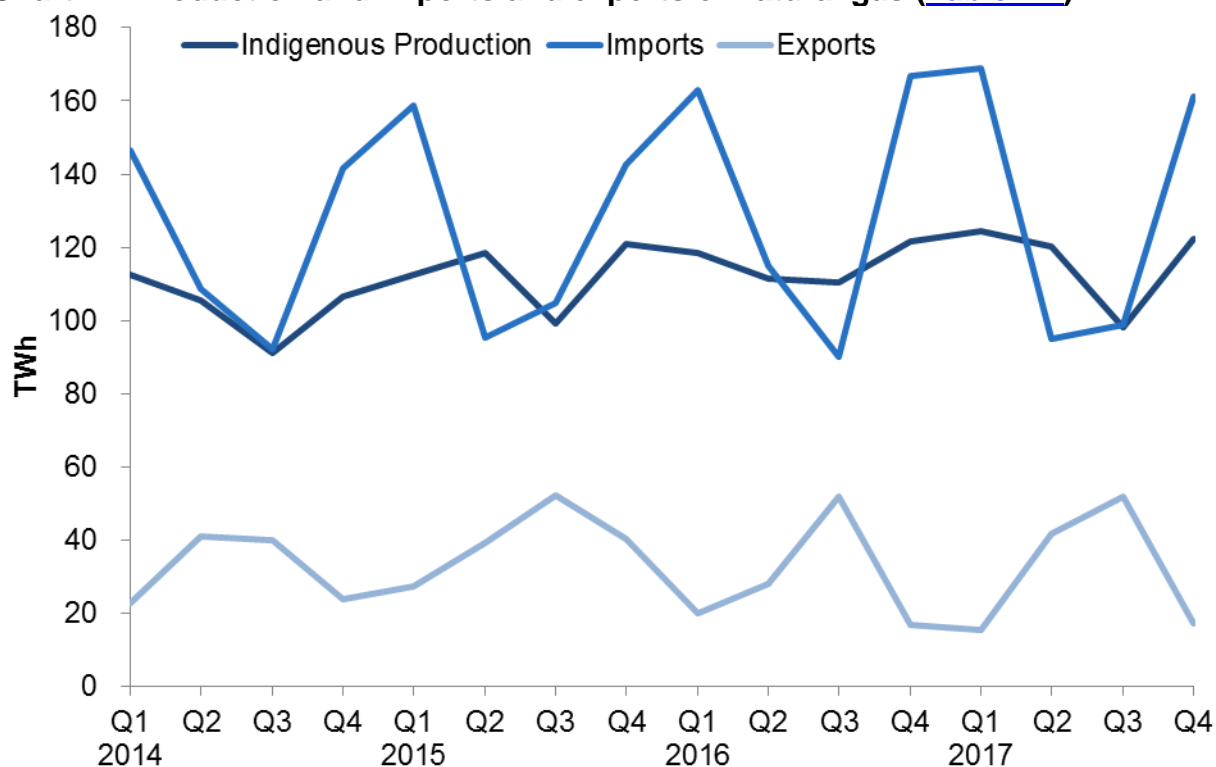
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**Chart 4.1 Production and imports and exports of natural gas (Table 4.1)**

Production of natural gas in 2017 was stable on 2016. Year on year production has decreased by an average of nearly 6 per cent since 2000, but has increased in recent years after bottoming out in 2013. This recent trend has been driven by both reduced maintenance and new fields, such as Laggan coming on stream towards the middle of 2016.

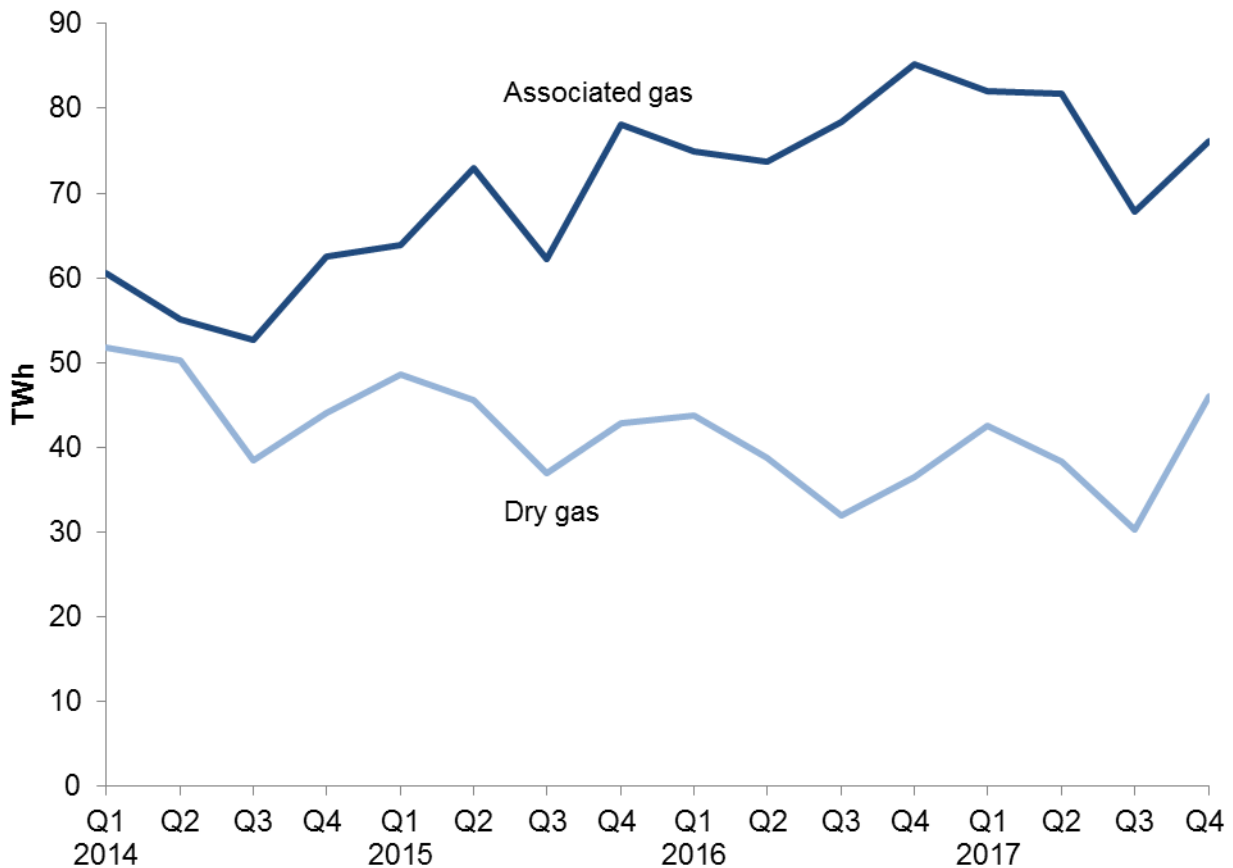
In 2017 imports fell by 1.8 per cent and exports increased by 8.8 per cent compared to 2016. For more detail on trade see Chart 4.4.

Gross production of natural gas in Q4 2017 was stable on the year before (up by 0.4 per cent). During October and November indigenous production was strong due to the drawing down of reserves from the Rough facility in preparation for its closure, along with higher production from Bacton. However the closure of the Forties Pipeline System in December saw a decline of nearly a fifth, reducing overall quarterly production figures. Production in Q4 2017 was around 37% of the average quarterly figures in 2000, which is when gas production peaked.

Imports in Q4 2017 were down 2.8 per cent on the same quarter in 2016. In contrast, exports increased by 8.8 per cent over the same period, leading to a 4.1 per cent increase in net imports. For more detail on trade see Chart 4.4.

## Gas

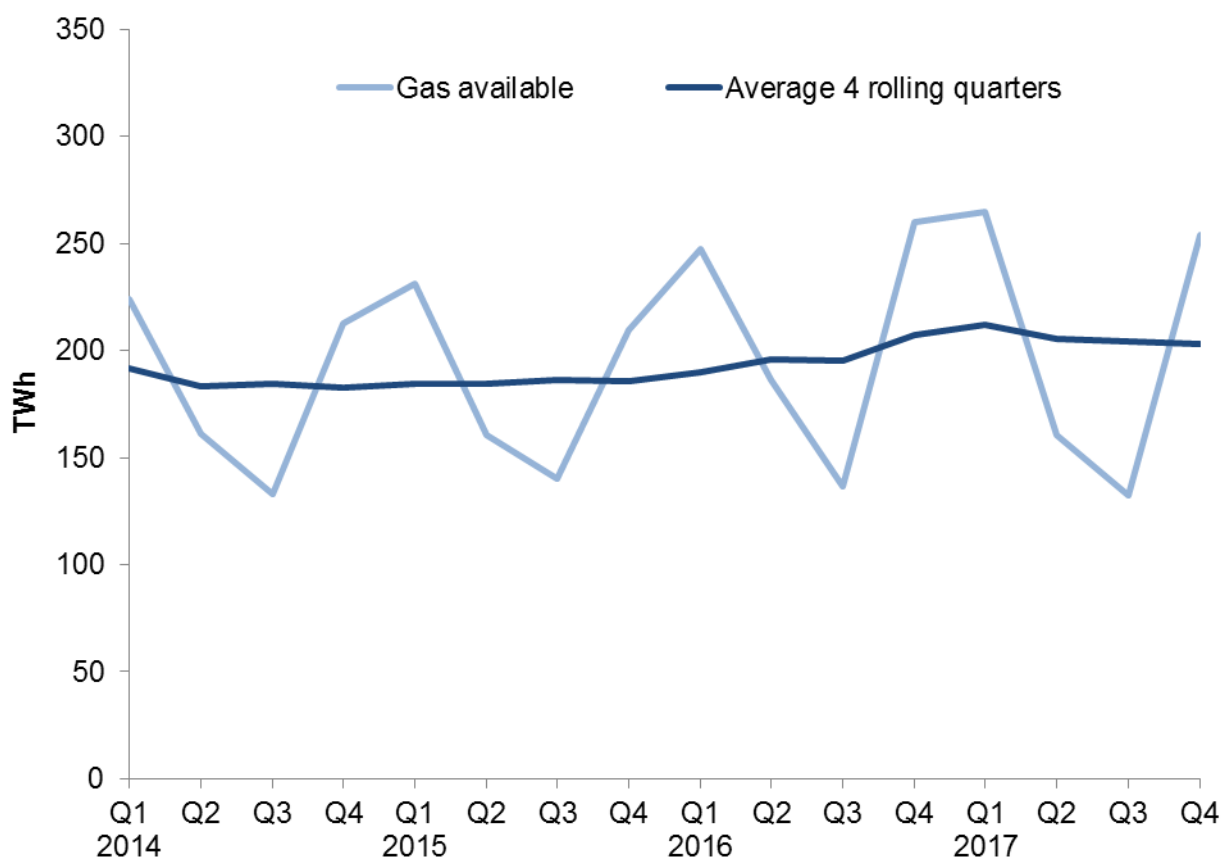
**Chart 4.2 Production of dry gas and associated gas (not shown in published tables)**



Production of associated gas (natural gas produced from oil fields) in 2017 was down by 1.4 per cent compared to 2016. Similarly in Q4 2017 associated gas production decreased by 11 per cent on Q4 2016, from 85 TWh to 76 TWh.

Compared to the same quarter in 2016 dry gas production (natural gas composed mainly of methane) increased by 26 per cent to 46 TWh. Overall dry gas production increased by 4.0% in 2017 compared to 2016.

**Chart 4.3 Gas availability (Table 4.2)**



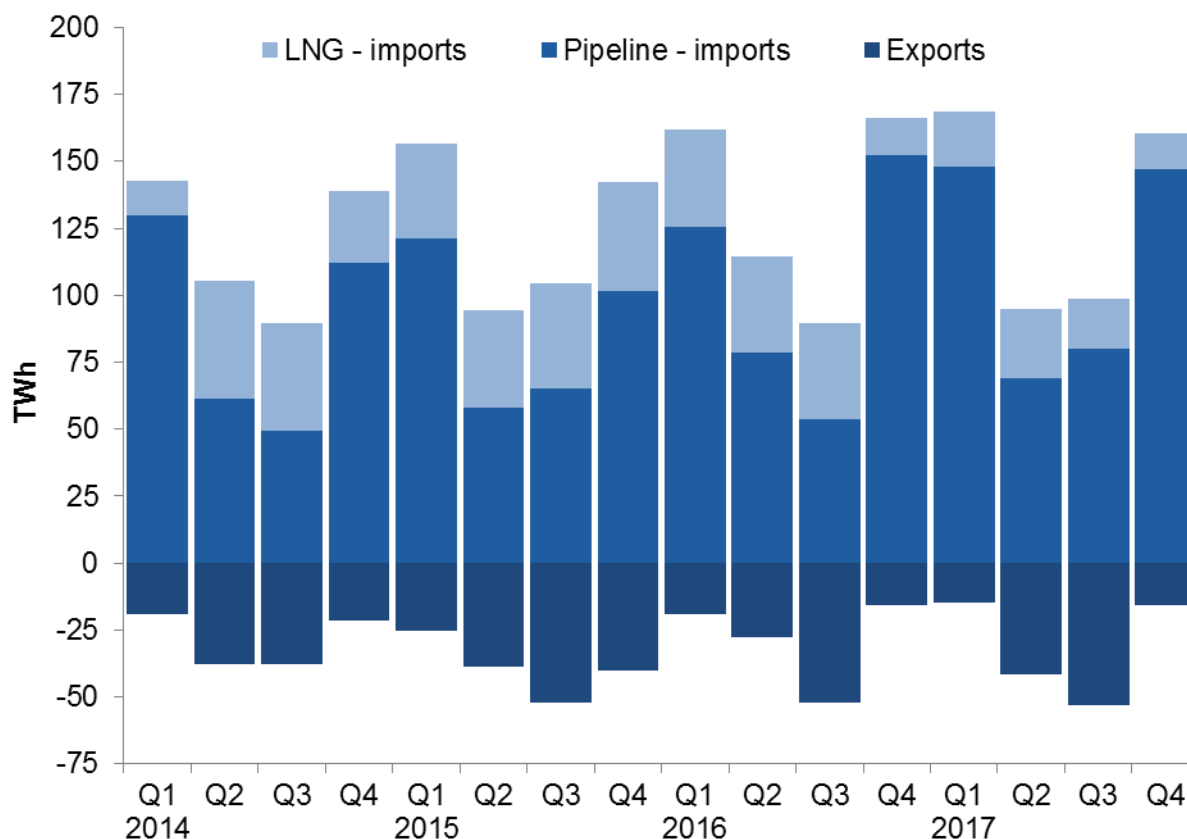
Gas available at terminals is equal to the gross gas production minus producers own use, plus net imports.

Gas availability is seasonal, mirroring gas demand, and peaks during Q1 and Q4 each year. Gas availability in Q4 2017 decreased by 2.2 per cent compared to Q4 2016 to 255 TWh. This was driven by the decrease in net imports, and reflects the slightly warmer temperatures and fewer heating degree days in this period compared to the previous year

The long term picture shows that the average availability of gas over 4 rolling quarters has been gradually rising since the start of 2015, reaching volumes close to 2012/13 levels in 2017, after figures had decreased in 2014.

## Gas

**Chart 4.4 Import and exports (Table 4.3 and Table 4.4)**



As noted in Map 4.1, the UK imports natural gas primarily from Norway (predominantly via the Langeled, Tampen Link and Gjoa/Vega pipelines). Smaller volumes are imported from Belgium (via the UK-Belgium Interconnector) and the Netherlands (via the Balgzand to Bacton line).

In 2017 imports of natural gas decreased by 1.8 per cent on 2016 and exports increased by 8.8 per cent, driving a 4.1 per cent decrease in net imports over the 12 months.

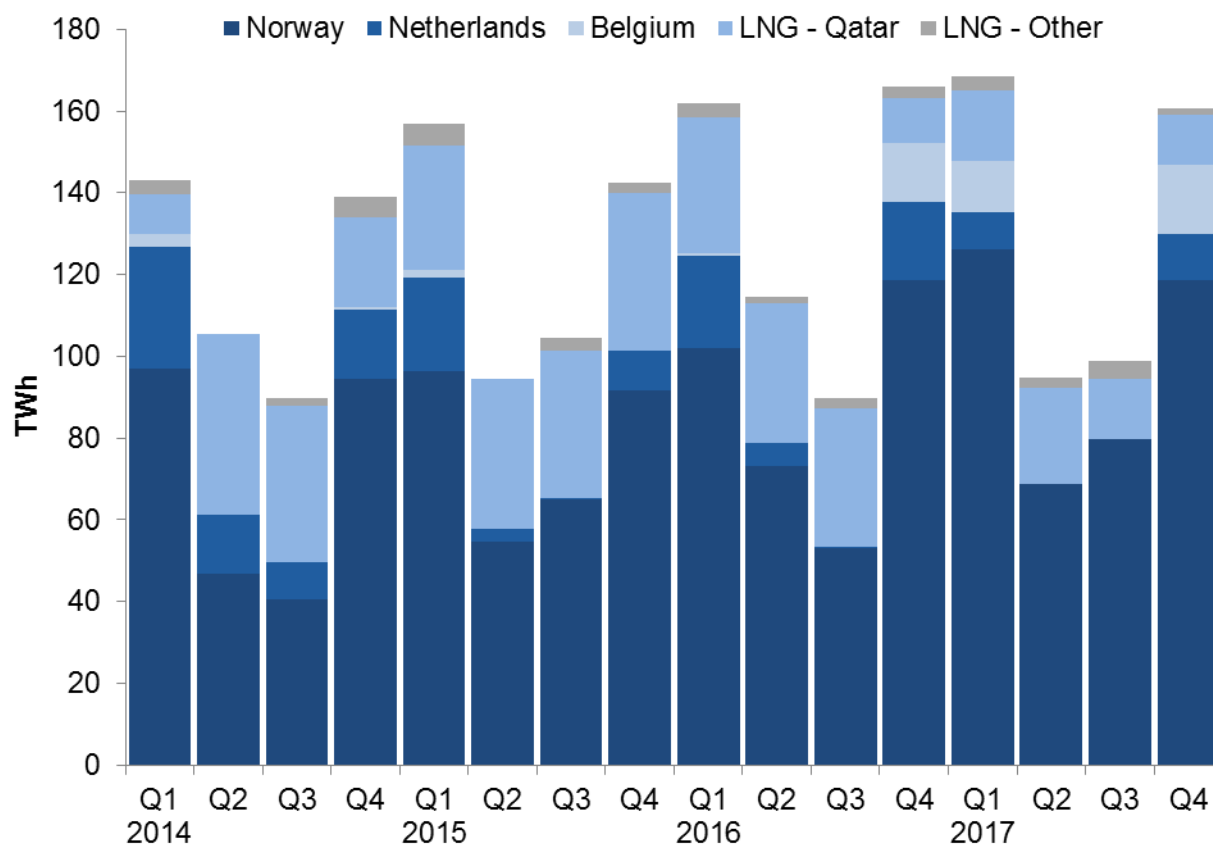
Imports of LNG were down one-third, with imports from Qatar (the UK's principal source of LNG) decreasing by 40 per cent. In contrast pipeline imports increased by 8.2 per cent, meaning LNG only accounted for 15 per cent of UK imports in 2017 compared to 23 per cent in 2016.

The increase in exports to 126 TWh in 2017 was caused by an increase of nearly one-third in pipeline exports to Belgium. Exports to other countries decreased, meaning that exports to Belgium comprised 70 per cent of all UK exports, up from 59 per cent in 2016.

The observed 4.1 per cent increase in net imports in Q4 2017 is a reflection of the impact of the Forties closure in causing near record high imports in December, and masks that the UK had been a net exporter of gas during October and November.

Pipeline imports were down by 3.5 per cent on the same quarter last year, with imports from the Netherlands down 41 per cent, driving an overall 2.6 per cent decrease in imports.

Exports increased by 12 per cent over the quarter, driven by a 6.5 per cent increase in pipeline exports with volumes to Belgium up by 45 per cent on last year. The increase was driven by stable production and decreased demand. Liquefied Natural Gas 'reloads' started in late 2014 and have continued since with the UK exporting to countries including Brazil, Pakistan, and the United Arab Emirates.

**Chart 4.5 Imports by origin (Table 4.4)**

In 2017, the main development is the contraction in the amount of LNG imported into the UK. LNG's share of imports decreased (from 23 per cent to 15 per cent) with imports from Norway and Belgium increasing. Norway remains the principal source of UK gas imports at 75 per cent, up from 65 per cent in 2016.

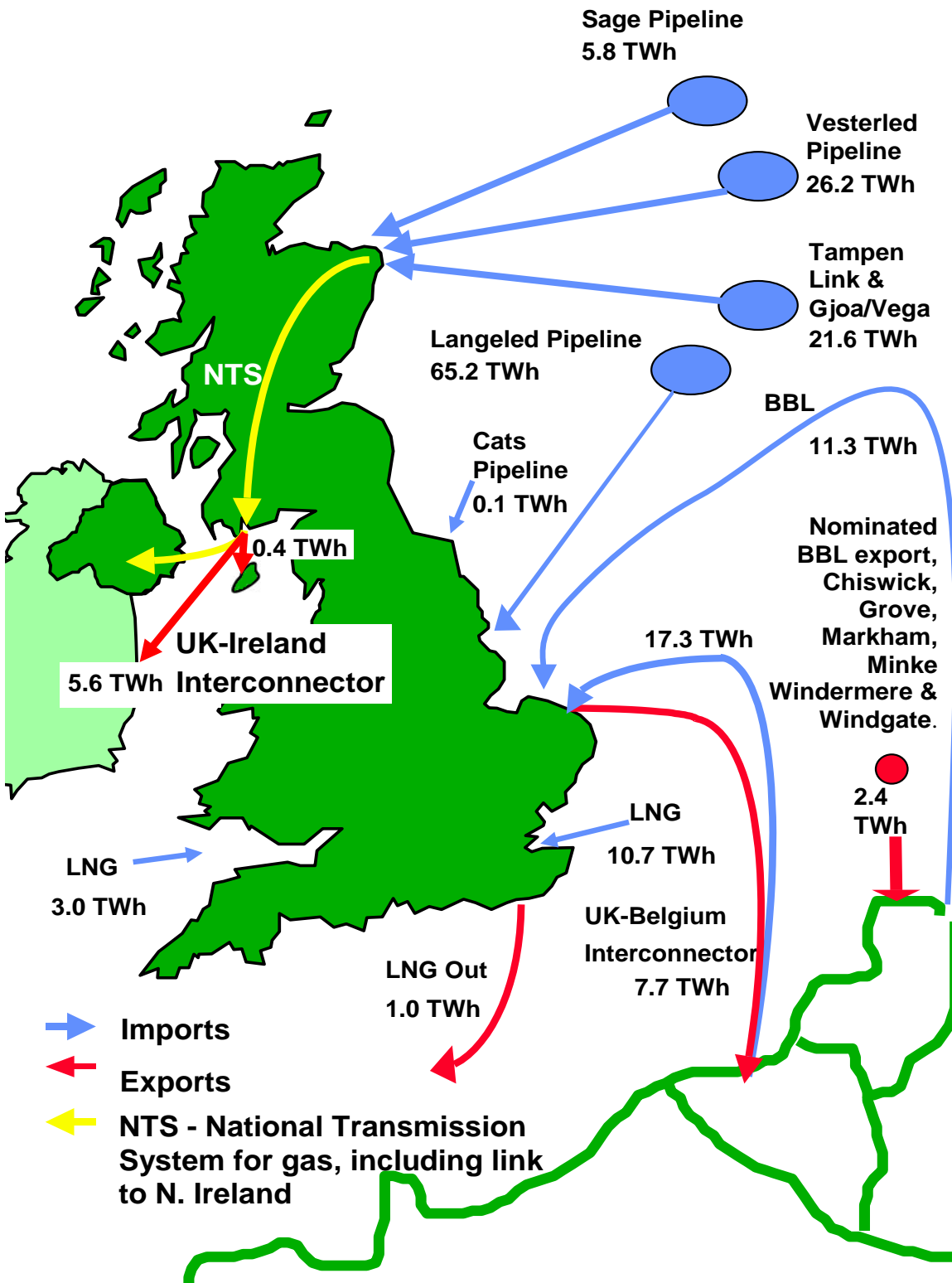
December 2017 saw the arrival in the UK of the first LNG cargo from Russia, which was then re-exported (See Table 4.3 for LNG exports).

Imports from Belgium nearly doubled (up more than 80 per cent) in December 2017, and comprised more than one-fifth of UK pipeline imports that month, to counter-balance the large reduction in UK gas production as a result of the Forties closure. Pipeline imports from Norway were relatively flat, although varying significantly by pipeline. Norway is still the major supplier of gas to the UK, with Norwegian pipeline and LNG imports together making up 74% of all Q4 2017 imports.

LNG imports in Q4 were up 6.6 per cent on the year before, with the majority (89 per cent) of LNG imports being sourced from Qatar. Remaining volumes were imported from Trinidad and Tobago, and Algeria. Over the year 2017 LNG imports fell by more than a third, likely due to increased demand from Asia.

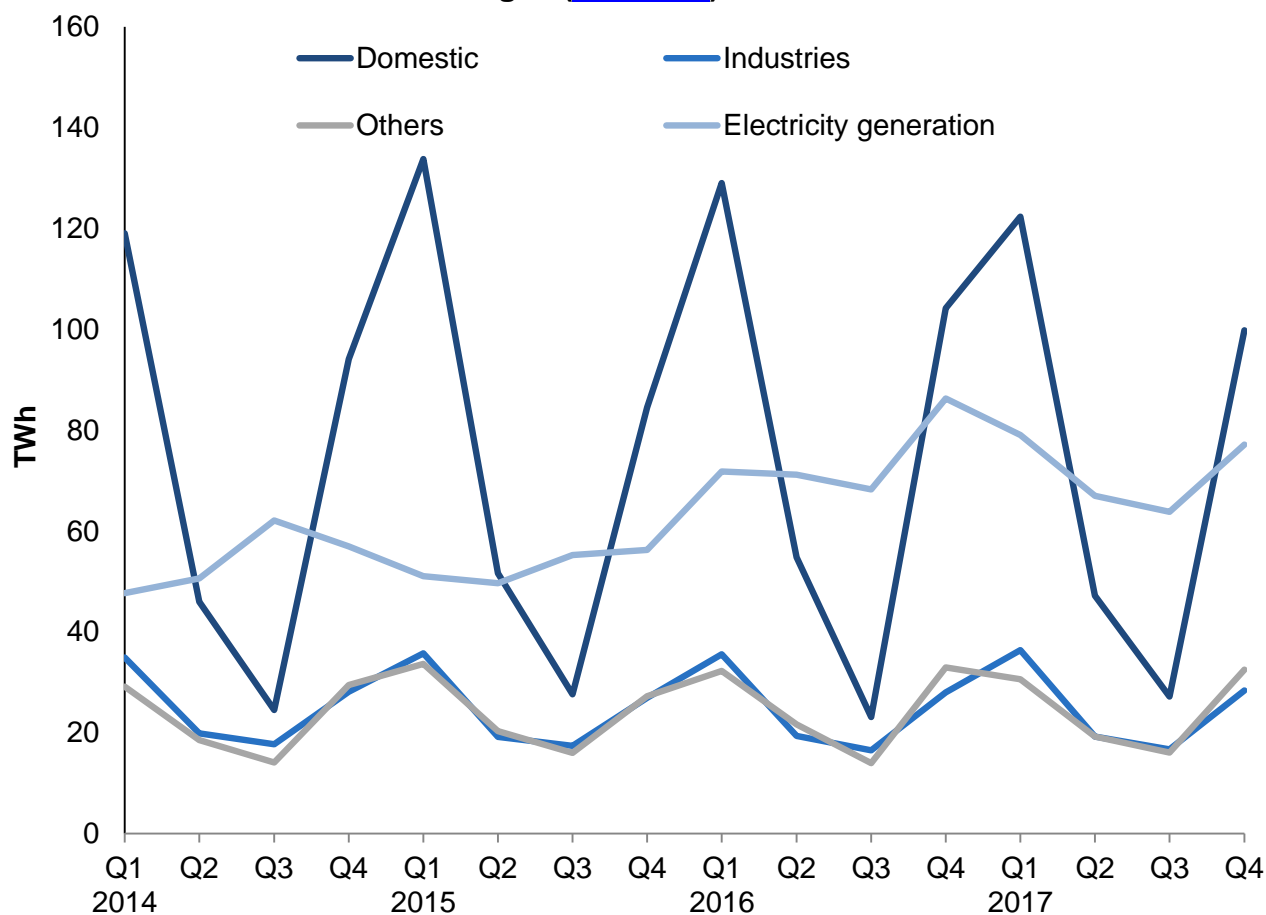
A complete country breakdown for physical pipeline and LNG imports is provided in Energy Trends Table 4.4 - *Supplementary information on the origin of UK gas imports*.

Map 4.1: UK imports and exports of gas Q4 2017\*



\*Please note that imports and exports in this map uses nominated flows through the UK-Belgium Interconnector and BBL pipeline as in Table 4.1. The figures here will differ from those in ET Table 4.3 which uses actual physical flows through the Interconnector.



**Chart 4.6 UK demand for natural gas (Table 4.1)**

In 2017 the UK's gas demand was down 2.6 per cent compared to 2016, with demand for gas used for electricity generation decreasing by 3.6 per cent year-on-year a result of an uptake in low carbon electricity sources such as renewables and nuclear. Similarly demand for final consumption was down 3.0 per cent, with domestic and other final users down 4.6 and 2.5 per cent respectively. These decreases were driven by warmer temperatures throughout the year, apart from January and December, in comparison to 2016. In contrast gas used for other industries has increased by 1.6 per cent, a result of increased economic activity.

UK demand for natural gas in Q4 2017 is down 4.2 per cent in comparison to Q4 2016, to 263 TWh. The principal cause of this is the decrease in demand for gas used for electricity generation, which fell by 11 per cent in comparison to the same quarter last year, again as a result of increased generation from renewable sources.

Final consumption of gas was down 2.4 per cent, with domestic use and other final users down 3.8 and 1.2 per cent respectively. These increases were driven by warmer temperatures in October and November, which was balanced somewhat by colder temperatures in December.

A complete breakdown for gas demand is provided in Energy Trends table 4.1 - *Natural gas supply and consumption*.

# 4 GAS

Table 4.1. Natural gas supply and consumption

	GWh												
	2016	2017 p	per cent change	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter	2016 4th quarter	2017 1st quarter	2017 2nd quarter	2017 3rd quarter	2017 4th quarter p	per cent change <sup>1</sup>
<b>SUPPLY</b>													
Indigenous production	463,364r	464,923	+0.3	121,031	118,637r	112,599r	110,387	121,740	124,547r	120,091r	98,110r	122,175	+0.4
Imports	534,740	524,890	-1.8	142,788	162,960	114,908	89,950	166,923	168,861	94,995r	98,857r	162,177	-2.8
<i>of which LNG</i>	122,310	80,129	-34.5	41,001	36,505	35,591	36,351	13,863	20,477	26,008	18,876r	14,768	+6.5
Exports	116,862	127,191	+8.8	40,459	20,163	27,979	51,985	16,735	15,417	41,758	51,815r	18,200	+8.8
Stock change <sup>2</sup>	16,242	11,227		-4,024	31,688	-9,551	-6,797	901	13,185	1,597	-1,028	-2,527	
Transfers <sup>3</sup>	1,575	2,603		190	238	345	457	535	562	631r	681r	729	
<b>Total supply</b>	899,058r	876,452	-2.5	219,526	293,361r	190,322r	142,013	273,363	291,738r	175,556r	144,805r	264,353	-3.3
Statistical difference	42r	1,231		443	-504	1,984	-335	-1,102	-1,239	705r	444r	1,320	
<b>Total demand</b>	899,016r	875,221	-2.6	219,083	293,865r	188,338r	142,348r	274,465r	292,976r	174,851r	144,361r	263,033	-4.2
<b>TRANSFORMATION</b>													
Electricity generation	297,643	287,048	-3.6	56,289	71,854	71,180	68,295	86,314	79,048r	67,011r	63,849r	77,140	-10.6
Heat generation <sup>4</sup>	26,120	26,120	-	6,687	8,016	5,833	4,955	7,315	8,016	5,833	4,955	7,315	-
Energy industry use	57,773r	60,168	+4.1	15,326	16,014r	14,097r	13,913	13,749	15,500r	15,228r	14,312r	15,128	+10.0
Losses	5,396	5,103	-5.4	2,082	1,154r	1,394r	1,636r	1,212r	1,085r	1,143r	1,299r	1,576	+30.0
<b>FINAL CONSUMPTION</b>													
Iron & steel	4,155	3,994	-3.9	1,118	1,161	990	973	1,032	1,212	1,024	899	859	-16.8
Other industries	95,278r	96,773	+1.6	25,793	34,391r	18,377r	15,526r	26,983r	35,188r	18,210r	15,825r	27,550	+2.1
Domestic	311,825r	297,563	-4.6	84,549	129,040	54,789r	23,098	104,897r	122,341r	47,179r	27,160r	100,882	-3.8
Other final users	95,718r	93,344	-2.5	25,923	30,958r	20,400r	12,674	31,686r	29,308r	17,945r	14,784r	31,307	-1.2
Non energy use <sup>4</sup>	5,109	5,109	-	1,317	1,277	1,277	1,277	1,277	1,277	1,277	1,277	1,277	-

1. Percentage change between the most recent quarter and the same quarter a year earlier.

2. Stock change + = stock draw, - = stock build.

3. Natural gas used in the manufacture of synthetic coke oven gas and biomethane injections into the grid from installations certified under the Renewable Heat Incentive (RHI).

4. For heat generation and non energy use, the 2017 figures currently shown are the 2016 figures carried forward - these will be updated in June 2018.

## Section 5 - Electricity

### Key results show:

#### Provisional 2017

UK electricity demand fell -1.8 per cent in 2017, from 357 TWh in 2016 to 350 TWh. Final consumption was 1.9 per cent lower than in 2016 due to warmer weather (+0.3 degrees Celsius, on average) and improved energy efficiency measures. Domestic consumption fell by 2.6 per cent. **(Table 5.2 and Chart 5.5)**

Supply matched demand with indigenous generation down 1.0 per cent from 339 TWh to 336 TWh. Net imports dropped 15.6 per cent from 17.5 TWh to 14.8 TWh as repairs to the UK-France interconnector went into Q1 2017 and French nuclear outages in Q4 2017 led to high French electricity prices and increased UK exports. **(Chart 5.4)**

Low carbon generation (from nuclear and renewable sources) comprised more than half of UK generation for the first time in 2017, reaching a record high 50.4 per cent share. This was 4.7 percentage points higher than the 45.7 per cent share in 2016, driven by increased renewable capacity and more favourable weather conditions. Nuclear generation has remained broadly stable in recent times, 20.9 per cent in 2017. **(Chart 5.3)**

Gas' share of generation dropped to 40 per cent from 42 per cent, though this was still the second highest annual share since 2011 as gas continued to displace coal-fired generation. Coal's share of generation fell further to 6.7 per cent, from 9.0 per cent in 2016 and 22 per cent in 2015, as many coal plants have closed or converted to biomass. Furthermore, production favours supply from gas as the carbon price per GWh is higher for coal. **(Chart 5.1)**

#### Quarter 4 2017

Total renewables' share of generation increased to 30 per cent, compared to 22 per cent in Q4 2016. Wind and solar generation overtook nuclear in Q4 2017 to be the UK's second highest source of electricity for the first time. This was due to increased wind and solar capacity and higher wind speeds in Q4 2017, combined with lower nuclear generation. **(Chart 5.2)**

Coal's share of generation was stable at 9 per cent compared to Q4 2016, with gas' share down to 39 per cent from 45 per cent. Nuclear's share fell 2 percentage points to 18 per cent due to outages. In total, low carbon electricity accounted for almost half of generation - a record high for Q4 - although down 5.6 percentage points on Q3 2017 due to seasonal differences in electricity consumption. **(Chart 5.1).**

Electricity generated in the fourth quarter of 2017 fell by 1.4 per cent from 93.0 TWh a year earlier to 91.7 TWh. Final consumption in the fourth quarter of 2017 decreased by 0.9 per cent on a year earlier, and domestic sales decreased by 1.2 per cent, as a result of the comparatively warmer weather. **(Chart 5.6)**

### Relevant tables

5.1: Fuel used in electricity generation and electricity supplied

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5.2: Supply and consumption of electricity

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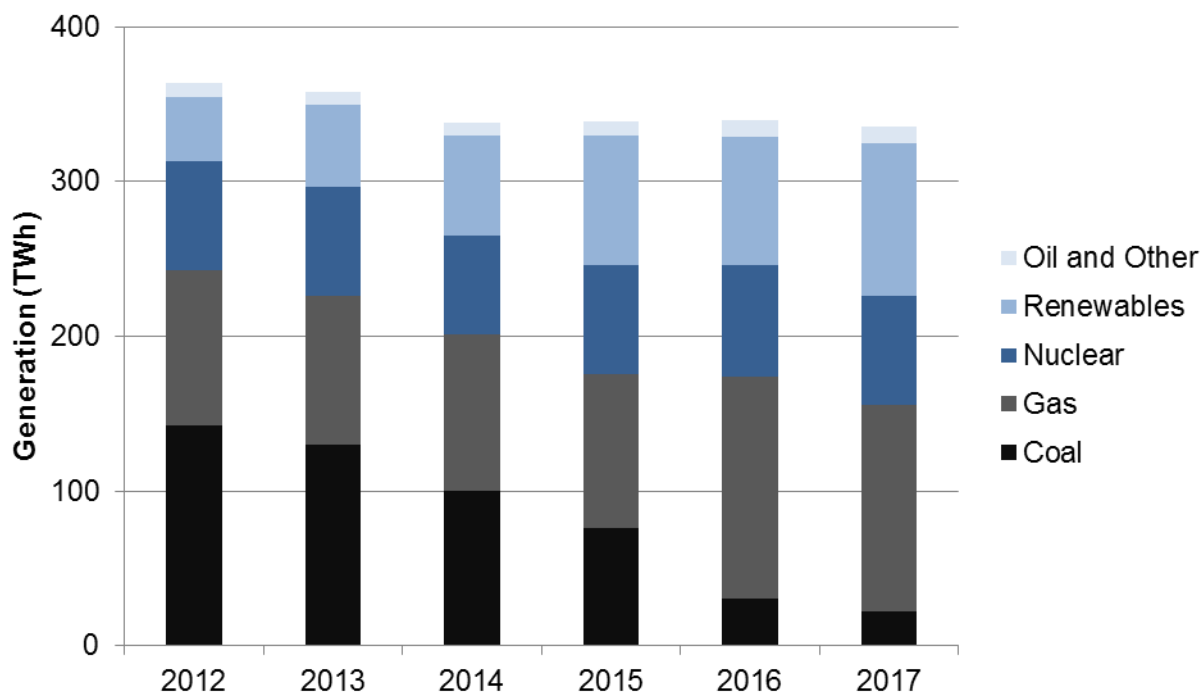
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## Electricity

**Chart 5.1 Electricity generated by fuel type (Table 5.1)**

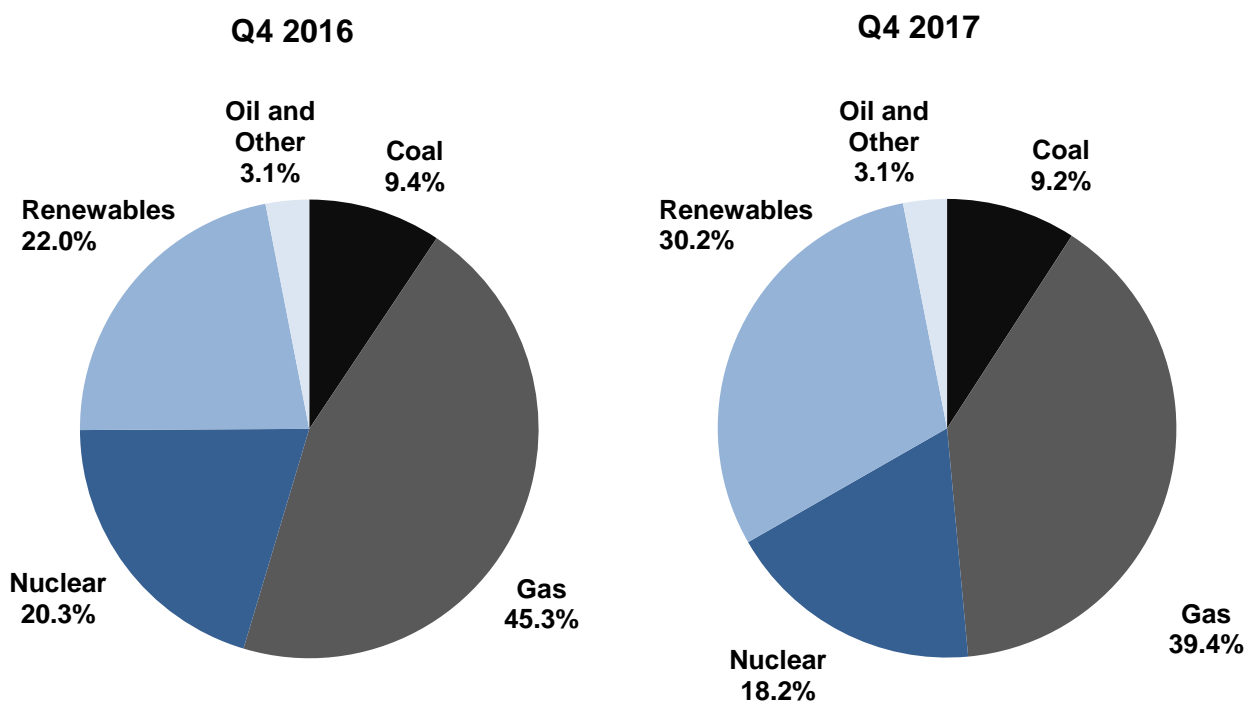


In 2017, total electricity generated continued the gradual declining trend seen in recent years, falling 1.0 per cent from 339 TWh in 2016 to 336 TWh. This was largely due to warmer weather (the daily average temperature in 2017 was 0.3 degrees warmer than 2016), as well as improved energy efficiency measures.

Over the past five years the generation mix has shifted further away from fossil fuels. Coal-fired generation fell 84 per cent compared to 2012, from 143 TWh to 22.6 TWh, its lowest level in this time series as coal plants closed or were converted to high-range co-firing plants (85-100% biomass). Some of the drop in coal was replaced by gas-fired generation, which increased from 100 TWh in 2012 to 143 TWh in 2016 as production costs favoured supply from gas. The increase in the carbon price in April 2016 meant that the carbon price per GWh was lower for gas than coal. Gas fired-generation fell back to 133 TWh in 2017 (-7.0 per cent compared to 2016) with an increase in generation from renewable sources. Nuclear generation fell by 1.9 per cent from 71.7 TWh to 70.3 TWh, the same as in 2015.

Generation from renewables (hydro, wind, solar and bioenergy) increased 19 percent from 83.2 TWh in 2016 to a record high of 98.9 TWh in 2017. The rise was driven by capacity increases in recent years as weather conditions for both wind and solar generation were both slightly below the ten year UK average. Average wind speeds were 4.8 per cent higher at 8.8 knots in 2017 compared to 2016, but still 0.1 knots below the ten year mean. Average daily sun hours were stable at 4.2 hours in 2017 compared to 2016, 0.2 hours below the ten year mean. Hydro generation rose 10 per cent from 5.4 TWh to 5.9 TWh; however, this was still below 2015's record 6.3 TWh.

The generation mix in 2017 was 6.7 per cent from coal (-2.3 pp on 2016), 40 per cent gas (-2.5 pp), 21 per cent nuclear (stable), 29 per cent renewables (+4.9 pp) and 3.2 percent from other sources (stable).

Chart 5.2 Shares of electricity generation ([Table 5.1](#))

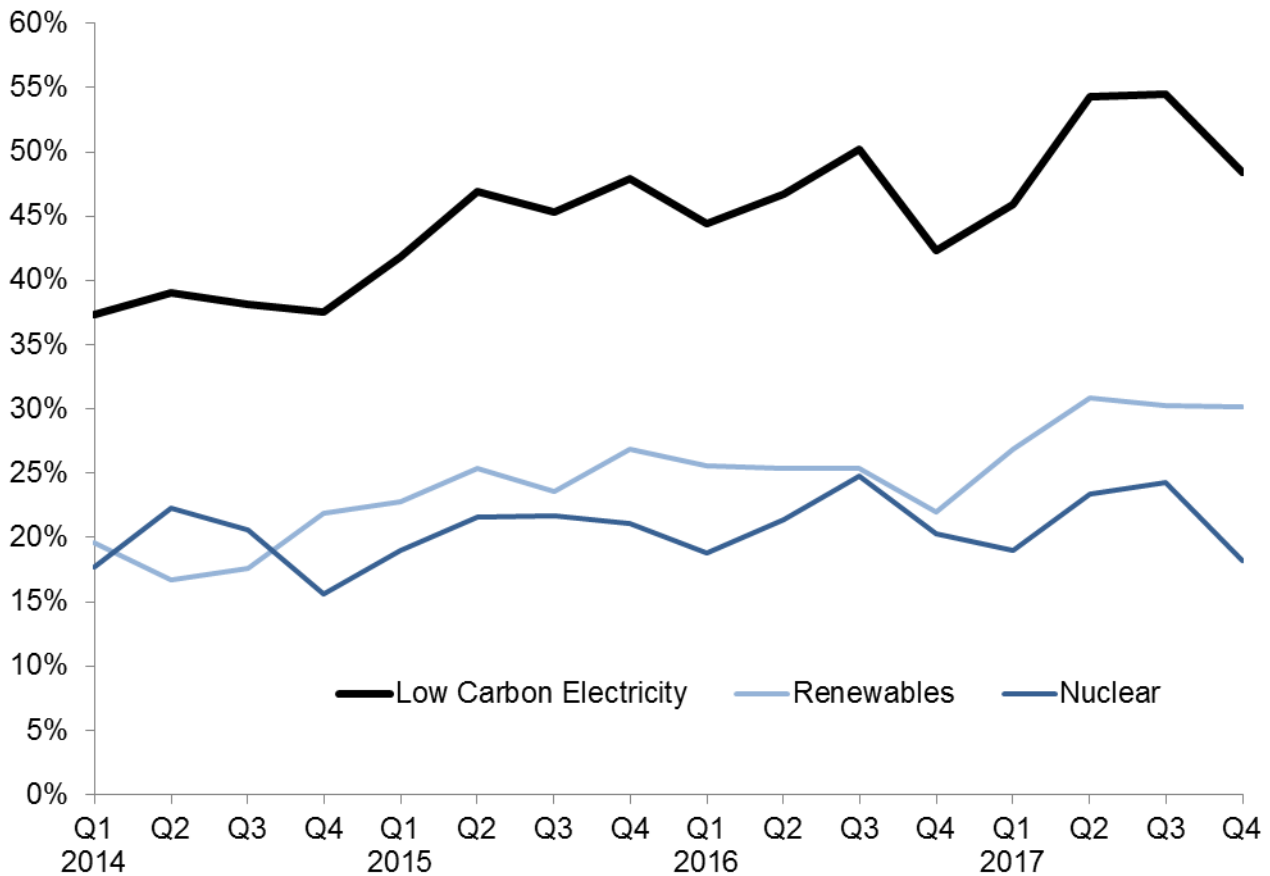
Total renewables' share of generation increased to 30 per cent, compared to 22 per cent in Q4 2016. Wind and solar generation overtook nuclear in Q4 2017 to be the UK's second highest source of electricity for the first time. This was due to increased wind and solar capacity and higher wind speeds in Q4 2017, combined with lower nuclear generation.

Coal-fired generation fell by 4 per cent from 8.7 TWh in 2016 Q4 to 8.4 TWh though its share was broadly stable at 9.2 per cent. Coal-fired plants operated over the colder months to meet increased seasonal demand. Gas fired generation saw the biggest drop in share, down 5.9 percentage points from 45 per cent in 2016 Q4 to 39 per cent in 2017 Q4. Generation from nuclear stations was down 12 per cent, from 18.9 TWh to 16.7 TWh and comprised 18 per cent (down 2.1 pp) of generation for Q4 2017. This is the lowest proportion of generation since Q4 2014, and was due to outages.

See Chapter 6 (Renewables) and table 6.1 for a more detailed breakdown of renewable generation.

## Electricity

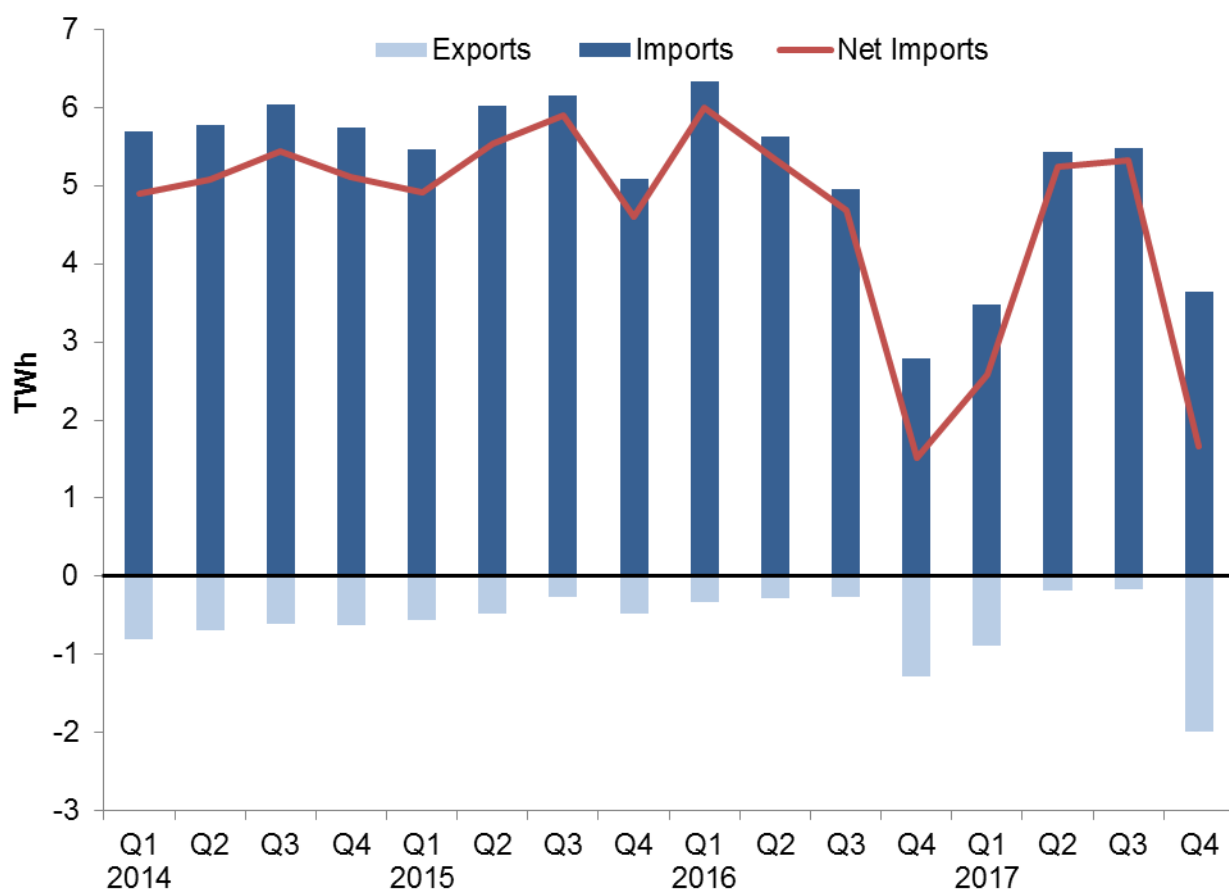
**Chart 5.3 Low carbon electricity's share of generation (Table 5.1)**



More than half of electricity generation was low carbon (from nuclear and renewable sources) for the first time in 2017, reaching a record high 50.4 per cent share of generation. This was 4.7 percentage points higher than the 45.7 per cent share in 2016. Low carbon generation was driven by favourable weather conditions for renewables as well as increased capacity. Nuclear generation has remained fairly constant in recent times.

Low carbon electricity's share of generation increased from 42.3 per cent in 2016 Q4 to 48.4 per cent in 2017 Q4, due to a large rise in renewables generation compared with 2016 Q4. Average wind speed was 9.5 knots in Q4 2017 compared to 7.6 knots in the same period of the previous year.

Chart 5.4 UK trade in electricity (Table 5.6)



Net imports were down 15.6 per cent in 2017 compared to 2016, to 14.8 TWh, as damage to the French interconnector in Q4 2016 halved its capacity; repairs continued into the first quarter of 2017. Outages in French nuclear plants in Q4 2017 led to high French electricity prices. Consequently imports of electricity fell by 8.5 per cent in 2017 compared to the previous year, whilst exports increased by 49 per cent. Net imports accounted for 4.5 per cent of UK electricity supplied in 2017 (down 0.7 percentage points on 2016).

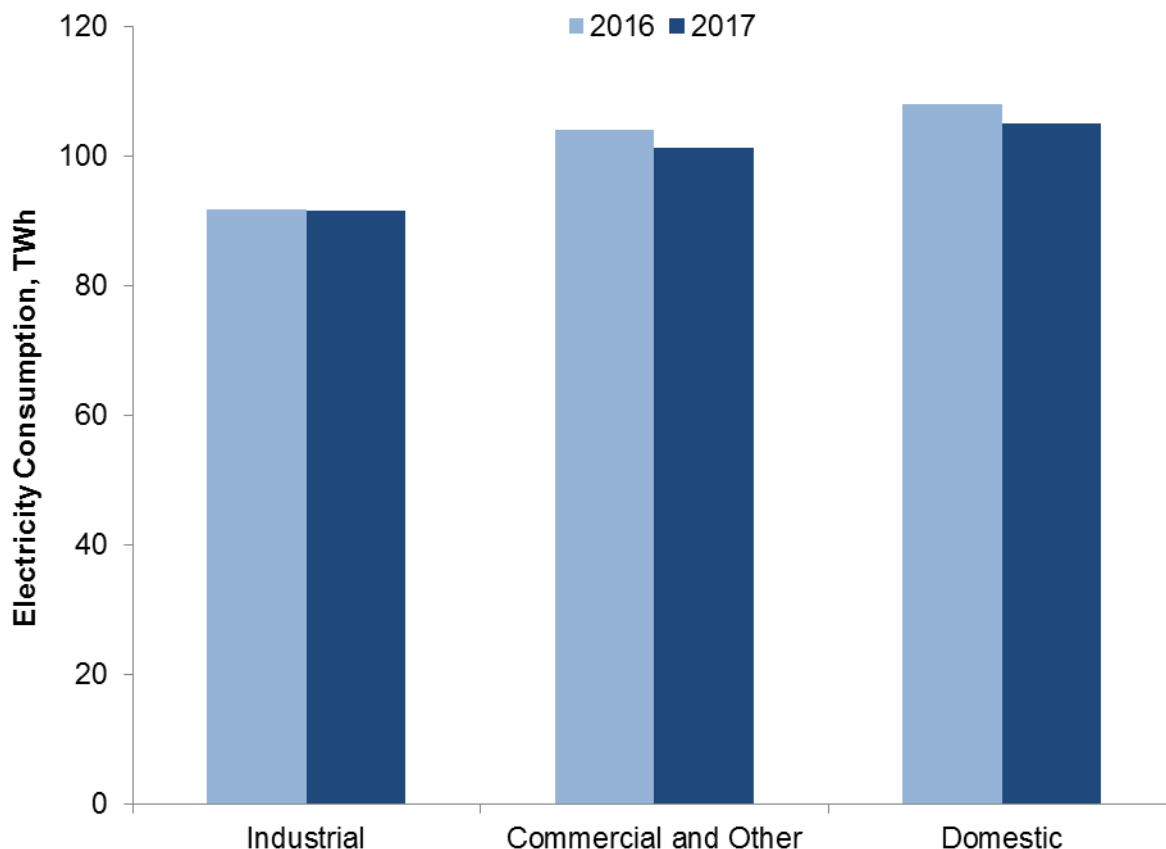
Interconnectors enable the UK to trade electricity with France, the Netherlands and Ireland. The UK was a net importer from all three countries in 2016 and 2017. In 2017, over half of imports came from France (52 per cent) with the balance from Netherlands (39 per cent) and Ireland (9 per cent). The French share was down from the previous year (56 per cent) with Netherlands up (from 38 per cent) and Ireland up (from 6 per cent).

In 2017 the UK net imports from France were 7.2 TWh, with 6.9 TWh from Netherlands and 0.8 TWh from Ireland.

For the most recent quarter, the UK imported 1.7 TWh in Q4 2017 compared to 1.5 TWh in Q4 2016 and 4.6 TWh in Q4 2015. It has been a net importer of electricity in each quarter since Q2 2010. Since France has supplied the majority of UK imports in recent years the high French prices in Q4 2017 and the damage to the UK-France interconnector in Q4 2016 underlie the drops compared to Q4 2015.

## Electricity

**Chart 5.5 Electricity final consumption (annual) (Table 5.2)**



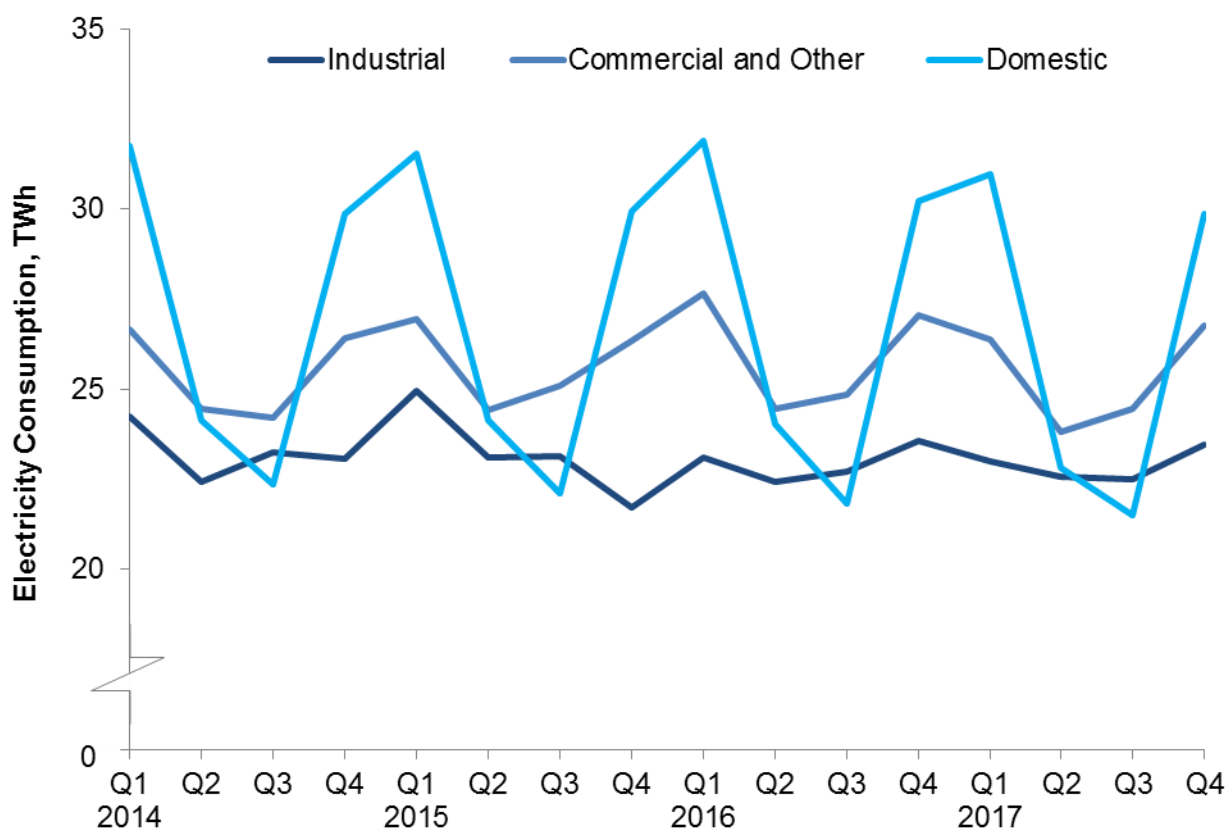
In 2017, final consumption of electricity decreased by 1.9 per cent on the previous year, from 303.8 TWh in 2016 to 298.1 TWh. All quarters in 2017 had a decrease in electricity consumption compared to the same quarter in 2016.

In 2017, domestic use decreased to 105.1 TWh, a 2.6 per cent decrease compared to 2016. For the industrial sector, including iron and steel industries, the decrease was much lower at 0.3 per cent reducing electricity consumption to 91.5 TWh in 2017. Similar to the domestic sector, electricity consumption by commercial and other users decreased by 2.5 per cent, from 104.0 TWh in 2016 to 101.4 TWh in 2017. Commercial and other users include commercial, transport and other final users.

In 2017, temperatures were 0.3 degrees Celsius warmer than in 2016 at 10.6 degrees Celsius – see Energy Trends table 7.1 at:

[www.gov.uk/government/statistics/energy-trends-section-7-weather](http://www.gov.uk/government/statistics/energy-trends-section-7-weather)



**Chart 5.6 Electricity final consumption (quarterly) (Table 5.2)**

In 2017, final electricity consumption decreased by the lowest amount in Q4 in relation to 2016. In Q4 2017, final electricity consumption decreased by 0.9 per cent, from 80.9 TWh in Q4 2016 to 80.1 TWh in Q4 2017.

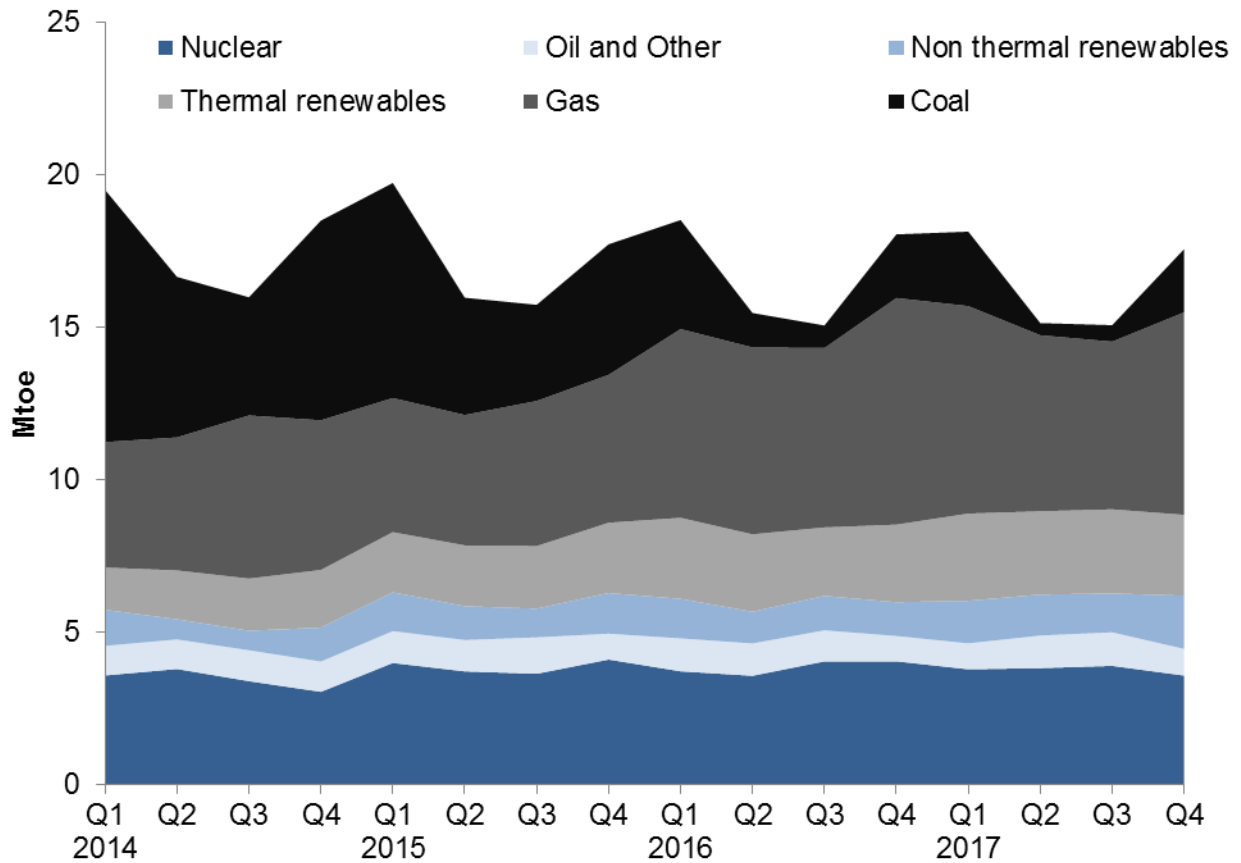
Domestic use decreased by 1.2 per cent, from 30.2 TWh in Q4 2016 to 29.9 TWh in Q4 2017. This decrease was likely a result of the warmer average temperature of Q4 2017 compared to Q4 2016. For the industrial sector (including iron and steel), consumption decreased by 0.5 per cent to 23.5 TWh in Q4 2017 compared to 23.6 TWh. For commercial and other users, consumption decreased to 26.8 TWh in Q4 2017 compared to 27.1 TWh in Q4 2016, a decrease of 1.0 per cent.

The decrease in the industrial sector in Q4 2017 was the smallest sector decrease, in comparison to 2016.

The average temperature was 0.3 degrees Celsius warmer in the fourth quarter of 2017 compared to the same period a year earlier – see Energy Trends table 7.1 at: [www.gov.uk/government/statistics/energy-trends-section-7-weather](http://www.gov.uk/government/statistics/energy-trends-section-7-weather).

Electricity

**Chart 5.7 Fuel used for electricity generation ([Table 5.1](#))**



Fuel used by generators in 2017 fell 1.8 per cent, from 67.1 mtoe in 2016 to 66.0 mtoe (note that for wind and other primary renewable sources the fuel used is assumed the same as the electricity generated, unlike thermal generation where conversion losses are incurred).

In 2017, gas use was 3.6 per cent lower than in 2016. Coal use during 2017 was 28 per cent lower than a year earlier, while nuclear sources fell by 1.9 per cent over the same period.

The chart above shows the how fuel use varies seasonally. In recent years the majority of coal use for electricity generation has shifted to cover periods of peak demand over the winter season. Fuel used by generators in 2017 Q4 fell 2.7 per cent compared to the same quarter in 2016, from 18.1 mtoe in 2016 Q4 to 17.6 mtoe.

In 2017 Q4, gas use was 11 per cent lower than in 2016 Q4. Coal use during the quarter was 0.8 per cent lower than a year earlier, while nuclear sources fell by 11.6 per cent due to outages.

# 5 ELECTRICITY

Table 5.1. Fuel used in electricity generation and electricity supplied

	2016	2017 p	per cent change	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter	2016 4th quarter	2017 1st quarter	2017 2nd quarter	2017 3rd quarter	2017 4th quarter p	per cent change <sup>1</sup>
<b>FUEL USED IN GENERATION</b>													
<b>All generating companies</b>													
	Million tonnes of oil equivalent												
Coal	7.54	5.46	-27.6	4.28	3.58	1.13	0.74	2.09	2.44r	0.40	0.54	2.07	-0.8
Oil	0.58	0.87	+48.7	0.17	0.11	0.15	0.16	0.16	0.17r	0.16	0.25r	0.29	+74.5
Gas	25.63	24.72	-3.6	4.85	6.19	6.13	5.88	7.43	6.81	5.77	5.50r	6.64	-10.6
Nuclear	15.41	15.12	-1.9	4.11	3.73	3.58	4.05	4.06	3.79	3.83	3.91	3.59	-11.6
Hydro	0.46	0.51	+10.2	0.16	0.18	0.08	0.10	0.10	0.16	0.08	0.11	0.17	+62.1
Wind and Solar <sup>2</sup>	4.11	5.25	+27.8	1.18	1.12	0.96	1.03	1.00	1.24r	1.27	1.17r	1.58	+57.1
Bioenergy <sup>3</sup>	9.99	11.00	+10.1	2.31	2.66	2.54	2.25	2.55	2.86r	2.73r	2.76r	2.65	+4.1
Other fuels	1.90	1.76	-7.5	0.28	0.46	0.45	0.45	0.54	0.45	0.46	0.39	0.45	-16.5
Net imports	1.51	1.27	-15.6	0.40	0.52	0.46	0.40	0.13	0.22	0.45	0.46	0.14	+9.7
<b>Total all generating companies</b>	<b>67.14</b>	<b>65.95</b>	<b>-1.8</b>	<b>17.73</b>	<b>18.53</b>	<b>15.48</b>	<b>15.07</b>	<b>18.06</b>	<b>18.15r</b>	<b>15.15r</b>	<b>15.08r</b>	<b>17.57</b>	<b>-2.7</b>
<b>ELECTRICITY GENERATED</b>													
<b>All generating companies</b>													
	TWh												
Coal	30.71	22.58	-26.5	17.48	14.69	4.58	2.72	8.72	10.46r	1.56	2.17	8.40	-3.8
Oil	1.84	2.19	+19.1	0.55	0.34	0.56	0.44	0.50	0.74r	0.26r	0.62r	0.57	+14.2
Gas	143.36	133.34	-7.0	26.20	34.11	34.49	32.67	42.10	36.97r	30.98r	29.27r	36.12	-14.2
Nuclear	71.73	70.34	-1.9	18.69	17.34	16.66	18.86	18.87	17.64	17.83	18.17	16.69	-11.6
Hydro (natural flow)	5.39	5.94	+10.2	1.83	2.09	0.94	1.15	1.21	1.81r	0.88	1.28r	1.97	+62.1
Wind and Solar <sup>2</sup>	47.79	61.09	+27.8	13.69	13.02	11.13	11.96	11.67	14.45r	14.73r	13.57r	18.33	+57.1
- of which, Offshore <sup>6</sup>	16.41	20.89	+27.3	5.76	5.15	3.25	3.58	4.42	5.15r	3.98	3.95	7.80	+76.4
Bioenergy <sup>3</sup>	30.04	31.83	+5.9	8.22	8.52	7.70	6.22	7.60	8.78r	7.86r	7.79r	7.39	-2.8
Pumped Storage	2.96	2.87	-2.9	0.71	0.76	0.69	0.69	0.82	0.79	0.69	0.64	0.75	-7.9
Other fuels	5.57	5.69	+2.1	1.11	1.40	1.30	1.34	1.53	1.42r	1.35r	1.42r	1.51	-1.7
<b>Total all generating companies</b>	<b>339.40</b>	<b>335.87</b>	<b>-1.0</b>	<b>88.49</b>	<b>92.27</b>	<b>78.04</b>	<b>76.06</b>	<b>93.03</b>	<b>93.07r</b>	<b>76.14r</b>	<b>74.93r</b>	<b>91.73</b>	<b>-1.4</b>
<b>ELECTRICITY SUPPLIED <sup>4</sup></b>													
<b>All generating companies</b>													
	TWh												
Coal	29.14	21.42	-26.5	16.58	13.94	4.34	2.58	8.28	9.92r	1.48	2.06	7.96	-3.8
Oil	1.67	1.81	+8.5	0.50	0.30	0.51	0.40	0.46	0.67r	0.25r	0.57r	0.32	-31.3
Gas	140.84	130.89	-7.1	25.73	33.56	33.87	32.07	41.34	36.31r	30.42r	28.74r	35.43	-14.3
Nuclear	65.15	63.89	-1.9	16.98	15.75	15.13	17.13	17.14	16.03	16.20	16.51	15.16	-11.6
Hydro	5.35	5.88	+10.0	1.82	2.07	0.93	1.14	1.20	1.80r	0.87	1.27r	1.95	+62.1
Wind and Solar <sup>2</sup>	47.79	61.09	+27.8	13.69	13.02	11.13	11.96	11.67	14.45r	14.73r	13.57r	18.33	+57.1
- of which, Offshore <sup>6</sup>	16.41	20.89	+27.3	5.76	5.15	3.25	3.58	4.42	5.15r	3.98	3.95	7.80	+76.4
Bioenergy <sup>3</sup>	26.02	27.65	+6.3	7.15	7.41	6.69	5.34	6.58	7.66r	6.83r	6.76r	6.40	-2.7
Pumped Storage (net supply) <sup>5</sup>	-1.07	-1.00	-6.4	-0.25	-0.27	-0.26	-0.23	-0.30	-0.29	-0.25	-0.21	-0.25	-16.1
Other fuels	5.16	5.17	-	1.03	1.30	1.20	1.25	1.42	1.31r	1.26r	1.31	1.29	-9.5
Net imports	17.55	14.81	-15.6	4.60	6.00	5.35	4.68	1.51	2.59	5.24	5.32	1.66	+9.7
<b>Total all generating companies</b>	<b>337.59</b>	<b>331.62</b>	<b>-1.8</b>	<b>87.83</b>	<b>93.08</b>	<b>78.88</b>	<b>76.33</b>	<b>89.30</b>	<b>90.45r</b>	<b>77.03r</b>	<b>75.89r</b>	<b>88.24</b>	<b>-1.2</b>

1. Percentage change between the most recent quarter and the same quarter a year earlier.

2. Includes wave and tidal

3. Up to 2006 Q4, this includes non-biodegradable wastes. From 2007 Q1, this is included in 'Other fuels' (as it is not considered a renewable source).

4. Electricity supplied net of electricity used in generation

5. Net supply from pumped storage is usually negative, as electricity used in pumping is deducted.

6. This now includes a small amount of offshore wind generation from other generators

# 5 ELECTRICITY

Table 5.2 Supply and consumption of electricity

													GWh
	2016	2017 p	Per cent change	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter	2016 4th quarter	2017 1st quarter	2017 2nd quarter	2017 3rd quarter	2017 4th quarter p	Per cent change <sup>1</sup>
<b>SUPPLY</b>													
Indigenous production	339,398	335,865	-1.0	88,489	92,267	78,039	76,062	93,029	93,073	76,137r	74,926r	91,729	-1.4
Major power producers <sup>2,3</sup>	289,985	284,617	-1.9	77,438	80,565	65,450	63,025	80,945	80,683	62,973r	61,787r	79,174	-2.2
Auto producers	46,453	48,376	+4.1	10,337	10,940	11,900	12,345	11,268	11,599	12,471r	12,502r	11,804	+4.8
Other sources <sup>4</sup>	2,959	2,872	-2.9	714	762	689	693	815	791	694	636	751	-7.9
Imports	19,699	18,032	-8.5	5,080	6,334	5,622	4,951	2,792	3,476	5,423r	5,487	3,646	+30.6
Exports	2,153	3,217	+49.4	480	331	275	268	1,279	888	179r	165	1,984	+55.2
Transfers	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total supply</b>	356,943	350,680	-1.8	93,088	98,271	83,386	80,745	94,543	95,661	81,381r	80,248r	93,390	-1.2
Statistical difference	194	261	-	455	85	186	120	26	-360r	18r	290r	313	-
<b>Total demand</b>	356,749	350,420	-1.8	92,633	98,356	83,200	80,625	94,568	96,021r	81,363r	79,957r	93,078	-1.6
<b>TRANSFORMATION</b>	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy industry use <sup>5</sup>	26,631	26,026	-2.3	7,154	6,974	6,297	6,273	7,087	6,959r	6,230r	6,211r	6,626	-6.5
Losses	26,323	26,343	+0.1	7,499	8,713	6,016	4,969	6,624	8,751r	5,922r	5,318r	6,352	-4.1
<b>FINAL CONSUMPTION</b>	303,795	298,050	-1.9	77,979	82,669	70,886	69,383	80,857	80,311r	69,211r	68,428r	80,100	-0.9
Iron & steel	2,847	2,832	-0.5	875	708	703	707	730	714r	702r	685r	730	-
Other industries	88,961	88,699	-0.3	20,827	22,387	21,728	22,000	22,845	22,268r	21,880r	21,813r	22,738	-0.5
Transport	4,669	4,669	-	1,129	1,167	1,167	1,167	1,167	1,167r	1,167r	1,167r	1,167	-
Domestic	107,971	105,114	-2.6	29,947	31,904	24,014	21,831	30,222	30,952r	22,822r	21,489r	29,851	-1.2
Other final users	99,347	96,736	-2.6	25,202	26,502	23,274	23,679	25,892	25,210r	22,639r	23,274r	25,613	-1.1
Non energy use	-	-	-	-	-	-	-	-	-	-	-	-	-

1. Percentage change between the most recent quarter and the same quarter a year earlier.

2. Companies that produce electricity from nuclear sources plus all companies whose prime purpose is the generation of electricity are included under the heading "Major Power Producers". At the end of December 2017 they were:

AES Electric Ltd., Anesco Ltd., Acquisintionco, Baglan Generation Ltd., British Energy plc., British Solar Renewables Ltd., Centrica Energy, Centrica Renewable Energy Ltd., CEP Wind 2, Coolkeeragh ESB Ltd., Corby Power Ltd., Coryton Energy Company Ltd., Cubico Sustainable Investments Ltd., Deeside Power Development Company Ltd., DONG Energy Burbo UK Ltd., Drax Power Ltd., EDF Energy plc., EDF Energy Renewables Ltd., Eggborough Power Ltd., E.On UK plc., Eneco Wind UK Ltd., Energy Power Resources, Falck Renewables Ltd., Fellside Heat and Power Ltd., Ferrybridge Multifuel Energy Limited, First Hydro Company., Greencoat UK Wind plc., Immingham CHP, Infinis plc., International Power Mitsui, Lark Energy Ltd., Lightsource Renewable Energy Ltd., London Waste Ltd., Lynemouth Power Ltd., Magnox North Ltd., Marchwood Power Ltd., Peel Energy Ltd., Premier Power Ltd., REG BlackRock, Riverside Resource Recovery Ltd., Rocksavage Power Company Ltd., RWE Innogy Markinch Ltd., RWE Npower plc., Saltend Cogeneration Company Ltd., Scira Offshore Energy Ltd., Scotia Wind (Craigengelt) Ltd., Scottish Power plc., Scottish and Southern Energy plc., Seabank Power Ltd., SELCHP Ltd., Sembcorp Utilities (UK) Ltd., Severn Power Ltd., Slough Heat and Power Ltd., Spalding Energy Company Ltd., Statkraft Energy Ltd., Statkraft Wind UK Ltd., Third Energy Trading Ltd., Viridor Waste Management Ltd., Xceco

3. This table includes the change of definition of Major power producers (MPPs) to include major wind farm companies. Details of this change of definition were given in an article on pages 43 to 48 of the September 2008 edition of Energy Trends.

4. Gross supply from pumped storage hydro.

5. Includes electricity used in generation and for pumping, along with energy used by other fuel industries (including coal and coke, blast furnaces, extraction of oil and gas, petroleum refineries, nuclear fuel production and gas and electricity supply) .

## Section 6 - Renewables

### Key results show:

#### Provisional 2017

Renewable electricity generation in 2017 increased 18.8 per cent compared to 2016, from 83.2 TWh to a record 98.9 TWh, largely due to increased capacity, and higher wind speeds compared to a year earlier. **(Table 6.1)**

Renewables' share of electricity generation was a record 29.4 per cent and an increase of 4.9 percentage points on the 24.5 per cent share in 2016. This reflects the higher renewable generation and slightly lower overall electricity generation in 2017, compared to 2016. **(Table 6.1 and Chart 6.1)**

In 2017, on the 2009 Renewable Energy Directive basis, normalised renewable generation (accounting for variable weather) was a record 28.1 per cent of gross electricity consumption, an increase of 3.5 percentage points on 2016's share. **(Table 6.1)**

Renewable electricity capacity was 40.5 GW at the end of 2017, a 13.3 per cent increase (4.8 GW) on a year earlier, largely due to increased wind (both onshore and offshore) and solar PV capacity. **(Chart 6.3)**

#### Quarter 4 2017

Renewables' share of electricity generation was 30.2 per cent in 2017 Q4, up 8.2 percentage points on the 22.0 per cent share in 2016 Q4, reflecting higher renewable generation and slightly lower overall electricity generation.

Renewable electricity generation was 27.7 TWh in 2017 Q4, an increase of 35 per cent on 20.5 TWh in 2016 Q4. This was driven by record onshore and offshore wind generation, a result of increased capacity, and higher wind speeds in 2017 Q4 compared to the particularly low wind speeds recorded in 2016 Q4. **(Chart 6.2).**

In 2017 Q4, 207 MW of capacity eligible for the Feed in Tariff scheme was installed, increasing total FiTs capacity to 6.3 GW, across 923,029 installations. **(Chart 6.5)**

### Relevant tables

6.1: Renewable electricity capacity and generation

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6.2: Liquid biofuels for transport consumption

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**Table 6.1 Renewable electricity shares – 2016 and 2017 (provisional)**

	<b>2016</b>	<b>2017p</b>
Renewable generation (TWh)	83.2	98.9
Total electricity generation (TWh)	339.4	335.9
<b>International basis</b>	<b>24.5%</b>	<b>29.4%</b>
Normalised renewable generation (TWh)	87.1	97.8
Gross electricity consumption (TWh)	354.0	347.8
<b>2009 Renewable Energy Directive basis</b>	<b>24.6%</b>	<b>28.1%</b>

In 2017, renewables' share of electricity generation increased to 29.4 per cent, due to increased capacity and higher wind speeds compared to 2016. Overall electricity generation fell by 4.9 per cent; which increased renewables share only slightly, by 0.3 percentage points.

Total electricity generated from renewables in 2017 increased by 18.8 per cent on 2016, from 83.2 TWh to a record 98.9 TWh. Normalised renewable generation rose from 87.1 TWh in 2016 to 97.8 TWh in 2017.

On the 2009 Renewable Energy Directive (RED) basis, the electricity share was 28.1 per cent, compared with 24.6 per cent in 2016. The RED measure uses normalised wind and hydro generation, to account for variable generation due to weather conditions. Under this measure, wind and hydro generation were lowered (due to higher than average load factors in 2017), a reversal of 2016.

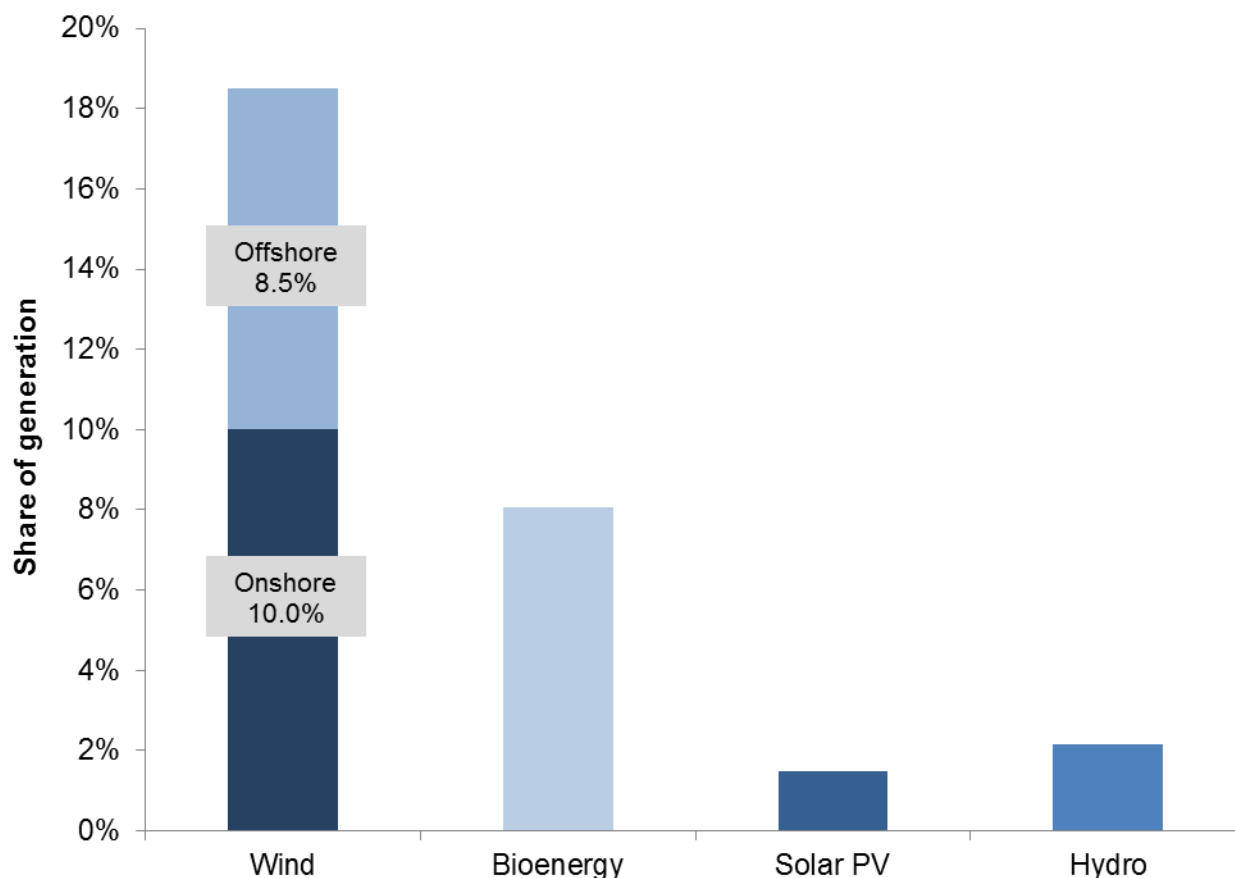
For more information on normalisation, and the various measures of renewable electricity's shares, please see June 2017's "Renewable energy in 2016", at:

[www.gov.uk/government/statistics/energy-trends-june-2017-special-feature-article-renewable-energy-in-2016](http://www.gov.uk/government/statistics/energy-trends-june-2017-special-feature-article-renewable-energy-in-2016)

In 2017 Q4, renewables' share of electricity generation increased by 8.2 percentage points to 30.2 per cent, from the 22.0 per cent share in 2016 Q4. Total electricity generation and electricity demand figures (all generating companies) can be found in tables ET 5.1 and ET 5.2, at:

[www.gov.uk/government/statistics/electricity-section-5-energy-trends](http://www.gov.uk/government/statistics/electricity-section-5-energy-trends).

Overall quarterly electricity generation was 91.7 TWh in 2017 Q4, down by 1.4 per cent on a year earlier (as a result of lower demand, partly due to higher average daily temperatures, which were on average 0.7 degrees higher than the long term mean, and 0.3 degrees higher than a year earlier). Lower electricity generation contributed 0.4 percentage points of the 8.2 percentage point increase in renewables share of generation.

**Chart 6.1 Renewables' share of electricity generation – 2017 Q4** ([Table 6.1](#))

In 2017, generation from onshore wind increased by 37 per cent, from 21.0 TWh in 2016 to a record 28.7 TWh. Onshore wind generation also reached a record level, increasing by 27 per cent, from 16.4 TWh to 20.9 TWh. This was due to increased capacity, and higher wind speeds compared to 2016, which had wind speeds 0.5 knots lower than the 10 year average.

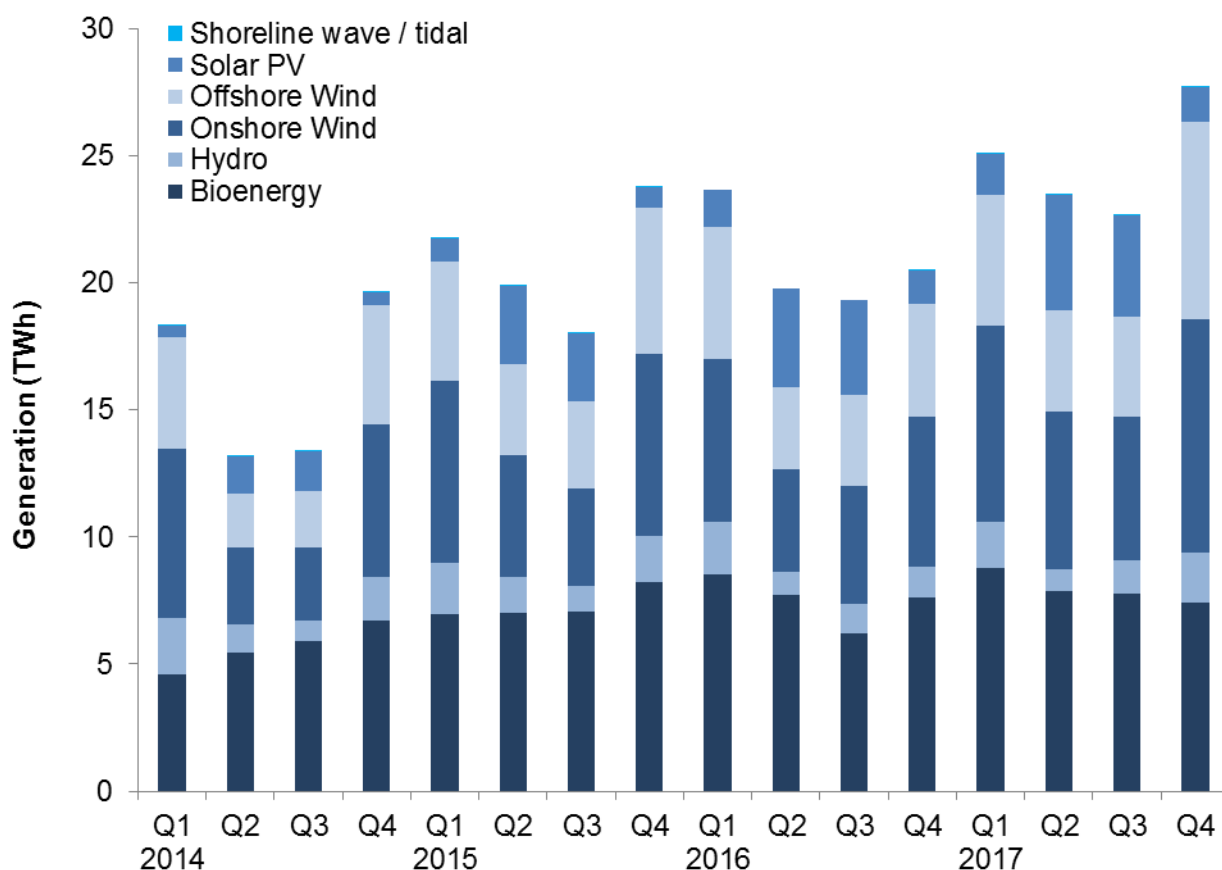
Hydro generation increased by 10 per cent compared to 2016, from 5.4 TWh to 5.9 TWh, with a small increase in capacity offsetting a 0.6 per cent decrease in average rainfall on a year earlier.

In 2017, generation from bioenergy<sup>1</sup> increased by 5.9 per cent, from 30 TWh in 2016 to a record 31.8 TWh. Within this figure, generation from waste increased by 27 per cent, and generation from anaerobic digestion increased by 18 per cent, both partly due to increased capacity. Generation from sewage gas, plant and animal biomass all increased, by 11 per cent, 5.6 per cent and 0.6 per cent, respectively. These combined increases exceeded the large fall in generation from co-firing with fossil fuels (-34 per cent) and landfill gas (-9.7 per cent). Co-firing with fossil fuels fell to a new record low of 77 GWh, as generation from coal-fired power stations fell.

In 2017, 32 per cent of renewables generation was from bioenergy, 29 per cent from onshore wind, 21 per cent from offshore wind, 12 per cent from solar PV, and 6.0 per cent from hydro.

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](http://www.gov.uk/government/statistics/electricity-section-5-energy-trends).

<sup>1</sup> landfill gas, sewage gas, biodegradable municipal solid waste, plant biomass, animal biomass, anaerobic digestion and co-firing (generation only)

**Chart 6.2 Renewable electricity generation (Table 6.1)**

Total electricity generated from renewables in 2017 Q4 was up by 35 per cent on 2016 Q4, from 20.5 TWh to 27.7 TWh, driven by increased, and record, generation from wind.

In 2017 Q4, generation from onshore wind increased by 55 per cent to a record 9.2 TWh. Generation from offshore wind increased by 76 per cent, from 4.4 TWh to a record 7.8 TWh. The increase in generation from both onshore and offshore wind was due to increased capacity coming online throughout 2017, and higher wind speeds compared to 2016 Q4, which saw the lowest wind speeds recorded over the last 15 years. See Energy Trends table 7.2 at: [www.gov.uk/government/statistics/energy-trends-section-7-weather](http://www.gov.uk/government/statistics/energy-trends-section-7-weather).

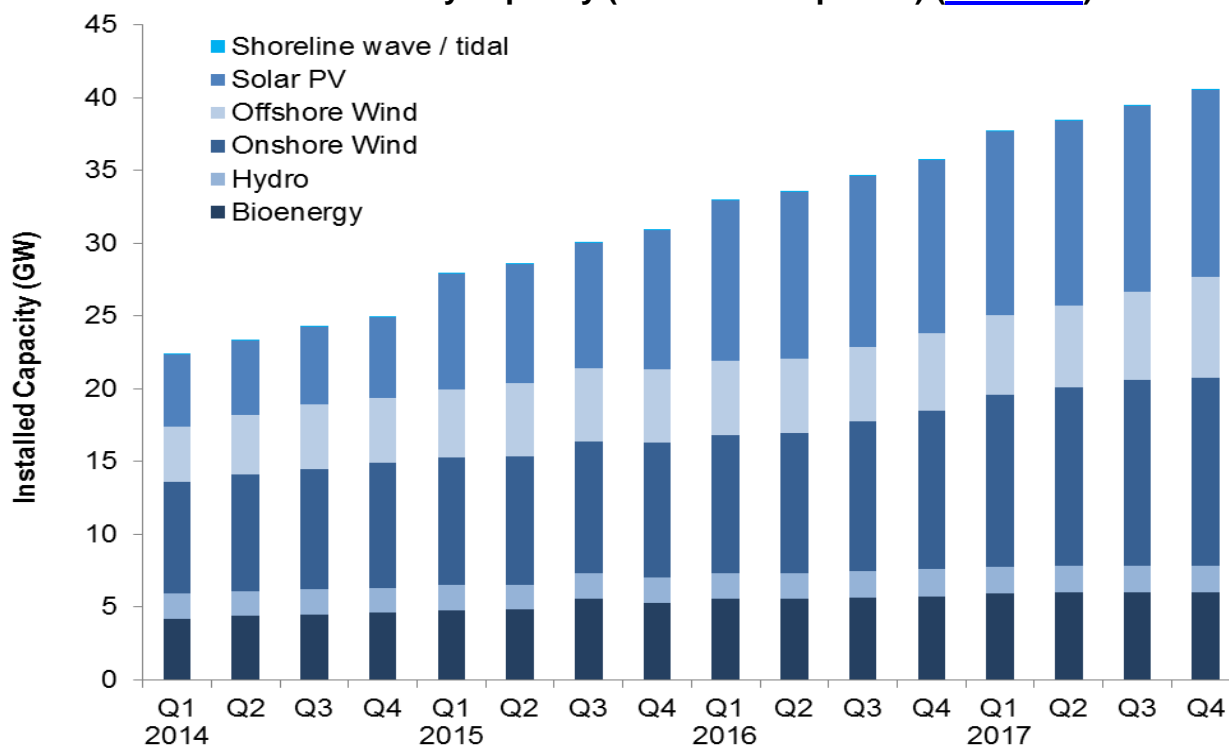
Solar PV generation increased slightly, by 1.6 per cent. Although there was 7.8 per cent of additional capacity in 2017 Q4 compared to a year earlier, the effect of this was reduced by lower load factors, a result of 0.4 less sun hours per day than 2016 Q4.

Generation from bioenergy fell by 2.9 per cent, from 7.6 TWh in 2016 Q4 to 7.4 TWh in 2017 Q4, due to maintenance outages at Drax's biomass units. Within bioenergy, generation from co-firing was down 47 per cent on 2016 Q4, due to a reduction in generation from coal.

In 2017 Q4, hydro generation increased by 62 per cent on a year earlier to 2.0 TWh, the highest Q4 level since 2011. Rainfall (in the main hydro catchment areas) in Q4 was up 54 per cent on 2016 Q4 (the driest Q4 in the last 17 years).

In 2017 Q4, onshore wind had the largest share of generation (33 per cent), with 28 per cent from offshore wind, 27 per cent from bioenergy, 7.1 per cent from hydro and 4.9 per cent from solar PV.



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

At the end of 2017 Q4, the UK's renewable electricity capacity totalled 40.5 GW, an increase of 13 per cent (4.8 GW) on that installed at the end of 2016 Q4, and up 2.7 per cent (1.1 GW) on that installed at the end of the previous quarter. At the end of 2017 Q4, onshore wind had the highest share of capacity at 32 per cent (12.9 GW), followed by solar photovoltaics at 32 per cent (12.8 GW), offshore wind (17 per cent), bioenergy (15 per cent) and hydro (4.6 per cent).

During 2017, onshore wind capacity increased by 1.9 GW, with several large sites opening, or continuing to expand during the year, including the majority of the 239 MW Kilgallioch site and the 173 MW extension to Clyde (both in Scotland). The final third of Wales's largest onshore wind farm, Pen y Cymoedd (228 MW), also came online. Offshore wind capacity increased by 1.7 GW, also a result of several large sites opening, and expanding throughout the year. Key sites which came online during 2017 were Race Bank (573 MW capacity), and the first half of the 660 MW (on completion) of the Walney extension; as well as the 402 MW Dudgeon and final 59 MW of the 259 MW Burbo Bank Extension, the first two offshore wind sites supported under CfD.

Solar PV capacity increased by 0.9 GW during 2017, compared to a 2.4 GW increase during 2016. The majority of growth came from sites accredited under the Renewables Obligation (RO), mainly in 2017 Q1, ahead of the final closure of the RO to grace period qualifying<sup>2</sup> small solar, as well as an increase in small scale Feed in Tariff<sup>3</sup> sites, and a second solar farm under Contracts for Difference (CfD).

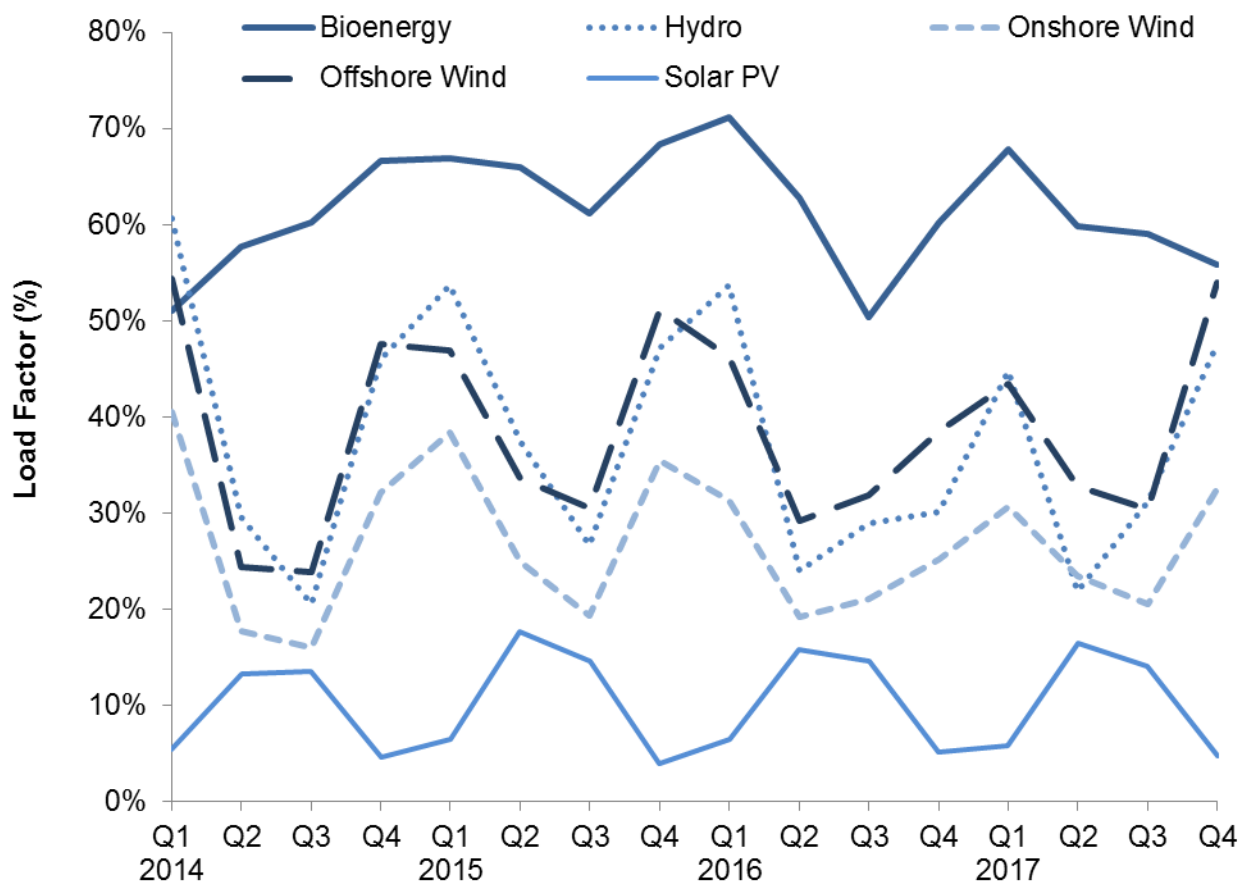
Bioenergy capacity increased by 4.2 per cent (241 MW), mostly due to a 145 MW plant biomass capacity increase (including the 40 MW Margam plant in Wales).

<sup>2</sup> The Renewables Obligation (RO) closed to all large-scale (>5 MW) on 31 March 2015 and small-scale (up to 5 MW) solar on 31 March 2016. Certain installations meeting investment or planning criteria were given year long extensions ("grace periods") to these deadlines, with the commissioning deadline for qualifying small solar sites 31 March 2017. Further details are available at: [www.ofgem.gov.uk/environmental-programmes/ro/about-ro/ro-closure](http://www.ofgem.gov.uk/environmental-programmes/ro/about-ro/ro-closure)

<sup>3</sup> 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.

## Renewables

**Chart 6.4 Renewable electricity load factors (Table 6.1)**



In 2017, onshore wind's load factor averaged 27.6 per cent, a 3.9 percentage point increase on 2016's six-year low. Load factors for offshore wind increased by 2.9 percentage points from a four-year low of 36.0 per cent, to 38.9 per cent. Average wind speeds in 2017, at 8.8 knots, were 0.4 knots higher than in 2016, but 0.1 knots lower than the 10-year average.

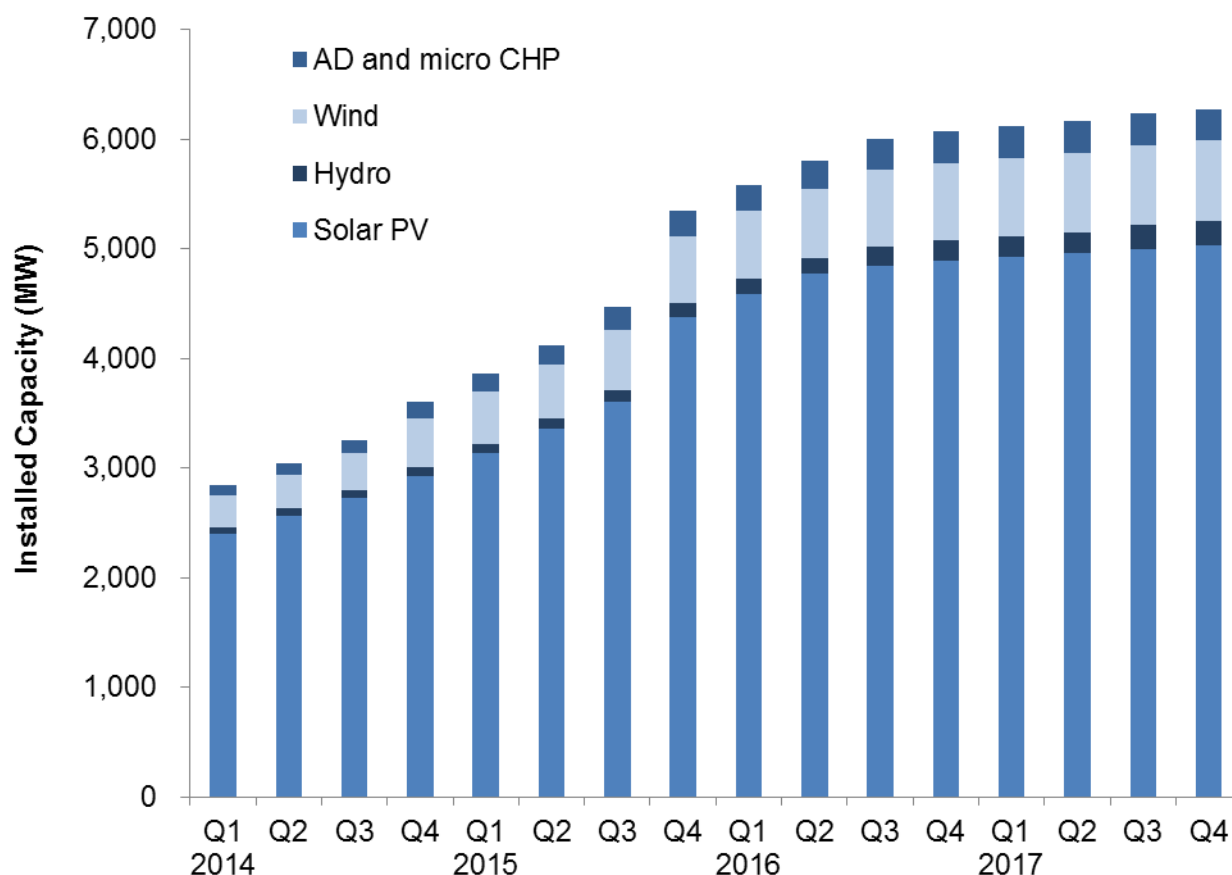
Hydro's load factor in 2017 increased by 2.6 percentage points, from 34.0 per cent in 2016 to 36.6 per cent in 2017.

Onshore wind's load factor in 2017 Q4 stood at a two-year high of 32.5 per cent, a 7.2 percentage point increase on a year earlier. Offshore wind's load factor increased by 15.5 percentage points compared to 2016 Q4, from 38.5 per cent, to 54.0 per cent, the second highest load factor recorded in 8 years and the highest since 2014 Q1. Average wind speeds were 9.5 knots, 1.8 knots higher than in the same period a year earlier.<sup>4</sup>

Hydro's load factor in 2017 Q4 was 47.6 per cent, a 17.5 percentage point increase on a year earlier, due to 54 per cent more rainfall (in the main hydro catchment areas) than 2016 Q4, and rainfall in October over three times higher than a year earlier.

Bioenergy's load factor fell to 55.8 per cent in 2017 Q4, down from 59.0 per cent the previous quarter and 4.4 percentage points lower than a year earlier, as the biomass units at Drax power station suffered maintenance outages.

<sup>4</sup> 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 2017 Q4, 6.3 GW of capacity was installed and eligible for the GB Feed in Tariff (FiT) scheme<sup>5</sup>. This was an increase of 0.6 per cent (38 MW) on that installed at the end of 2017 Q3, and 3.4 per cent (207 MW) higher than the amount installed at the end of 2016 Q4. Two-thirds of FiT capacity installed across the year was solar PV.

In terms of number of installations, at the end of 2017 Q4, there were 923,029 installed and eligible for the FiT scheme, a 0.9 per cent increase on the 914,622 installed at the end of the previous quarter, and a 4.0 per cent increase on the 887,912 installations a year earlier.

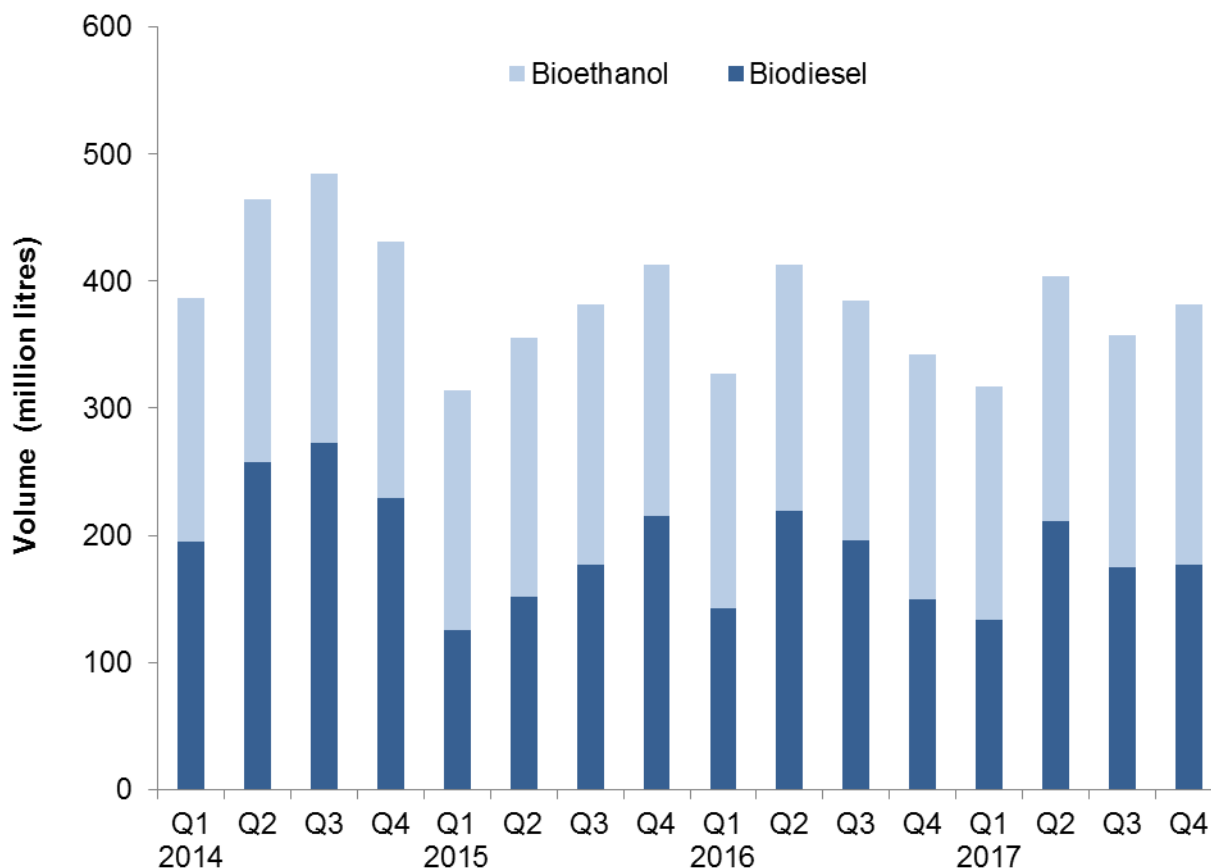
Solar photovoltaics (PV) represent the majority of both installations and installed capacity confirmed on FiTs, making up, respectively, 99 per cent and 80 per cent of the total.

Renewable installations eligible for FiTs (all except Micro CHP) 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](http://www.gov.uk/government/collections/feed-in-tariff-statistics)

<sup>5</sup> 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)**

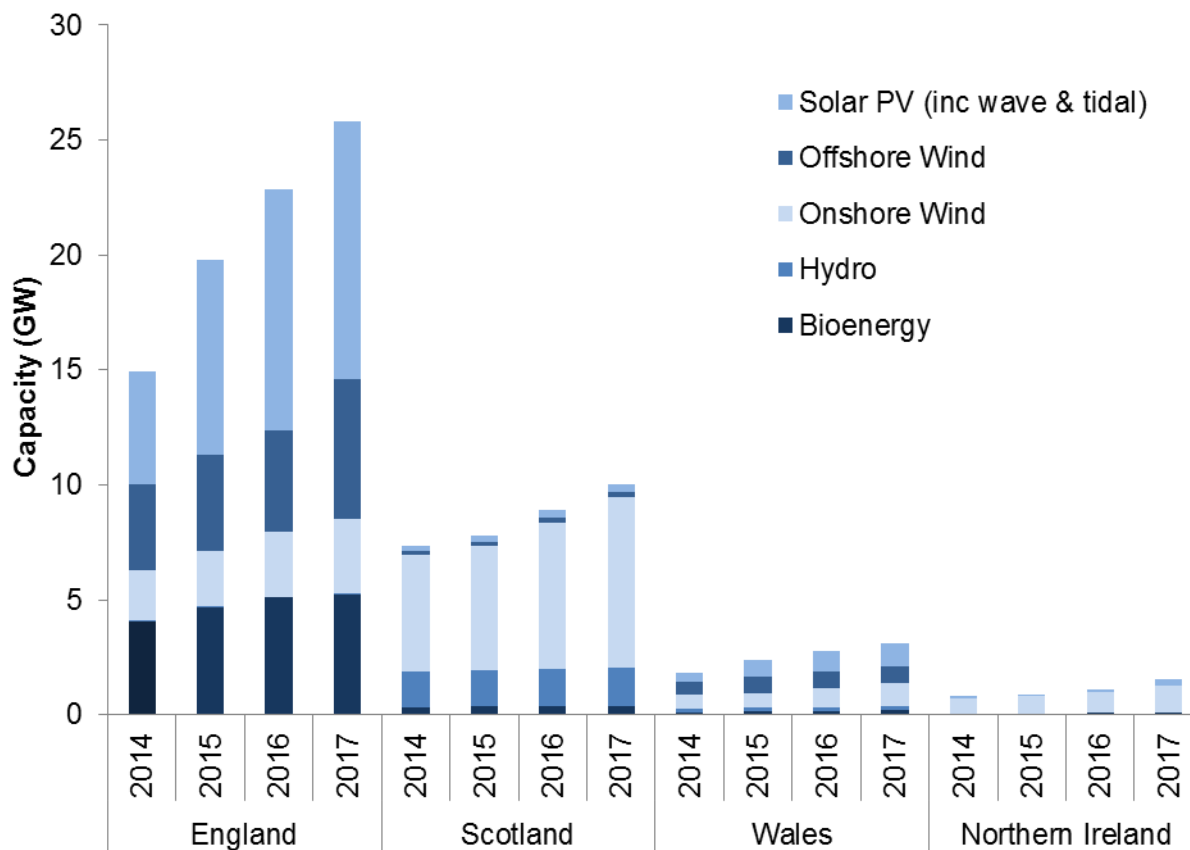
In 2017, 1,460 million litres of liquid biofuels were consumed in transport, a decrease of 0.5 per cent on 2016's 1,467 million litres. Bioethanol consumption increased, by 0.6 per cent, from 759 million litres to 764 million litres. Biodiesel consumption fell by 1.7 per cent, from 708 million litres in 2015 to 696 million litres in 2017.

In 2017, bioethanol contributed to 52 per cent of biofuel consumption, compared with 48 per cent from biodiesel. This split is equivalent to that recorded in 2016.

In 2017, in volume terms, bioethanol accounted for 4.5 per cent of motor spirit, and biodiesel 2.3 per cent of total diesel; the combined contribution to total road fuels was 3.1 per cent, equivalent to 2016.

In 2017 Q4, 382 million litres of liquid biofuels were consumed in transport, an increase of 12 per cent on the 342 million litres in 2016 Q4. Biodiesel consumption increased by 18 per cent, from 150 million litres, the lowest Q4 for four years, to 177 million litres. Bioethanol consumption in 2016 Q4 increased by 6.7 per cent, from 192 million litres, the lowest Q4 in 5 years, to 205 million litres in 2017 Q4.

In 2017 Q4, the largest share of consumption was from bioethanol (54 per cent), with the remaining 46 per cent from biodiesel. Biodiesels share increased 2 percentage points on a year earlier.

**Chart 6.7 Renewable electricity capacity, by UK country**

At the end of 2017, England's renewable electricity capacity was 25.8 GW, an increase of 13 per cent (2.9 GW) on that at the end of 2016, with offshore wind (1.6 GW), solar (0.7 GW) and onshore wind (0.4 GW) being the main contributors to the increase.

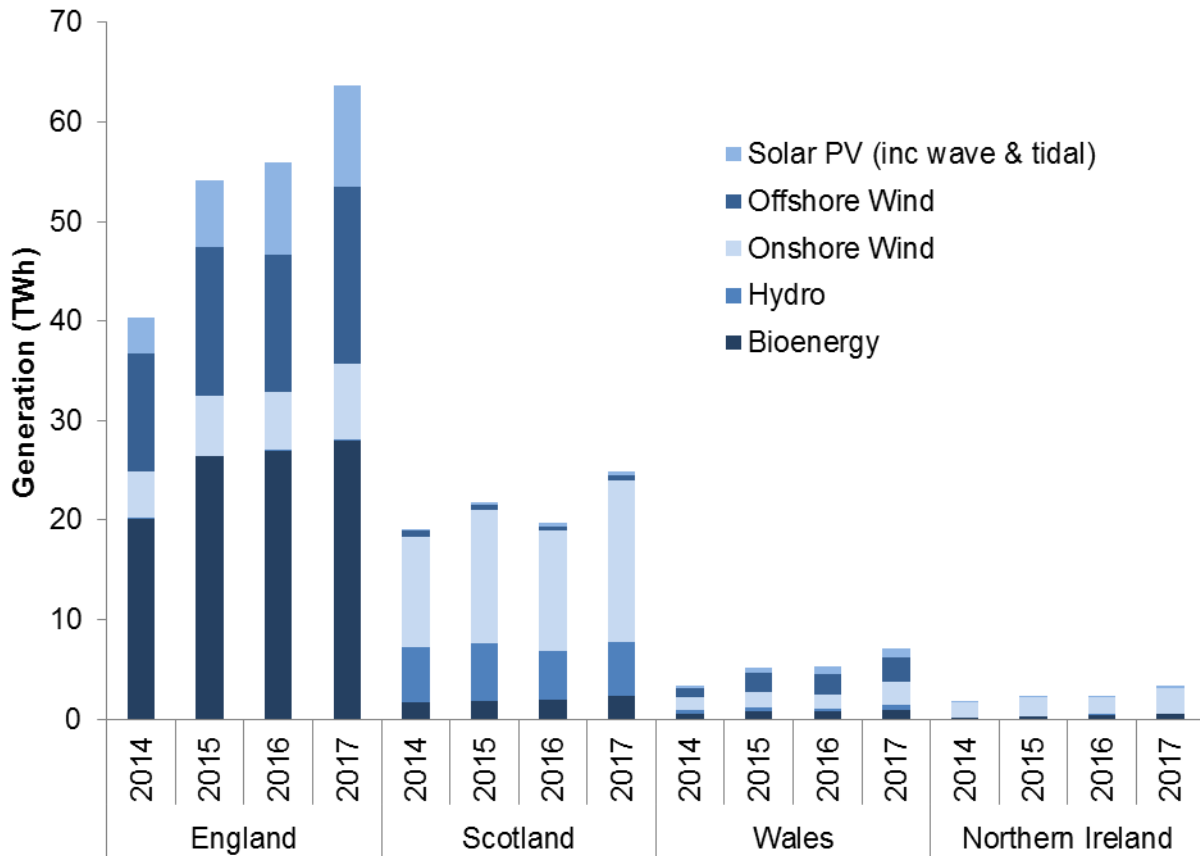
Scotland's capacity was 9.9 GW, an increase of 16 per cent (1.4 GW) on a year earlier, 95 per cent of this increase was due to additional onshore wind capacity.

Wales's capacity was 3.1 GW, an increase of 10 per cent (0.3 GW) on that at the end of 2016, with 64 per cent of this increase due to additional onshore wind capacity.

Northern Ireland's capacity was 1.5 GW, an increase of 36 per cent (0.4 GW) on a year earlier, with 67 per cent of this increase attributable to new wind farms, and 29 per cent due to new solar capacity (both small and large solar).

At the end of 2017, England accounted for 64 per cent of UK renewable electricity capacity; Scotland's share was 25 per cent, Wales's was 7.7 per cent and Northern Ireland's stood at 3.7 per cent.

Quarterly renewable electricity statistics by UK country can be found in table ET 6.1, at: [www.gov.uk/government/statistics/energy-trends-section-6-renewables](http://www.gov.uk/government/statistics/energy-trends-section-6-renewables)

**Chart 6.8 Renewable electricity generation, by UK country**

In 2017, renewable electricity generation in England was 63.7 TWh, an increase of 14 per cent (7.7 TWh) on 2016. Of this extra generation, 5.8 TWh came from onshore and offshore wind, due to increased capacity, and higher wind speeds compared to 2016.

Generation in Scotland was 24.8 TWh, an increase of 26 per cent (5.1 TWh) on 2016; 4.2 TWh of this additional generation was from onshore wind.

Generation in Wales was 7.0 TWh, an increase of 34 per cent (1.8 TWh) on 2016. An increase in wind generation by 1.4 TWh contributed to 80 per cent of this increase.

Generation in Northern Ireland was 3.3 TWh, an increase of 42 per cent (1.0 TWh) on 2016, 0.8 TWh (82 per cent) of this increase was from onshore wind.

In 2017, England accounted for 64 per cent of UK renewable electricity generation; Scotland's share was 25 per cent, Wales's was 7.1 per cent and Northern Ireland's 3.3 per cent.

## 6 RENEWABLES

Table 6.1. Renewable electricity capacity and generation

	2016	2017 p	per cent change	2015	2016	2016	2016	2016	2017	2017	2017	2017	per cent change <sup>11</sup>
				4th quarter	1st quarter	2nd quarter	3rd quarter	4th quarter	1st quarter	2nd quarter	3rd quarter	4th quarter p	
<b>Cumulative Installed Capacity<sup>1</sup></b>													<b>MW</b>
Onshore Wind	10,924	12,862	+17.7	9,222	9,479	9,633	10,295	10,924	11,799r	12,233r	12,725r	12,862	+17.7
Offshore Wind	5,294	6,975	+31.8	5,094	5,094	5,094	5,094	5,294	5,455	5,653	6,101	6,975	+31.8
Shoreline wave / tidal	13	18	+36.4	9	8	8	8	13	18r	18r	18r	18	+36.4
Solar photovoltaics	11,899	12,760	+7.2	9,535	11,008	11,469	11,742	11,899	12,618r	12,660r	12,715r	12,760	+7.2
Small scale Hydro	358	397	+10.8	299	307	311	343	358	362r	366r	395r	397	+10.8
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	1,062	1,066	+0.4	1,061	1,062	1,062	1,062	1,062	1,066r	1,066r	1,066r	1,066	+0.4
Sewage sludge digestion	257	271	+5.4	231	257	257	257	257	271r	271r	271r	271	+5.4
Energy from waste	1,017	1,054	+3.7	925	934	934	983	1,017	1,054	1,054	1,054	1,054	+3.7
Animal Biomass (non-AD) <sup>2</sup>	129	129	-	111	129	129	129	129	129	129	129	129	-
Anaerobic Digestion	420	461	+9.6	323	370	377	405	420	457r	460r	460r	461	+9.6
Plant Biomass <sup>3,6</sup>	2,850	2,995	+5.1	2,607	2,787	2,787	2,796	2,850	2,942r	2,995r	2,995r	2,995	+5.1
<b>Total</b>	<b>35,700</b>	<b>40,464</b>	<b>+13.3</b>	<b>30,893</b>	<b>32,909</b>	<b>33,537</b>	<b>34,591</b>	<b>35,700</b>	<b>37,649r</b>	<b>38,383r</b>	<b>39,408r</b>	<b>40,464</b>	<b>+13.3</b>
Co-firing <sup>4</sup>	13	9	-34.5	21	13	13	13	13	9	9	9	9	-34.5
<b>Generation<sup>5</sup></b>													<b>GWh</b>
Onshore Wind <sup>6</sup>	20,962	28,720	+37.0	7,135	6,406	4,010	4,631	5,915	7,703r	6,180r	5,659r	9,179	+55.2
Offshore Wind <sup>6,7</sup>	16,406	20,885	+27.3	5,757	5,150	3,253	3,584	4,419	5,154r	3,984r	3,951r	7,797	+76.4
Shoreline wave / tidal <sup>6</sup>	0	4	(+)	0	-	-	-	0	0r	0r	2r	1	(+)
Solar photovoltaics <sup>6</sup>	10,420	11,479	+10.2	798	1,464	3,872	3,750	1,335	1,595r	4,572r	3,956r	1,356	+1.6
Hydro <sup>6</sup>	5,395	5,944	+10.2	1,834	2,089	938	1,154	1,214	1,815r	878r	1,282r	1,968	+62.1
Landfill gas <sup>6</sup>	4,703	4,247	-9.7	1,220	1,218	1,171	1,158	1,156	1,092r	1,049r	1,057r	1,049	-9.2
Sewage sludge digestion <sup>6</sup>	950	1,056	+11.1	220	236	251	229	234	267r	271r	258r	260	+10.8
Energy from waste <sup>8</sup>	2,741	3,484	+27.1	688	728	626	677	710	809r	859r	911r	905	+27.5
Co-firing with fossil fuels	117	77	-34.4	55	51	15	5	47	50	0	1	25	-46.6
Animal Biomass (non-AD) <sup>2,6</sup>	650	654	+0.6	165	171	165	140	173	171	164r	142r	177	+2.3
Anaerobic Digestion	2,052	2,423	+18.0	426	482	492	524	554	582r	609r	620r	611	+10.4
Plant Biomass <sup>3,6</sup>	18,829	19,885	+5.6	5,443	5,637	4,981	3,481	4,730	5,808r	4,911r	4,803r	4,363	-7.8
<b>Total</b>	<b>83,225</b>	<b>98,857</b>	<b>+18.8</b>	<b>23,741</b>	<b>23,633</b>	<b>19,773</b>	<b>19,333</b>	<b>20,485</b>	<b>25,046r</b>	<b>23,477r</b>	<b>22,643r</b>	<b>27,691</b>	<b>+35.2</b>
Non-biodegradable wastes <sup>9</sup>	2,742	3,485	+27.1	688	728	626	678	710	809r	859r	911r	905	+27.5
<b>Load Factors<sup>10</sup></b>													
Onshore Wind	23.7%	27.6%		35.4%	31.4%	19.2%	21.0%	25.2%	31.4%	23.5%	20.5%	32.5%	
Offshore Wind	36.0%	38.9%		51.2%	46.3%	29.2%	31.9%	38.5%	44.4%	32.8%	30.4%	54.0%	
Solar photovoltaics	11.1%	10.6%		4.0%	6.5%	15.8%	14.6%	5.1%	6.0%	16.6%	14.1%	4.8%	
Hydro	34.0%	36.6%		47.1%	53.7%	24.1%	29.0%	30.1%	45.8%	21.8%	31.3%	47.6%	
Landfill gas	50.4%	45.6%		52.1%	52.5%	50.5%	49.4%	49.3%	47.5%	45.0%	44.9%	44.6%	
Sewage sludge digestion	44.3%	45.6%		43.1%	44.3%	44.7%	40.3%	41.3%	46.8%	45.8%	43.1%	43.4%	
Energy from waste	32.1%	38.4%		34.1%	35.9%	30.7%	32.0%	32.1%	36.2%	37.3%	39.1%	38.9%	
Animal Biomass (non-AD)	61.7%	57.7%		67.7%	65.4%	58.5%	49.2%	60.7%	61.3%	58.0%	49.6%	62.1%	
Anaerobic Digestion	62.8%	62.8%		61.9%	63.7%	60.4%	60.7%	60.8%	61.4%	60.8%	61.0%	60.1%	
Plant Biomass	78.6%	77.7%		88.5%	95.7%	81.8%	56.5%	75.9%	92.8%	75.7%	72.6%	66.0%	
<b>Total (excluding co-firing and non-biodegradable wastes)</b>	<b>28.4%</b>	<b>29.6%</b>		<b>35.2%</b>	<b>33.8%</b>	<b>27.2%</b>	<b>25.7%</b>	<b>26.3%</b>	<b>31.6%</b>	<b>28.3%</b>	<b>26.4%</b>	<b>31.4%</b>	
<b>Renewable share of electricity generation (%)</b>													
Onshore wind	6.2%	8.6%		8.1%	6.9%	5.1%	6.1%	6.4%	8.3%	8.1%	7.6%	10.0%	
Offshore wind	4.8%	6.2%		6.5%	4.2%	4.7%	4.7%	5.5%	5.5%	5.2%	5.3%	8.5%	
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%		0.9%	1.6%	5.0%	4.9%	1.4%	1.7%	6.0%	5.3%	1.5%	
Hydro	1.6%	1.8%		2.1%	2.3%	1.2%	1.5%	1.3%	2.0%	1.2%	1.7%	2.1%	
Bioenergy	8.9%	9.5%		9.3%	9.2%	9.9%	8.2%	8.2%	9.4%	10.3%	10.4%	8.1%	
<b>All renewables</b>	<b>24.5%</b>	<b>29.4%</b>		<b>26.8%</b>	<b>25.6%</b>	<b>25.3%</b>	<b>25.4%</b>	<b>22.0%</b>	<b>26.9%</b>	<b>30.8%</b>	<b>30.2%</b>	<b>30.2%</b>	

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.

11. Percentage change between the most recent quarter and the same quarter a year earlier; (+) represents a positive percentage change greater than 100%.

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%.

## 6 RENEWABLES

Table 6.2. Liquid biofuels for transport consumption

	2016	2017 p	per cent change	2015 4th Quarter	2016 1st quarter	2016 2nd quarter	2016 3rd Quarter	2016 4th Quarter	2017 1st Quarter	2017 2nd Quarter	2017 3rd Quarter	2017 4th Quarter p	per cent change <sup>1</sup>
<b>Volume (million litres)</b>													
Bioethanol	759	764	+0.6	198	184	194	189	192	184	193	182r	205	6.7%
Biodiesel	708	696	-1.7	215	143	219	196	150	133	211	175r	177	17.9%
<b>Total biofuels for transport</b>	<b>1,467</b>	<b>1,460</b>	<b>-0.5</b>	<b>413</b>	<b>327</b>	<b>413</b>	<b>385</b>	<b>342</b>	<b>317</b>	<b>404</b>	<b>357r</b>	<b>382</b>	<b>11.6%</b>
<b>Energy (thousand toe)</b>													
<b>Thousand tonnes of oil equivalent</b>													
Bioethanol	428	431	+0.6	112	104	109	107	108	104	109	103r	115	6.7%
Biodiesel	582	572	-1.7	177	117	180	161	123	109	173	144r	145	17.9%
<b>Total biofuels for transport</b>	<b>1,010</b>	<b>1,002</b>	<b>-0.7</b>	<b>288</b>	<b>221</b>	<b>289</b>	<b>268</b>	<b>231</b>	<b>213</b>	<b>282</b>	<b>246r</b>	<b>261</b>	<b>12.7%</b>
<b>Shares of road fuels</b>													
Bioethanol as per cent of Motor Spirit	4.4%	4.5%		4.5%	4.5%	4.4%	4.4%	4.5%	4.6%	4.5%	4.3%	4.8%	
Biodiesel as per cent of DERV	2.4%	2.3%		2.9%	2.0%	2.9%	2.6%	1.9%	1.9%	2.7%	2.3%	2.3%	
<b>Total biofuels as per cent of road fuels</b>	<b>3.1%</b>	<b>3.1%</b>		<b>3.5%</b>	<b>2.9%</b>	<b>3.4%</b>	<b>3.2%</b>	<b>2.8%</b>	<b>2.8%</b>	<b>3.4%</b>	<b>3.0%</b>	<b>3.2%</b>	
<b>Shares of road fuels - % change on quarter in previous year</b>													
Bioethanol as per cent of Motor Spirit				0.0%	-0.1%	-0.2%	-0.3%	-0.1%	0.1%	0.1%	-0.1%	0.3%	
Biodiesel as per cent of DERV				-0.3%	0.2%	0.8%	0.2%	-0.9%	-0.1%	-0.1%	-0.3%	0.4%	
<b>Total biofuels as per cent of road fuels</b>				<b>-0.2%</b>	<b>0.0%</b>	<b>0.4%</b>	<b>0.0%</b>	<b>-0.7%</b>	<b>-0.1%</b>	<b>-0.1%</b>	<b>-0.2%</b>	<b>0.3%</b>	

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](http://www.uktradeinfo.com/Statistics/Pages/TaxAndDutybulletins.aspx)



## Domestic energy bills in 2017: The impact of variable consumption

### Introduction

From March 2018, Quarterly Energy Prices (QEP) includes two additional tables that cover estimated annual bills based on actual consumption and temperature adjusted consumption. These tables, Table 2.2.5 (electricity) and Table 2.3.5 (gas) which supplements the tables showing bills for fixed consumption, can be found in the latest addition of QEP at:

[www.gov.uk/government/statistical-data-sets/annual-domestic-energy-price-statistics](http://www.gov.uk/government/statistical-data-sets/annual-domestic-energy-price-statistics)

### Summary

BEIS estimate that annual standard electricity bills based on actual consumption rose by 1.9 per cent from 2016 to 2017, with gas bills falling by 3.1 per cent over the same period. This is as a result of decreases in gas prices in 2017, and decreases in average consumption of both standard electricity and gas. Combined annual actual bills are at their lowest in cash terms since 2011 at £1,112 (see Table 2), and in real terms, bills are at their lowest in the current decade (see Table 3). Estimates using temperature adjusted consumption are also available in Tables 2.2.5 and 2.3.5.

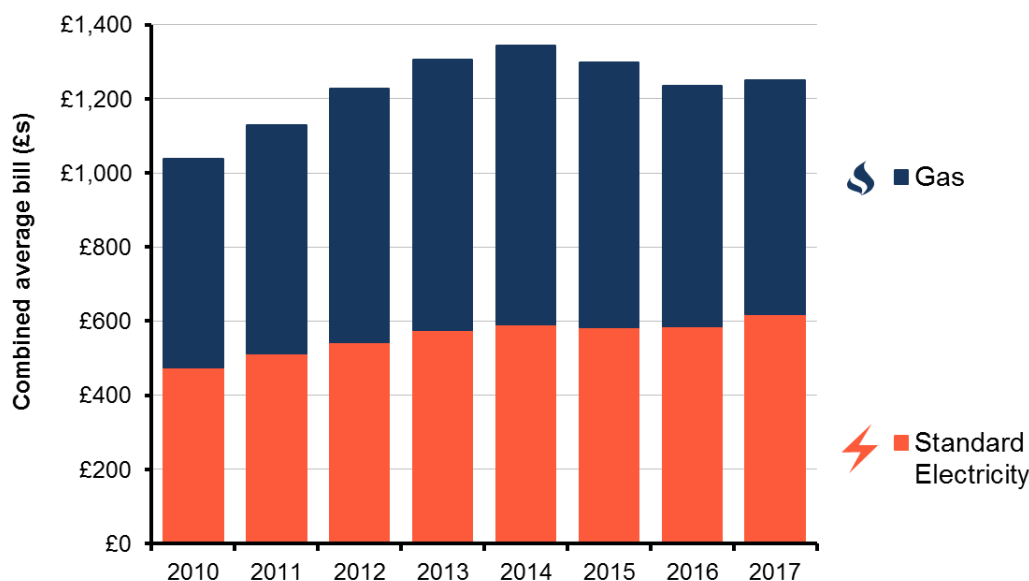
### Drivers of actual bills

The two key drivers of actual bills are the unit prices of energy and the amount of energy consumed. There are several further factors that influence consumption, such as increased energy efficiency through household insulation or more efficient appliances, but the most influential factor of gas consumption is the weather.

### Drivers of actual bills - price changes

Annual energy bills can be calculated based on fixed energy consumption levels: a given consumption level of energy that does not change from year to year<sup>1</sup>. This allows price comparisons between years as the impacts of weather and energy efficiency measures on bills that influence consumption are removed. Average combined bills between 2010 and 2017 are shown in Chart 1, with data available in Table 2.2.1 for electricity and Table 2.3.1 for gas of QEP.

**Chart 1: Domestic energy bills based on fixed consumption levels 2010-2017**



<sup>1</sup> BEIS publishes estimates of annual domestic electricity and gas bills in its Quarterly Energy Prices (QEP) publication. These bills are based on quarterly pricing information collected from energy suppliers. They are calculated using standard annual consumption assumptions of 3,800kWh for standard electricity and 15,000kWh for gas.

### Annual domestic energy bills based on actual consumption

The extent to which price and consumption changes cause overall bill changes can be analysed by holding one driver constant so any change in the bill is attributable to the other. Overall, for standard electricity and gas combined, there is around a £36 fall in the average energy bill from 2016 to 2017.

If standard electricity prices had remained static from 2016 to 2017, bills would have decreased by £21 due to the fall in average consumption. If consumption had remained static bills would have increased by £32 due to the increase in price. The combination of these factors caused average standard electricity bills to increase by around £10.

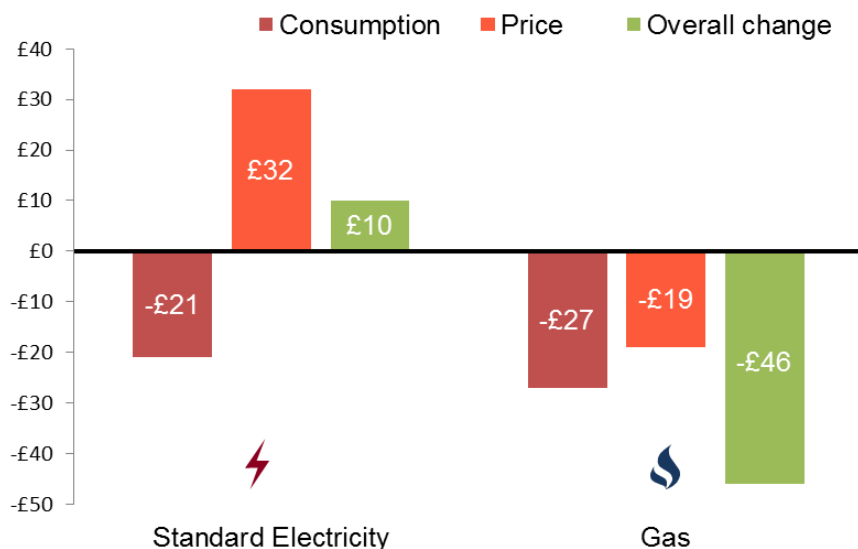
For gas, if prices had remained static from 2016 to 2017, bills would have decreased by £27. If consumption had remained static, bills would have decreased by £19 due to the decrease in prices. Together, these factors resulted in a decrease of £46 for the average actual gas bill. This is demonstrated in Chart 2 below.

The above splits are equivalent to stating that the price effect is adding around £13 to energy bills (£32 from electricity and a £19 reduction from gas), but the fall in average consumption (a £23 fall in electricity and a £26 fall in gas) has outweighed this price effect. This is also shown in Table 1 below.

**Table 1: Summary of effects that have altered energy bills between 2016 and 2017**

	Standard electricity (£)	Gas (£)	Total (£)
Price effect (£)	+32	-19	+13
Consumption effect (£)	-21	-27	-49
Combined effect (£)	+10	-45	-36

**Chart 2: 2016 to 2017 changes in energy bills attributable to changes in consumption and price**



The data below shows average energy bills based on actual consumption, split by standard electricity and gas, in both cash and real terms. To see an extended time series going back further, see the link at the beginning of this article.

**Table 2: Average energy bills based on actual consumption (cash prices)**

	Standard electricity	Gas	Total
2010	£518	£647	£1,165
2011	£527	£581	£1,108
2012	£563	£706	£1,269
2013	£591	£748	£1,339
2014	£578	£641	£1,219
2015	£557	£630	£1,187
2016	£555	£593	£1,148
2017	£565	£547	£1,112
Change in 2016-2017	£10	-£46	-£36
% Change	1.9%	-7.8%	-3.1%

**Table 3: Average energy bills based on actual consumption (in 2010 prices)**

	Standard electricity	Gas	Total
2010	£518	£647	£1,165
2011	£516	£570	£1,086
2012	£544	£681	£1,225
2013	£560	£708	£1,268
2014	£538	£598	£1,136
2015	£516	£584	£1,100
2016	£504	£539	£1,043
2017	£503	£487	£990
Change in 2016-2017	-£1	-£52	-£53
% Change	-0.2%	-9.6%	-5.1%

**Next steps**

These tables will be revised in July when DUKES (Digest of UK Energy Statistics) is published to reflect revised average consumption data. It will then be updated at this time next year to update for 2018 data.

**User feedback**

Please send any comments or queries regarding this analysis to the contact details below:

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## The contribution of reversible air to air heat pumps towards the Renewable Energy Directive

### Introduction

Each year, the Department of Business, Energy and Industrial Strategy (BEIS) reports to Eurostat, the statistical division of the European Commission (EC), its progress against the Renewable Energy Directive (RED) target<sup>1</sup>; 15 per cent of UK energy consumption is to be sourced from renewables by 2020. Although there is no set target for heat specific consumption, the UK aims to achieve 12 per cent by 2020.

This article provides the high level provisional results from a recent research project into heat consumption from reversible air to air heat pumps (RAAHPs) in order for heat generated by these types of heat pumps to be included in the UK's progress against the RED. The full research paper can be accessed via the following link:

[www.gov.uk/government/publications/renewable-energy-from-reversible-air-to-air-heat-pumps](http://www.gov.uk/government/publications/renewable-energy-from-reversible-air-to-air-heat-pumps)

### Key Points

- In 2016, 512 thousand tonnes of oil equivalent (ktoe) were generated by RAAHPs
- Total installed capacity of RAAHPs meeting the minimum eligible for reporting progress towards the RED was 20GW in 2016
- Heat generated by all heat pumps increased by a factor of over four
- Renewable heat (as measured on a RED basis) increased from 6.2 per cent (as reported in DUKES 2017) to 7.0 per cent in 2016
- 73 per cent of RAAHPs were used for heating at least some of the time (the remainder were either used only in cooling mode or weren't able to provide heating)
- There were 3.6 million single and split type systems operating in 2016, and 0.3 million variable flow rate systems

### Background

Since 2008, the UK has included heat from heat pumps, where evidence for the stock and performance has been readily available. Previously, ground source, air source, and exhaust air heat pumps were included, using industry body sales figures to estimate the stock in addition to Eurostat default assumptions<sup>2</sup> and the results of a previous heat pump research study<sup>3</sup>. Typical capacities were estimated using data collected to support the Renewable Heat Incentive (RHI)<sup>4</sup>.

There are three types of systems which can be considered to be RAAHPs<sup>5</sup>;

- Single split air conditioners; systems where a single indoor unit is connected to a single outdoor unit, both ducted and un-ducted
- Multi split air conditioners; systems where multiple indoor units are connected to a single outdoor unit, with all units operating simultaneously
- Variable refrigerant flow (VRF); systems where multiple indoor units that can be in heating and cooling mode simultaneously are connected to one or more outdoor unit

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<sup>1</sup> <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32009L0028>

<sup>2</sup> In 2013, the EC published a Commission Decision providing guidelines on calculating renewable energy from heat pumps which included default assumptions;;

<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32013D0114>

<sup>3</sup> [www.gov.uk/government/publications/detailed-analysis-of-data-from-heat-pumps-installed-via-the-renewable-heat-premium-payment-scheme-rhpp](http://www.gov.uk/government/publications/detailed-analysis-of-data-from-heat-pumps-installed-via-the-renewable-heat-premium-payment-scheme-rhpp)

<sup>4</sup> [www.gov.uk/government/collections/renewable-heat-incentive-statistics](http://www.gov.uk/government/collections/renewable-heat-incentive-statistics)

<sup>5</sup> Source; Delta EE research results;

[www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/680534/renewable-energy-reversible-air-to-air-heat-pumps.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/680534/renewable-energy-reversible-air-to-air-heat-pumps.pdf)

### *Special feature – heat generated by reversible air to air heat pumps*

Although market industry data showed that there was a high number of RAAHPs in the UK, it was considered likely that they were mostly used as air conditioning units rather than to provide heat. BEIS considered that even if a modest proportion of RAAHPs were used to provide at least some heating, this could provide a significant boost to renewable heat estimates.

In order to provide a more reflective picture of renewable heat in the UK, BEIS commissioned Delta Energy and Environment (Delta EE) to undertake a detailed survey of small to medium enterprises (SMEs) and energy managers to estimate key variables necessary to calculate the heat generated. These were;

- The proportion of RAAHPs able to provide heating
- Time in operation in heating mode (as opposed to cooling)
- The average capacity (this was not available from RHI data as RAAHPs are not supported by this mechanism)
- The stock of heat pumps exceeding the minimum Seasonal Performance Factor<sup>6</sup> ((SPF, 2.5 as specified in the heat pump guidelines)

In addition, Delta EE were tasked with estimating other factors to improve the accuracy of the estimates; although the heat pump guidance includes some default assumptions, member states are actively encouraged to produce their own, more reflective estimates. These properties are;

- Average SPF
- Hours of operation
- The proportion exceeding the minimum SPF (100 per cent of heat pumps installed after 2008)

A regional analysis was also required as the EC Commission Decision guidance for reporting requires member states to produce estimates based on warm, average and cold climates as heat pump characteristics vary depending on the ambient temperature. The UK is classified as mostly being a warm climate apart from Scotland and the northernmost counties of England (Northumberland, Tyne and Wear, Tees Valley Cumbria, County Durham, and Cumbria.

## **Methodology**

In order to estimate the quantity of heat generated, how heat pumps are used in situ (as opposed to relying on manufactures' specifications), are required. Delta identified that the majority of installed RAAHPs are within the commercial sector and therefore determined that the following research approaches should be pursued;

- A telephone based survey of 100 SMEs which use RAAHPs for heating
- An online survey of energy managers representing larger groups and companies active in the UK and using RAAHPs at some (or all) of their sites
- Interviews of installers active in the UK air conditioning market
- Desk based research including the analysis of previous scientific work in this area as well as market research of prices and efficiencies
- Review of market data collected by the Building Services Research and Information Association (BSRIA)

More detail on the methodology can be found in section 3.3 (page 9) of Delta EE's report<sup>7</sup>.

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<sup>6</sup> Measure of the efficiency; for example, an SPF of 2.5 means that 2.5kWh of heat is delivered for every 1kWh of electricity it uses;

[Seasonal Performance Factor \(SPF\) | Ofgem](#)

<sup>7</sup> [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/680534/renewable-energy-reversible-air-to-air-heat-pumps.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/680534/renewable-energy-reversible-air-to-air-heat-pumps.pdf)

## Results

Final results were derived using a combination of the best quality data from each of the survey and research approaches.

Table 1 below shows a summary of the derived assumptions alongside references to the relevant section in Delta’s published report.

**Table 1**

Description	Assumption	Survey / research method	Section in report
Installed capacity; single & multi  VRF	8.18 kW  47.47 kW	BSRIA sales data for cooling capacity plus analysis of relationship between heating and cooling capacities	Page 51, section 7.1.2
RAAHPs used for heating	73 per cent	Mean; EMA SME	Page 28, section 6.1.3 Page 45, section 6.2.3
Located in “average” climate	89 per cent	SME survey	Page 37, figure 30
Exceeding the minimum 2.5 SPF <sup>8</sup> ; Single & split VRF	50 per cent 100 per cent	Analysis of BSRIA sales data 2008 and 2017	Page 53, section 7.1.4
Hours of operation; VRF average climate VRF cold climate	738 738	EMA	Page 29, section 6.1.5
Single & multi average climate Single & multi cold climate	646 339	SME	Page 45, section 6.2.3
Proportion non-recovered heat (VRFs only)	39 per cent	SME survey	Page 56, third bullet
Average SPF	2.8	Desk research; Eunomia report <sup>9</sup>	Page 53, section 7.1.4

The varied approach to the research; surveys combined with desk based research has led to more robust assumptions and has ensured more gaps in existing knowledge have been filled. For example, had the study focussed solely on the Energy Managers Association (EMA) survey, the proportion of recovered heat for VRF systems would not have been established as these systems were not prevalent among the SME sector. For those variables where data were determined using more than one approach, such as the hours of operation, there is an increased level of confidence in the results. The coverage of the study has meant that none of the default values set out by the commission have been implemented.

Table 2 below shows a comparison of the Eurostat default assumptions compared to the results of Delta EE’s research:

<sup>8</sup> For reporting the UK’s progress against the Renewable Energy Directive, only heat generated by heat pumps exceeding the minimum SPF. For other renewables reporting such as The Digest of UK Energy Statistics (DUKES), all heat pumps are included. This applies to all heat pumps, not just RAAHPs

<sup>9</sup> “RHI Evidence: Reversible Air to Air Heat Pumps”;  
[www.eunomia.co.uk/reports-tools/rhi-evidence-report-reversible-air-to-air-heat-pumps/](http://www.eunomia.co.uk/reports-tools/rhi-evidence-report-reversible-air-to-air-heat-pumps/)

**Table 2**

	Hours of operation		Average SPF	
	Average climate	Cold climate	Average climate	Cold climate
Split and multi split	646	339	2.8	2.8
VRF	738	738	2.8	2.8
Apportioned <sup>1</sup>	669	438	2.8	2.8
Eurostat assumption	710	1,970	2.6	2.5

<sup>1</sup> As Delta had produced estimates for the different types of RAAHPs, it was necessary to produce an overall figure. This was done using apportionment depending on the relative installed capacities. As installed capacity for single and multi split systems was much greater than that for VRF systems, the net result was skewed towards single and multi splits.

Where the results of the survey differ most to the default assumptions is in the hours of operation in the colder climate; just 438 compared to 1,970.

**The formula used to calculate the useable energy value** is provided in the Commission guidance;

Installed capacity X proportion >2.5 SPF X hours of operation

This is then adjusted to allow for the portion of energy used to drive the heat pump;

Useable energy X (1-1/ Average SPF)

#### **Impact on progress against the Directive target**

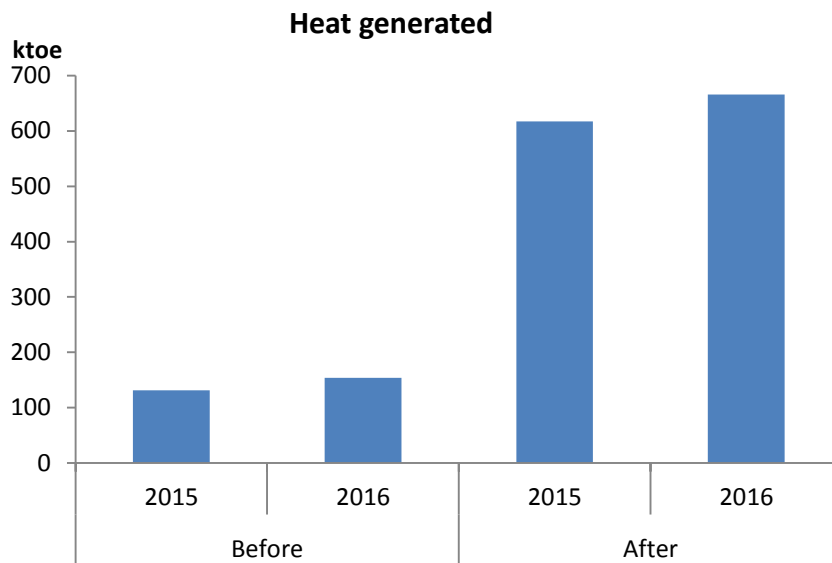
The results have been incorporated into the latest reporting to Eurostat on the UK's progress against the Renewable Energy Directive; filed 31<sup>st</sup> December 2017 as published on their website at: <http://ec.europa.eu/eurostat/web/energy/data/shares>

The "Detailed Results" link shows the full templates returned for each member state and includes a specific heat pump sheet. This shows the full breakdown by heat pump type and climate zones.

**The inclusion of RAAHPs has increased heat generation from heat pumps by a factor of 4.** Chart 1 below shows a comparison for the 2015 and 2016 years both before<sup>10</sup> and after inclusion;

<sup>10</sup> As reported in the Digest of UK Energy Statistics (DUKES), published in July 2017. See table 6.1 or 6.6 [Digest of UK Energy Statistics \(DUKES\): renewable sources of energy - GOV.UK](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/644222/Digest_of_UK_Energy_Statistics_(DUKES)_renewable_sources_of_energy_-_GOV.UK)

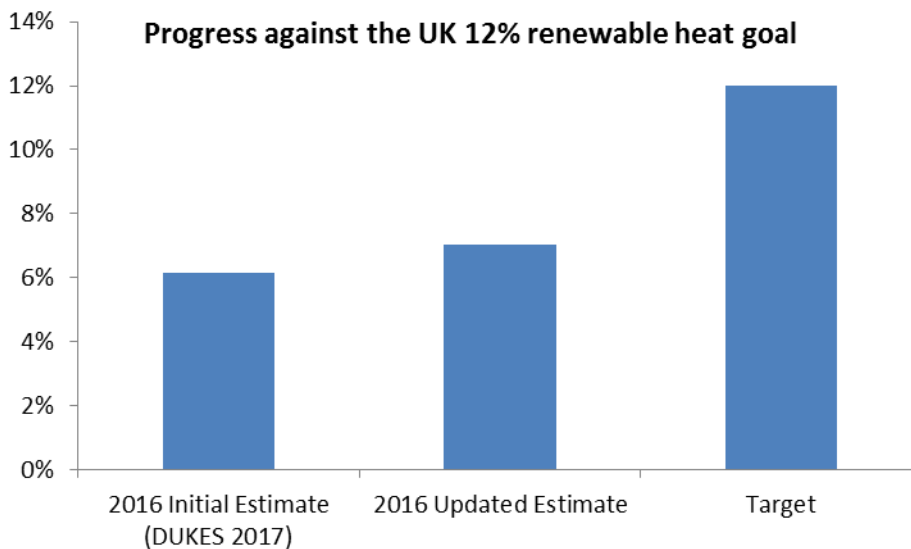
**Chart 1**



**The impact on the percentage of renewable heat** was more muted as heat pumps represent a fairly small proportion of overall heat.

Chart 2 below shows the effect against the UK’s goal<sup>11</sup> of achieving 12 per cent of heat from renewable sources:

**Chart 2**



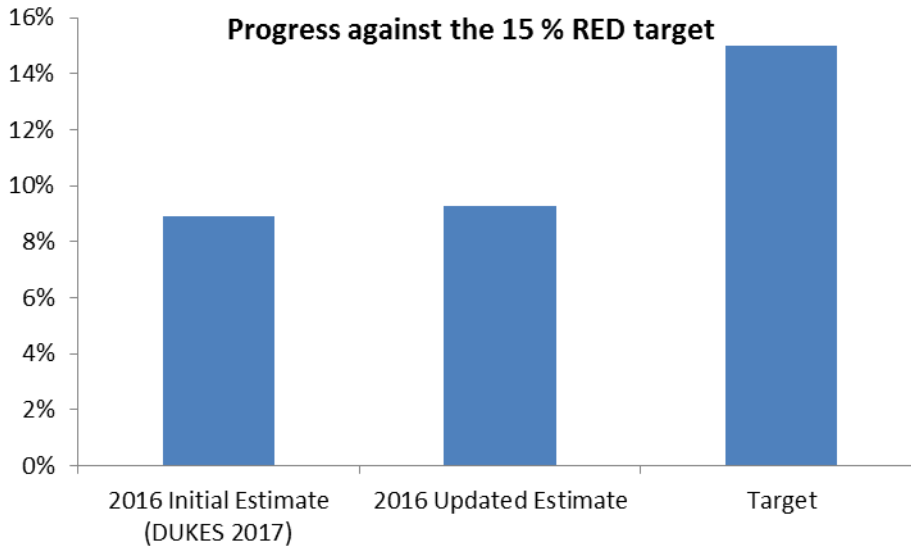
When reported in DUKES 2017, the percentage of renewable heat in 2016 was 6.2 per cent. With the inclusion of RAAHPs, this share grew to 7.0 per cent.

The effect on overall progress against the RED is more muted again as the impact of RAAHPs is further reduced when divided by total energy consumption. Chart 3 shows the impact:

<sup>11</sup> There is no specific EU target for renewable heat or electricity but the UK has set a 12 per cent renewable heat goal by 2020



**Chart 3**



In DUKES 2017, progress against the 15 per cent target was 8.9 per cent. The latest SHARES return showed that this had risen to 9.3 per cent.

Although the impact on the overall proportion of renewable energy is fairly small, the inclusion of RAAHPs provides a more accurate picture of renewable heat sources in the UK.

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## Experimental statistics on heat networks

### Introduction

The Heat Network (Metering and Billing) Regulations 2014<sup>1</sup> came into force on 18<sup>th</sup> December 2014. The legislation implements the requirements set out in the 2012 Energy Efficiency Directive Article 9 (1)<sup>2</sup>. The regulations require heat network suppliers to submit a notification once operational and at four yearly intervals to provide information on the status and performance of network(s) managed.

The UK had not previously collected detailed information on heat networks though previous studies had attempted to estimate the number of networks such as the DECC Summary evidence on District Heating Networks in the UK<sup>3</sup>. This did not, however include communal heat networks.

This paper sets out preliminary results of the data collected, the **key points** are shown below;

- There are 13,995 heat networks in the UK
- 2,087 of these networks are classed as district heating
- 1,109 networks provided space heating, hot water *and* cooling
- Just 1,664 networks provided cooling (of which 141 provided *only* cooling)
- Generation for heating and hot water was 17.7 TWh compared to 1.9 TWh for cooling
- Capacity for heating and hot water was 19,362 MW and 2,605 MW for cooling

### Background

With growing interest in heat networks as a measure to increase energy efficiency, data collected as a result of the regulations will contribute to monitoring the prevalence of heat networks in the UK. Additionally, the Government launched the Heat Network Investment Project<sup>4</sup> to deliver capital investment support to increase the volume of heat networks built.

The Department for Business, Energy, and Industrial Strategy (BEIS, previously The Department for Energy and Climate Change, DECC) commissioned The National Measurement and Regulation Office (NMRO, now Office for Product Safety and Standards (OPS & S)) to collect the reporting requirements including;

- Capacity, generation, and supply for space heating, hot water and cooling
- Fuel type and technology
- Number of buildings and final customers
- Type of end user (residential, commercial etc)
- Qualitative information for metering and billing.

The NMRO published on its website<sup>5</sup> the notification template along with guidance as to how to complete this and also a Question and Answer document steering network operators as to whether their network(s) would be captured by the legislation.

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<sup>1</sup> [www.legislation.gov.uk/ukxi/2014/3120/pdfs/ukxi\\_20143120\\_en.pdf](http://www.legislation.gov.uk/ukxi/2014/3120/pdfs/ukxi_20143120_en.pdf)

<sup>2</sup> <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1416394987283&uri=SWD:2013:448:FIN>

<sup>3</sup>

[www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/212565/summary\\_evidence\\_district\\_heating\\_networks\\_uk.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/212565/summary_evidence_district_heating_networks_uk.pdf)

<sup>4</sup> [www.gov.uk/government/publications/heat-networks-investment-project-hnip](http://www.gov.uk/government/publications/heat-networks-investment-project-hnip)

<sup>5</sup>

[www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/212565/summary\\_evidence\\_district\\_heating\\_networks\\_uk.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/212565/summary_evidence_district_heating_networks_uk.pdf)

Heat networks can be considered as either district or communal heating as defined in the guidance;

“**District heat network** means the distribution of thermal energy in the form of steam, hot water or chilled liquids from a central source of production through a network to multiple buildings or sites for the use of space heating or process heating, cooling or hot water.”

“**Communal Heating** means the distribution of thermal energy in the form of steam, hot water, or chilled liquids from a central source in a building which is occupied by more than one final customer for the use of space heating, process heating, cooling or hot water. It is not necessary for the heat supply to be within the building only that a single building is making use of the heat.”

The key metrics captured by the reporting template, such as capacity, generation and supply are summarised in this report and more detailed Excel tables are available via the following link;

[www.gov.uk/government/publications/energy-trends-march-2018-special-feature-articles](http://www.gov.uk/government/publications/energy-trends-march-2018-special-feature-articles)

## **Challenges implementing a new reporting requirement**

With the introduction of new data reporting requirements, there are challenges to be faced;

- No previous years' data for comparison purposes
- Ensuring the template design is clear and comprehensive
- Validation checks evolve as more data are received

Early submissions were problematic, with data missing or showing values that were outside expected norms or otherwise incorrect (e.g. networks operating for more than 365 days per year). Provisional estimates were published in February 2017 for a small number of networks (just under 2,000) where data appeared to be of acceptable quality. This was published on the Heat network metering and billing regulations: compliance and guidance page:

[Heat network metering and billing regulations: compliance and guidance - GOV.UK](http://www.gov.uk/government/publications/heat-network-metering-and-billing-regulations-compliance-and-guidance)

## **Further Data validation**

Subsequent to the publication of data last year, BEIS have worked with Ricardo Energy and Environment to develop a set of data validation rules that will apply to data collection going forward and can be retrospectively applied to the existing data.

This system of quality assurance techniques was developed using a combination of expert heat network opinion along with a series of histograms applied to the whole data set and used to determine reasonable boundaries for typical capacities, generation and supply figures. Those networks with all three values outside the expected range were excluded from this publication. However, if a network included reasonable values for at least one variable, estimates were made based on typical load factors and efficiencies.

These estimates were made to those networks with only residential final customers; the range for non-residential was difficult to determine due to the high variability and lower number of observations. This will result in a bias towards residential only networks.

Following the application of these rules, the number of networks included in this publication total just under 14,000 compared to the 2,000 published last year (out of a total of 17,000 notifications received). Approximately 3,000 notifications remain excluded from the data due to missing data or no means of interpolating values. In addition, 17 schemes have been added despite not having received a notification; data for these schemes have been sourced from the CHPQA database.

### Special feature – Experimental statistics on heat networks

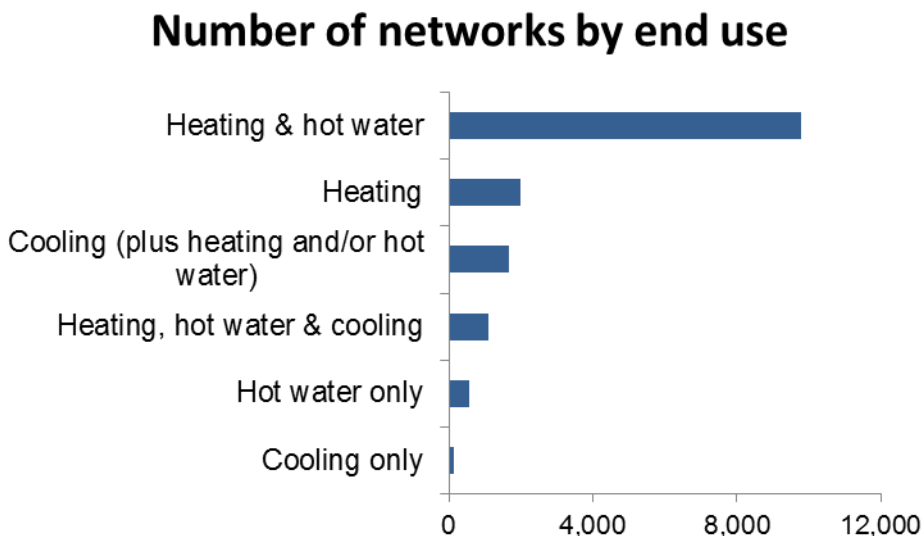
Further data validation is ongoing by the Office for Product Safety and Standards (OPS & S)) and as a result the conclusions outlined here are provisional. Given the developing nature of these data they are classified as ‘Experimental Statistics’.

## Results

**The majority of heat networks are communal heating** with district heating representing 15 per cent of total networks for the UK as a whole (see table 1 in accompanying excel tables). This proportion varies by region with the North West having the lowest percentage of district heat networks (8 per cent) and London the highest at 20 per cent. Densely populated areas lend themselves better to district heating due to the infrastructure required to link end users to the heat source.

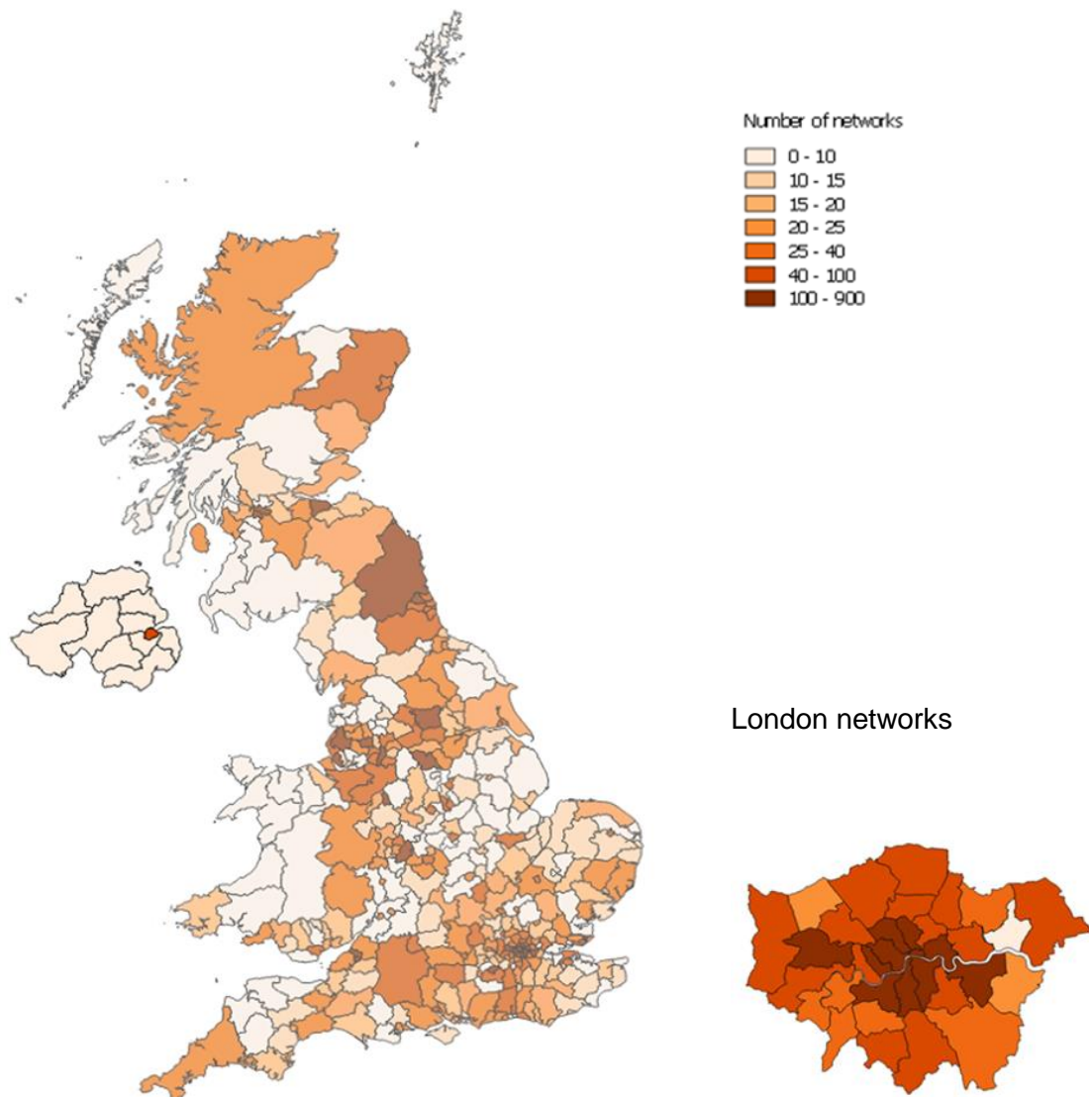
Table 1 also shows the nature of end uses for heat networks in terms of provision of heating, hot water, cooling or combination of end uses. **A large proportion (70 per cent) of networks provides space heating and hot water**, though very few (8 per cent) provide heating, hot water *and* cooling. Even less provide cooling only (just 141 networks). Chart 1 below shows the number of networks operational for various combinations of end uses;

Chart 1



A further level of regional disaggregation is provided in table 2 which shows the **number of heat networks by local authority**. This data are mapped below in Figure 1;

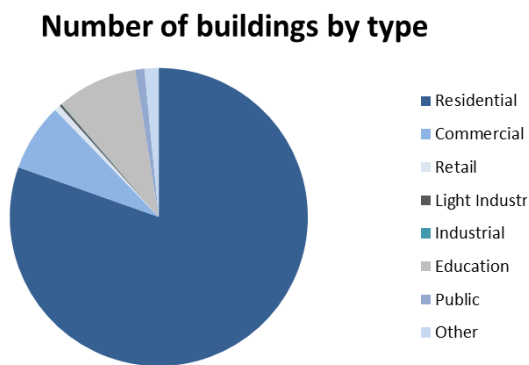
Figure 1; Number of heat networks by Local Authority



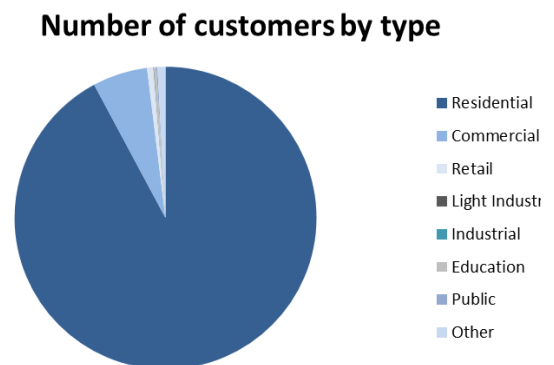
This shows the absolute number of networks with a separate inset for London. As would be expected, it is the more highly densely populated areas with the higher number of heat networks, particularly around London, Manchester, Belfast, Birmingham, Newcastle, and Sheffield.

Heat networks provided heating and / or cooling to **75,645 buildings** with **476,951 individual customers**. **Table 3** shows the type of building and final customer, split by dwellings, commercial, retail, light industrial, industrial, education, and the public sector, see charts 2 and 3 below;

**Chart 2; Number of buildings**



**Chart 3; Number of customers**

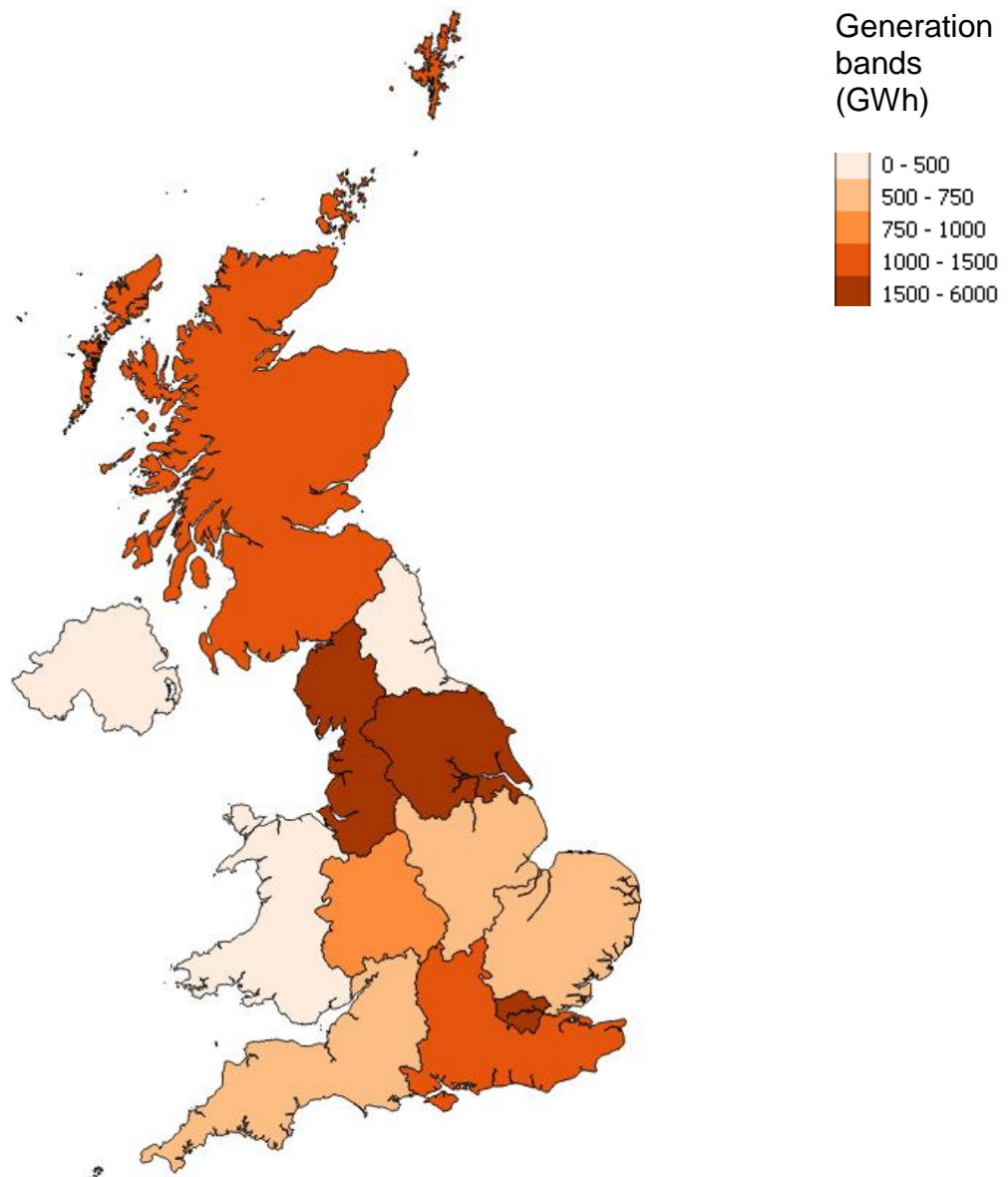


The majority of buildings are classed as residential (80 per cent) and an even higher proportion of final customers are residential (92 per cent). This reflects the higher proportion of communal heating networks which are generally apartment blocks. There are 15,440 building level meters installed across the 75,645 buildings and 134,996 final customers whose consumption is measured by meters or heat cost allocators.

Table 4 shows the number of networks using at least some of each fuel type. Most networks (12,645, or 90 per cent) used at least some natural gas. The next most widely used fuel source was electricity (5 per cent) followed by bioenergy and waste (2 per cent of networks). It was not possible to apportion fuel types to actual generation due to multiple fuel use.

Capacity, generation and supply by region are shown in table 5, and mapped below in Figure 2. Across the UK, installed capacity for heating and hot water is 19.4 GW with Yorkshire and The Humber showing the highest capacity for heating and hot water (6.0 GW).

Figure 2; regional distribution of generation



London has the highest levels of generation and supply at 3.7 TWh and 2.8 TWh respectively, compared to 17.7 TWh and 14.4 TWh for the UK as a whole. London also has the highest installed capacity, generation and supply for cooling. **For the UK as a whole, cooling generation represents 10 per cent of total generation.** The second section of table 4 shows generation and capacity for those networks classified as district heating; although the number of district heat networks is relatively small compared to the number of communal schemes, generation is disproportionately higher reflecting the increased demand from larger installations and also a small number of unusually large schemes.

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## Recent and forthcoming publications of interest to users of energy statistics

### **Sub-national electricity and gas consumption at LSOA, MSOA and IGZ level, 2016**

This publication comprising a series of Excel spreadsheets provides details of domestic and non-domestic electricity and gas consumption at Lower Super Output Area (LSOA), Middle Super Output Area (MSOA) and Intermediate Geography Zone (IGZ) for 2016. The data was published on 25 January 2018 for electricity at:

[www.gov.uk/government/statistics/lower-and-middle-super-output-areas-electricity-consumption](http://www.gov.uk/government/statistics/lower-and-middle-super-output-areas-electricity-consumption)

and gas at:

[www.gov.uk/government/statistics/lower-and-middle-super-output-areas-gas-consumption](http://www.gov.uk/government/statistics/lower-and-middle-super-output-areas-gas-consumption)

### **Greenhouse Gas Emissions final 2016 statistics**

This publication provides final estimates of UK greenhouse gas emissions going back to 1990. Estimates are presented by source in February of each year and are updated in March of each year to include estimates by end-user and fuel type. Final 2016 UK greenhouse gas emissions statistics were published on 6 February 2018 at:

[www.gov.uk/government/collections/final-uk-greenhouse-gas-emissions-national-statistics](http://www.gov.uk/government/collections/final-uk-greenhouse-gas-emissions-national-statistics)

### **Household Energy Efficiency statistics**

This series presents statistics on the Energy Company Obligation (ECO), Green Deal and homes insulated. The headline release presents monthly updates of ECO measures and quarterly updates of in-depth ECO statistics, carbon savings and the Green Deal schemes. The latest release was published on 27 March 2018 at:

[www.gov.uk/government/collections/household-energy-efficiency-national-statistics](http://www.gov.uk/government/collections/household-energy-efficiency-national-statistics)

### **Smart Meters quarterly statistics**

This publication provides estimates of the number of Smart Meters installed and operating in homes and businesses in Great Britain. The latest release, covering estimates of the number of Smart Meters deployed up to the end of December 2017, was published on 27 March 2018 at:

[www.gov.uk/government/collections/smart-meters-statistics](http://www.gov.uk/government/collections/smart-meters-statistics)

### **Greenhouse Gas Emissions provisional 2017 statistics**

This publication provides the latest annual provisional estimates of UK greenhouse gas emissions based on provisional inland energy consumption statistics as published in Energy Trends. A quarterly emissions time series is also included within this publication. Provisional 2017 UK greenhouse gas emissions statistics were published on 29 March 2018 at:

[www.gov.uk/government/collections/provisional-uk-greenhouse-gas-emissions-national-statistics](http://www.gov.uk/government/collections/provisional-uk-greenhouse-gas-emissions-national-statistics)

### **Local authority carbon dioxide emissions**

This annual publication provides estimates of local authority carbon dioxide emissions in the United Kingdom. Data for 2016 will be released on 28 June 2018 at:

[www.gov.uk/government/collections/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics](http://www.gov.uk/government/collections/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics)

### **Sub-national road transport consumption**

This annual publication provides estimates of road transport fuel consumption in the United Kingdom, by vehicle and fuel type. Data for 2016 will be released on 28 June 2018 at:

[www.gov.uk/government/collections/road-transport-consumption-at-regional-and-local-level](http://www.gov.uk/government/collections/road-transport-consumption-at-regional-and-local-level)



## List of special feature articles published in Energy Trends between March 2017 and December 2017

<u>Subject</u>	<u>Title</u>
<b>Energy</b>	
March 2017	Digest of United Kingdom Energy Statistics (DUKES) 2017 – proposed changes
December 2017	Fuel Mix Disclosure – proposed methodology change for residuals
<b>Combined Heat and Power (CHP)</b>	
September 2017	Combined Heat and Power in Scotland, Wales, Northern Ireland and the regions of England in 2016
<b>Electricity</b>	
March 2017	Nuclear capacity in the UK
September 2017	Competition in UK electricity markets
December 2017	Electricity generation and supply figures for Scotland, Wales, Northern Ireland and England, 2013 to 2016
<b>Energy efficiency</b>	
March 2017	International comparisons of energy efficiency indicators
December 2017	Domestic energy consumption by energy efficiency and environmental impact, 2015
<b>Energy prices</b>	
March 2017	Domestic energy bills in 2016: The impact of variable consumption
June 2017	Changes to Eurostat tables methodology
September 2017	International energy price comparisons
<b>Feed-in Tariffs</b>	
December 2017	Feed-in Tariff load factor analysis
<b>Gas</b>	
June 2017	Enhancements to Energy Trends gas tables
September 2017	Competition in gas supply
December 2017	Physical gas flows across Europe and diversity of gas supply in 2016

### **Petroleum (oil and oil products)**

March 2017 Mapping the UK's oil stocks

September 2017 Diversity of supply for oil and oil products in OECD countries in 2016

### **Renewables**

June 2017 Renewable energy in 2016

September 2017 Renewable electricity in Scotland, Wales, Northern Ireland and the regions of England in 2016  
Aggregated energy balances showing proportion of renewables in supply and demand

### **UK Continental Shelf (UKCS)**

March 2017 UKCS capital expenditure survey 2017

PDF versions of the special feature articles appearing in Energy Trends since 2013 can be accessed on the BEIS section of the GOV.UK website at:

[www.gov.uk/government/collections/energy-trends-articles](http://www.gov.uk/government/collections/energy-trends-articles)

Articles published before 2013 can be accessed via the National Archives version of the BEIS website at:

[http://webarchive.nationalarchives.gov.uk/20130109092117/http://decc.gov.uk/en/content/cms/statistics/publications/trends/articles\\_issue/articles\\_issue.aspx](http://webarchive.nationalarchives.gov.uk/20130109092117/http://decc.gov.uk/en/content/cms/statistics/publications/trends/articles_issue/articles_issue.aspx)

# Explanatory notes

## General

More detailed notes on the methodology used to compile the figures and data sources are available on the BEIS section of the GOV.UK website.

## Notes to tables

- Figures for the latest periods and the corresponding averages (or totals) are provisional and are liable to subsequent revision.
- The figures have not been adjusted for temperature or seasonal factors except where noted.
- Due to rounding the sum of the constituent items may not equal the totals.
- Percentage changes relate to the corresponding period a year ago. They are calculated from unrounded figures but are shown only as (+) or (-) when the percentage change is very large.
- Quarterly figures relate to calendar quarters.
- All figures relate to the United Kingdom unless otherwise indicated.

- Further information on Oil and Gas is available from The Oil & Gas Authority at: [www.ogauthority.co.uk/](http://www.ogauthority.co.uk/)

## Abbreviations

ATF	Aviation turbine fuel
CCGT	Combined cycle gas turbine
DERV	Diesel engined road vehicle
LNG	Liquefied natural gas
MSF	Manufactured solid fuels
NGLs	Natural gas liquids
UKCS	United Kingdom continental shelf

## Symbols used in the tables

- .. not available
- nil or not separately available
- p provisional
- r revised; where a column or row shows 'r' at the beginning, most, but not necessarily all, of the data have been revised.
- e estimated; totals of which the figures form a constituent part are therefore partly estimated

## Conversion factors

1 tonne of crude oil =	7.55 barrels
1 tonne =	1,000 kilograms
1 gallon (UK) =	4.54609 litres
1 kilowatt (kW) =	1,000 watts
1 megawatt (MW) =	1,000 kilowatts
1 gigawatt (GW) =	1,000 megawatts
1 terawatt (TW) =	1,000 gigawatts

All conversion of fuels from original units to units of energy is carried out on the basis of the gross calorific value of the fuel. More detailed information on conversion factors and calorific values is given in Annex A of the Digest of United Kingdom Energy Statistics.

## Conversion matrices

To convert from the units on the left hand side to the units across the top multiply by the values in the table.

To:	Thousand toe	Terajoules	GWh	Million therms
<b>From</b>	<b>Multiply by</b>			
Thousand toe	1	41.868	11.630	0.39683
Terajoules (TJ)	0.023885	1	0.27778	0.0094778
Gigawatt hours (GWh)	0.085985	3.6000	1	0.034121
Million therms	2.5200	105.51	29.307	1

To:	Tonnes of oil equivalent	Gigajoules	kWh	Therms
<b>From</b>	<b>Multiply by</b>			
Tonnes of oil equivalent	1	41.868	11,630	396.83
Gigajoules (GJ)	0.023885	1	277.78	9.4778
Kilowatt hours (kWh)	0.000085985	0.003600	1	0.034121
Therms	0.0025200	0.105510	29.307	1

Note that all factors are quoted to 5 significant figures

## Sectoral breakdowns

The categories for final consumption by user are defined by the Standard Industrial Classification 2007, as follows:

Fuel producers	05-07, 09, 19, 24.46, 35
Final consumers	
Iron and steel	24 (excluding 24.4, 24.53 and 24.54)
Other industry	08, 10-18, 20-23, 24.4 (excluding 24.46), 24.53, 24.54, 25-33, 36-39, 41-43
Transport	49-51
Other final users	
Agriculture	01-03
Commercial	45-47, 52-53, 55-56, 58-66, 68-75, 77-82
Public administration	84-88
Other services	90-99
Domestic	Not covered by SIC 2007

