Department for Business, Energy & Industrial Strategy

ENERGY TRENDS DECEMBER 2016

December 2016

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This is a National Statistics publication

The United Kingdom Statistics Authority has designated these statistics as National Statistics, in accordance with the Statistics and Registration Service Act 2007 and signifying compliance with the UK Statistics Authority: Code of Practice for Official Statistics.

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- meet identified user needs
- are well explained and readily accessible
- are produced according to sound methods, and
- are managed impartially and objectively in the public interest

Once statistics have been designated as National Statistics it is a statutory requirement that the Code of Practice shall continue to be observed

Any enquiries regarding this publication should be sent to us at energy.stats@beis.gov.uk.

This publication is available for download at www.gov.uk/government/statistics/energy-trends-december-2016.

Contents

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 December editions cover the third quarter of the current year.

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 2016 edition of the Digest was published on 28 July 2016 and is available on the BEIS section of the GOV.UK website at: 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, via the electronic versions of these tables. The electronic versions are available free of charge from the BEIS section of the GOV.UK website. In addition to quarterly tables, the main monthly tables that were published in the period up to May 2001 when Energy Trends was produced monthly, 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

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. 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

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The main points for the third quarter of 2016:

- Total energy production was 8.0 per cent higher than in the third quarter of 2015. This rise in output was due to strong growth in oil, gas, nuclear and renewables production which more than offset the decline in UK coal production.
- Oil production rose by 7.8 per cent when compared with the third quarter of 2015. Refinery production in the third quarter of 2016 was down by 6.5 per cent on the same quarter of last year due to increased maintenance activity.
- Natural gas production was 10.8 per cent higher than the third quarter of 2015. Gas imports fell by 14.9 per cent whilst exports rose by 4.6 per cent. Gas consumption was down 13.0 per cent, driven by warmer weather particularly in September 2016.
- Total primary energy consumption for energy uses fell by 4.6 per cent. However, when adjusted to take account of weather differences between the third quarter of 2015 and the third quarter of 2016, primary energy consumption fell by 5.0 per cent.
- Temperatures in the quarter were on average 1.6 degrees warmer than a year earlier, with average temperatures in September 2016 3.0 degrees warmer than a year earlier.
- Final consumption fell by 2.9 per cent compared to the third quarter of 2015. Domestic consumption fell by 11.9 per cent reflecting the warmer weather in the quarter, service consumption fell by 4.2 per cent, industrial consumption fell by 2.6 per cent, whilst transport consumption rose by 0.4 per cent. On a seasonally and temperature adjusted basis, final energy consumption fell by 1.1 per cent.
- Gas demand was 3.5 per cent higher than the third quarter of 2015 driven by a significant increase in use by electricity generators, whilst electricity consumption was 1.9 per cent lower than in the third quarter of 2015.
- Total deliveries of the key transport fuels were up 0.7 per cent when compared to the same period last year. DERV deliveries were up 3.3 per cent, whilst motor spirit deliveries were down 2.6 per cent and aviation turbine fuel deliveries were down 0.9 per cent.
- Electricity generated in the third quarter of 2016 fell by 1.2 per cent, from 76.4 TWh a year earlier to 75.4 TWh. Along with a decrease in net imports of 21 per cent this caused supply to decrease by 2.6 per cent.
- Of electricity generated in the third quarter of 2016, gas accounted for 43.6 per cent, up from 34.8 per cent in the third quarter of 2015, whilst coal accounted for 3.6 per cent, down from 16.7 per cent in the third quarter of 2015. Nuclear generation accounted for 25.0 per cent of total electricity generated in the third quarter of 2016, an increase from the 21.7 per cent share in the third quarter of 2015.
- Renewables' share of electricity generation increased to 25.0 per cent, up from the 23.6 per cent share in the third quarter of 2015. Offshore wind generation increased by 3.8 per cent, and onshore wind generation increased by 19.4 per cent, whilst solar generation increased by 30 per cent due to increased capacity. Hydro generation increased by 10.8 per cent due to increased rainfall. Overall renewable electricity generation was up 4.3 per cent compared to the same quarter in 2015.
- Low carbon electricity's share of generation increased from 45.3 per cent in 2015 Q3 to a record high 50.0 per cent in 2016 Q3, due to increased generation from renewables and nuclear.

Section 1 - Total Energy

Key results show:

Total energy production was 8.0 per cent higher than in the third quarter of 2015. (**Charts 1.1 & 1.2**)

Total primary energy consumption for energy uses fell by 4.6 per cent. However, when adjusted to take account of weather differences between the third quarter of 2015 and the third quarter of 2016, primary energy consumption fell by 5.0 per cent, largely due to decreased coal use in electricity generation. (**Chart 1.3**)

Final energy consumption (excluding non-energy use) fell by 2.9 per cent compared to the third quarter of 2015. Domestic consumption fell by 11.9 per cent reflecting the warmer weather in the quarter, service consumption fell by 4.2 per cent, industrial consumption fell by 2.6 per cent, whilst transport consumption rose by 0.4 per cent. (**Charts 1.4 & 1.5**)

On a temperature adjusted basis, final energy consumption fell by 1.1 per cent. (**Chart 1.5**)

Net import dependency was 28.8 per cent, down 7.4 percentage points from the third quarter of 2015 reflecting the rises in UKCS production and the falls in coal and gas imports. (**Chart 1.6**)

Fossil fuel dependency fell to 78.7 per cent in the third quarter of 2016, a record low level. (**Chart 1.7**)

Relevant tables

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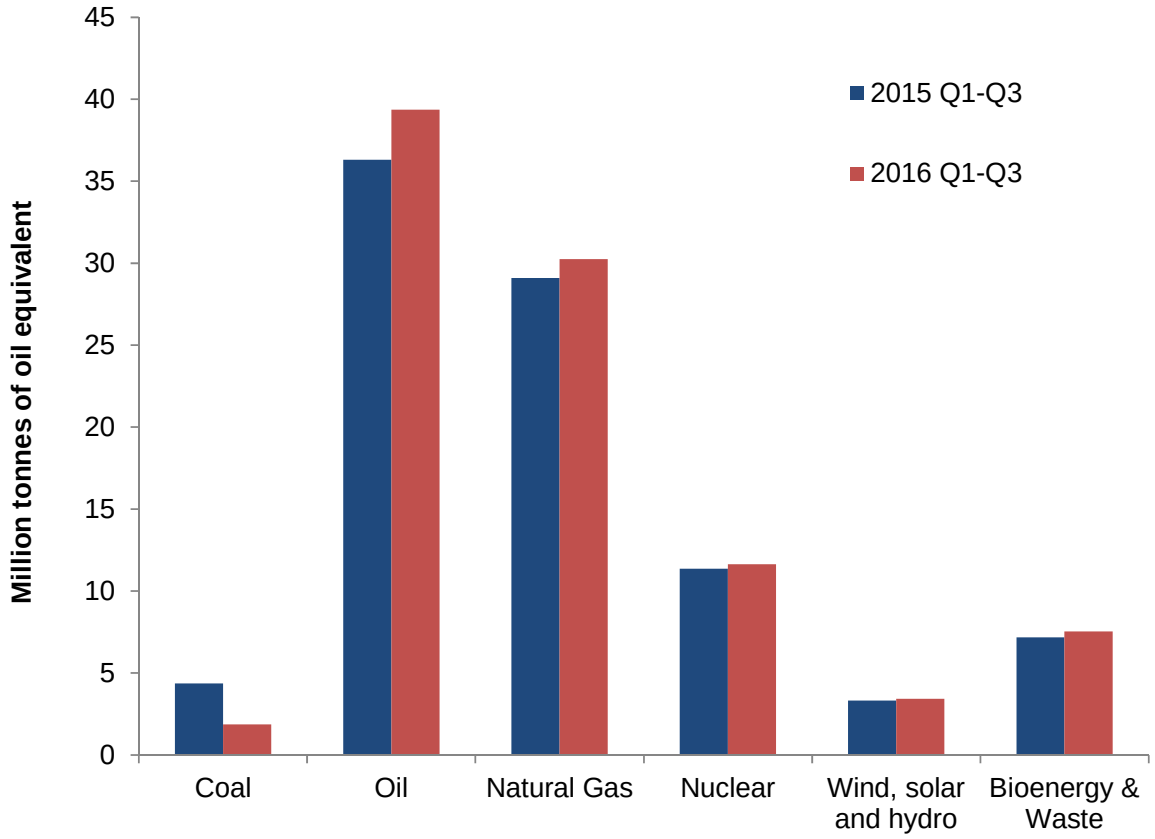
Chart 1.1 Production of indigenous primary fuels



Total production in the third quarter of 2016 at 29.9 million tonnes of oil equivalent was 8.0 per cent higher than in the third quarter of 2015, and was 2.6 per cent higher in the first three quarters of 2016 compared to the same period in 2015.

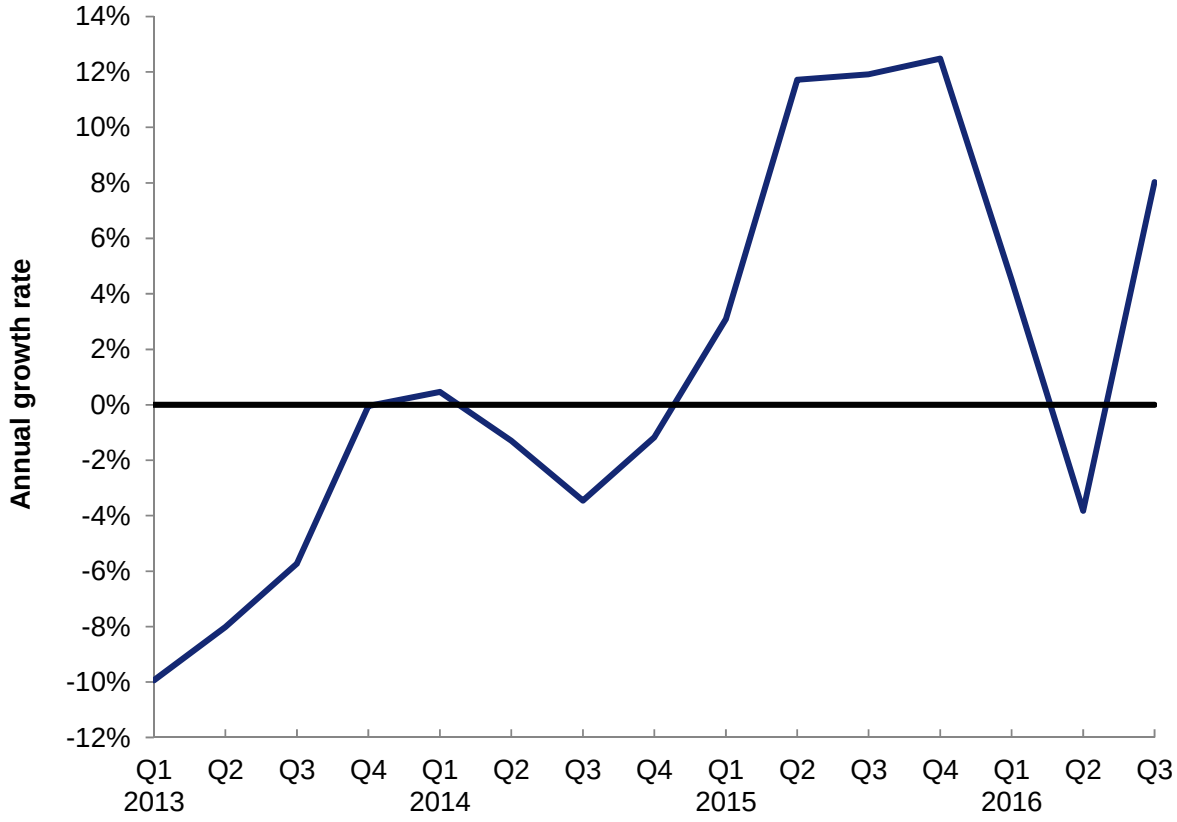
Production of oil rose by 8.1 per cent compared to the third quarter of 2015, due to less maintenance activity and new fields coming online. Production of gas rose by 10.8 per cent compared to the third quarter of 2015, boosted by production from the new Laggan field.

Primary electricity output in the third quarter of 2016 was 14.4 per cent higher than in the third quarter of 2015, within which nuclear electricity output was 13.9 per cent higher following outages in 2015, whilst output from wind, solar and natural flow hydro was 16.4 per cent higher than the same period in 2015, due to improved weather conditions for renewable generation, higher wind speeds, more sun hours and increased rainfall. Renewable capacity also increased (see section 6).

Production of bioenergy and waste was 3.2 per cent lower compared to the third quarter in 2015, but was 5.2 per cent higher in the first three quarters of 2016 compared to the same period in 2015.

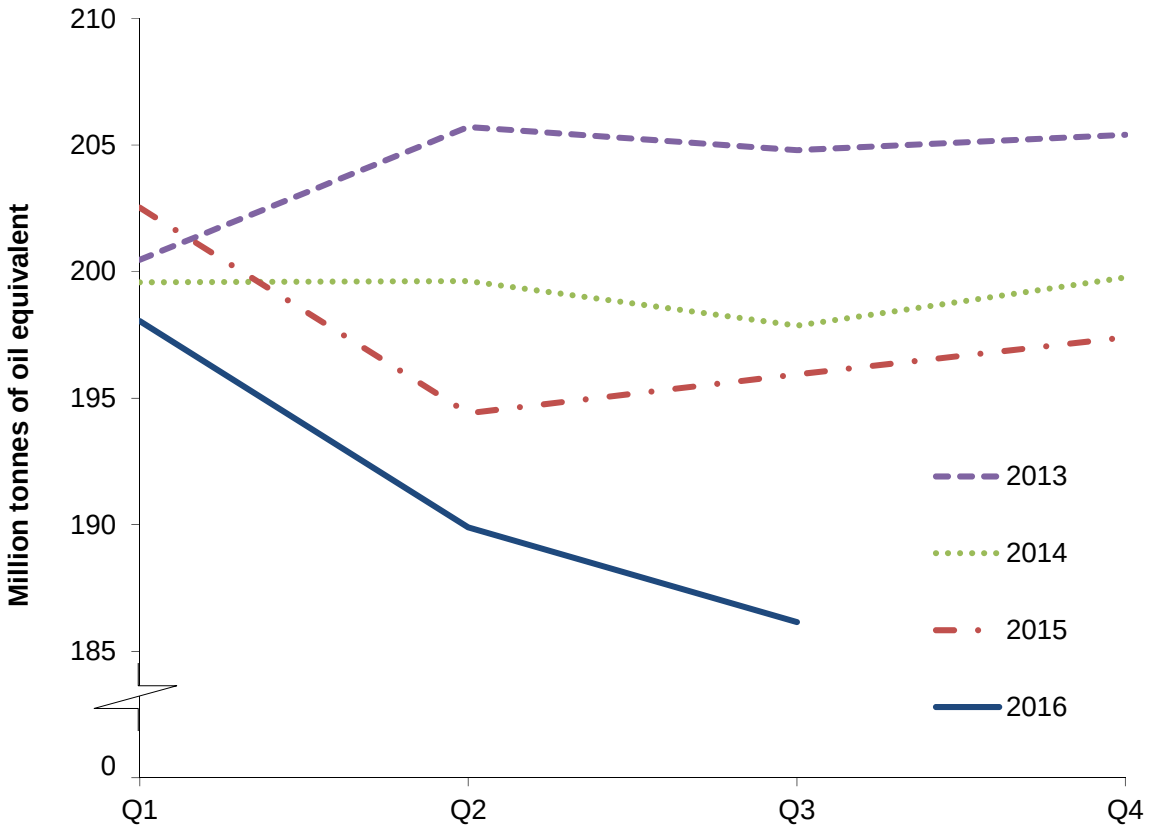
In the third quarter of 2016 production of coal and other solid fuels was 28 per cent lower than the corresponding period of 2015. This was mainly due to the last deep mine in operation at Kellingley in North Yorkshire closing in December 2015.

Chart 1.2 UK production (annual growth rate)



In the third quarter of 2016, the annual growth rate of UK production was +8.0 per cent, with the growth in oil and gas and primary electricity production more than offsetting the decline of UK coal production.

Chart 1.3 Total inland consumption (primary fuel input basis) [(1)]



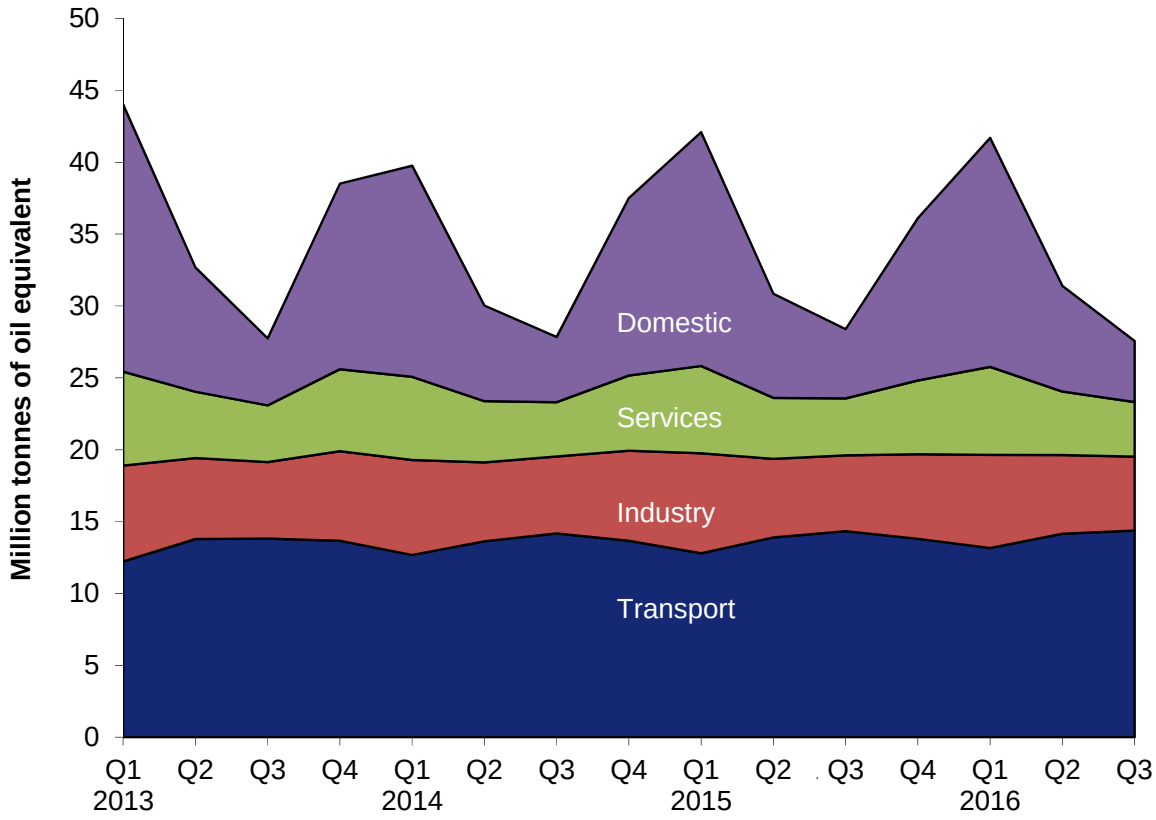
Total inland consumption on a primary fuel input basis (temperature corrected, seasonally adjusted annualised rate), was 186.1 million tonnes of oil equivalent in the third quarter of 2016, 5.0 per cent lower than in the third quarter of 2015. The average temperature in the third quarter of 2016 was 1.6 degrees Celsius warmer than the same period a year earlier.

Between the third quarter of 2015 and the third quarter of 2016 (on a seasonally adjusted and temperature corrected basis) coal consumption fell by 59 per cent driven by decreased coal use in electricity generation.

On the same basis, oil consumption rose by 0.4 per cent, whilst gas consumption rose by 2.2 per cent driven by increased gas use in electricity generation.

Also on a seasonally adjusted and temperature corrected basis, there were rises in nuclear consumption of 14.2 per cent, and in wind, solar and hydro consumption of 18.4 per cent, whilst bioenergy and waste consumption fell by 4.5 per cent.

Chart 1.4 Final energy consumption by user



Total final energy consumption fell by 2.1 per cent between the third quarter of 2015 and the third quarter of 2016.

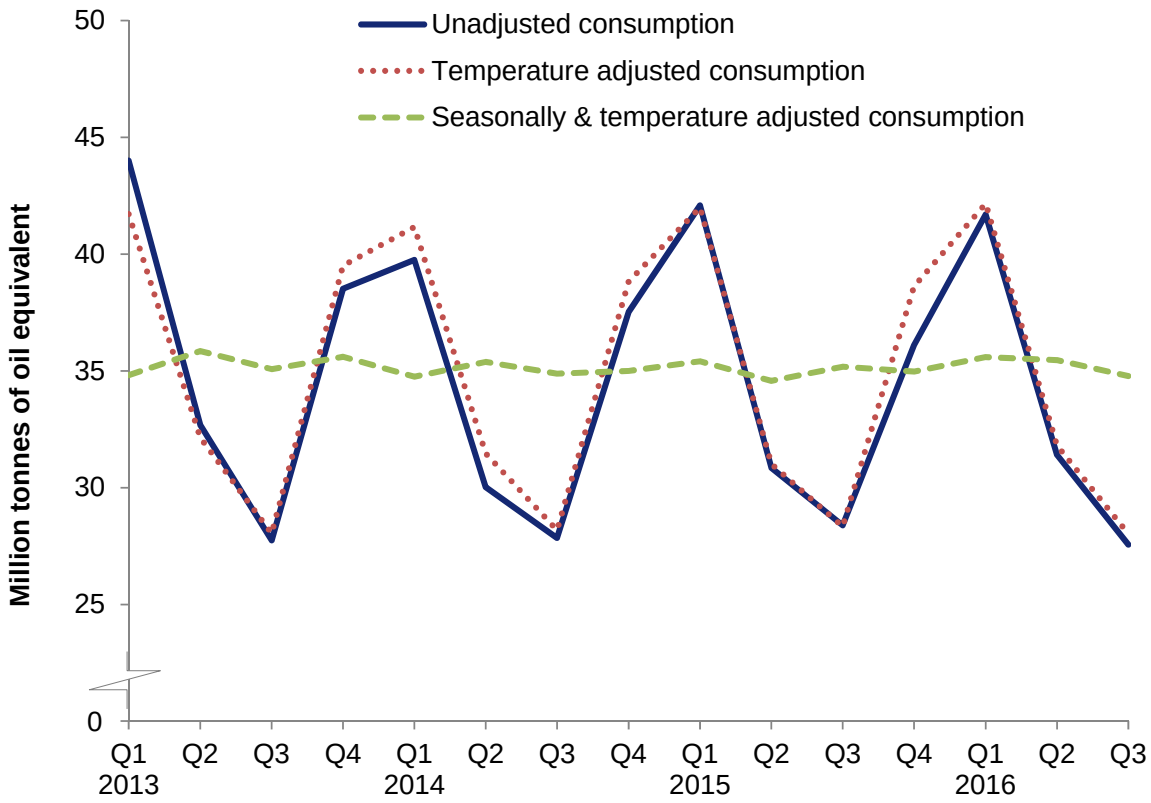
Domestic sector energy consumption fell by 11.9 per cent, reflecting the warmer weather compared to a year earlier. Average temperatures in the third quarter of 2016 were 1.6 degrees Celsius warmer than a year earlier, with average temperatures in September 2016 being 3.0 degrees Celsius warmer than in September 2015.

Service sector energy consumption fell by 4.2 per cent.

Industrial sector energy consumption fell by 2.6 per cent.

Transport sector energy consumption rose by 0.4 per cent.

Chart 1.5 Seasonally adjusted and temperature corrected final energy consumption



Total unadjusted final energy consumption (excluding non-energy use) fell by 2.9 per cent between the third quarter of 2015 and the third quarter of 2016.

On a seasonally and temperature adjusted basis final energy consumption (excluding non-energy use) fell by 1.1 per cent between the third quarter of 2015 and the third quarter of 2016.

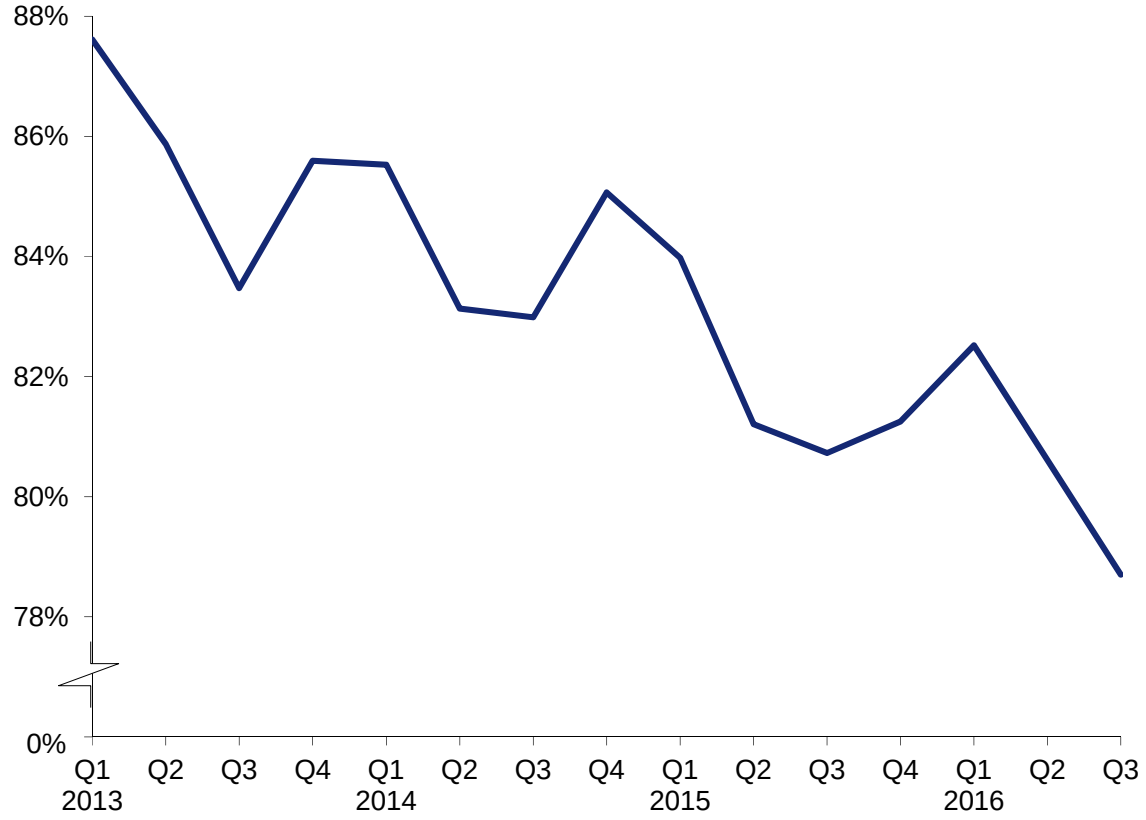
Unadjusted domestic consumption fell by 11.9 per cent over this same period, and was down 2.3 per cent on a seasonally and temperature adjusted basis.

Consumption data by fuel and sector is available in table ET 1.3c which is now included within this publication as well as on the BEIS section of the GOV.UK website at:
www.gov.uk/government/statistics/total-energy-section-1-energy-trends

Chart 1.6 Net import dependency

In the third quarter of 2016 net import dependency was 28.8 per cent, down 7.4 percentage points from the third quarter of 2015, reflecting the increases in UKCS oil and gas production and the decreases in coal and gas imports. This is the lowest level of net import dependency since the third quarter of 2010. Imports in the third quarter of 2016 were at their lowest level since the first quarter of 2005.

Chart 1.7 Fossil fuel dependency



In the third quarter of 2016 dependency on fossil fuels was 78.7 per cent, down 2.0 percentage points from the third quarter of 2015, and at a record low level.

1 TOTAL ENERGY

TABLE 1.1. Indigenous production of primary fuels

Million tonnes of oil equivalent

							Primary electricity	
		Total	Coal[1]	Petroleum[2]	Natural gas[3]	Bioenergy & waste[4,5]	Nuclear	Wind, solar and hydro[6]
2011		137.3	11.5	56.9	45.3	6.1	15.6	1.86
2012		122.6	10.6	48.8	38.9	6.8	15.2	2.28
2013		115.1	8.0	44.5	36.5	7.7	15.4	3.02
2014		113.6	7.3	43.7	36.8	8.3	13.9	3.60
2015		124.5	5.4	49.5	39.6	9.9	15.5	4.66
Per cent change		*+9.6*	*-26.1*	*+13.4*	*+7.6*	*+18.1*	*+11.8*	*+29.3*
2015	Quarter 3	27.6	0.9	11.4	8.8	2.0	3.6	0.94
	Quarter 4	32.9	1.0	13.2	10.5	2.7	4.1	1.33
2016	Quarter 1	33.3r	0.6	13.8	10.5r	3.3r	3.8	1.30
	Quarter 2	30.9r	0.6	13.3r	10.0r	2.4r	3.7	1.03r
	Quarter 3 p	29.9r	0.6r	12.3r	9.8r	1.9r	4.1	1.10r
Per cent change[7]		*+8.0*	*-27.9*	*+8.1*	*+10.8*	*-3.2*	*+13.9*	*+16.4*

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
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

							Primary electricity								Primary electricity		
		Total	Coal[1]	Petroleum[2]	Natural gas[3]	Bioenergy & waste[4, 5]	Nuclear	Wind, solar and hydro[6]	Net imports	Total	Coal	Petroleum	Natural gas	Bioenergy & waste	Nuclear	Wind, solar and hydro	Net imports
		Unadjusted[7]								*Seasonally adjusted and temperature corrected*[8,9] *(annualised rates)*							
2011		203.5	32.2	67.8	77.6	7.7	15.6	1.86	0.53	209.0	34.0	67.8	81.5	7.7	15.6	1.86	0.53
2012		208.0	40.9	67.0	73.3	8.3	15.2	2.28	1.02	207.9	40.9	67.0	73.3	8.3	15.2	2.28	1.02
2013		206.9	39.1	65.8	72.7	9.6	15.4	3.02	1.24	204.1	38.4	65.8	70.6	9.6	15.4	3.02	1.24
2014		193.9	31.6	65.8	66.1	11.2	13.9	3.60	1.76	199.2	33.2	65.8	69.9	11.2	13.9	3.60	1.76
2015		194.8	25.1	66.7	67.9	13.2	15.5	4.66	1.80	197.6	25.5	66.7	70.2	13.2	15.5	4.66	1.80
Per cent change		*+0.4*	*-20.7*	*+1.4*	*+2.7*	*+18.1*	*+11.8*	*+29.3*	*+2.0*	*-0.8*	*-23.0*	*+1.4*	*+0.5*	*+18.1*	*+11.8*	*+29.3*	*+2.0*
2015	Quarter 3	41.2	4.6	17.0	11.6	2.8	3.6	0.94	0.51	195.9	23.3	68.1	71.3	11.4	14.9	4.90	2.03
	Quarter 4	50.7	5.7	16.9	18.6	3.7	4.1	1.33	0.40	197.4	21.1	67.5	71.4	14.6	16.9	4.34	1.58
2016	Quarter 1	56.3r	4.9	16.5r	25.1r	4.2r	3.8	1.30	0.52	198.0r	16.9	66.1r	77.1r	16.9r	14.7	4.30	2.06
	Quarter 2	43.9r	2.3r	16.9r	16.2r	3.4r	3.7	1.03r	0.46	189.9r	11.0r	67.8r	76.5r	13.5r	14.6	4.76r	1.84
	Quarter 3 p	39.3r	1.9r	17.1r	11.9r	2.7r	4.1	1.10r	0.40	186.1r	9.5r	68.4r	72.9r	10.9r	17.0	5.80r	1.61r
Per cent change[10]		*-4.6*	*-59.1*	*+0.4*	*+2.8*	*-4.5*	*+13.9*	*+16.4*	*-20.5*	*-5.0*	*-59.0*	*+0.4*	*+2.2*	*-4.5*	*+14.2*	*+18.4*	*-20.5*

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
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
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

	2014	2015	*per cent change*	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter p	*per cent change* [1]
SUPPLY													
Indigenous production	113,626	124,547	*+9.6*	24,695	29,251	31,852	32,157	27,636	32,903	33,290r	30,929r	29,855	*+8.0*
Imports	164,955	154,846	*-6.1*	38,650	43,407	43,766	35,233	36,170	39,676	39,559r	35,096r	32,877	*-9.1*
Exports	-70,629	-76,667	*+8.5*	-16,948	-17,471	-16,955	-19,532	-20,270	-19,910	-19,506r	-18,286r	-20,705	*+2.1*
Marine bunkers	-3,004	-2,593	*-13.7*	-740	-812	-564	-720	-725	-584	-553r	-712r	-751	*+3.7*
Stock change [2]	-3,935	+2,868		-2,763	+72	+2,507	-960	+479	+841	5,741r	-787r	+285	*(+)*
Primary supply	201,013	203,001	*+1.0*	42,893	54,448	60,606	46,178	43,291	52,926	58,530r	46,240r	41,560	*-4.0*
Statistical difference [3]	-374	523		-218	-96	258	32	20	213	-135r	-30r	-131	
Primary demand	201,387	202,478	*+0.5*	43,111	54,544	60,348	46,146	43,271	52,713	58,665r	46,270r	41,691	*-3.7*
Transfers [4]	-3	21		6	-2	19	2	3	-3	-4r	2r	-1	
TRANSFORMATION	-44,010	-41,212	*-6.4*	-10,049	-11,358	-12,147	-9,596	-9,093	-10,376	-10,764r	-8,786r	-8,505	*-6.5*
Electricity generation	-39,578	-37,603	*-5.0*	-8,902	-10,286	-10,984	-8,629	-8,346	-9,644	-9,902r	-7,959r	-7,705	*-7.7*
Heat generation	-1,105	-1,084	*-1.9*	-210	-312	-350	-240	-207	-287	-350	-240	-207	*+0.0*
Petroleum refineries	-505	-40	*-92.2*	-196	-111	-80	-6	12	34	-51r	-120r	-118	*(-)*
Coke manufacture	-334	-176	*-47.2*	-85	-86	-48	-46	-38	-44	-20	-20	-21	*-44.8*
Blast furnaces	-2,379	-2,201	*-7.5*	-626	-537	-665	-647	-485	-404	-407	-425	-432	*-10.9*
Patent fuel manufacture	-66	-64	*-2.4*	-18	-15	-10	-18	-17	-20	-21r	-11r	-11	*-32.0*
Other [5]	-44	-44	*+0.7*	-11	-11	-10	-9	-12	-12	-13	-11	-11	*-10.5*
Energy industry use	11,873	12,485	*+5.2*	2,808	2,975	3,197	3,115	3,056	3,118	3,129r	3,131r	2,794	*-8.6*
Losses	3,270	3,147	*-3.7*	705	915	982	649	658	858	857r	656r	573	*-12.9*
FINAL CONSUMPTION	142,232	145,654	*+2.4*	29,563	39,289	44,032	32,791	30,474	38,356	43,902r	33,702r	29,826	*-2.1*
Iron & steel	1,359	1,263	*-7.1*	338	317	369	343	291	260	249	236	237	*-18.6*
Other industries	22,359	22,332	*-0.1*	5,015	5,952	6,593	5,127	4,986	5,626	6,227r	5,245r	4,902	*-1.7*
Transport	54,126	54,810	*+1.3*	14,169	13,658	12,791	13,894	14,325	13,800	13,158r	14,149r	14,376	*+0.4*
Domestic	38,232	39,623	*+3.6*	4,537	12,361	16,265	7,247	4,814	11,297	15,935r	7,361r	4,240	*-11.9*
Other Final Users	19,063	19,403	*+1.8*	3,781	5,232	6,069	4,238	3,969	5,127	6,127r	4,412r	3,802	*-4.2*
Non energy use	7,093	8,223	*+15.9*	1,723	1,769	1,944	1,942	2,090	2,247	2,206r	2,299r	2,269	*+8.6*
DEPENDENCY [6]													
Net import dependency	46.2%	38.0%		49.7%	46.9%	43.8%	33.5%	36.1%	36.9%	33.9%r	35.8%r	28.8%	
Fossil fuel dependency	84.3%	82.0%		83.0%	85.1%	84.0%	81.2%	80.7%	81.3%	82.5%	80.6%r	78.7%	
Low carbon share	14.3%	16.5%		15.4%	13.7%	14.8%	17.1%	17.3%	17.4%	16.1%r	17.7%r	19.5%	

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

	2015 Quarter 3									2016 Quarter 3 p								
	Coal	Manufactured fuels[4]	Primary oil	Petroleum Products	Natural gas[5]	Bioenergy & waste[6]	Primary electricity	Electricity	Heat sold	Coal	Manufactured fuels[4]	Primary oil	Petroleum Products	Natural gas[5]	Bioenergy & waste[6]	Primary electricity	Electricity	Heat sold
SUPPLY																		
Indigenous production	894	-	11,376	-	8,809	1,970	4,586	-	-	645	-	12,297	-	9,759	1,907	5,246	-	-
Imports	2,590	153	14,210	8,923	8,794	972	-	529	-	1,146	201	13,507	9,212	7,484	902	-	426	-
Exports	-78	-5	-8,654	-6,899	-4,516	-96	-	-22	-	-103	-4	-8,965	-6,797	-4,724	-90	-	-23	-
Marine bunkers	-	-	-	-725	-	-	-	-	-	-	-	-	-751	-	-	-	-	-
Stock change[1]	+1,133	-36	+1,060	-310	-1,369	-	-	-	-	+31	-10	+68	+675	-478	-	-	-	-
Primary supply	4,539	112	17,993	990	11,718	2,846	4,586	507	-	1,719	186	16,907	2,339	12,041	2,719	5,246	403	-
Statistical difference[2]	+6	+0	-4	-58	+22	+29	-	+25	-	-56	+1	-2	-31	-59	-	-	+16	-
Primary demand	4,533	111	17,997	1,048	11,696	2,818	4,586	482	-	1,776	185	16,909	2,370	12,100	2,719	5,246	386	-
Transfers[3]	-	9	-290	+293	-9	-	-942	+942	-	-	+5	-277	+276	-5	-	-1,097	+1,097	-
TRANSFORMATION	-4,115	267	-17,707	17,524	-5,190	-2,068	-3,644	5,569	272	-1,423	54	-16,633	16,336	-6,300	-1,990	-4,150	5,329	272
Electricity generation	-3,130	-164	-	-149	-4,767	-2,060	-3,644	5,569	-	-749	-139	-	-136	-5,877	-1,982	-4,150	5,329	-
Heat generation	-20	-13	-	-16	-423	-8	-	-	272	-20	-13	-	-16	-423	-8	-	-	272
Petroleum refineries	-	-	-17,830	17,842	-	-	-	-	-	-	-	-16,745	16,627	-	-	-	-	-
Coke manufacture	-669	631	-	-	-	-	-	-	-	-353	332	-	-	-	-	-	-	-
Blast furnaces	-251	-234	-	-	-	-	-	-	-	-263	-169	-	-	-	-	-	-	-
Patent fuel manufacture	-45	46	-	-18	-	-	-	-	-	-38	44	-	-17	-	-	-	-	-
Other[7]	-	-	123	-135	-	-	-	-	-	-	-	112	-123	-	-	-	-	-
Energy industry use	-	163	-	1,182	1,127	-	-	517	68	-	99	-	1,025	1,117	-	-	485	68
Losses	-	63	-	-	158	-	-	437	-	-	27	-	-	140	-	-	406	-
FINAL CONSUMPTION	418	161	-	17,683	5,212	750	-	6,039	212	352	119	-	17,956	4,537	729	-	5,921	212
Iron & steel	8	100	-	1	105	-	-	76	-	7	69	-	0	86	-	-	74	-
Other industries	318	-	-	906	1,472	213	-	1,904	174	261	-	-	954	1,403	202	-	1,909	174
Transport	2	-	-	13,964	-	262	-	96	-	3	-	-	13,993	-	284	-	96	-
Domestic	86	38	-	401	2,193	180	-	1,910	4	77	38	-	393	1,730	144	-	1,854	4
Other final users	3	-	-	456	1,328	95	-	2,052	34	5	-	-	471	1,204	100	-	1,988	34
Non energy use	-	22	-	1,955	113	-	-	-	-	-	11	-	2,145	113	-	-	-	-

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. Inludes 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[1]

Thousand tonnes of oil equivalent

	2014	2015	per cent change	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter p	per cent change[2]
By consuming sector													
Final Consumption (unadjusted)													
Industry	23,718	23,595	-0.5	5,353	6,269	6,962	5,470	5,277	5,885	6,476r	5,481r	5,139	-2.6
Transport	54,126	54,810	+1.3	14,169	13,658	12,791	13,894	14,325	13,800	13,158r	14,149r	14,376	+0.4
Domestic	38,232	39,623	+3.6	4,537	12,361	16,265	7,247	4,814	11,297	15,935r	7,361r	4,240	-11.9
Other final users	19,063	19,403	+1.8	3,781	5,232	6,069	4,238	3,969	5,127	6,127r	4,412r	3,802	-4.2
Total	135,139	137,431	+1.7	27,840	37,520	42,088	30,850	28,384	36,109	41,696r	31,403r	27,556	-2.9
Final Consumption (Seasonally and temperature adjusted)													
Industry	23,719	23,594	-0.5	6,041	5,908	6,181	5,885	5,967	5,561	5,782r	5,879r	5,763	-3.4
Transport	54,126	54,809	+1.3	13,699	13,582	13,545	13,700	13,817	13,747	13,927r	13,929r	13,844	+0.2
Domestic	42,493	42,057	-1.0	10,211	10,637	10,746	10,180	10,399	10,731	10,845r	10,601r	10,159	-2.3
Other final users	19,660	19,658	-0.0	4,928	4,871	4,941	4,806	4,987	4,924	5,037r	5,056r	5,016	+0.6
Total	139,998	140,118	+0.1	34,880	34,998	35,413	34,571	35,171	34,963	35,591r	35,465r	34,782	-1.1
By fuel													
Final Consumption (unadjusted)													
Gas	40,226	41,707	+3.7	4,715	12,867	17,236	7,681	5,099	11,691	16,701r	7,963r	4,425	-13.2
Electricity	26,042	26,032	-0.0	6,003	6,821	7,160	6,142	6,039	6,690	7,132r	6,084r	5,921	-1.9
Other	68,871	69,692	+1.2	17,122	17,833	17,692	17,026	17,246	17,728	17,862r	17,355r	17,212	-0.2
Total	135,139	137,431	+1.7	27,840	37,520	42,088	30,850	28,384	36,109	41,696r	31,403r	27,557	-2.9
Final Consumption (Seasonally and temperature adjusted)													
Gas	44,106	43,885	-0.5	10,697	11,133	11,275	10,598	10,986	11,026	11,173r	11,179r	10,602	-3.5
Electricity	26,285	26,161	-0.5	6,619	6,444	6,595	6,581	6,603	6,381	6,594r	6,531r	6,530	-1.1
Other	69,607	70,072	+0.7	17,564	17,421	17,543	17,392	17,582	17,555	17,824r	17,754r	17,650	+0.4
Total	139,998	140,118	+0.1	34,880	34,998	35,413	34,571	35,171	34,963	35,591r	35,465r	34,782	-1.1

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.

Section 2 – Solid Fuels and Derived Gases

Key results show:

Overall coal production in the third quarter of 2016 was down 28 per cent (-0.4 million tonnes) compared with the third quarter of 2015. This was mainly due to the last large deep mine Kellingley closing in December 2015. Deep-mined mine output fell to a new record low, down 99 per cent. Surface mining output rose by 1.8 per cent. **(Chart 2.1)**

Coal imports fell 56 per cent (2.2 million tonnes) on levels shown in the third quarter of 2015, as demand fell, especially for use by electricity generators. **(Charts 2.1 and 2.2)**

The demand for coal by electricity generators in the third quarter of 2016 fell to a new record low of 1.2 million tonnes and was 76 per cent (-3.8 million tonnes) lower than demand in the third quarter of 2015 due to a fall in coal generation capacity, including the closures of Ferrybridge C and Longannet in March 2016 and the conversion of a third unit at Drax from coal to high-range co-firing (85% to <100% biomass) in July 2015. **(Chart 2.3)**

Total stock levels were down 45 per cent (-7.6 million tonnes) to 9.2 million tonnes (a new record low) compared to a year earlier. This was due to generators using more coal stocks for electricity generation. **(Chart 2.4)**

Relevant tables

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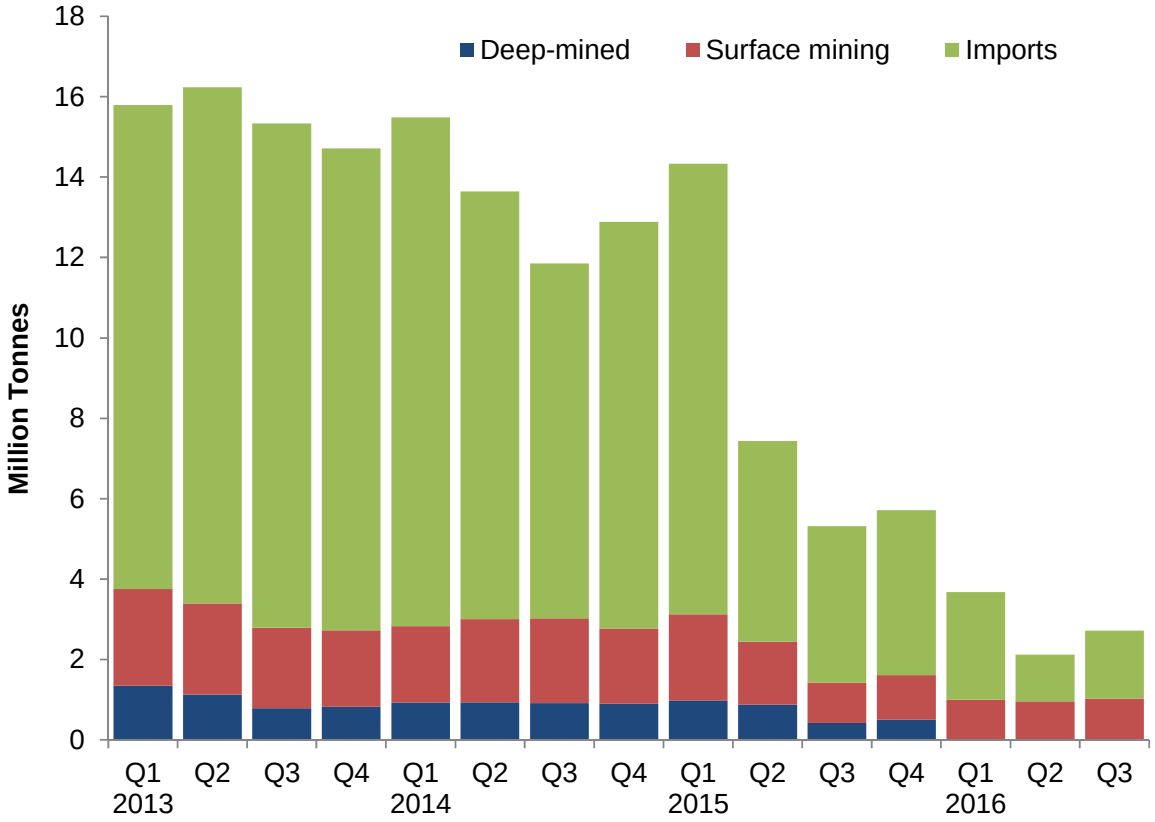
Chart 2.1 Coal supply



Coal production in the third quarter of 2016 was 1.0 million tonnes, 28 per cent lower than the third quarter of 2015. This was mainly due to the last large deep mine Kellingley closing in December 2015. Deep mine production fell by 99 per cent to 5 thousand tonnes (a new record low). There are just seven small deep mines remaining. Surface mine production rose by 1.8 per cent to 1.0 million tonnes

Table 2A Coal imports by origin

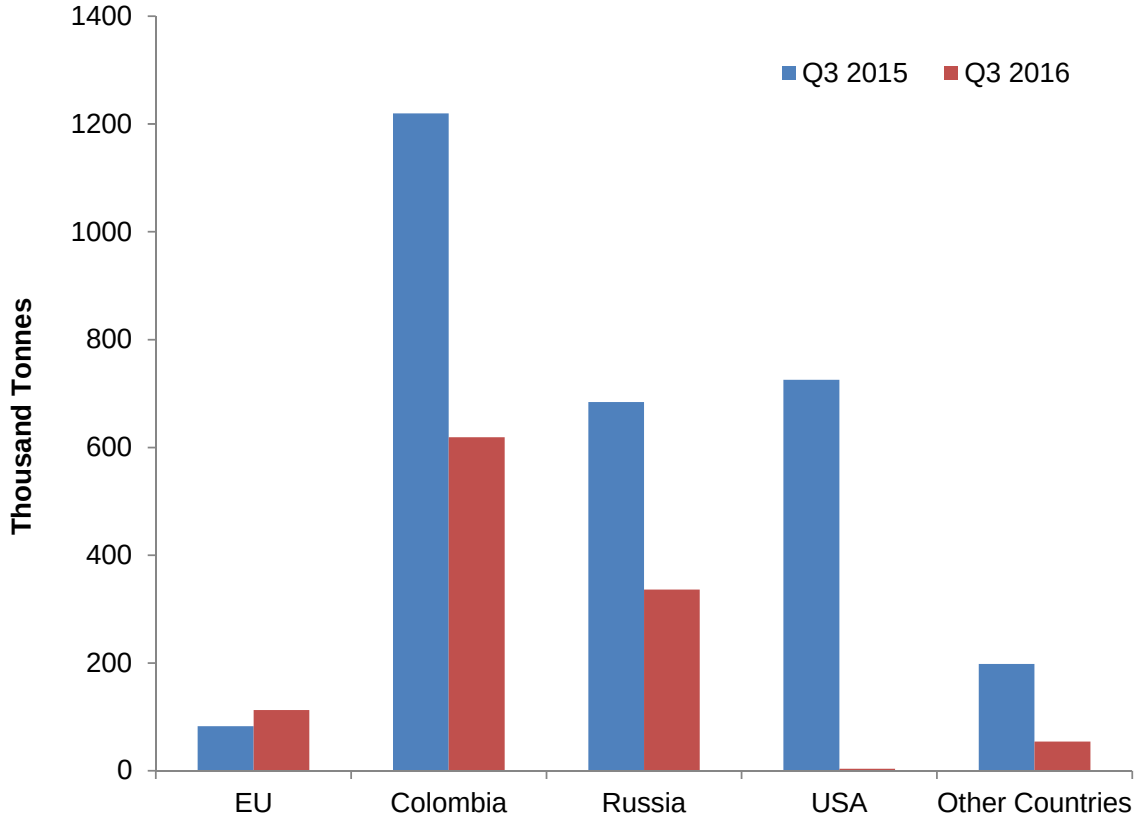
Thousand Tonnes

	2014	2015	2015 Q3	2016 Q3p
European Union	764	614	99	135
Russia	17,869	9,187	1,035	482
Colombia	9,700	7,070	1,220	619
USA	11,182	5,317	1,080	190
Australia	1,249	910	141	125
Other Countries	1,461	1,100	316	143
Total Imports	**42,225**	**24,198**	**3,891**	**1,694**

Imports of coal in the third quarter of 2016 were 56 per cent lower than in the third quarter of 2015 at 1.7 million tonnes due to lower demand, particularly from electricity generators. The decline was due to a fall in coal generation capacity, including the closures of Ferrybridge C and Longannet in March 2016 and the conversion of a third unit at Drax from coal to high-range co-firing (85% to <100% biomass) in July 2015.

Colombia was the largest supplier with 37 per cent of total imports, followed by Russia (28 per cent) and the USA (11 per cent).

Chart 2.2 Steam coal imports by origin



Steam coal imports in the third quarter of 2016 fell by 61 per cent to 1.1 million tonnes and accounted for 66 per cent of total coal imports.

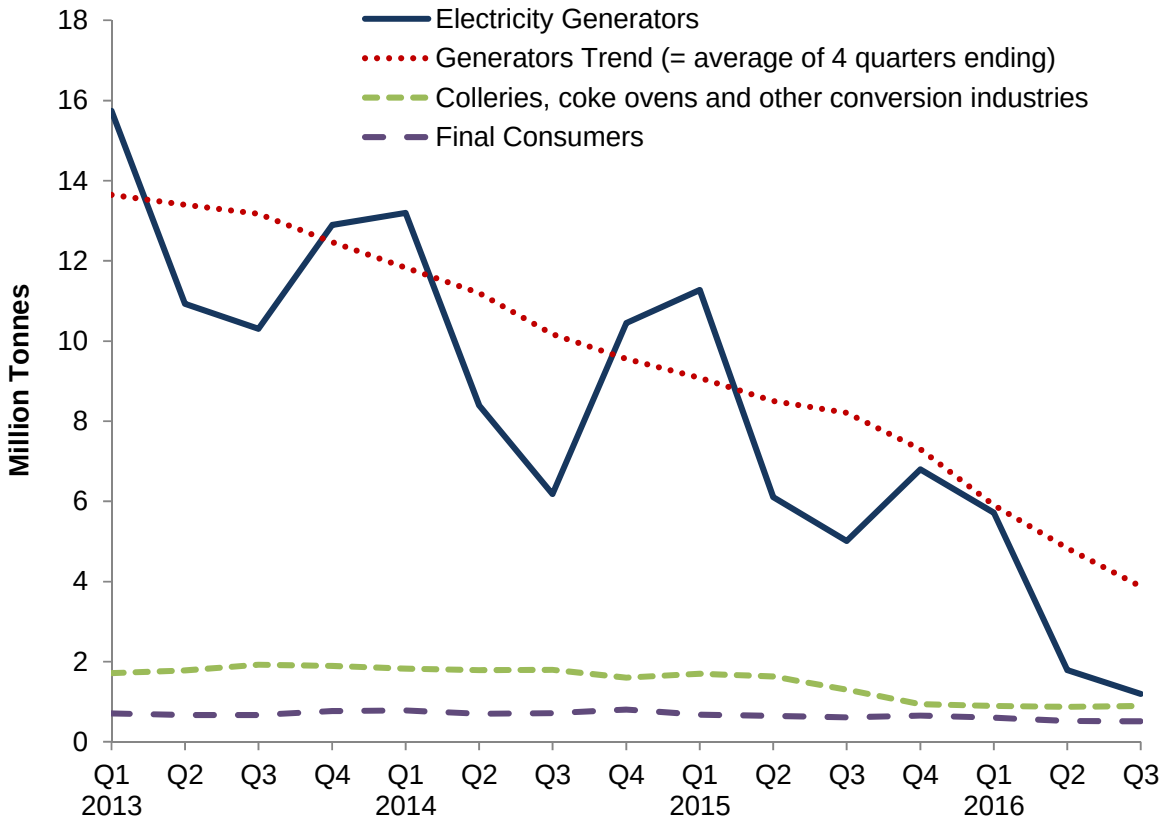
Coking coal imports in the third quarter of 2016 fell by 43 per cent to 0.5 million tonnes and accounted for 32 per cent of total coal imports.

In the third quarter of 2015, 85 per cent of total UK steam coal imports were from Colombia (55 per cent) and Russia (30 per cent). Steam coal imports from Colombia fell by 49 per cent from 1.2 million tonnes in the third quarter of 2015 to 0.6 million tonnes in the third quarter of 2016. Steam coal imports from Russia fell 51 per cent from 0.7 million tonnes in the third quarter of 2015 to 0.3 million tonnes in the third quarter of 2016.

USA - one of the top three suppliers of steam coal imports continuously for the last six years up to the fourth quarter of 2015 exported only 4 thousand tonnes of steam coal to the UK in the third quarter of 2016. This was a fall of 99 per cent from 0.7 million tonnes in the third quarter of 2015. It did not export any steam coal to the UK in the first quarter of 2016.

Aside from the EU, Columbia, Russia and the US, the other major source for steam coal in the last two quarters was Kazakhstan. Kazakhstan's share of total steam coal imports fell from 23 per cent (107 thousand tonnes) in the second quarter of 2016 to 5 per cent (54 thousand tonnes) in the third quarter of 2016.

Chart 2.3 Coal consumption



Total demand for coal in the third quarter of 2016 fell to a new record low of 2.6 million tonnes, 62 per cent lower than in the third quarter of 2015. Consumption by electricity generators was down by 76 per cent to 1.2 million tonnes (a new record low).

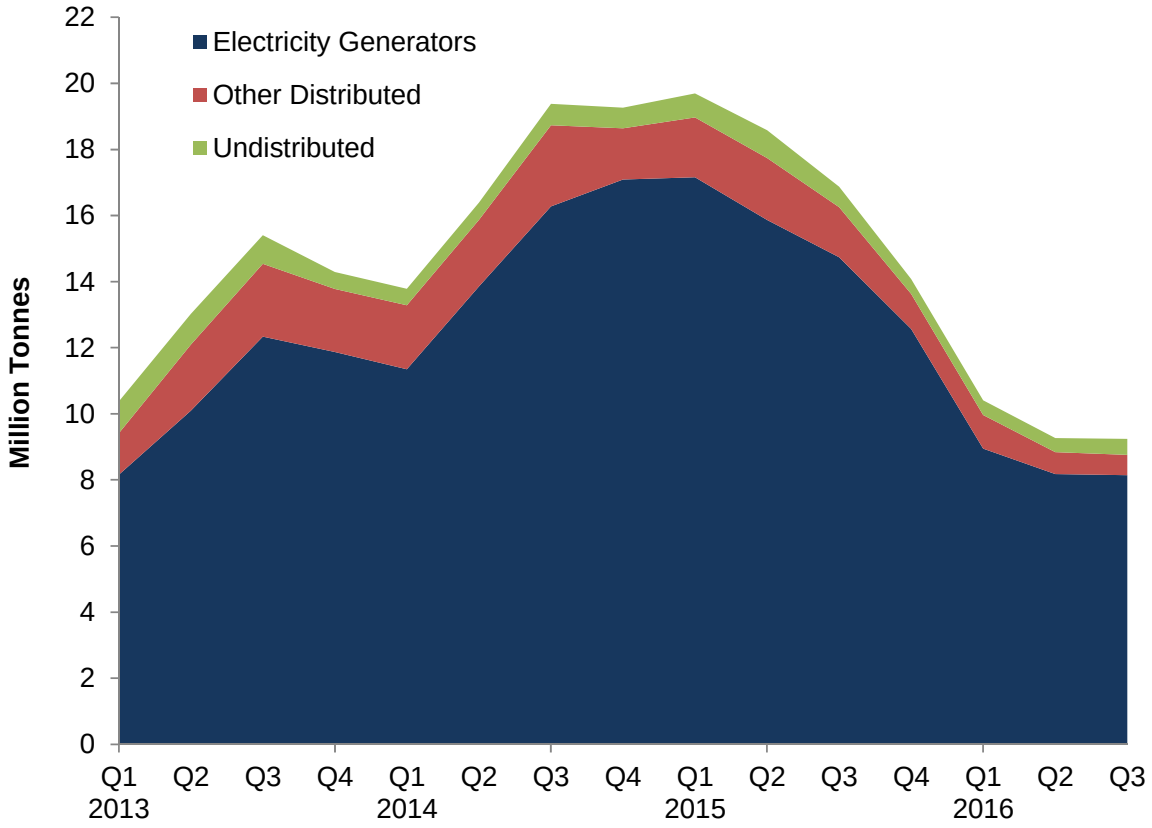
Electricity generators accounted for 46 per cent of total coal use in the third quarter of 2016; compared with 72 per cent a year earlier.

Demand for coal for coke manufacture fell 47 per cent in Q3 2016 compared to a year earlier, from 0.9 million tonnes to 0.5 million tonnes.

Sales to industrial users fell by 17.8 per cent in the third quarter of 2016 and sales to other final consumers including domestic fell by 8.2 per cent to 0.1 million tonnes during the third quarter of 2016.

Coal used in blast furnaces was 0.3 million tonnes in the third quarter of 2016, an increase of 4.7 per cent compared to the third quarter of 2015, though levels remained historically low.

Chart 2.4 Coal stocks



Coal stocks remained broadly stable during the third quarter of 2016 compared to the previous quarter and stood at 9.2 million tonnes (a new record low), 7.6 million tonnes lower than at the end of September 2015.

Coal stocks at power stations were 8.1 million tonnes at the end of the third quarter of 2016, 6.6 million tonnes lower than at the end of September 2015, as closing power stations used up their stocks.

Stocks held by coke ovens were 0.4 million tonnes at the end of the third quarter of 2016, this was 0.3 million tonnes lower than stock levels at the end of September 2015.

Stocks held by producers (undistributed stocks) at the end of the third quarter of 2016 were 0.5 million tonne, 0.1 million tonnes lower than at the end of September 2015.

2 SOLID FUEL AND DERIVED GASES

Table 2.1 Supply and consumption of coal

Thousand tonnes

	2014	2015	*per cent change*	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter p	*per cent change* [1]
SUPPLY													
Indigenous production	11,648	8,598	*-26.2*	3,030	2,776	3,122	2,441	1,424	1,612	1,001	962	1,027	*-27.9*
Deep mined	3,685	2,784	*-24.5*	916	901	980	880	420	504	7	6	5	*-98.8*
Surface mining[2]	7,962	5,814	*-27.0*	2,113	1,875	2,142	1,561	1,004	1,108	994	957	1,022	*+1.8*
Imports[4]	42,225	24,198	*-42.7*	8,826	10,114	11,207	4,997	3,891	4,103	2,675	1,156	1,694	*-56.5*
Exports[5]	425	385	*-9.3*	112	105	111	75	104	96	103	76	137	*+31.9*
Stock change[6]	-4,973	+5,134	*(-)*	-2,988	+96	-419	+1,001	+1,710	+2,842	+3,678r	+1,140r	+23	*-98.6*
Total supply	48,474	37,545	*-22.5*	8,755	12,882	13,799	8,364	6,921	8,461	7,252r	3,182r	2,608	*-62.3*
Statistical difference	+219	+173		+59	+25	+141	-34	-5	+71	+34r	-3r	+0	
Total demand	48,255	37,372	*-22.6*	8,696	12,857	13,658	8,398	6,926	8,390	7,218r	3,186r	2,607	*-62.4*
TRANSFORMATION	45,255	34,776	*-23.2*	7,981	12,053	12,976	7,747	6,316	7,737	6,611r	2,666r	2,094	*-66.8*
Electricity generation	38,234	29,198	*-23.6*	6,183	10,451	11,278	6,112	5,010	6,799	5,717r	1,790r	1,198	*-76.1*
Heat generation[7]	272	213	*-21.7*	45	80	80	43	32	58	80	43	32	-
Coke manufacture	4,977	3,699	*-25.7*	1,264	1,156	1,165	1,083	880	572	443	438	464	*-47.2*
Blast furnaces	1,513	1,444	*-4.6*	416	309	423	447	330	244	316	345	346	*+4.7*
Patent fuel manufacture	259	223	*-13.9*	72	57	31	63	64	65	55	51	54	*-15.6*
Energy industry use	1	-	*-100.0*	-	-	-	-	-	-	-	-	-	
FINAL CONSUMPTION	3,000	2,596	*-13.5*	714	804	682	651	610	653	607r	519r	513	*-15.9*
Iron & steel	54	45	*-17.5*	14	13	12	12	12	10	10	10	10	*-12.8*
Other industries	2,351	1,968	*-16.3*	568	618	502	505	477	483	431r	376r	392	*-17.9*
Domestic	546	552	*+1.0*	119	163	159	127	114	152	156r	122r	101	*-10.8*
Other final users	48	32	*-34.7*	14	9	9	7	8	8	10r	11r	10	*+29.1*
Stocks at end of period													
Distributed stocks	18,641	13,629	*-26.9*	18,732	18,641	18,971	17,742	16,255	13,629	9,963r	8,840r	8,760	*-46.1*
Of which:													
Major power producers[8]	17,091	12,569	*-26.5*	16,275	17,091	17,158	15,864	14,737	12,569	8,948	8,178	8,141	*-44.8*
Coke ovens	795	621	*-21.9*	739	795	836	955	742	621	531	562	396	*-46.7*
Undistributed stocks	622	452	*-27.3*	647	622	724	839	616	452	444r	427r	485	*-21.3*
Total stocks[9]	19,263	14,081	*-26.9*	19,379	19,263	19,695	18,581	16,871	14,081	10,407r	9,267r	9,244	*-45.2*

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 2016 heat generation figure will not be published until the end of July 2017. Therefore, the 2015 figure is used as an estimate for 2016.

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

Thousand tonnes

	2014	2015	*per cent change*	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter p	*per cent change* [3]
SUPPLY													
Indigenous production	3,906	2,965	*-24.1*	990	897	895	868	727	474	376	385	409	*-43.8*
Coke Oven Coke	3,601	2,716	*-24.6*	912	830	854	800	658	404	320	319	344	*-47.8*
Coke Breeze	31	18	*-42.0*	8	7	5	5	4	5	4	4	4	*-5.2*
Other MSF	274	231	*-15.8*	70	60	36	64	65	66	51	61	61	*-5.6*
Imports	940	1,132	*+20.5*	283	251	302	290	215	325	287	284	282	*+31.6*
Exports	112	111	*-0.6*	29	13	23	74	7	8	6	4	6	*-12.9*
Stock change[1]	-212	+64	*(-)*	-75	-87	+73	+37	-50	+4	-2	+21	-15	*-70.7*
Transfers	-5	-3		9	-	-2	-1	-	-	-1	-1	-0	
Total supply	4,518	4,047	*-10.4*	1,177	1,049	1,246	1,121	885	796	654	685	670	*-24.3*
Statistical difference	-1	0		-0	-0	-0	-	0	-0	-0	-	0	
Total demand	4,519	4,047	*-10.4*	1,177	1,049	1,246	1,121	885	796	654	685	670	*-24.3*
TRANSFORMATION	3,585	3,257	*-9.1*	929	842	1,009	908	705	635	525	548	533	*-24.5*
Coke manufacture	-	-		-	-	-	-	-	-	-	-	-	
Blast furnaces	3,585	3,257	*-9.1*	929	842	1,009	908	705	635	525	548	533	*-24.5*
Energy industry use	-	-		-	-	-	-	-	-	-	-	-	
FINAL CONSUMPTION	934	790	*-15.4*	248	207	237	213	179	161	130	137r	137	*-23.6*
Iron & steel	634	539	*-14.9*	174	134	165	151	125	98	75	79	84	*-33.3*
Other industries	45	17	*-62.9*	10	14	10	6	-	-	-	-	0	
Domestic	256	235	*-8.2*	64	59	62	56	54	63	55	58	53	*-1.2*
Stocks at end of period[2]	1,188	1,124	*-5.4*	1,093	1,188	1,115	1,028	1,038	1,124	1,126	1,108	1,142	*+10.0*

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

GWh

	2014	2015	*per cent change*	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter p	*per cent change* [1]
SUPPLY													
Indigenous production	25,441	22,156	*-12.9*	6,673	5,748	6,995	6,315	4,972	3,874	3,406	3,603	3,424	*-31.1*
Coke oven gas	8,473	6,890	*-18.7*	2,199	1,931	2,264	2,030	1,595	1,000	870	836	855	*-46.4*
Blast furnace gas	15,386	14,131	*-8.2*	4,094	3,455	4,359	3,941	3,117	2,713	2,403	2,645	2,439	*-21.7*
Benzole & tars	1,582	1,136	*-28.2*	380	361	371	344	260	161	134	123	129	*-50.3*
Transfers	140	420	*(+)*	40	66	92	96	99	132	127	106	64	*-35.8*
Total supply	25,581	22,576	*-11.7*	6,713	5,813	7,088	6,411	5,071	4,006	3,534	3,709	3,487	*-31.2*
Statistical difference	-37	+41		-29	+8	+33	-14	+5	+17	-9	+10	+7	
Total demand	25,618	22,535	*-12.0*	6,742	5,805	7,054	6,425	5,066	3,989	3,543	3,699	3,480	*-31.3*
TRANSFORMATION	11,223	9,704	*-13.5*	2,862	2,668	3,192	2,580	2,053	1,880	1,804	1,882	1,767	*-13.9*
Electricity generation	10,626	9,107	*-14.3*	2,713	2,519	3,042	2,430	1,904	1,731	1,655	1,733	1,618	*-15.0*
Heat generation[2]	598	598	-	149	149	149	149	149	149	149	149	149	-
Energy industry use	9,331	8,330	*-10.7*	2,381	2,154	2,581	2,358	1,894	1,497	1,236	1,235	1,150	*-39.3*
Losses	2,517	2,646	*+5.1*	926	452	674	912	737	323	248	337	318	*-56.8*
FINAL CONSUMPTION	2,546	1,855	*-27.1*	573	531	608	576	383	289	255	245	244	*-36.2*
Iron & steel	800	719	*-10.1*	149	126	237	231	123	128	121	122	115	*-6.3*
Other industries[3]	165	-	*-100.0*	44	44	-	-	-	-	-	-	-	
Non-Energy Use[4]	1,582	1,136	*-28.2*	380	361	371	344	260	161	134	123	129	*-50.3*

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

2. For Heat generation, the 2016 figure currently shown is the 2015 figures carried forward - these will be updated in July 2017.

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:

Total indigenous UK production of crude oil and Natural Gas Liquids (NGL) in Q3 2016 continues to be strong, 7.8 per cent higher than a year ago. Production in the year to date is up 8.3 per cent on last year. (**Chart 3.1**)

As a result of strong production, net imports of primary oils (crude oil, NGLs and process oils) in Q3 2016 were 4.1 million tonnes (down from 5.1 million tonnes last year). This is equivalent to 27 per cent of the UK's refinery demand. **(Chart 3.3)**

Refinery production in Q3 2016 was lower than the trend in the year to date, down 6.5 per cent on the same quarter of last year. This decrease was driven by maintenance during the quarter. Production in the year to date has been stable compared to last year (down 1.3 per cent in year to Q3). (**Chart 3.2**)

Trade in petroleum products was static with imports up by 3.0 per cent and exports down 1.3 per cent. The UK was a net importer of petroleum products in Q3 2016 by 2.2 million tonnes and remains short in middle distillates such as road diesel and jet fuel. **(Chart 3.2)**

Total deliveries of the key transport fuels were static, up 0.7 per cent. Diesel deliveries increased by 3.3 per cent in line with the long term trend and motor spirit deliveries decreased by 2.6 per cent. The diesel share of road fuels is now 67 per cent as more drivers move towards diesel vehicles. **(Chart 3.5)**

Overall stocks of crude oil and petroleum products stood at 14.3 million tonnes. This quarter has seen a move towards companies preferring primary oil to petroleum product stocks. **(Chart 3.6)**

Relevant tables

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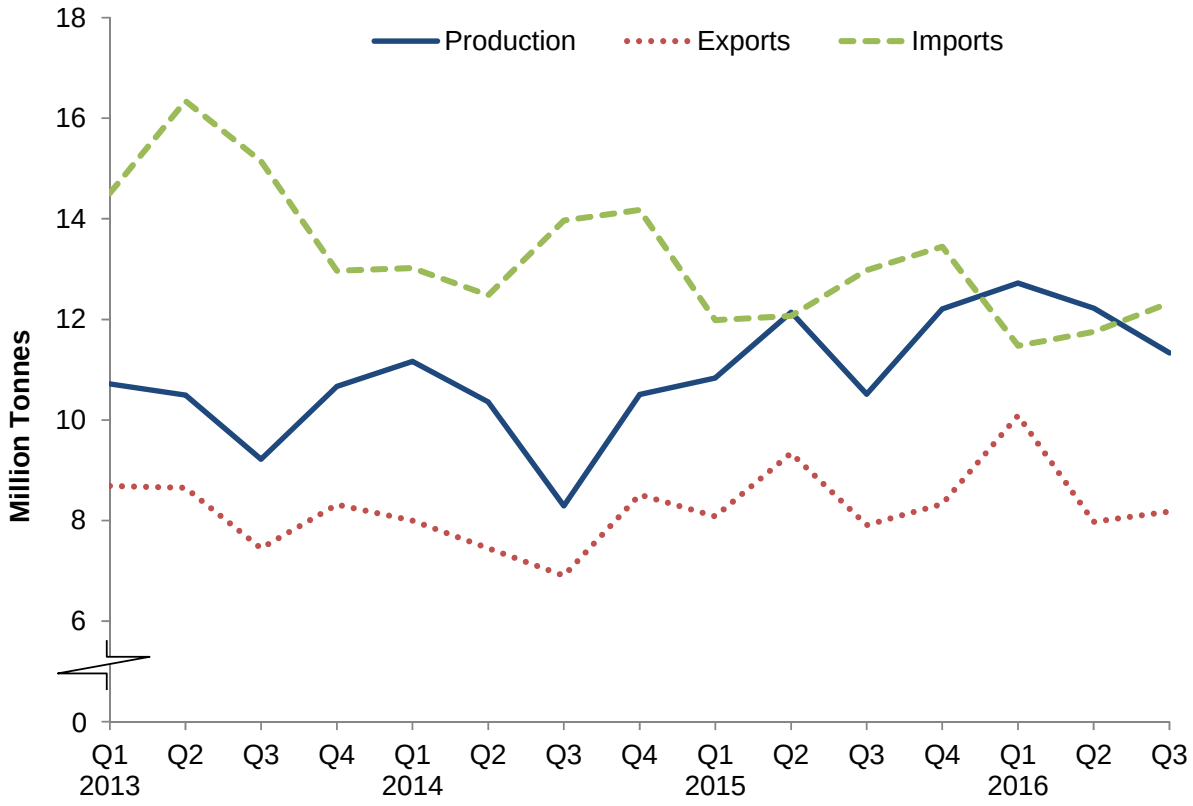
Chart 3.1 Production and trade of crude oil and NGLs



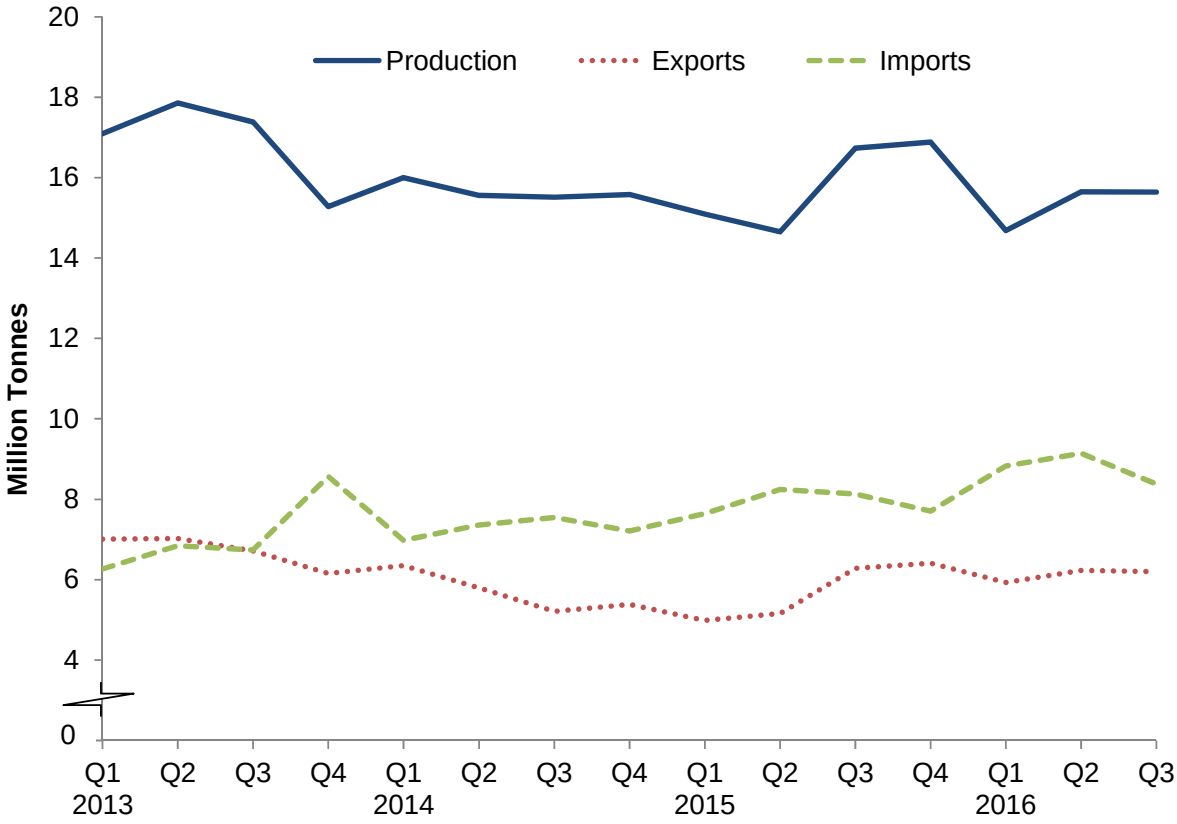
Indigenous UK crude oil production was 6.3 per cent higher in Q3 of 2016 compared with Q3 2015. The increase in crude oil production is mainly driven by fewer maintenance activities compared to last year along with increased production from the Balloch field and the new Solan oil field coming online, despite the delay of scheduled maintenance at the Buzzard field towards the end of the quarter.

Production of NGLs increased by 41 per cent compared to last year, partly due to increased production from the St Fergus FLAGS terminal. Overall indigenous production was up 7.8 per cent.

Imports of crude oil and NGLs decreased by 6.1 per cent compared with the same quarter a year earlier as UK indigenous production accounted for a larger share of refinery demand.

Net imports of primary oils (crude, NGLs and feedstocks) decreased from 5.1 million tonnes in Q3 2015 to 4.1 million tonnes in Q3 2016.

Chart 3.2 Production and trade of petroleum products

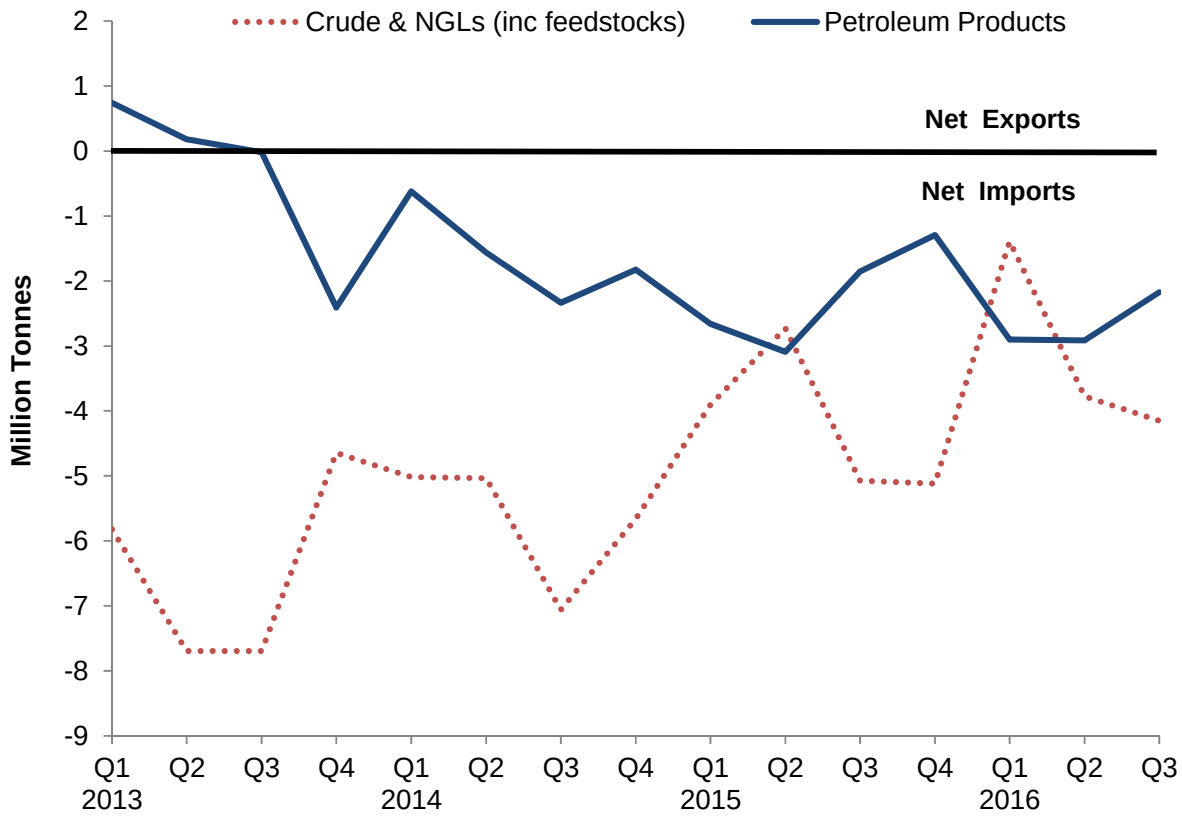


Indigenous production of petroleum products at refineries in Q3 2016 was 6.5 per cent lower compared with a year earlier. This was partly caused by planned maintenance activity at some major refineries. Production remains robust compared to last year, down 1.3 per cent on the year to date.

With relatively steady demand and strong production, the trade position is broadly unchanged on last year with imports of petroleum products up 3.0 per cent and exports down 1.3 per cent.

Whilst the trade balance on some products has varied slightly on the same quarter last year, the broad pattern is similar to last year with the UK reliant on imports of middle distillates (particularly road diesel and jet fuel which comprise around two-thirds of imports) and strong exports of petrol (which comprises nearly half of the UK's petroleum product exports).

Chart 3.3 Overall trade of primary oils and petroleum products

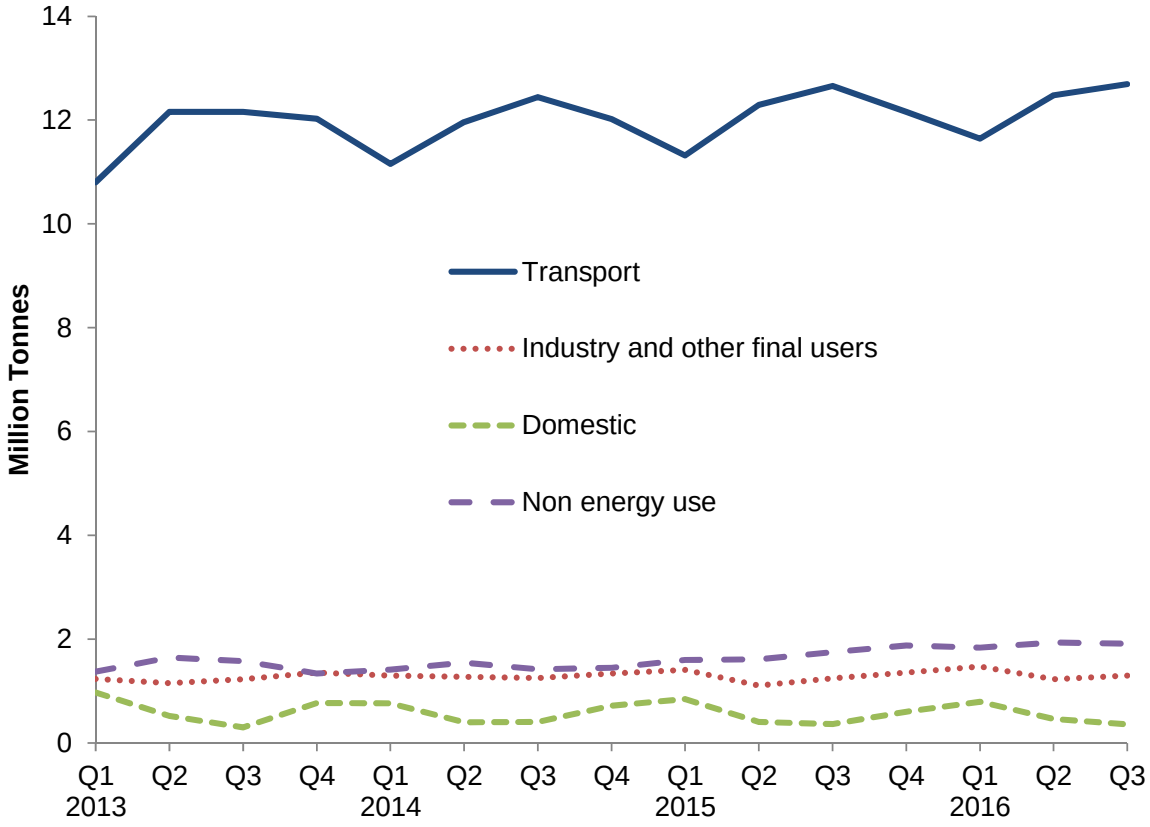


The UK's overall net import dependence for primary oils (Crude, NGL's and feedstocks) was 27 per cent in Q3 2016, down slightly from 31 per cent on Q3 2015.

Crude oil import dependence has decreased in 2016 as new fields have come online. In 2014 there were maintenance issues that dented UK indigenous production of crude, which have not affected this year's production so adversely. Recent increased refinery activity has also helped push up demand for primary oils.

In Q3 2016 the UK was a net importer of petroleum products, by 2.2 million tonnes, up from 1.9 million tonnes in Q3 2015.

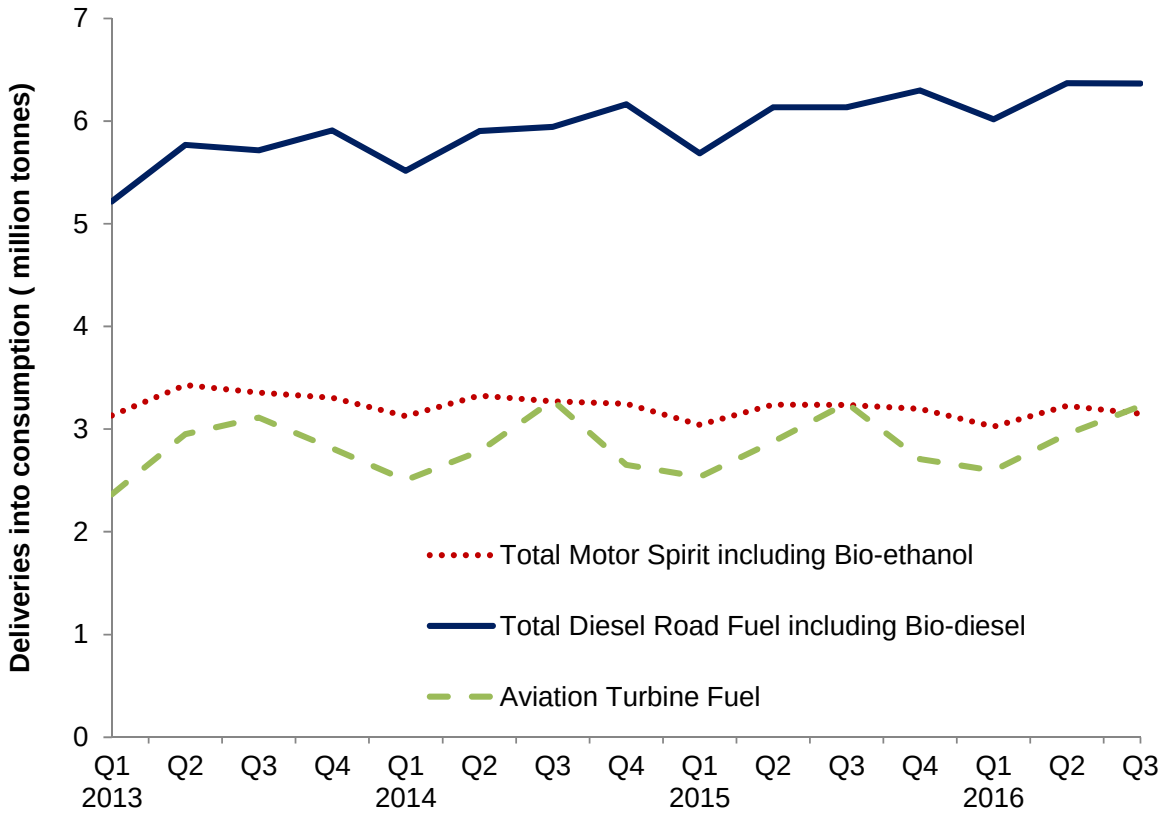
Chart 3.4 Final consumption of oil



Final consumption in the oil sector is slightly seasonal with different products peaking at different times of the year. Consumption of domestic fuels for heating peaks in Q1 and Q4 each year, and consumption of aviation fuels is higher in Q2 and Q3.

Overall, final consumption of petroleum products in Q3 2016 was up 1.5 per cent on the same period last year. The majority of the data are similar to last year but there is increased demand of petroleum gases such as butane and propane for both energy and non-energy use.

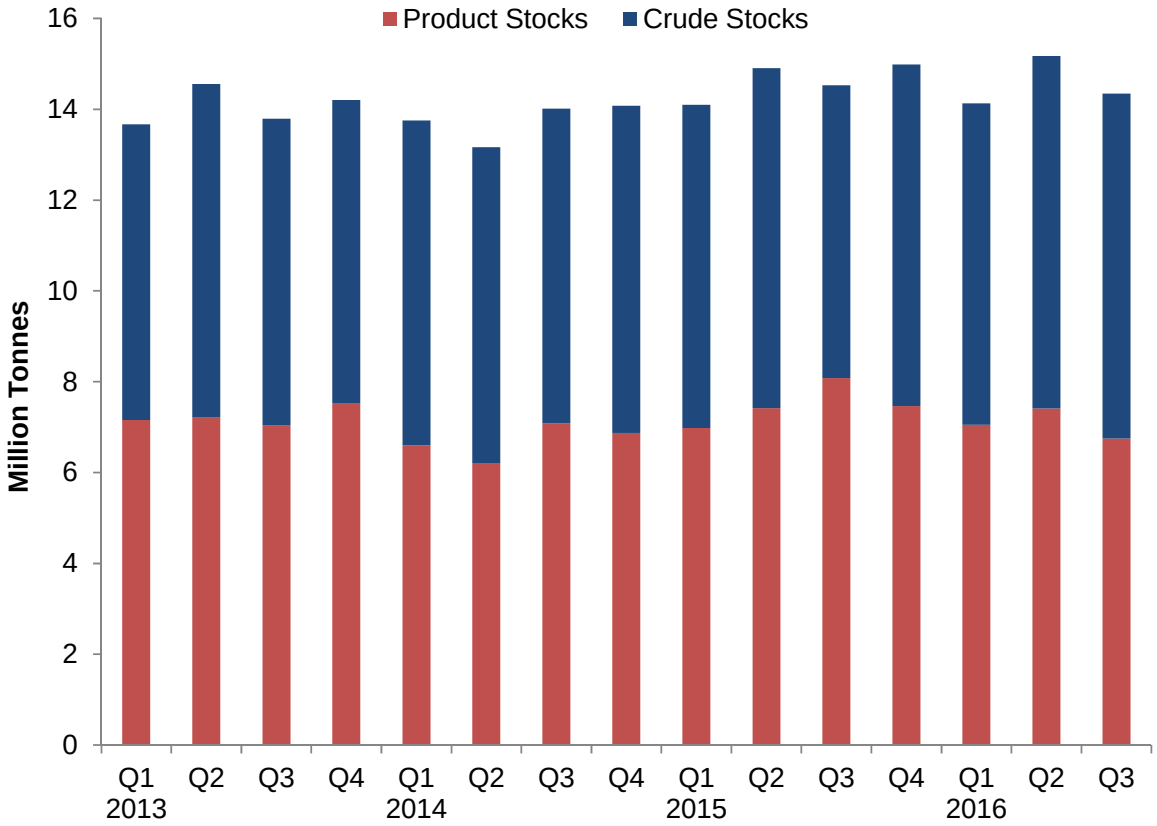
Chart 3.5 Demand for key transport fuels



Transport fuels accounted for near three-quarters of demand for petroleum products, with road fuels alone accounting for more than half of demand.

Consumption of all transport fuels were near identical to last year. Motor spirit sales saw a decrease (down 2.6 per cent), which was countered by an increase in road diesel (up 3.3 per cent) in continuation of the long term trend as more motorists switch from petrol to diesel. Deliveries of aviation turbine fuel were similar to the same period last year, down just 0.9 per cent.

Chart 3.6 UK oil stocks



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 Q3 2016 the UK held 14.3 million tonnes, equivalent to just under the 61 days of consumption with an additional 14 days of commercial stocks available on top of the obligation. The same volume is equivalent to around 180 days of net imports. Whilst UK total oil stocks were broadly stable (down 1.6 per cent on the same period last year) there has been a significant shift to primary oil stocks (up 18 per cent) from petroleum product stocks (down 17 per cent).

The bulk of this change has been driven by an increase in primary oils held for the UK elsewhere in the EU, which are up 30 per cent on the same period last year. Countering this has been a substantial contraction in petroleum products held overseas which are down nearly a third on the same period last year. The primary driver for these 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 a decrease in stock held overseas on behalf of the UK, down 7.7 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

3 OIL AND OIL PRODUCTS

Table 3.1 Supply and use of crude oil, natural gas liquids and feedstocks[1]

Thousand tonnes

	2014	2015	*per cent change*	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter p	*per cent change*[8]
SUPPLY													
Indigenous production[2]	40,328	45,698	*+13.3*	8,296	10,510	10,836	12,141	10,515	12,206	12,720	12,223r	11,333	*+7.8*
Crude oil	37,474	42,826	*+14.3*	7,692	9,779	10,163	11,364	9,895	11,404	11,816	11,357r	10,515	*+6.3*
NGLs[3]	2,454	2,462	*+0.3*	503	623	577	689	508	688	784	757	716	*+41.1*
Feedstocks	400	410	*+2.6*	101	108	96	88	112	114	120	108	102	*-8.7*
Imports[4]	53,638	50,480	*-5.9*	13,964	14,174	11,985	12,068	12,979	13,448	11,479	11,750r	12,329	*-5.0*
Crude oil & NGLs	48,890	45,159	*-7.6*	12,831	13,101	10,920	10,931	11,406	11,902	9,842	10,130r	10,705	*-6.1*
Feedstocks	4,747	5,322	*+12.1*	1,133	1,074	1,065	1,137	1,574	1,547	1,637	1,620r	1,624	*+3.2*
Exports[4]	30,869	33,660	*+9.0*	6,906	8,515	8,082	9,339	7,908	8,331	10,088r	7,976r	8,180	*+3.4*
Crude Oil & NGLs	29,809	31,730	*+6.4*	6,634	8,231	7,587	8,846	7,279	8,018	9,460	7,544r	7,886	*+8.3*
Feedstocks	1,060	1,930	*+82.1*	273	284	494	493	630	313	628r	433r	294	*(-)*
Stock change[5]	-592	-19	*(-)*	199	-566	-59	-384	970	-546	399	-449r	62	*(-)*
Transfers[6]	-1,439	-1,135	*-21.1*	-306	-455	-83	-382	-225	-445	-389	-395	-209	*-6.9*
Total supply	61,066	61,365	*+0.5*	15,246	15,149	14,597	14,104	16,332	16,332	14,121r	15,153r	15,335	*-6.1*
Statistical difference[7]	+4	-10		-24	+8	-35	+1	-1	+24	+15r	-19r	+1	
Total demand	61,063	61,375	*+0.5*	15,270	15,141	14,632	14,103	16,332	16,308	14,106	15,172	15,334	*-6.1*
TRANSFORMATION	61,063	61,375	*+0.5*	15,270	15,141	14,632	14,103	16,332	16,308	14,106	15,172	15,334	*-6.1*
Petroleum refineries	61,063	61,375	*+0.5*	15,270	15,141	14,632	14,103	16,332	16,308	14,106	15,172	15,334	*-6.1*

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, othe 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

	2014	2015	*per cent change*	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter p	*per cent change* [1]
SUPPLY													
Indigenous production [2]	62,647	63,368	*+1.2*	15,515	15,577	15,097	14,652	16,736	16,883	14,684r	15,650r	15,640	*-6.5*
Imports [3]	29,093	31,727	*+9.1*	7,546	7,213	7,643	8,247	8,134	7,703	8,831r	9,145r	8,375	*+3.0*
Exports [3]	22,748	22,835	*+0.4*	5,212	5,387	4,984	5,159	6,283	6,409	5,932r	6,232r	6,203	*-1.3*
Marine bunkers	2,824	2,426	*-14.1*	695	764	526	673	679	548	518r	667r	703	*+3.6*
Stock change [4]	+292	-747		-324	184	-148	-229	-295	-75	182	-267	+617	
Transfers [5]	-817	-1,218		-181	-125	-529	-249	-257	-184	-310	-273	-281	
Total supply	65,643	67,869	*+3.4*	16,649	16,699	16,552	16,589	17,357	17,371	16,937r	17,356r	17,444	*+0.5*
Statistical difference [6]	-109	+78		-75	-34	+128	-4	-53	+7	-82r	-36r	-28	
Total demand	65,752	67,790	*+3.1*	16,724	16,733	16,424	16,593	17,410	17,363	17,019r	17,392r	17,473	*+0.4*
TRANSFORMATION	1,055	1,116	*+5.8*	254	271	260	254	290	311	317	266	261	*-10.0*
Electricity generation	490	551	*+12.4*	115	124	130	126	140	155	156	119	121	*-13.0*
Heat generation	61	59	*-3.7*	15	15	15	15	15	15	15	15	15	*+0.0*
Other Transformation	504	506	*+0.5*	124	131	115	113	136	142	146	133	125	*-8.1*
Energy industry use	3,861	4,099	*+6.2*	957	938	994	933	1,108	1,064	962	1,028	963	*-13.1*
Petroleum Refineries	3,198	3,400	*+6.3*	791	772	819	758	933	889	787	853	788	*-15.6*
Blast Furnaces	-	-		-	-	-	-	-	-	-	-	-	
Others	663	699	*+5.5*	166	166	175	175	175	175	175	175	175	-
FINAL CONSUMPTION	60,837	62,576	*+2.9*	15,513	15,524	15,170	15,406	16,012	15,989	15,740r	16,097r	16,249	*+1.5*
Iron & steel	6	6	*+6.6*	2	2	1	2	1	1	1	0	0	*(-)*
Other industries	3,765	3,612	*-4.1*	875	982	1,028	748	827	1,009	1,085r	811r	870	*+5.2*
Transport	47,578	48,427	*+1.8*	12,442	12,020	11,316	12,290	12,660	12,161	11,642r	12,477r	12,690	*+0.2*
Domestic	2,278	2,212	*-2.9*	404	715	844	405	363	600	792r	460r	355	*-2.1*
Other final users	1,390	1,490	*+7.2*	374	356	379	353	415	342	383r	416r	425	*+2.4*
Non energy use	5,820	6,830	*+17.4*	1,417	1,449	1,601	1,607	1,747	1,875	1,836r	1,932r	1,909	*+9.3*

1. Percentage change between the most recent quarter and the same quarter a year earlier; (+) represents a positive percentage change greater than 100%.
2. 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

	2015 3rd quarter									2016 3rd quarter p								
	Total Petroleum Products	Motor spirit	DERV[8]	Gas oil[1]	Aviation turbine fuel	Fuel oils	Petroleum gases[2]	Burning oil	Other products[3]	Total Petroleum Products	Motor spirit	DERV[8]	Gas oil[1]	Aviation turbine fuel	Fuel oils	Petroleum gases[2]	Burning oil	Other products[3]
SUPPLY																		
Indigenous Production[4]	16,736r	4,562	3,646	1,925	1,456	1,243	1,660r	406	1,840	15,640	4,342	3,630	1,805	1,280	1,044	1,557	309	1,673
Imports[5]	8,134	806	3,098	523	2,333	339	187	137	711	8,375	944	3,207	454	2,248	343	419	112	648
Exports[5]	6,283	2,856	530	679	368	964	231	48	608	6,203	2,743	841	513	380	822	232	13	659
Marine bunkers	679	-	-	432	-	246	0	-	-	703	-	-	463	-	239	-	-	-
Stock change[6]	-295	+63	-118	-2	-187	+14	+2	+18	-85	+617	+48	+284	+49	+167	+14	+1	-19	+72
Transfers[7]	-257	+510	-72	+82	+23	-239	-	-30	-530	-281	+400	-103	+14	-97	-168	-2	+85	-410
Total supply	17,357r	3,085	6,025	1,417	3,257	147	1,617r	483	1,328	17,444	2,992	6,177	1,346	3,219	172	1,742	474	1,323
Statistical difference[8]	-53	+12	-	-1	+6	-14	-58	-20	+22	-28	-1	-	-	-4	+2	-40	-13	+28
Total demand	17,410r	3,072	5,976	1,418	3,252	161	1,675r	503	1,355	17,473	2,993	6,175	1,346	3,223	170	1,782	487	1,297
TRANSFORMATION	290	-	-	23	-	50	178	-	40	261	-	-	24	-	46	164	-	27
Electricity generation	140	-	-	22	-	38	63	-	-	121	-	-	23	-	35	63	-	0
Heat generation	15	-	-	1	-	11	2	-	-	15	-	-	1	-	11	2	-	-
Petroleum refineries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coke manufacture	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Blast furnaces	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Patent fuel manufacture	21	-	-	-	-	-	0	-	21	20	-	-	-	-	-	0	-	20
Other transformation[9]	116	-	-	-	-	-	112	-	4	105	-	-	-	-	-	98	-	7
Energy industry use	1,108	-	-	158	-	85	552	-	313	963	-	-	158	-	70	474	-	260
FINAL CONSUMPTION	16,013r	3,072	5,976	1,236	3,252	27	946r	503	1,001	16,249	2,993	6,175	1,163	3,223	54	1,144	487	1,010
Iron & steel	1	-	-	-	-	1	0	-	-	0	-	-	-	-	0	-	-	-
Other industries	827r	-	-	518	-	11	74r	205	19	870	-	-	510	-	54	72	199	37
Transport	12,660	3,072	5,976	336	3,252	0	20	-	4	12,690	2,993	6,175	277	3,223	0	18	-	4
Domestic	363	-	-	42	-	-	23	298	-	355	-	-	44	-	-	23	289	-
Other final users	415r	-	-	335	-	15	65r	-	-	425	-	-	328	-	0	97	-	-
Non energy use	1,747	-	-	5	-	-	764	-	979	1,909	-	-	5	-	-	935	-	969

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 product
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[1]

Thousand tonnes

	2014	2015	*per cent change*	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter p	*per cent change* [2]
MOTOR SPIRIT													
of which, Hydrocarbon[3]	12,326	12,082	*-2.0%*	3,103	3,086	2,893	3,076	3,072	3,040	2,877	3,072	2,993	*-2.6%*
of which, Bio-ethanol[4]	645	631	*-2.1%*	168	160	150	161	163	157	146	154	157	*-3.3%*
Total Motor Spirit including Bio-ethanol	**12,971**	**12,713**	*-2.0%*	**3,271**	**3,247**	**3,043**	**3,237**	**3,235**	**3,197**	**3,023**	**3,226**	**3,150**	*-2.6%*
of which, sold through Supermarkets[5]	5,755	5,794	*0.7%*	1,448	1,464	1,418	1,467	1,435	1,473	1,480	1,479	1,453	*1.2%*
DIESEL ROAD FUEL													
of which, Hydrocarbon[3]	22,675	23,656	*4.3%*	5,701	5,960	5,575	5,998	5,976	6,106	5,889	6,173	6,175	*3.3%*
of which, Bio-diesel[4]	850	595	*-29.9%*	243	204	111	135	158	191	127	195	191	*21.1%*
Total Diesel Road Fuel including Bio-diesel	**23,525**	**24,251**	*3.1%*	**5,944**	**6,164**	**5,687**	**6,133**	**6,134**	**6,298**	**6,016**	**6,368**	**6,366**	*3.8%*
of which, sold through Supermarkets 5	6,394	6,644	*3.9%*	1,625	1,658	1,605	1,648	1,706	1,685	1,793	1,802	1,814	*6.3%*

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 onl

3 OIL AND OIL PRODUCTS

Table 3.6 Stocks of petroleum[1] at end of period

Thousand tonnes

		Crude oil and refinery process oil					Petroleum products							Total stocks		
		Refineries[2]	Terminals[3]	Offshore[4]	Net bilaterals of Crude and Process oil [5]	Total[5]	Motor Spirit[6]	Kerosene[7]	Gas/Diesel Oil[8]	Fuel oils	Other products[9]	Net bilaterals of products [5]	Total products	Total Net bilaterals [5]	Total Stocks in UK[10]	Total stocks
2011		3,889	694	540	151	5,274	696	1,454	1,949	525	845	2,100	7,569	2,251	10,592	12,843
2012		3,829	1,194	473	195	5,690	605	1,427	1,931	491	841	2,441	7,735	2,636	10,790	13,425
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		3,106	1,629	499	2,289	7,524	1,084	1,425	1,859	321	755	2,022	7,466	4,312	10,678	14,990
2014	3rd quarter	3,248	1,309	512	1,863	6,932	914	1,259	1,681	330	684	2,215	7,083	4,078	9,938	14,016
	4th quarter	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	1st quarter	3,793	991	461	1,871	7,116	1,304	1,142	1,553	292	640	2,051	6,982	3,922	10,176	14,098
	2nd quarter	3,590	1,565	474	1,862	7,491	1,150	1,265	1,706	348	634	2,315	7,418	4,177	10,731	14,909
	3rd quarter	3,098	1,211	350	1,793	6,451	1,087	1,436	1,825	314	716	2,703	8,082	4,496	10,037	14,533
	4th quarter	3,106	1,629	499	2,289	7,524	1,084	1,425	1,859	321	755	2,022	7,466	4,312	10,678	14,990
2016	1st quarter	3,038r	1,370	478	2,193	7,078r	1,086r	1,450r	1,641r	256r	807r	1,812	7,052r	4,005	10,125r	14,131r
	2nd quarter	3,145r	1,586	603r	2,427r	7,762r	1,162r	1,395r	1,890r	278r	784r	1,899r	7,408r	4,326	10,844r	15,170r
	3rd quarter p	3,193	1,473	607	2,323	7,596	1,114	1,249	1,559	247	711	1,826	6,708	4,150	10,154	14,304
Per cent change [11]		*+3.1*	*+21.7*	*+73.4*	*+29.6*	*+17.7*	*+2.5*	*-13.0*	*-14.5*	*-21.4*	*-0.7*	*-32.4*	*-17.0*	*-7.7*	*+1.2*	*-1.6*

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 underare 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 lead 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:

Gross UK production of natural gas in Q3 2016 was 10.8 per cent higher on Q3 2015, at 113 TWh **(Chart 4.1).** Within this production of associated gas was 25 per cent higher, whilst dry gas production was14.4 per cent lower **(Chart 4.2)**. The increase is due to a number of factors including production from the new Laggan gas field and continued strong production across much of the UK's continental shelf.

Net Imports decreased by 35 per cent in comparison to Q3 2015 **(Chart 4.4).** This decrease has been driven by strong production and a reduced stock build when compared to last year due to the closure of the Rough storage for maintenance.

Imports in Q3 2016 were down 14.9 per cent in comparison to the same quarter in 2015 **(Chart 4.5).** This fall has largely been driven by imports from Norway which are down 19.7 per cent. Exports increased by 4.6 per cent on Q3 2016, with exports to Belgium up 18.8 per cent **(Chart 4.4).**

UK demand for natural gas in Q3 2016 was up 3.5 per cent in comparison to Q3 2015. Within this there has been a significant increase in gas used for electricity generation up 23 per cent. In contrast final consumption has decreased by 13.0 per cent with domestic, other final users and other industry all decreasing by 21, 9.3 and 4.7 per cent respectively. These decreases were partly as a result of warmer temperatures, particularly in September. **(Chart 4.5)**

Relevant table

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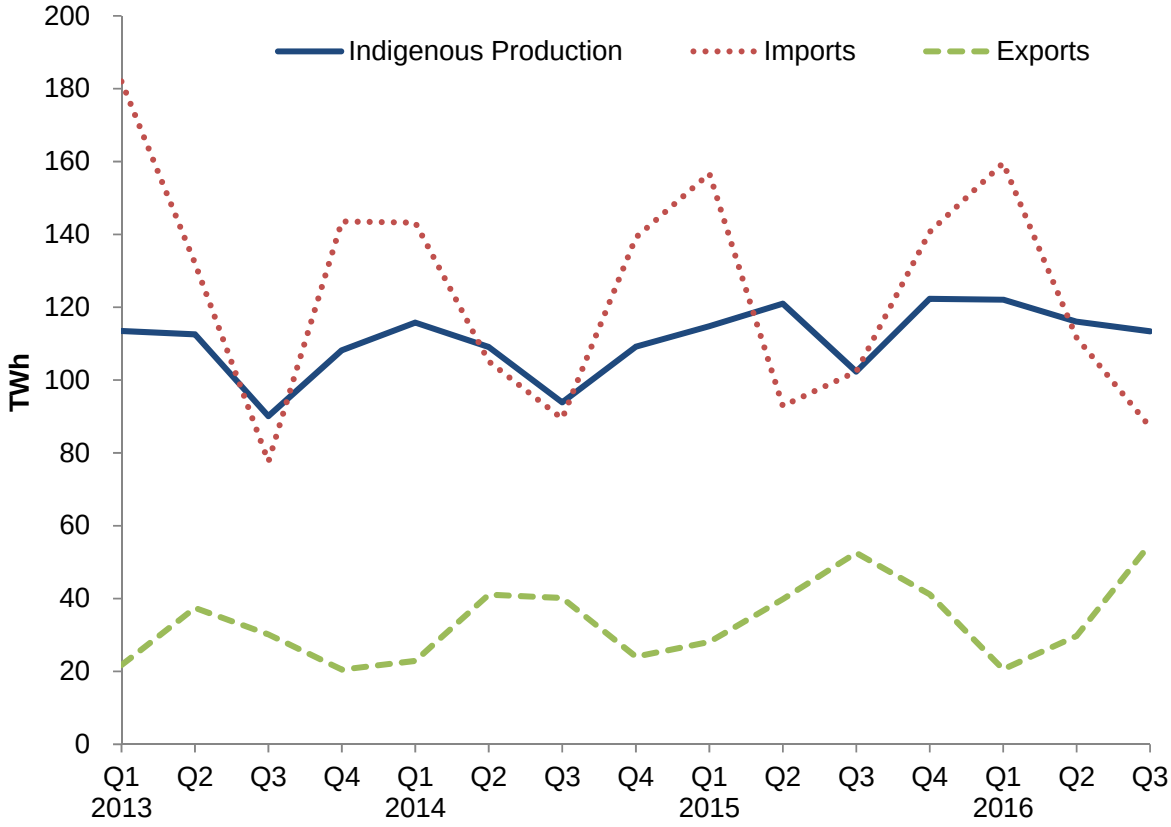
Chart 4.1 Production and imports and exports of natural gas

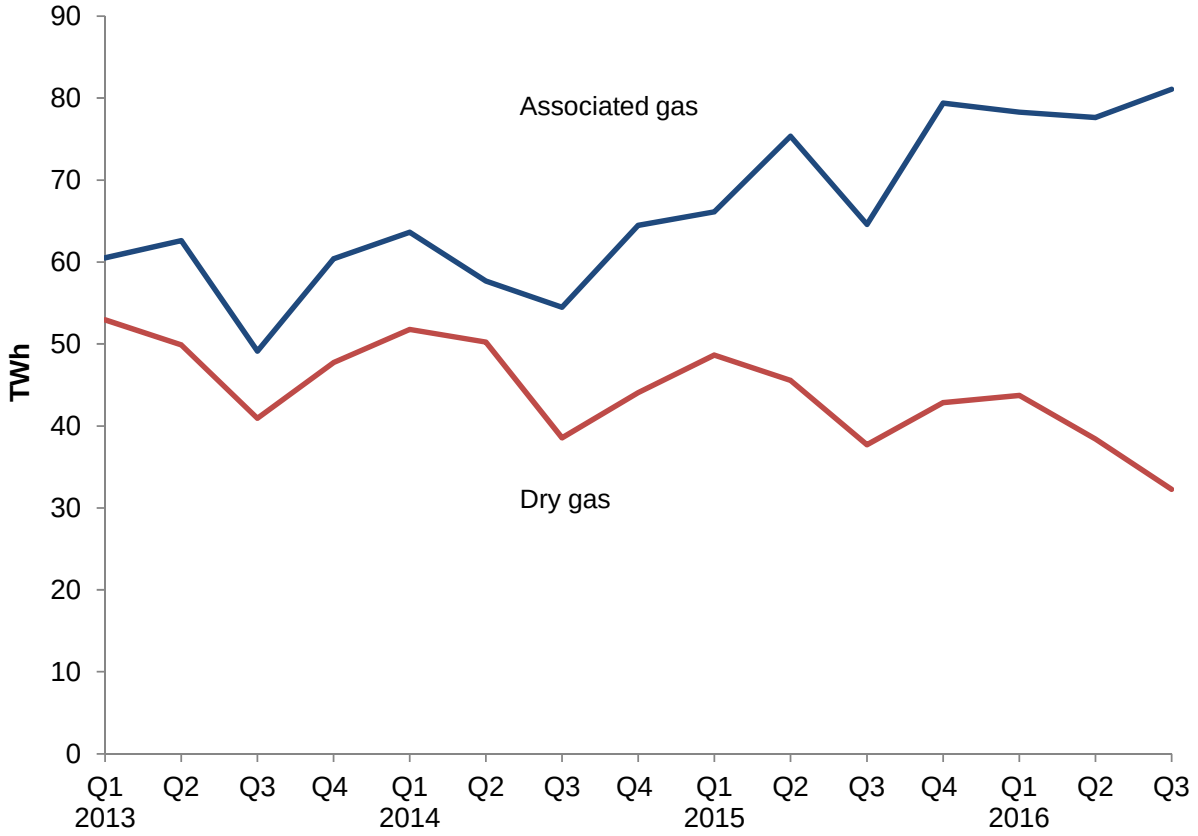


In the third quarter of 2016, gross production of natural gas was up 10.8 per cent on Q3 2015 with July's 18.8 per cent increase particularly notable as the largest month-on-month growth since 2010. The increase is due to a number of factors including production from the new Laggan field and the continued strong production across much of the UK's Continental Shelf.

The recent growth contrasts strongly with the decreases since production peaked in 2000, which have averaged a 6.5 per cent decrease per year. Whilst the recent increases are notable, output in 2016 is down by around 40 per cent on the 2000 levels.

Imports in Q3 2016 were down 15 per cent in comparison to the same quarter in 2015, this fall has largely been driven by imports from Norway which are down 20 per cent. Exports increased by 4.6 per cent on Q3 2016, with exports to Belgium up 19 per cent. Reloads of Liquefied Natural Gas (LNG) have expanded substantially on last year, up over 300 per cent and accounted for around 7 per cent of total gas exports during the quarter.

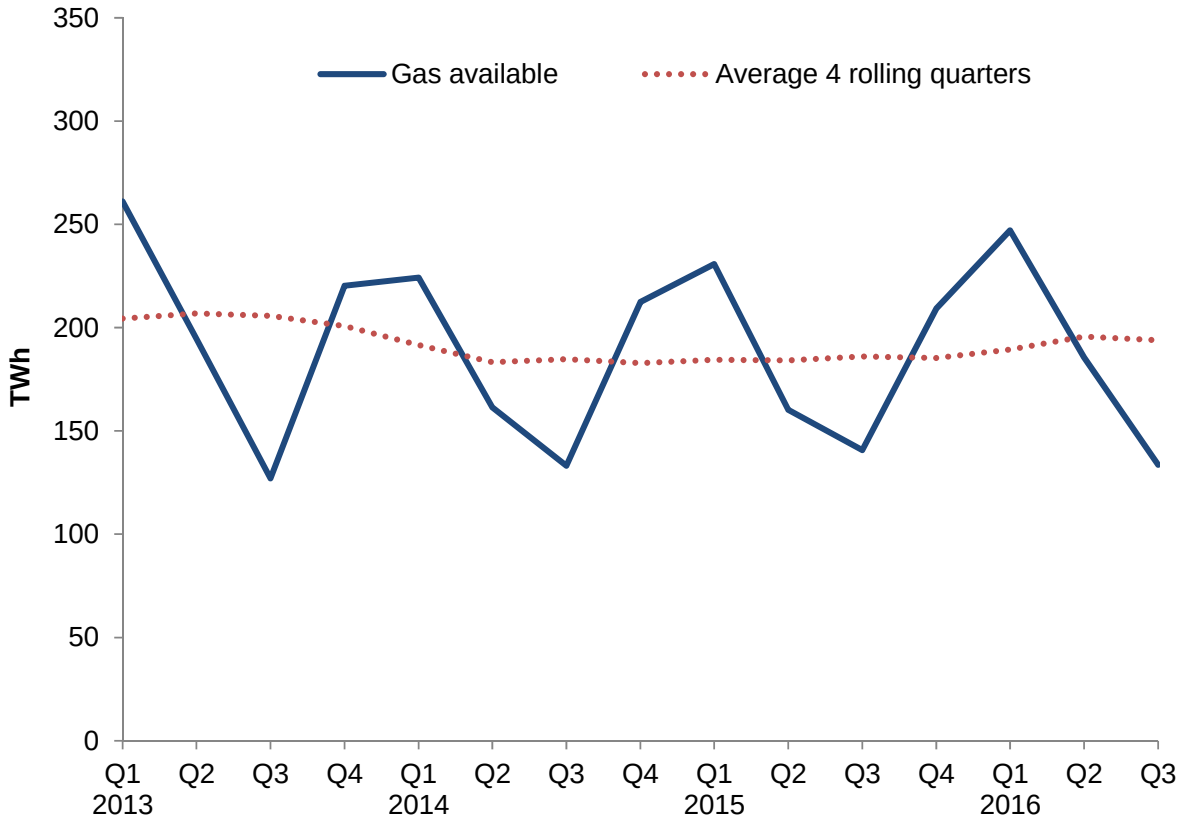
Chart 4.2 Production of dry gas and associated gas



In Q3 2016 associated gas production increased by 25 per cent versus Q3 2015, from 65 TWh to 81 TWh. This increase partly reflects production from a number of new, relatively large condensate fields in the North Sea.

Compared to the same quarter in 2015 dry gas production decreased by 14 per cent to 32 TWh.

Chart 4.3 Gas availability

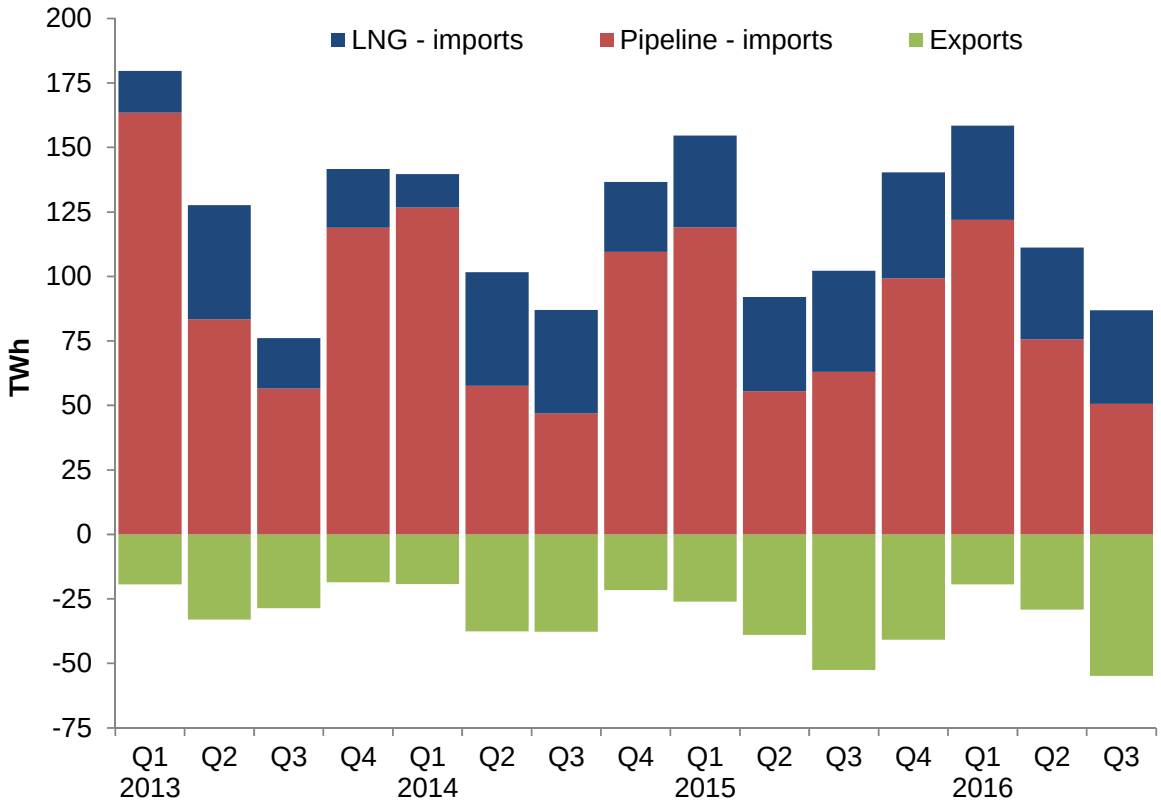


Gas available at terminals is equal to the gross gas production minus producers own use, plus net imports.

Gas availability is seasonal, mirroring gas demand, and peaks during Q1 and Q4 each year. Gas availability in Q3 2016 decreased by 5.0 per cent compared to Q3 2015 to 133.6 TWh. This was driven by a decrease in net imports.

The long-term picture shows that the average availability over 4 rolling quarters had remained fairly constant since the start of 2012 before increasing slightly since the start of 2015 and falling slightly in Q3 2016

Chart 4.4 Import and exports

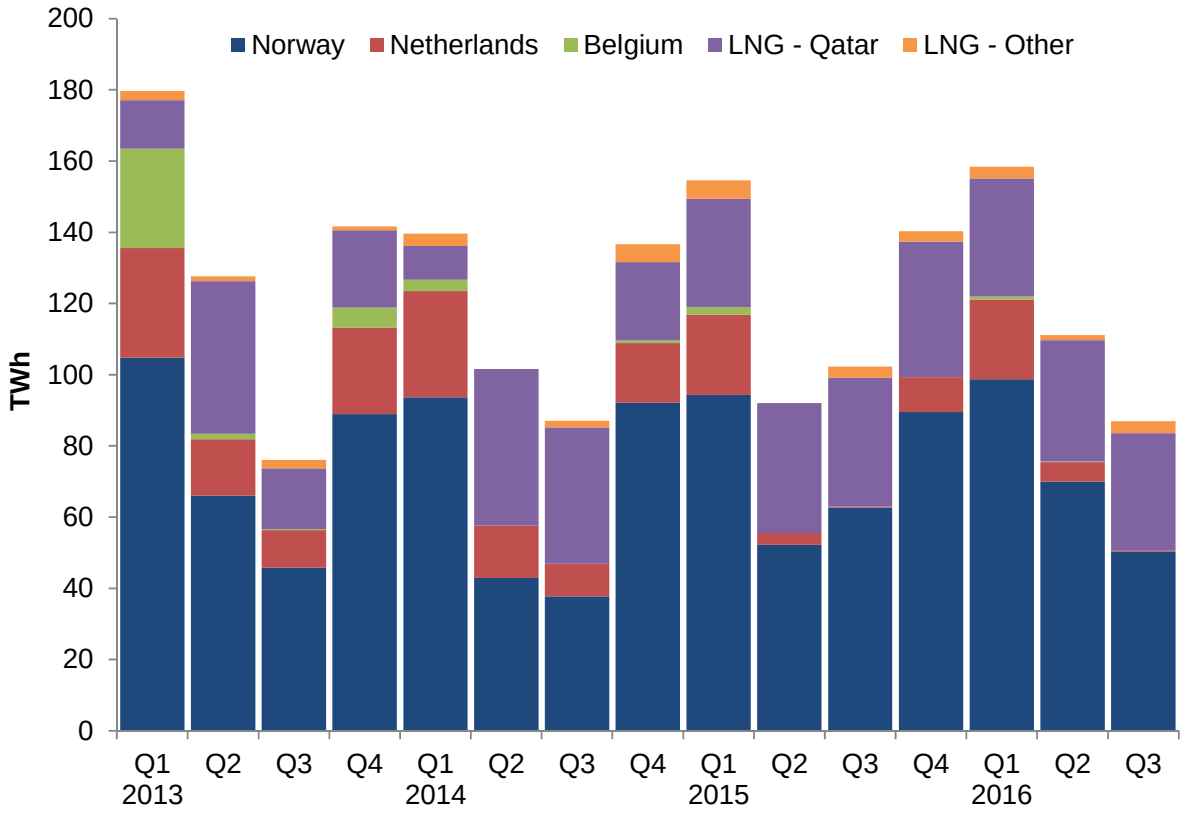


Net imports decreased by 35 per cent in comparison to Q3 2015**.** This decrease has been driven by strong production and a reduced stock build when compared to last year.

Imports in Q3 2016 were down 15 per cent in comparison to the same quarter in 2015. This reduction has been driven by imports from Norway which are down 20 per cent, which could partly be driven by annual maintenance on the Norwegian Continental Shelf, and imports of LNG which are down 7.6 per cent.

Exports increased by 4.6 per cent over the same time frame. This increase has been driven by a 19 per cent increase in exports to Belgium and a three-fold increase of LNG exports or 'reloads', which started in late 2014. Outside of those two increases, exports to the Republic of Ireland decreased by 41 per cent (largely due to the production from the Corrib gas field which is now supplying Ireland) and exports to the Netherlands decreased by 22 per cent.

Chart 4.5 Imports by origin

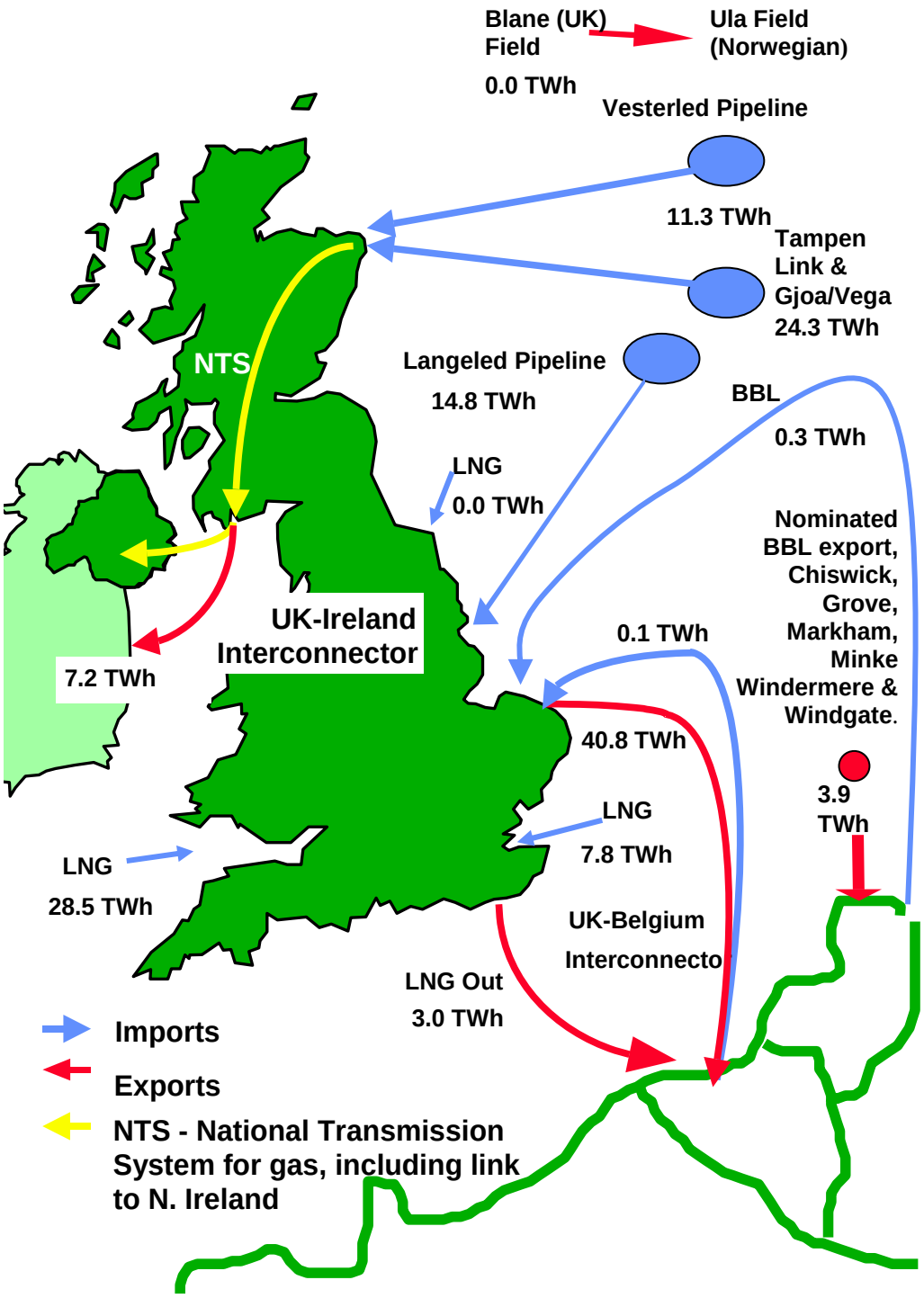


The majority of LNG imports are sourced from Qatar, around 91 per cent in Q3 2016. There was a decrease in the quantity of LNG imports from Qatar in Q3 2016, 14 per cent lower than the same quarter in 2015.

Pipeline imports from Norway were down 20 per cent on Q3 2015.

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* at: www.gov.uk/government/statistics/gas-section-4-energy-trends

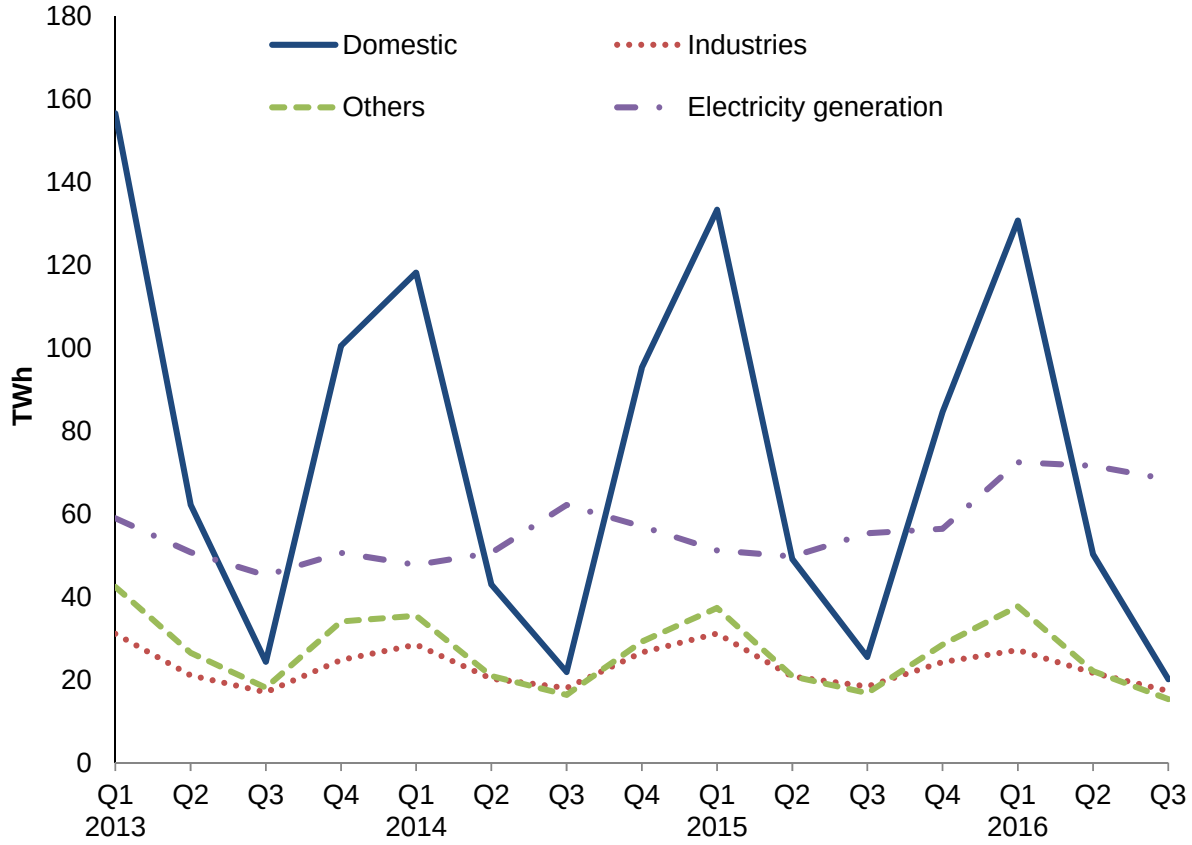
Map: UK imports and exports of gas Q3 2016*



*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.

Gas

Chart 4.6 UK demand for natural gas



UK demand for natural gas in Q3 2016 was up 3.5 per cent in comparison to the same quarter last year.

The principal change this year was that gas use for electricity generation rose by 23 per cent in comparison to Q3 2015. This growth is smaller than the previous quarters of 2016, with Q1 and Q2 up 42 and 44 per cent, but does still follow the trend of substantial growth in gas use at the expense of coal generation.

Final consumption of gas is down 13 per cent. Within this consumption by domestic, other final users and other industries were all down by 21, 9.3 and 4.7 per cent respectively. These decreases reflect the warmer temperatures, particularly in September.

4 GAS

Table 4.1. Natural gas supply and consumption

GWh

	2014	2015	*per cent change*	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter p	*per cent change* [1]
SUPPLY													
Indigenous production	427,784	460,268	*+7.6*	93,850	109,116	114,776	120,931	102,315	122,246	122,011r	116,013r	113,366	*+10.8*
Imports	476,837	492,382	*+3.3*	89,405	139,141	156,690	92,828	102,270	140,594	159,542r	111,624	87,036	*-14.9*
of which LNG	*124,081*	*152,397*	*+22.8*	*40,151*	*27,046*	*35,602*	*36,565*	*39,242*	*40,988*	*36,466*	*35,523*	*36,245*	*-7.6*
Exports	128,076	161,575	*+26.2*	40,102	24,049	28,105	39,789	52,520	41,161	20,518r	29,692r	54,938	*+4.6*
Stock change [2]	-2,383	+3,515		-7,057	5,754	34,500	-11,042	-15,919	-4,024	31,688	-8,669	-5,563	
Transfers	-140	-420		-40	-66	-92	-96	-99	-132	-127	-106	-64	
Total supply	774,022	794,170	*+2.6*	136,056	229,896	277,768	162,832	136,047	217,523	292,596r	189,171r	139,838	*+2.8*
Statistical difference	-1,269	1,823		-496	-422	649	170	258	746	-913r	619r	-685	
Total demand	775,291	792,346	*+2.2*	136,552	230,318	277,119	162,661	135,789	216,777	293,509r	188,551r	140,523	*+3.5*
TRANSFORMATION	243,022	237,957	*-2.1*	67,012	64,173	59,266	55,370	60,259	63,063	80,537r	77,211r	73,166	*+21.4*
Electricity generation	217,392	212,556	*-2.2*	62,105	56,961	51,144	49,713	55,338	56,361	72,415r	71,555r	68,245	*+23.3*
Heat generation3	25,631	25,401	*-0.9*	4,906	7,212	8,122	5,656	4,921	6,702	8,122	5,656	4,921	-
Energy industry use	52,172	57,580	*+10.4*	11,694	13,482	14,651	15,534	13,079	14,315	16,273r	16,029r	12,966	*-0.9*
Losses	6,856	6,500	*-5.2*	1,656	1,667	1,438	1,115	1,834	2,114	1,148r	1,387r	1,632	*-11.0*
FINAL CONSUMPTION	473,241	490,309	*+3.6*	56,190	150,995	201,763	90,643	60,618	137,285	195,551r	93,924r	52,759	*-13.0*
Iron & steel	5,454	5,374	*-1.5*	1,270	1,375	1,589	1,454	1,224	1,108	1,191	1,016	998	*-18.5*
Other industries	87,878	89,088	*+1.4*	16,764	25,204	29,532	19,291	17,118	23,146	25,941r	20,637r	16,319	*-4.7*
Domestic	278,101	292,417	*+5.1*	21,842	95,204	133,307	49,034	25,510	84,565	130,714	50,208r	20,118	*-21.1*
Other final users	96,378	98,163	*+1.9*	14,956	27,854	36,019	19,547	15,448	27,149	36,388r	20,747r	14,008	*-9.3*
Non energy use [3]	5,430	5,267	*-3.0*	1,357	1,357	1,317	1,317	1,317	1,317	1,317	1,317	1,317	-

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

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

3. For heat generation and non energy use, the 2016 figures currently shown are the 2015 figures carried forward - these will be updated in July 2017.

Section 5 - Electricity

Key results show:

In 2016 Q3, total electricity generated fell by 1.2 per cent, from 76.4 TWh a year earlier to 75.4 TWh. (**Chart 5.1**).

Low carbon electricity's share of generation increased from 45.3 per cent to a record high 50.0 per cent, due to increased generation from renewables and nuclear. **(Chart 5.3)**.

Renewables' share of electricity generation was 25.0 per cent in 2016 Q3, up 1.3 percentage points on the share in 2015 Q3. **(Chart 5.2).**

Coal's share of generation decreased from 16.7 per cent to 3.6 per cent, whilst gas' share of generation increased from 34.8 per cent in the third quarter of 2015 to 43.6 per cent in the third quarter of 2016. (**Chart 5.2**).

Nuclear's share of generation rose from 21.7 per cent in the third quarter of 2015 to 25.0 per cent in the third quarter of 2016 following outages in 2015. (**Chart 5.2**).

The UK remains a net importer with 6.2 per cent of electricity supplied from net imports in the third quarter of 2016. (**Chart 5.4**).

Final consumption of electricity during the third quarter of 2016, at 68.9 TWh, was 1.9 per cent lower than in the same period last year which, alongside a fall in losses, left overall demand 2.5 per cent lower than in Q3 2015. Domestic sales fell by 2.9 per cent compared to the same quarter in 2015. (**Chart 5.5**).

Relevant tables

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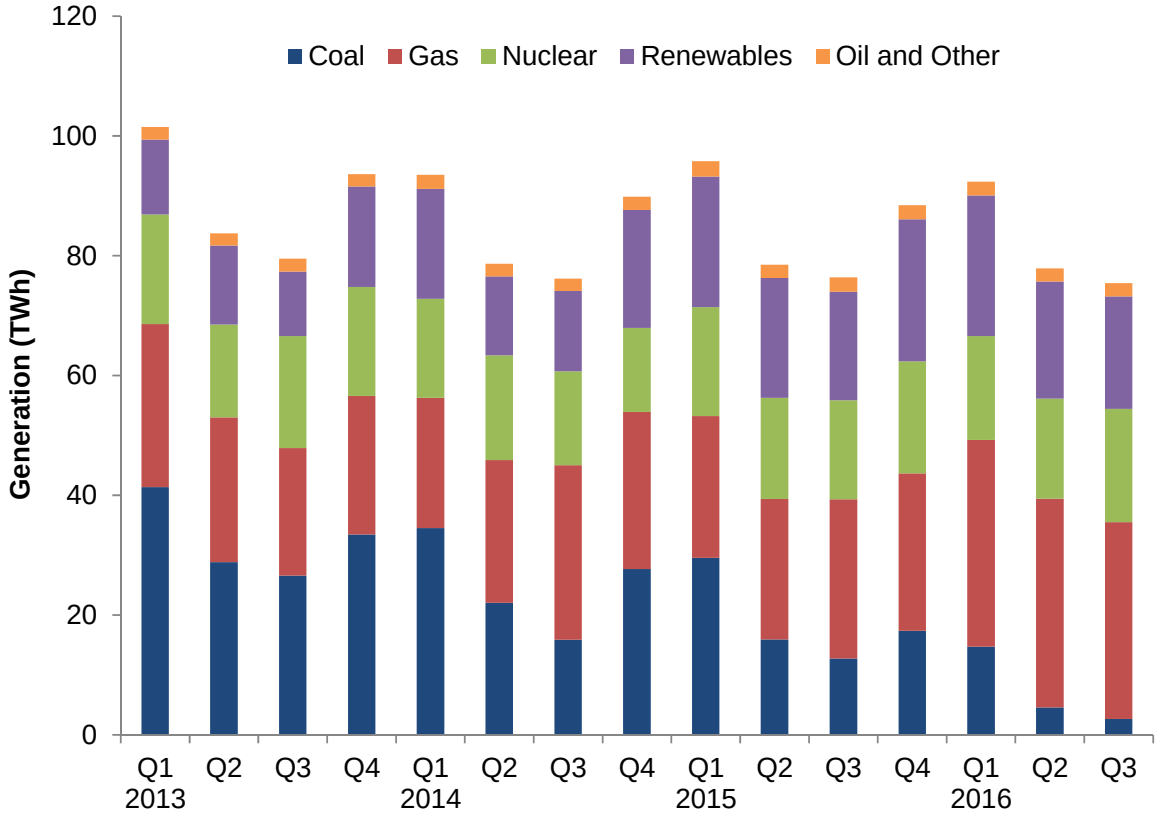
Chart 5.1 Electricity generated by fuel type



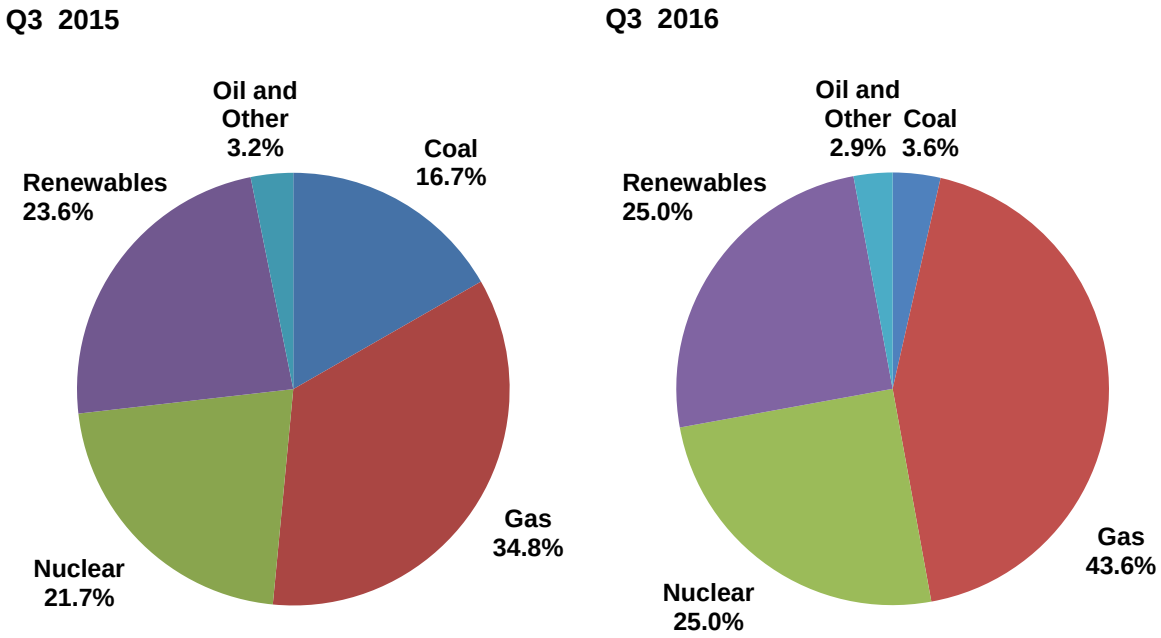
Despite a 3.3 per cent fall in Major Power Producers[1] (MPPs) generation in the third quarter of 2016, overall generation only fell by 1.2 per cent. This was due to an 11 per cent increase in generation from other generators, mostly as a result of an increase in wind and solar capacity.

Coal fired generation fell by 79 per cent from 12.8 TWh in 2015 Q3 to a record low 2.7 TWh in 2016 Q3, due to a reduction in coal capacity, including the closures of Ferrybridge C and Longannet in March 2016 along with the conversion of a unit at Drax from coal to high-range co-firing (85% to <100% biomass). In 2016 Q3, gas fired generation increased by 24 per cent from 26.6 TWh to 32.9 TWh. Nuclear generation rose by 14 per cent from 16.6 TWh in 2015 Q3 to 18.9 TWh in 2016 Q3.

In 2016 Q3, wind and solar generation rose by 17 per cent, from 9.9 TWh to 11.6 TWh. Wind generation was up 12 per cent compared with a year ago whilst solar generation rose by 30 per cent, due to a 29 per cent increase in capacity. Hydro generation rose 11 per cent, from 1.03 TWh to 1.14 TWh, with 56 per cent more rainfall than a year ago.

[1] Major Power Producers are plants with the primary purpose of generating electricity to be supplied to the public supply grid.

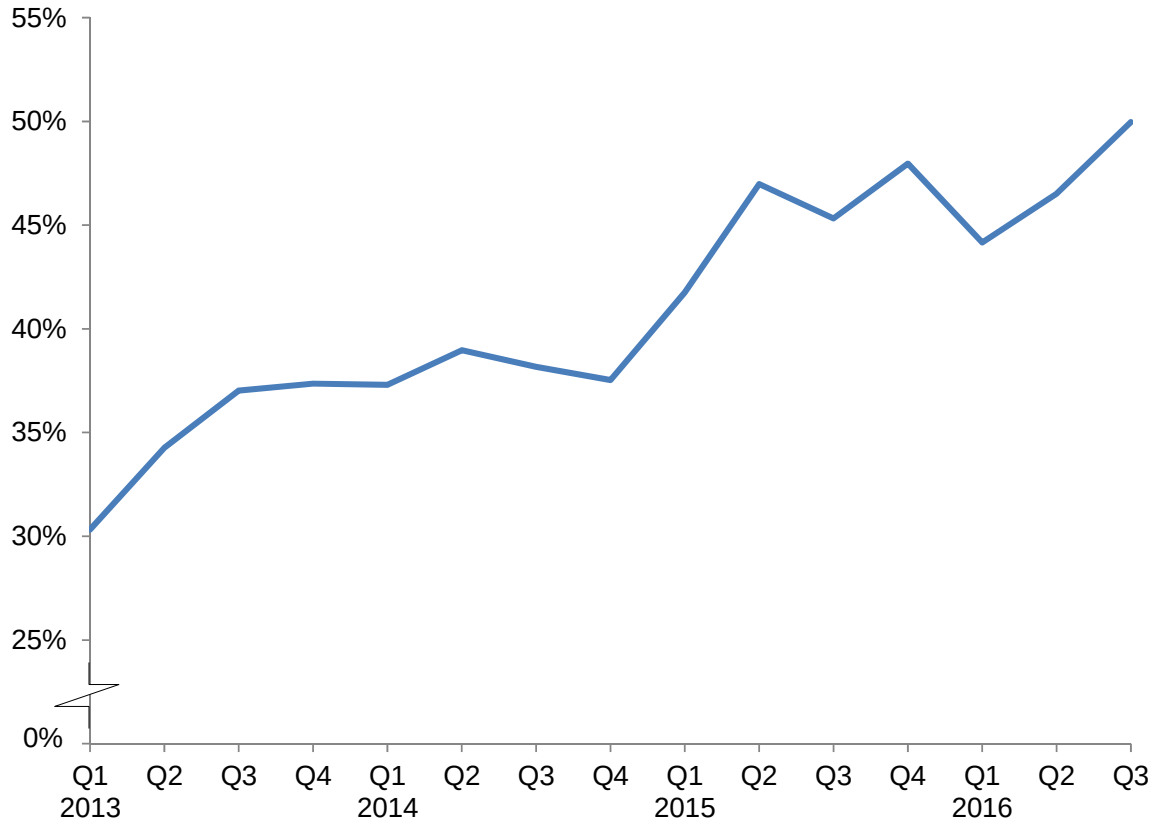
Chart 5.2 Shares of electricity generation



The share of generation from coal decreased from 16.7 per cent in 2015 Q3 to 3.6 per cent in 2016 Q3. Gas's share of generation increased from 34.8 per cent in 2015 Q3 to 43.6 per cent in 2016 Q3. Nuclear's share of generation increased from 21.7 per cent in 2015 Q3 to 25.0 per cent in 2016 Q3.

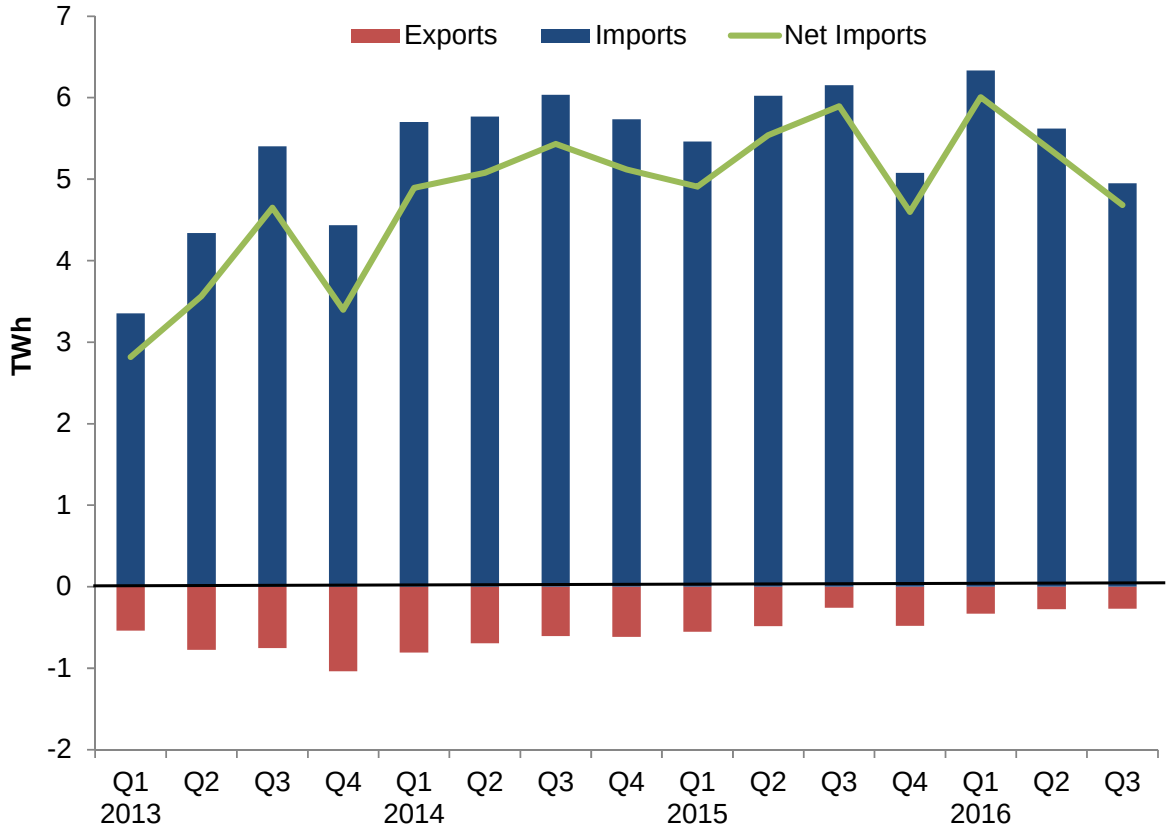
The share of renewables (wind, solar, hydro and other renewables) increased from 23.6 per cent in 2015 Q3 to 25.0 per cent in 2016 Q3. This was primarily due to an increase in wind and solar capacity which compensated for a reduction in bioenergy generation following outages at Drax.

Chart 5.3 Low carbon electricity's share of generation



Low carbon electricity's share of generation increased from 45.3 per cent in 2015 Q3 to a record high 50.0 per cent in 2016 Q3, with the fall in coal generation replaced by an increase in generation from renewables and nuclear.

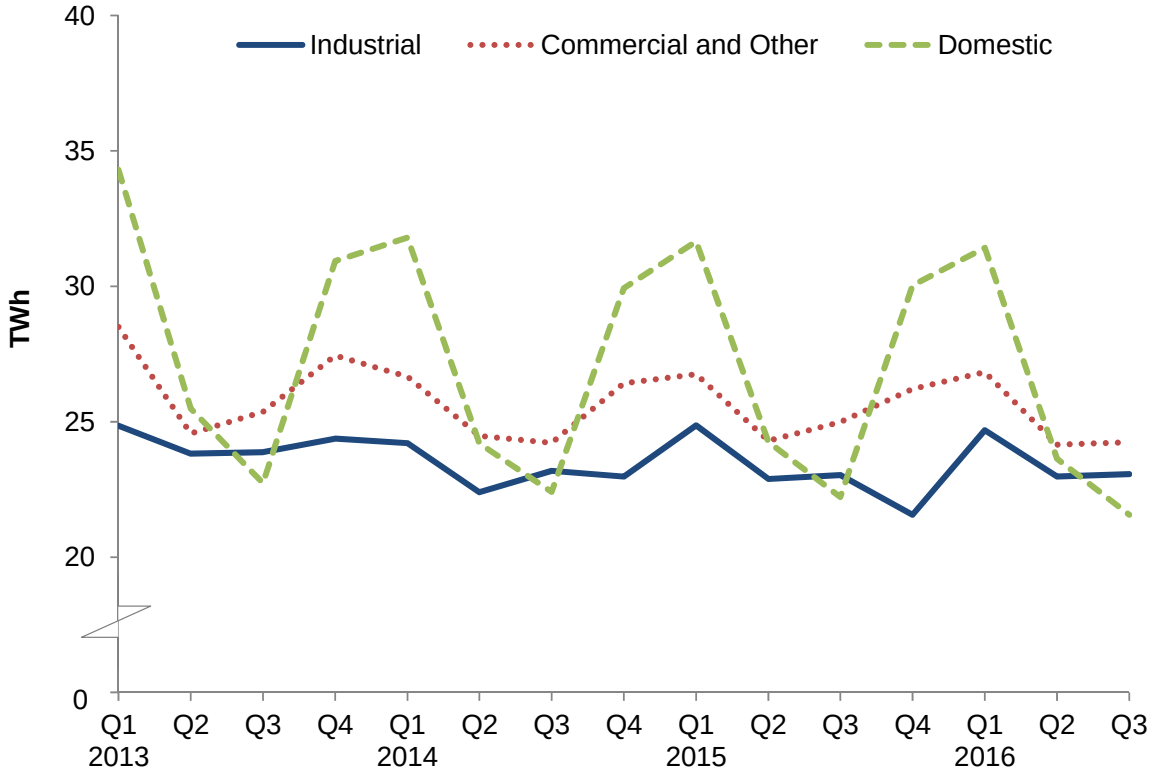
Chart 5.4 UK trade in electricity



In 2016 Q3, compared with the same period in 2015, imports of electricity fell by 20 per cent (-1.2 TWh) to 5.0 TWh mostly due to a reduction in imports from France with maintenance being carried out on the UK-France interconnector. Exports increased by 3.6 per cent to 0.27 TWh mostly due to increased exports to France following a number of French nuclear outages. The UK has been a net importer of electricity since 2010 Q1.

Net imports of electricity decreased by 21 per cent from 5.9 TWh in 2015 Q3 to 4.7 TWh in 2016 Q3, with a fall in imports from the Netherlands and France. Total imports from Ireland to Wales were over 2.5 times larger than Q3 2015 at 0.38 TWh whilst Wales to Ireland exports were down by 63 per cent to 0.09 TWh.

Chart 5.5 Electricity final consumption



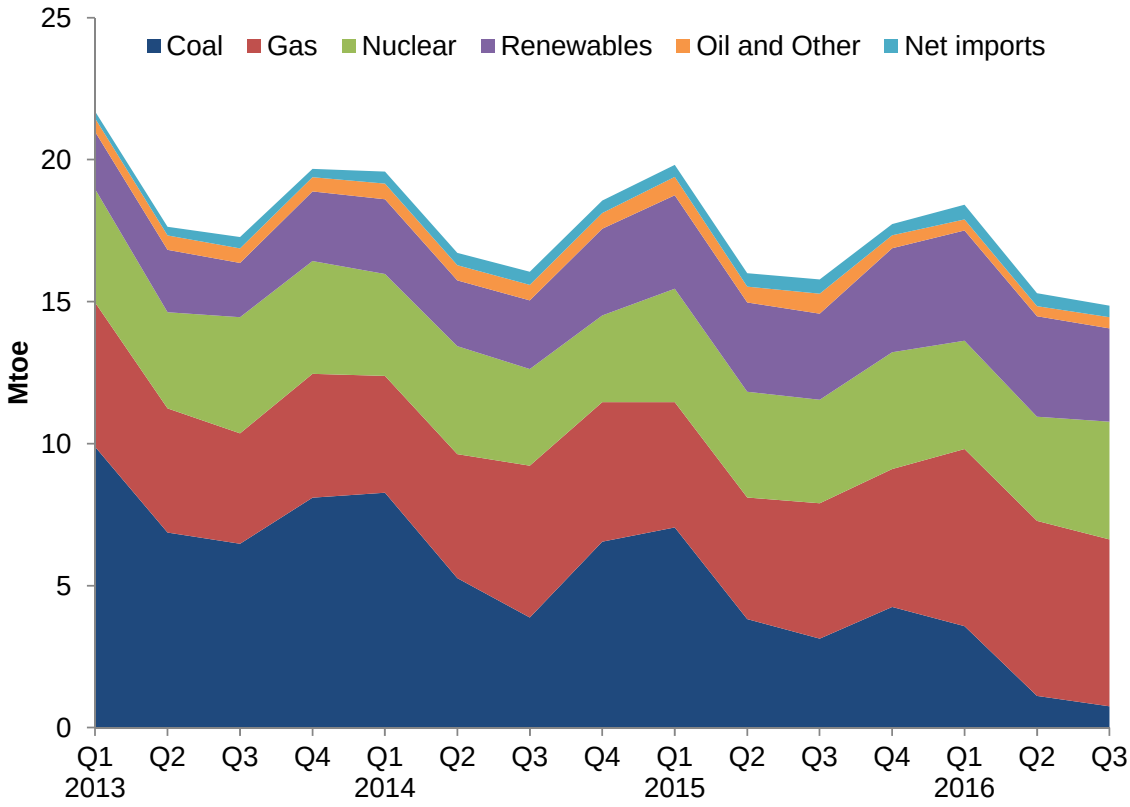
Final consumption of electricity fell by 1.9 per cent in 2016 Q3, from 70.2 TWh in 2015 Q3, to 68.9 TWh.

Domestic use also dropped by 2.9 per cent from 22.2 TWh in Q3 2015 to 21.6 TWh in Q3 2016.

Industrial use of electricity, including iron and steel, increased slightly by 0.1 per cent from 23.0 TWh to 23.1 TWh, while consumption by commercial, transport and other final users decreased by 3.0 per cent, from 25.0 TWh to 24.2 TWh.

In 2016 Q3, temperatures were on average 1.6 degrees higher than in 2015 Q3 – see Energy Trends table 7.1 at: www.gov.uk/government/statistics/energy-trends-section-7-weather.

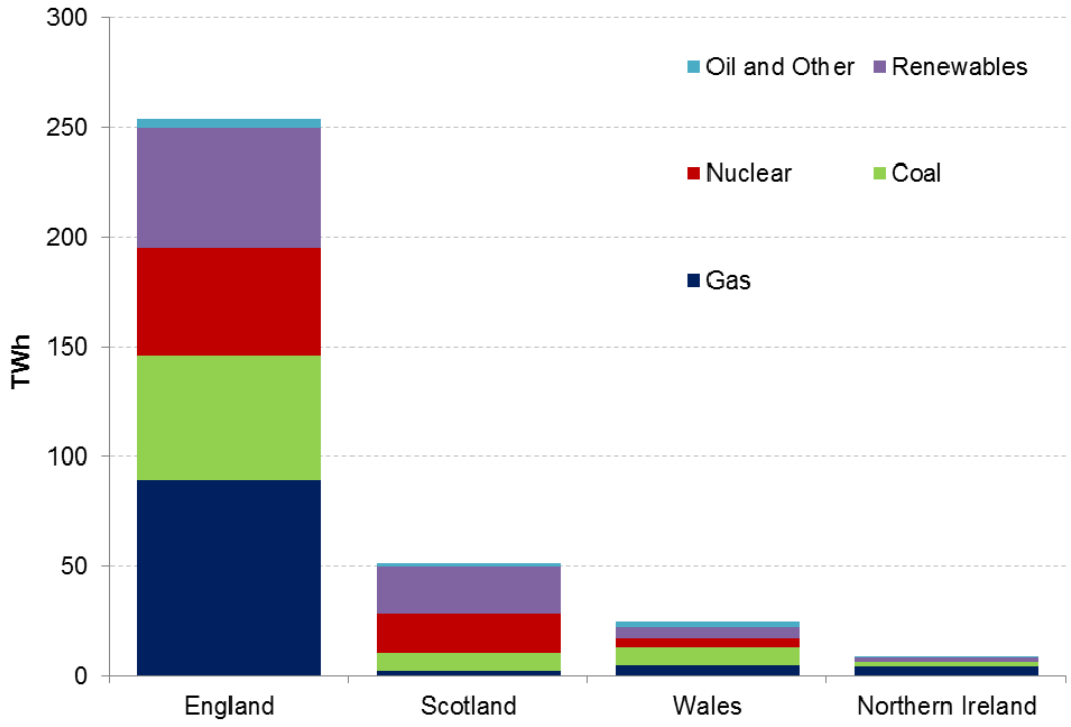
Chart 5.6 Fuel used for electricity generation



Fuel used by generators fell 5.9 per cent, from 15.8 mtoe in 2015 Q3 to 14.9 mtoe in 2016 Q3 *(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 2016 Q3, gas use was 23 per cent higher than in 2015. Coal use during the quarter was 76 per cent lower than a year earlier, whilst nuclear sources rose by 14 per cent.

Chart 5.7 Generation by fuel in 2015 for England, Scotland, Wales and Northern Ireland



In 2015, England had a share of 75.1 per cent of electricity generation in the UK with 254.7 TWh. Of England's generation 35.0 per cent was from gas and 22.4 per cent was from coal.

Scotland had a share of 15.1 per cent of electricity generation in the UK with 51.2 TWh. Of Scotland's generation 34.7 per cent was from nuclear, 42.2 per cent from renewables, and 16.2 per cent was from coal.

Wales had a share of 7.2 per cent of electricity generation in the UK with 24.5 TWh. Of Wales's generation 19.9 per cent was from gas, with 32.7 per cent from coal.

Northern Ireland had a share of 2.5 per cent of electricity generation in the UK with 8.6 TWh. Of Northern Ireland's generation, 48.3 per cent came from gas and 24.9 per cent came from coal.

Of electricity generated in the UK, 24.6 per cent came from renewables in 2015. The shares of electricity generated by renewables for each country are: Scotland 42.2 per cent, Northern Ireland 26.0 per cent, England 21.5 per cent and Wales 20.0 per cent.

Data from special feature article "Electricity generation and supply figures for Scotland, Wales and Northern Ireland and England, 2012 to 2015" (see page 65).

5 ELECTRICITY

Table 5.1. Fuel used in electricity generation and electricity supplied

	2014	2015	per cent change	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter p	per cent change [1]
FUEL USED IN GENERATION													
All generating companies												**Million tonnes of oil equivalent**	
Coal	23.97	18.26	*-23.8*	3.88	6.55	7.05	3.82	3.13	4.25	3.57	1.12	0.75	*-76.1*
Oil	0.55	0.62	*+11.9*	0.13	0.12	0.16	0.12	0.18	0.16	0.12r	0.09r	0.13	*-29.5*
Gas	18.73	18.31	*-2.2*	5.35	4.91	4.41	4.28	4.77	4.86	6.24r	6.16r	5.88	*+23.3*
Nuclear	13.85	15.48	*+11.8*	3.40	3.05	4.00	3.72	3.64	4.11	3.82	3.67	4.15	*+13.9*
Hydro	0.51	0.54	*+6.7*	0.07	0.15	0.17	0.12	0.09	0.16	0.18r	0.08r	0.10	*+10.8*
Wind and Solar [2]	3.10	4.12	*+32.9*	0.58	0.97	1.10	0.99	0.85	1.17	1.12r	0.95r	1.00	*+17.0*
Bioenergy [3]	6.82	8.46	*+24.2*	1.77	1.94	2.01	2.03	2.09	2.33	2.58r	2.51r	2.19	*+4.7*
Other fuels	1.63	1.75	*+7.4*	0.42	0.43	0.50	0.44	0.52	0.29	0.27	0.27	0.27	*-49.0*
Net imports	1.76	1.80	*+2.0*	0.47	0.44	0.42	0.48	0.51	0.40	0.52	0.46	0.40	*-20.5*
Total all generating companies	70.91	69.33	*-2.2*	16.05	18.56	19.82	16.00	15.78	17.73	18.41r	15.30r	14.86	*-5.9*
ELECTRICITY GENERATED													
All generating companies												**TWh**	
Coal	100.23	75.63	*-24.5*	15.89	27.69	29.54	15.92	12.77	17.40	14.73	4.56r	2.69	*-78.9*
Oil	1.90	2.13	*+12.5*	0.44	0.41	0.62	0.43	0.58	0.50	0.42r	0.39r	0.42	*-28.0*
Gas	100.89	100.03	*-0.9*	29.15	26.23	23.70	23.47	26.58	26.29	34.55r	34.90r	32.86	*+23.6*
Nuclear	63.75	70.34	*+10.3*	15.66	14.06	18.17	16.92	16.56	18.69	17.34	16.66	18.86	*+13.9*
Hydro (natural flow)	5.89	6.29	*+6.7*	0.78	1.75	2.01	1.43	1.03	1.82	2.08r	0.93r	1.14	*+10.8*
Wind and Solar [2]	36.01	47.87	*+33.0*	6.70	11.22	12.81	11.48	9.93	13.66	13.00r	11.03r	11.62	*+17.0*
- of which, Offshore [6]	13.40	17.42	*+30.0*	2.24	4.69	4.68	3.58	3.41	5.76	5.15r	3.25r	3.54	*+3.8*
Bioenergy [3]	22.68	29.39	*+29.6*	5.94	6.69	7.00	7.06	7.10	8.24	8.38r	7.60r	6.07	*-14.5*
Pumped Storage	2.88	2.74	*-5.0*	0.63	0.79	0.72	0.65	0.65	0.71	0.76r	0.69r	0.69	*+6.0*
Other fuels	3.94	4.66	*+18.4*	0.99	1.01	1.20	1.16	1.18r	1.12r	1.10r	1.12r	1.08	*-8.8*
Total all generating companies	338.17	339.10	*+0.3*	76.17	89.85	95.78	78.52	76.37	88.43	92.36r	77.88r	75.42	*-1.2*
ELECTRICITY SUPPLIED [4]													
All generating companies												**TWh**	
Coal	95.07	71.75	*-24.5*	15.07	26.26	28.03	15.11	12.11	16.50	13.97	4.33r	2.55	*-78.9*
Oil	1.72	1.94	*+12.5*	0.40	0.37	0.57	0.39	0.53	0.45	0.38r	0.35r	0.38	*-28.0*
Gas	99.00	98.16	*-0.9*	28.62	25.74	23.26	23.01	26.08	25.81	33.99r	34.26r	32.25	*+23.7*
Nuclear	57.90	63.89	*+10.3*	14.22	12.77	16.51	15.37	15.04	16.98	15.75	15.13	17.13	*+13.9*
Hydro	5.84	6.24	*+6.9*	0.77	1.74	2.00	1.41	1.02	1.81	2.06r	0.92r	1.13	*+10.8*
Wind and Solar [2]	36.01	47.87	*+32.9*	6.70	11.22	12.81	11.48	9.93	13.66	13.00r	11.03r	11.62	*+17.0*
- of which, Offshore [6]	13.40	17.42	*+30.0*	2.24	4.69	4.68	3.58	3.41	5.76	5.15r	3.25r	3.54	*+3.8*
Bioenergy [3]	19.59	25.53	*+30.3*	5.14	5.80	6.07	6.12	6.16	7.17	7.30r	6.61r	5.23	*-15.1*
Pumped Storage (net supply) [5]	-1.01	-0.98	*-3.0*	-0.24	-0.26	-0.25	-0.23	-0.25	-0.25	-0.27r	-0.26r	-0.23	*-6.0*
Other fuels	3.68	4.32	*+17.3*	0.92	0.94	1.11	1.07	1.09	1.04	1.02r	1.03r	0.99	*-8.9*
Net imports	20.52	20.94	*+2.0*	5.43	5.12	4.91	5.54	5.89	4.60	6.00	5.35	4.68	*-20.5*
Total all generating companies	338.33	339.65	*+0.4*	77.04	89.71	95.00	79.28	77.60	87.77	93.20r	78.76r	75.73	*-2.4*

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

	2014	2015	*Per cent change*	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter p	*Per cent change*[1]
SUPPLY													
Indigenous production	338,175	339,095	*+0.3*	76,171	89,851	95,782	78,518	76,371	88,425	92,361r	77,881r	75,420	*-1.2*
Major power producers[2 3]	297,939	293,003	*-1.7*	66,368	79,522	84,255	66,555	64,840	77,353	80,465r	65,313r	62,625	*-3.4*
Auto producers	37,352	43,353	*+16.1*	9,175	9,535	10,805	11,313	10,878	10,358	11,134r	11,879r	12,103	*+11.3*
Other sources[4]	2,883	2,739	*-5.0*	628	793	723	650	653	714	762r	689	693	*+6.0*
Imports	23,243	22,716	*-2.3*	6,036	5,737	5,462	6,023	6,152	5,080	6,334	5,622	4,951	*-19.5*
Exports	2,723	1,778	*-34.7*	604	618	555	484	259	480	331	275	268	*+3.6*
Transfers	-	-		-	-	-	-	-	-	-	-	-	
Total supply	358,694	360,034	*+0.4*	81,604	94,970	100,689	84,056	82,263	93,025	98,364r	83,227r	80,102	*-2.6*
Statistical difference	-1,210	1,671		-334	-153	504	419	284	464	-194r	190r	189	
Total demand	359,905	358,363	*-0.4*	81,938	95,123	100,186	83,637	81,979	92,560	98,558r	83,037r	79,913	*-2.5*
TRANSFORMATION	-	-		-	-	-	-	-	-	-	-	-	
Energy industry use[5]	28,387	28,160	*-0.8*	6,503	7,278	7,603	6,677	6,662	7,218	7,043r	6,371	6,331	*-5.0*
Losses	28,651	27,458	*-4.2*	5,621	8,521	9,307	5,525	5,088	7,538	8,569r	5,905r	4,718	*-7.3*
FINAL CONSUMPTION	302,867	302,745	-	69,813	79,324	83,276	71,436	70,229	77,805	82,946r	70,762r	68,864	*-1.9*
Iron & steel	3,787	3,688	*-2.6*	937	949	990	935	887	875	868	864	864	*-2.6*
Other industries	88,978	88,659	*-0.4*	22,251	22,027	23,872	21,951	22,143	20,693	23,818r	22,108r	22,198	*+0.2*
Transport	4,504	4,476	*-0.6*	1,126	1,126	1,119	1,119	1,119	1,119	1,119	1,119	1,119	-
Domestic	108,324	108,157	*-0.2*	22,407	29,929	31,657	24,257	22,214	30,029	31,423r	23,634r	21,565	*-2.9*
Other final users	97,274	97,765	*+0.5*	23,093	25,293	25,637	23,173	23,866	25,089	25,717r	23,036r	23,118	*-3.1*
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 2015 they were:

AES Electric Ltd., Anesco Ltd., 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., 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., 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.

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 refiniries, nuclear fuel production and gas and electricity supply) .

Section 6 - Renewables

Key results show:

Renewables' share of electricity generation was 25.0 per cent in 2016 Q3, up 1.3 percentage points on the share in 2015 Q3, due to increasing renewable capacity and more favourable weather conditions for renewable generation (higher wind speeds and rainfall), as well as lower overall electricity generation. **(Chart 6.1)**

Renewable electricity generation was 18.8 TWh in 2016 Q3, an increase of 4.3 per cent on the 18.1 TWh in 2015 Q3, though 21 per cent lower than the peak quarterly generation of 2015 Q4 (23.7 TWh). **(Chart 6.2)**

Onshore wind generation increased by 19.4 per cent, from 3.8 TWh in 2015 Q3 to 4.6 TWh in 2016 Q3. Offshore wind increased from 3.4 TWh to 3.5 TWh, an increase of 3.8 per cent. Solar PV increased by 30 per cent, from 2.7 TWh to 3.5 TWh due to increased capacity. However, generation from bioenergy fell by 14.5 per cent, to 6.1 TWh, due to outages at Drax. **(Chart 6.2)**

Renewable electricity capacity was 33.4 GW at the end of 2016 Q3, a 11.3 per cent increase (3.4 GW) on a year earlier, and a 0.7 per cent (0.3 GW) increase on the previous quarter, with high growth over the year in solar photovoltaics and onshore wind. **(Chart 6.3)**

By the end of 2016 Q3, 5.8 GW of capacity had been installed, and eligible for, the Feed in Tariff scheme, an increase of 30 per cent on a year earlier, constituting approximately 17 per cent of all renewable installed capacity. **(Chart 6.5)**

Liquid biofuels consumption rose by 6.0 per cent, from 382 million litres in 2015 Q3 to 405 million litres in 2016 Q3, driven by a 21 per cent increase in biodiesel. In 2016 Q3, liquid biofuels represented 3.4 per cent of petrol and diesel consumed in road transport, up from 3.3 per cent a year earlier. **(Chart 6.6)**

Relevant tables

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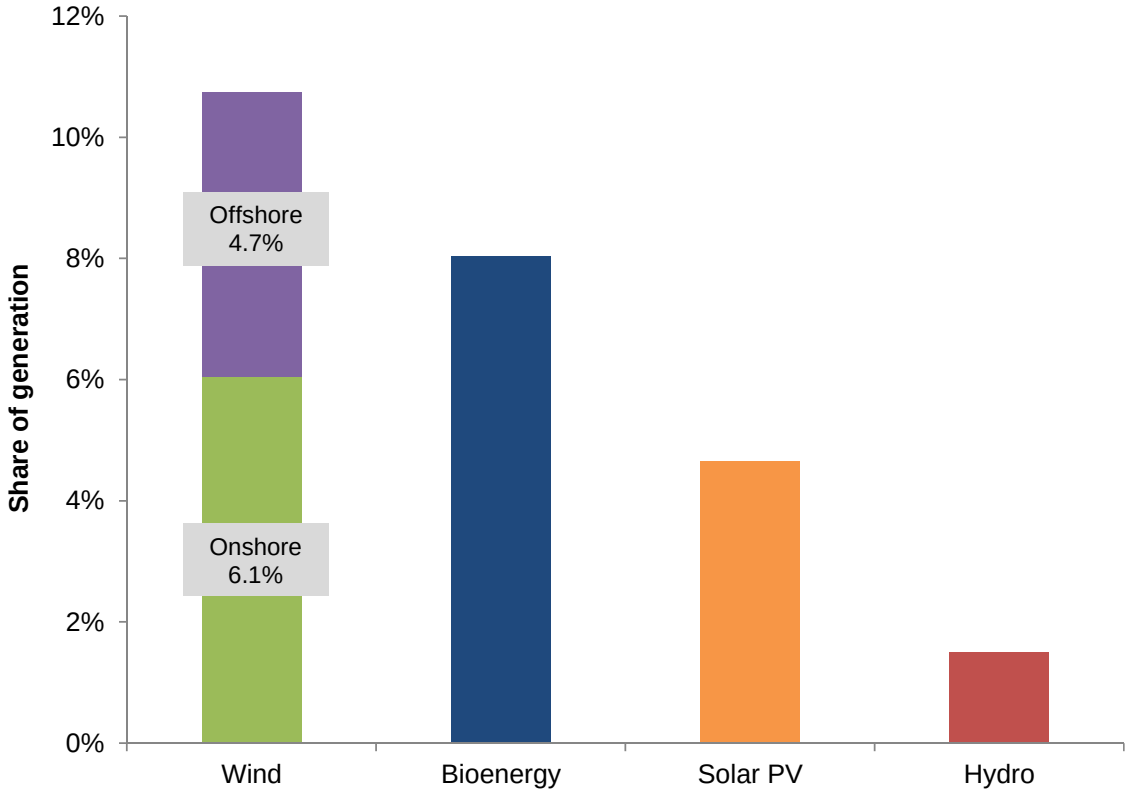
Chart 6.1 Renewables' share of electricity generation



Renewables' share of electricity generation increased from 23.6 per cent in 2015 Q3 to 25.0 per cent in 2016 Q3. However, compared to 2016 Q2, renewables' share was 0.2 percentage points lower.

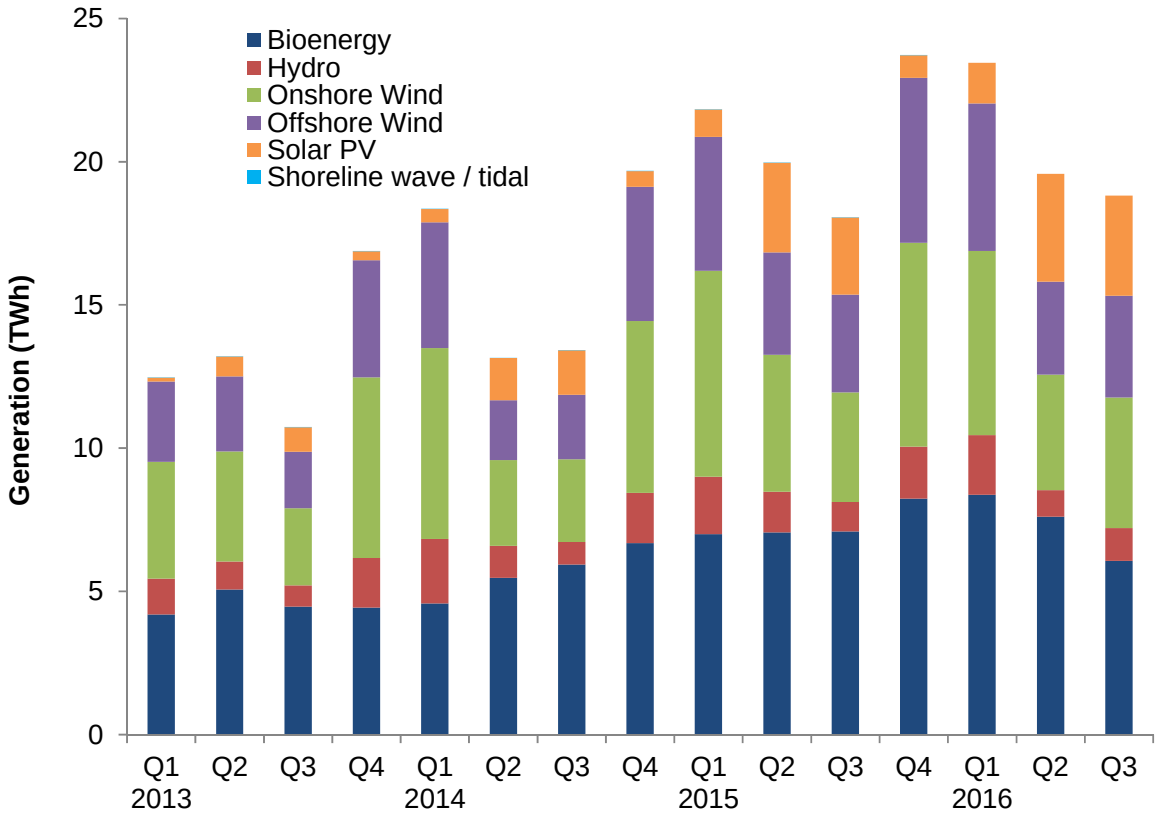
The increased share on a year earlier reflects the increase in renewables generation in addition to a decrease (1.2 per cent) in total electricity generation.

Total electricity generated from renewables in 2016 Q3 was 18.8 TWh, an increase of 0.7 TWh (4.3 per cent) compared to 2015 Q3, but 21 per cent lower than the record of 23.7 TWh in 2015 Q4.

Overall electricity generation fell by 1.2 per cent (1.0 TWh) from 76.4 TWh in 2015 Q3 to 75.4 TWh in 2016 Q3. This helped to increase the share of renewable generation by 0.3 percentage points.

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

Chart 6.2 Renewable electricity generation



Electricity generated from onshore wind increased by 19.4 per cent between 2015 Q3 and 2016 Q3, from 3.8 TWh to 4.6 TWh, while generation from offshore wind increased by 3.8 per cent, from 3.4 TWh to 3.5 TWh. This is due to a combination of higher wind speeds compared to last year and also increased onshore wind capacity.

Average wind speeds in 2016 Q3, at 8.3 knots, were the highest for quarter 3 since 2010, and 6.1 per cent (0.5 knots) higher than in 2015 Q3. Wind speeds were especially high in September; at 8.9 knots, these were 29 per cent up on a year earlier - see Energy Trends table 7.2 at: www.gov.uk/government/statistics/energy-trends-section-7-weather.

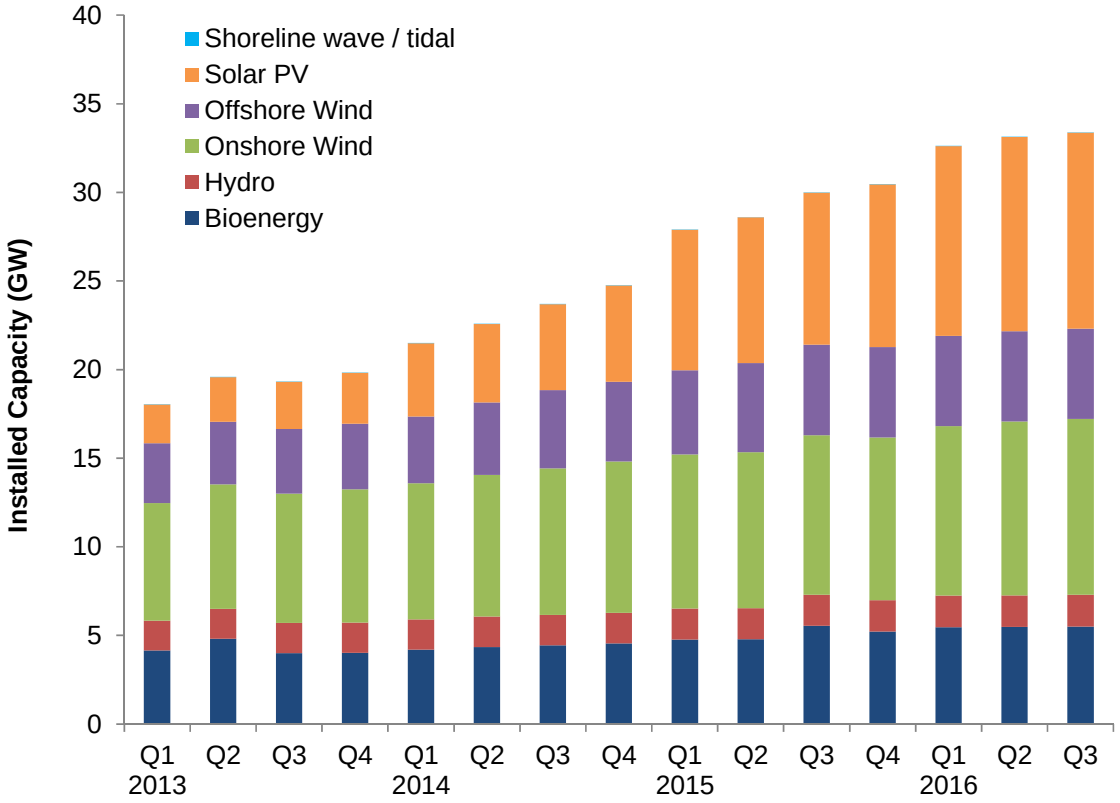
Generation from solar PV increased by 30 per cent compared to 2015 Q3, from 2.7 TWh to 3.5 TWh, due to increased capacity. In 2016 Q3, hydro generation rose by 10.8 per cent on a year earlier, from 1.0 TWh to 1.1 TWh, with rainfall (in the main hydro areas) up 56 per cent on a year earlier, though much of the increase occurred later in the quarter, in September (the wettest for four years), which experienced four times the amount of rainfall of a year earlier - see Energy Trends table 7.4 at: www.gov.uk/government/statistics/energy-trends-section-7-weather.

Generation from bioenergy[1] in 2016 Q3 fell by 14.5 per cent on a year earlier, from 7.1 TWh to 6.1 TWh. The main driver of this fall was plant biomass, which fell from 4.4 TWh to 3.4 TWh, due to several maintenance outages at the Drax converted units.

In 2016 Q3, bioenergy had a 32 per cent share of generation, with 24 per cent from onshore wind, and 19 per cent from each of offshore wind and solar. Solar photovoltaics and onshore wind saw the largest increase in the share of renewable generation on 2015 Q3, at 3.7 and 3.1 percentage points respectively, while bioenergy's share fell by 7.1 percentage points.

[1] landfill gas, sewage gas, biodegradable municipal solid waste, plant biomass, animal biomass, anaerobic digestion and co-firing (generation only)

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



At the end of 2016 Q3, the UK's renewable electricity capacity totalled 33.4 GW, an increase of 0.7 per cent (0.2 GW) on that installed at the end of 2016 Q2, and up 11.3 per cent (3.4 GW) on that installed a year earlier.

Of the 0.2 GW increase in capacity during 2016 Q3, more than half came from increases in onshore wind capacity, due to the opening of capacity at several new wind farms, including Assel Valley, the first turbines at Dersalloch, further turbines at the Black Law extension, as well as around 29 MW of smaller Feed in Tariff (FiT)-scale schemes. Solar photovoltaics (PV) capacity increased by around 76 MW in 2016 Q3, including around 50 MW from FiT eligible schemes, and 10 MW from small-scale Northern Irish schemes.

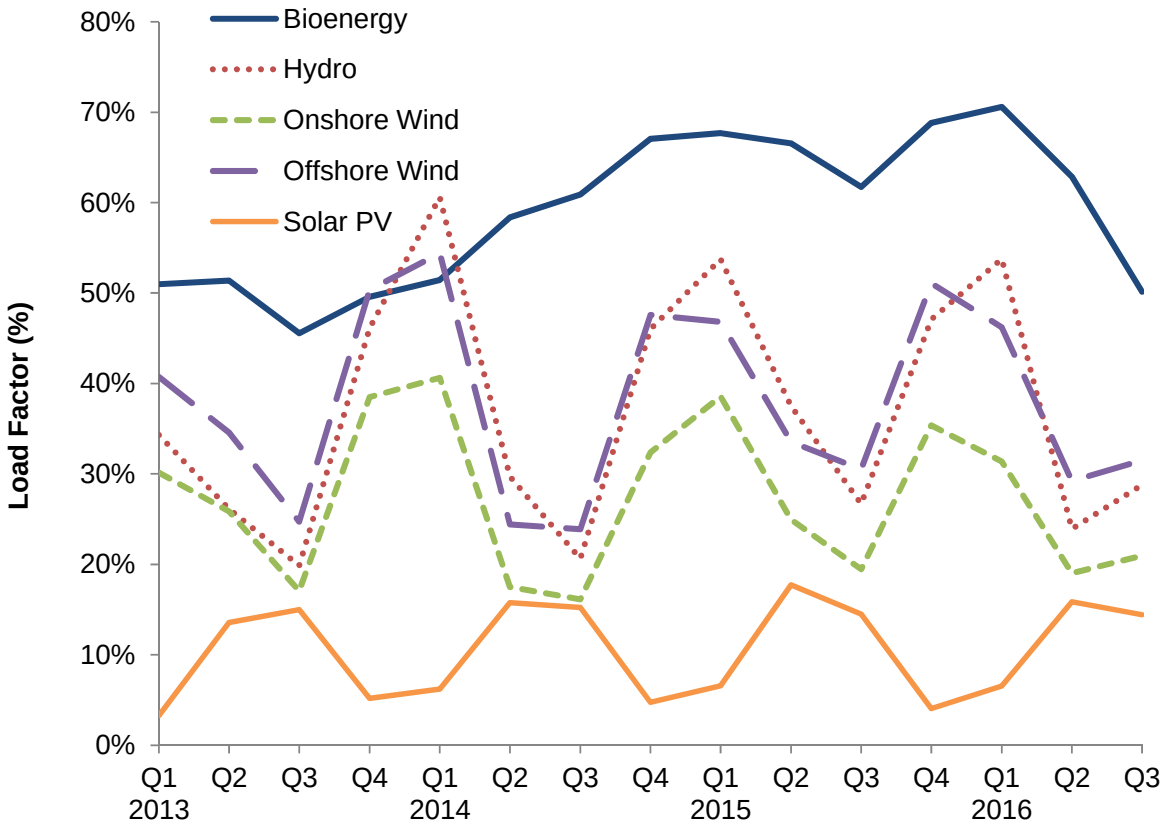
At the end of 2016 Q3, solar PV, at 11.1 GW, was one-third of all renewable capacity, the highest share of renewable technologies. This was followed by onshore wind (30 per cent), bioenergy (16 per cent) and offshore wind (15 per cent). [2]

Compared with a year ago, 2.5 GW of solar PV has been installed (with most in 2016 Q1, ahead of the Renewables Obligation (RO) closure to grace period-qualifying large and, non-grace period qualifying[3], small, solar) and 0.9 GW of onshore wind, with the remaining increases offset by the closure of Ironbridge biomass plant in late 2015 and the (smaller) Beatrice offshore wind farm in early 2016.

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

[3] The Renewables Obligation 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 now 31 March 2017. Further details on RO closure and grace periods are available at:
www.ofgem.gov.uk/environmental-programmes/ro/about-ro/ro-closure

Chart 6.4 Renewable electricity load factors



In 2016 Q3, onshore wind's load factor increased by 1.5 percentage points, from 19.5 per cent in 2015 Q3 to 20.9 per cent. This was an increase of 1.9 percentage points on 2016 Q2.

Offshore wind's load factor increased by 1.0 percentage point, from 30.5 per cent in 2015 Q3 to 31.5 per cent in 2016 Q3. This was an increase of 2.3 percentage points on 2016 Q2.

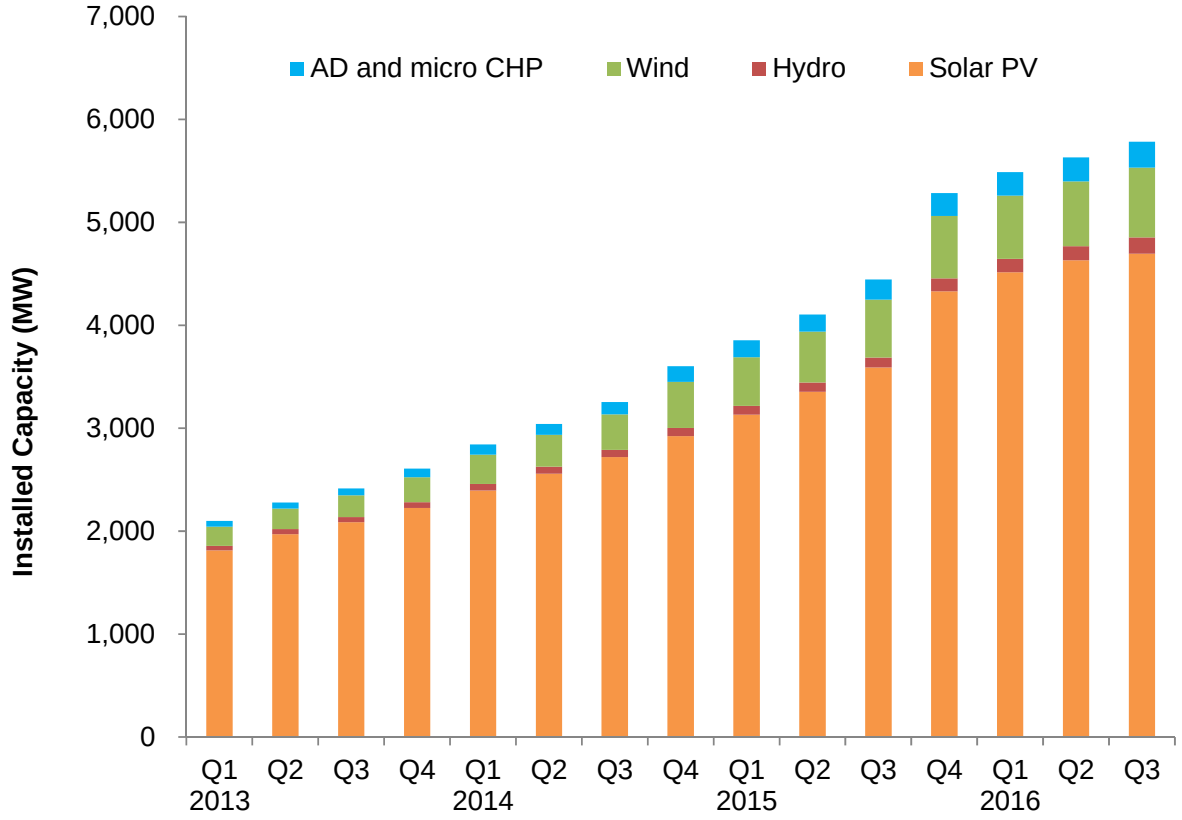
Average onshore wind speeds in 2016 Q3, at 8.3 knots, were the windiest in six years for the quarter, and up 6.1 per cent on a year earlier. September's wind speeds were up 28 per cent (1.9 knots) on a year ago, and the highest for that month for four years. [4] Compared with 2016 Q2, wind speeds in 2016 Q3 were up 6.9 per cent (0.5 knots).

Hydro's load factor in 2016 Q3 increased by 2.1 percentage points, from 26.7 per cent in 2015 Q3 to 28.8 per cent, due to higher rainfall. Compared with 2016 Q2, hydro's load factor in 2016 Q3 was 4.9 percentage points higher due to 75 per cent more rainfall, with 2016 the driest Q2 since 2010. The full impacts of the increased rainfall may not be seen until Q4, since much of the increase occurred late in the quarter, with September receiving over four times the rainfall of a year earlier, and over 50 per cent more than the final month (June) of 2016 Q2.

For bioenergy, the load factor in 2016 Q3, at 50.1 per cent, was down by 11.6 percentage points on a year earlier, and down by 12.7 percentage points on 2016 Q2, reflecting the maintenance outages at the Drax converted biomass units that ordinarily achieve high load factors.

[4] 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 2016 Q3, 5.8 GW of capacity was installed and eligible for the GB Feed in Tariff (FiT) scheme[5], a 30 per cent increase on that at the end of 2015 Q3. Much (0.8 GW) of this 1.3 GW increase took place in 2015 Q4, ahead of changes to the FiT scheme in January 2016.

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

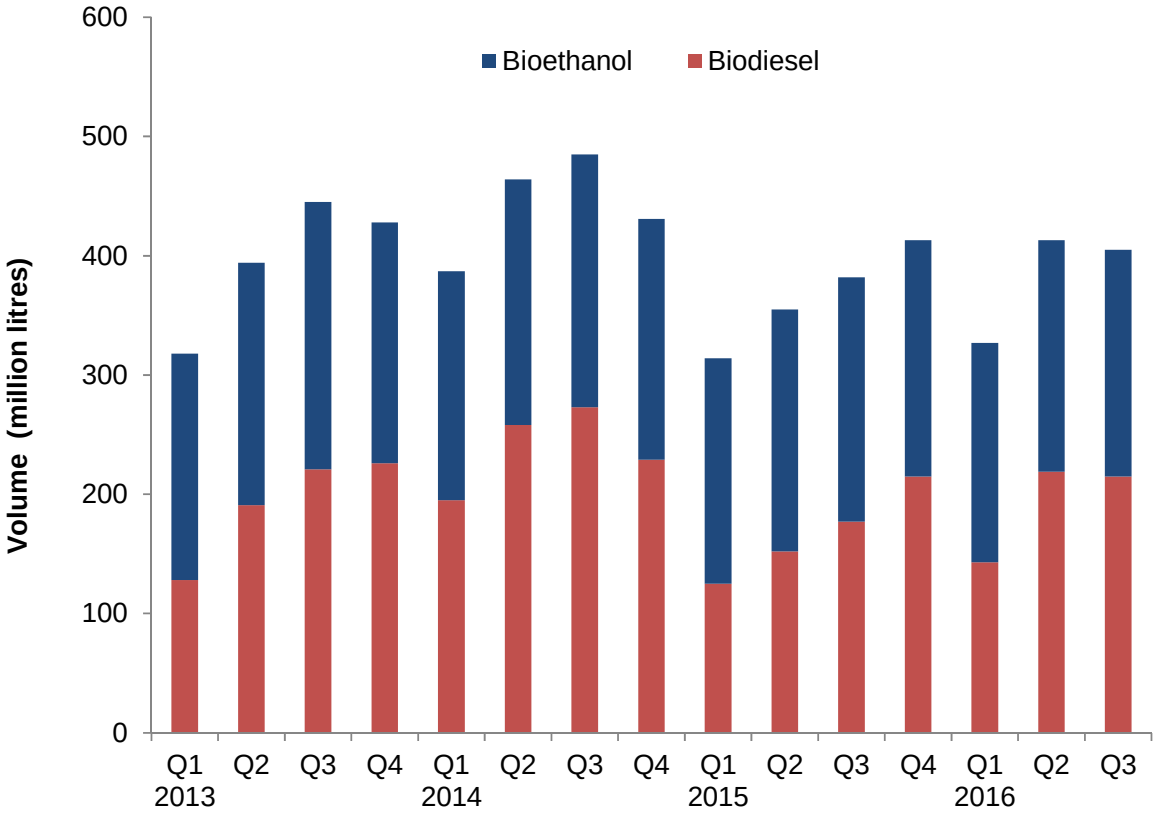
In terms of number of installations, at the end of 2016 Q3, there were over 870,000 installed and eligible for the FiT scheme, a 15 per cent increase on the number installed a year earlier.

Solar PV represents the majority of both installations and installed capacity on FiTs, with, respectively, 99 per cent and 81 per cent of the total. The majority of FiT PV installations, and over half of capacity, are sub-4 kW (mainly retrofitted) schemes, 2.4 GW at the end of 2016 Q3.

Renewable installations eligible for FiTs (all except MicroCHP) represented 17 per cent of all renewable installed capacity.

[5] 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



In 2016 Q3, 405 million litres of liquid biofuels were consumed in transport, a rise of 6.0 per cent on the total in 2015 Q3 (382 million litres). This was driven by an increase in consumption of biodiesel.

In 2016 Q3, biodiesel accounted for 2.8 per cent of diesel, and bioethanol 4.4 per cent of motor spirit. The combined contribution of the two fuels was 3.4 per cent, 0.1 percentage point higher than 2015 Q3's share.

Bioethanol consumption fell by 7.3 per cent, from 205 million litres in 2015 Q3 to 190 million litres in 2016 Q3. Biodiesel consumption rose by 21 per cent, from 177 million litres to 215 million litres.

In 2016 Q3, biodiesel contributed the largest share of biofuels consumption, unchanged from the previous quarter, with 53 per cent. Bioethanol represented 47 per cent of biofuels consumption.

6 RENEWABLES

Table 6.1. Renewable electricity capacity and generation

	2014	2015	per cent change	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter	2016 3rd quarter p	per cent change [11]
Cumulative Installed Capacity [1]												**MW**	
Onshore Wind	8,536r	9,188	*+7.6*	8,263	8,536	8,708	8,807	9,003	9,188	9,571r	9,812r	9,937	*+10.4*
Offshore Wind	4,501	5,104	*+13.4*	4,420	4,501	4,749	5,024	5,104	5,104	5,094	5,094	5,094	*-0.2*
Shoreline wave / tidal	9	9	*+2.9*	9	9	9	9	9	9	8	8	8	*-9.2*
Solar photovoltaics	5,424	9,188	*+69.4*	4,841	5,424	7,930	8,224	8,581	9,188	10,703r	10,974r	11,050	*+28.8*
Small scale Hydro	252r	282	*+12.0*	245	252	261	267	272	282	307r	311r	320	*+17.9*
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	1,058r	1,061	*+0.4*	1,057	1,058	1,061	1,061	1,061	1,061	1,062r	1,062r	1,062	*+0.1*
Sewage sludge digestion	215r	216	*+0.4*	212	215	216	216	216	216	245r	245r	245	*+13.5*
Energy from waste	681r	925	*+35.9*	630	681	826	834	902	925	946r	946r	946	*+4.8*
Animal Biomass (non-AD) [2]	111	111	-	111	111	111	111	111	111	111	111	111	-
Anaerobic Digestion	238r	286	*+20.2*	207	238	260	263	284	286	331r	335r	346	*+21.8*
Plant Biomass [3]	2,245r	2,619	*+16.7*	2,225	2,245	2,297	2,298	2,976	2,619	2,772r	2,772r	2,781	*-6.5*
Total	24,746r	30,465	*+23.1*	23,695	24,746	27,904	28,592	29,994	30,465	32,625r	33,146r	33,376	*+11.3*
Co-firing [4]	15	21	*+37.6*	15	15	21	21	21	21	10r	10r	10	*-51.9*
Generation [5]												**GWh**	
Onshore Wind [6]	18,562	22,887	*+23.3*	2,897	6,002	7,182	4,775	3,825	7,106	6,426r	4,028r	4,566	*+19.4*
Offshore Wind [6, 7]	13,404	17,423	*+30.0*	2,242	4,686	4,676	3,578	3,412	5,757	5,148r	3,251r	3,542	*+3.8*
Shoreline wave / tidal [6]	2	2	*-10.0*	0	1	1	0	0	0	-	-	-	*-100.0*
Solar photovoltaics [6]	4,040	7,561	*+87.2*	1,558	536	951	3,125	2,690	795	1,422r	3,756r	3,507	*+30.3*
Hydro [6]	5,893	6,289	*+6.7*	784	1,753	2,012	1,426	1,028	1,823	2,081r	933r	1,139	*+10.8*
Landfill gas [6]	5,045	4,872	*-3.4*	1,245	1,266	1,240	1,212	1,201	1,220	1,189r	1,138r	1,135	*-5.4*
Sewage sludge digestion [6]	846	888	*+4.9*	212	211	223	231	215	219	232r	249r	236	*+9.9*
Energy from waste [8]	1,923	2,782	*+44.7*	491	486	656	653	736	737	706r	615r	680	*-7.6*
Co-firing with fossil fuels	133	183	*+37.6*	37	34	36	36	57	55	51	15r	1	*-99.1*
Animal Biomass (non-AD) [2, 6]	614	648	*+5.5*	132	162	170	171	142	165	170	164r	143	*+1.0*
Anaerobic Digestion	1,019	1,429	*+40.2*	258	286	323	346	364	396	431r	444r	447	*+22.9*
Plant Biomass [3, 6]	13,105	18,587	*+41.8*	3,565	4,242	4,351	4,409	4,383	5,443	5,599r	4,978r	3,425	*-21.9*
Total	64,584	83,550	*+29.4*	13,420	19,665	21,819	19,961	18,053	23,717	23,455r	19,570r	18,821	*+4.3*
Non-biodegradable wastes [9]	1,923	2,784	*+44.7*	491	486	656	653	737	738	707r	615r	681	*-7.6*
Load Factors [10]													
Onshore Wind	26.4%	29.5%		16.1%	32.4%	38.6%	25.0%	19.5%	35.4%	31.4%r	19.0%r	20.9%	
Offshore Wind	37.3%	41.4%		23.9%	47.6%	46.8%	33.5%	30.5%	51.1%	46.2%r	29.2%r	31.5%	
Solar photovoltaics	11.1%	11.8%		15.2%	4.7%	6.6%	17.7%	14.5%	4.1%	6.5%r	15.9%r	14.4%	
Hydro	39.1%	41.2%		20.6%	46.0%	53.7%	37.5%	26.7%	47.1%	53.8%r	23.9%r	28.8%	
Landfill gas	54.8%	52.5%		53.4%	54.3%	54.2%	52.3%	51.2%	52.1%	51.3%r	49.1%r	48.4%	
Sewage sludge digestion	46.6%	46.9%		45.2%	44.7%	47.8%	48.9%	45.0%	45.8%	46.0%r	46.4%r	43.6%	
Energy from waste	35.8%	39.6%		35.5%	33.6%	40.3%	36.0%	38.4%	36.5%	34.6%r	29.8%r	32.6%	
Animal Biomass (non-AD)	63.4%	66.9%		54.1%	66.4%	71.1%	70.9%	58.1%	67.7%	70.4%r	67.9%r	58.7%	
Anaerobic Digestion	58.0%	62.2%		57.8%	58.1%	59.9%	60.5%	60.3%	63.0%	64.0%r	61.1%r	59.6%	
Plant Biomass	71.2%	87.2%		73.9%	86.0%	88.7%	87.9%	75.3%	88.1%	95.1%r	82.2%r	55.9%	
Total (excluding co-firing and non-biodegradable wastes)	33.0%	34.5%		26.2%	36.7%	38.3%	32.3%	27.8%	35.5%	34.0%r	27.2%r	25.6%	

1. Cumulative capacity at the end of the quarter/year
2. Includes the use of poultry litter and meat and bone.
3. Includes the use of straw and energy crops. Also includes high-range co-firing (>85% biomass).
4. This is the amount of fossil fuelled capacity used for co-firing of renewables based on the proportion of generation accounted for by the renewable source over the course of the year.
5. Generation figures for the latest quarter are highly provisional, particularly for the thermal renewable technologies (such as landfill gas) in the lower half of the table.
6. Actual generation figures are given where available, but otherwise are estimated using a typical load factor or the design load factor, where known. Generation from FiT schemes is estimated this way.
7. For 2009, shoreline wave and tidal are included in offshore wind.
8. Biodegradable part only.
9. Non-biodegradable part of municipal solid waste plus waste tyres, hospital waste and general industrial waste.
10. Load factors are calculated based on installed capacity at the beginning and the end of the quarter/year. These can be influenced by the time in the period when new capacity came online.

Load factors on an *unchanged configuration* basis, which consider just those sites operational throughout the year, are available annually in table DUKES 6.5, at: www.gov.uk/government/publications/renewable-sources-of-energy-chapter-6-digest-of-united-kingdom-energy-statistics-dukes

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

6 RENEWABLES

Table 6.2. Liquid biofuels for transport consumption

	2014	2015	*per cent change*	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd Quarter	2015 4th Quarter	2016 1st quarter	2016 2nd quarter	2016 3rd Quarter p	*per cent change*[1]
Volume (million litres)													
Bioethanol	812	795	*-2.1*	212	202	189	203	205	198	184	194	190	*-7.3%*
Biodiesel	955	669	*-29.9*	273	229	125	152	177	215	143	219	215	*21.5%*
Total biofuels for transport	1,767	1,464	*-17.1*	485	431	314	355	382	413	327	413	405	*6.0%*
Energy (thousand toe)													
Bioethanol	458	448	*-2.1*	120	114	107	114	116	112	104	109	107	*-7.3%*
Biodiesel	785	550	*-29.9*	224	188	103	125	145	177	117	180	177	*21.5%*
Total biofuels for transport	1,242	998	*-19.7*	344	302	209	239	261	288	221	289	284	*8.7%*
Shares of road fuels													
Bioethanol as per cent of Motor Spirit	4.6%	4.6%		4.8%	4.6%	4.6%	4.6%	4.7%	4.5%	4.5%	4.4%	4.4%	
Biodiesel as per cent of DERV	3.4%	2.3%		3.9%	3.1%	1.8%	2.1%	2.4%	2.9%	2.0%	2.9%	2.8%	
Total biofuels as per cent of road fuels	3.9%	3.2%		4.2%	3.7%	2.9%	3.0%	3.3%	3.5%	2.9%	3.4%	3.4%	

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

Shares of road fuels - % change on quarter in previous year	**% change on quarter in previous year (-ve value is decrease)**								
Bioethanol as per cent of Motor Spirit	-0.1%	0.1%	0.1%	0.1%	-0.1%	0.0%	-0.1%	-0.2%	-0.2%
Biodiesel as per cent of DERV	0.6%	-0.1%	-1.1%	-1.6%	-1.4%	-0.3%	0.2%	0.8%	0.4%
Total biofuels as per cent of road fuels	0.3%	0.0%	-0.7%	-1.0%	-0.9%	-0.2%	0.0%	0.4%	0.1%

Electricity generation and supply figures for Scotland, Wales, Northern Ireland and England, 2012 to 2015

Introduction

This article shows how generation and consumption of electricity varies across the four countries of the United Kingdom. It updates and extends a previous version published in December 2015[1]. The UK figures shown in this article are taken from the Digest of United Kingdom Energy Statistics (DUKES) 2016, chapters 5 and 6 so the definitions used are identical to those in the Digest. Tables 1 and 2 are included at the end of the main text and cover the last four years, with data for 2004 to 2015 available in the accompanying Excel spreadsheet.

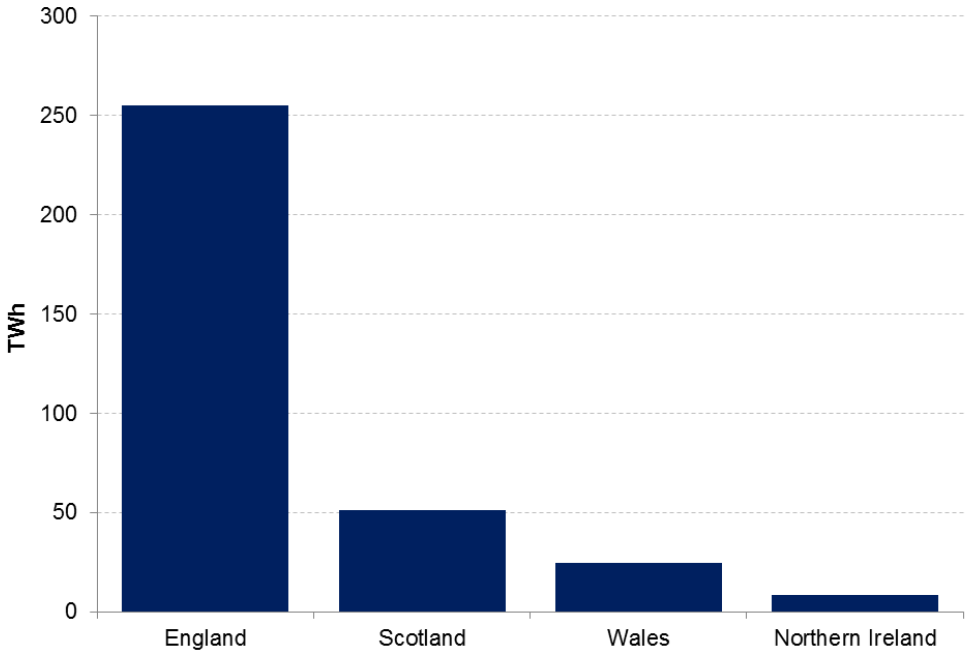
Key points

- Scotland exported a record high 29 per cent of generated electricity to other countries in the UK, with virtually all of these net exports going to England.
- The fuel mix for generation varied across the UK. Gas had the largest generation share in both England (35 per cent) and Northern Ireland (49 per cent). In Scotland renewables had the largest share at 42 per cent, while in Wales coal had the largest share at 33 per cent.
- A record high percentage of generation share came from renewables in each country; 21 per cent in England, 42 per cent in Scotland, 20 per cent in Wales and 26 per cent in Northern Ireland.

Generation and trade

Table 1 shows generation and supply of electricity in each UK country. Because the mix of generating plants is not the same in each country, the overall percentage for each fuel type in individual years will change according to the fuels and stations that are available and the most advantageous to use.

Chart 1: Total generation by country (all generating companies) in 2015



[1] www.gov.uk/government/statistics/energy-trends-december-2015-special-feature-article-electricity-generation-and-supply-figures-for-scotland-wales-northern-ireland-and-england-2

Between 2014 and 2015 England's share of total generation decreased to 77 per cent (down 1.7 percentage points), while Scotland's share remained broadly stable at 15 per cent (up 0.3 percentage points). Wales' share also increased, from 6.2 per cent to 7.2 per cent. Northern Ireland's share of generation slightly increased from 2.3 per cent to 2.5 per cent. On average, over the last four years, 76 per cent of UK electricity generation has taken place in England, 15 per cent in Scotland, 7 per cent in Wales and 2.3 per cent in Northern Ireland.

England is a net importer of electricity from Scotland and from continental Europe (via the France and Netherlands interconnectors), but has been a net exporter to Wales since 2014.

In 2015 Scotland exported a record high 29 per cent of the electricity generated there to consumers elsewhere in the UK; this has increased from 24 per cent in 2014 (up 5.2 percentage points) due to an increase in generation in Scotland (up 2.5 per cent). Net exports to England increased 36 per cent which offset the 82 per cent drop in net exports to Northern Ireland.

In 2015 Wales was a net importer from England for the second consecutive year, however the level of imports from England fell 87 per cent, as Welsh generation rose 17 per cent with only a 13 per cent increase in consumption. Wales started trading with the Republic of Ireland in 2012 and has been a net exporter to them each year, with the equivalent of 4.3 per cent of Wales' generation exported to the Republic of Ireland in 2015.

Northern Ireland trades electricity with the Republic of Ireland and had been a net exporter between 2004 and 2014, but has since become a net importer from the Republic of Ireland. Northern Ireland also imports electricity from Scotland via the Moyle interconnector.

Generation by fuel

For each of the four UK countries, Table A shows the shares of the generation of electricity by fuel category for 2014 and 2015. This is also shown in Chart 2. In the UK, the nuclear share increased slightly in 2015 from 19 per cent to 22 per cent following a decrease in generation in 2014 due to maintenance outages at a number of plants. In Scotland, the share of nuclear dropped slightly from 35 per cent to 33 per cent between 2013 and 2014, before rising to 35 per cent again in 2015. In Wales the share of nuclear generation dropped from 17 per cent in 2013 to 9 per cent in 2014 following outages at Wylfa, before increasing to 16 per cent in 2015.

Coal's share of UK generation has decreased each year since 2012, down to a record low 22 per cent in 2015. The fall in coal generation in England, from 31 per cent in 2014 to 22 per cent in 2015, is due to reduced capacity after the closure or partial closure of multiple coal plants that were opted out of the Large Combustion Plant Directive[2]. This includes the partial closure of Ferrybridge C in April 2014 (capacity falling from 1,960 MW to 980 MW) and the mothballing of Lynemouth in April 2015. Another factor in the reduction of coal generation in England was the conversion of two units at Drax: one unit from coal to biomass in 2014 and another unit from coal to high-range co-firing (85% to <100% biomass) in 2015. The share of coal generation in Wales decreased slightly from 36 per cent to 33 per cent, in Scotland from 20 per cent to 16 per cent and in Northern Ireland from 28 per cent to 25 per cent.

The share of gas generation between 2014 and 2015 in England increased only slightly to 35 per cent (up 0.6 percentage points), with Wales down from 24 per cent to 20 per cent and Northern Ireland down from 49 per cent to 48 per cent. Gas generation in Scotland has reduced each year since 2008, and fell further from 5.5 per cent to 3.7 per cent from 2014.

Renewables share of generation has been continually increasing, reaching a record high of 25 per cent in 2015. The conversions at Drax, along with a 70 per cent increase in solar capacity have led to an increase in England's renewables share of generation, up to 21 per cent in 2015 from 16 per cent in 2014. Scotland's generation from renewables was 42 per cent in 2015, up 4.2 percentage

[2] Details of this were published in the September 2015 issue of Energy Trends, available at www.gov.uk/government/uploads/system/uploads/attachment_data/file/462364/LCPD.pdf

points, mainly due to an increase in wind capacity of 6.2 per cent. Renewables generation in Wales increased by 3.7 percentage points to 20 per cent, with Northern Ireland up by 4.1 percentage points to 26 per cent.

Table A: Percentage shares of each country's generation, by fuel type, 2014 and 2015

	Scotland	Wales	Northern Ireland	England	UK total
2014					
Coal	20.3	35.7	28.4	31.0	29.6
Gas	5.5	24.1	48.9	34.4	29.8
Nuclear	33.3	9.3	0.0	17.4	18.9
Renewables	38.0	16.3	21.9	15.6	19.1
Oil and Other	2.9	14.6	0.8	1.6	2.6
2015					
Coal	16.2	32.7	24.9	22.4	22.3
Gas	3.7	19.9	48.3	35.0	29.5
Nuclear	34.7	15.8	0.0	19.1	20.7
Renewables	42.2	20.0	26.0	21.5	24.6
Oil and Other	3.1	11.6	0.7	2.0	2.8

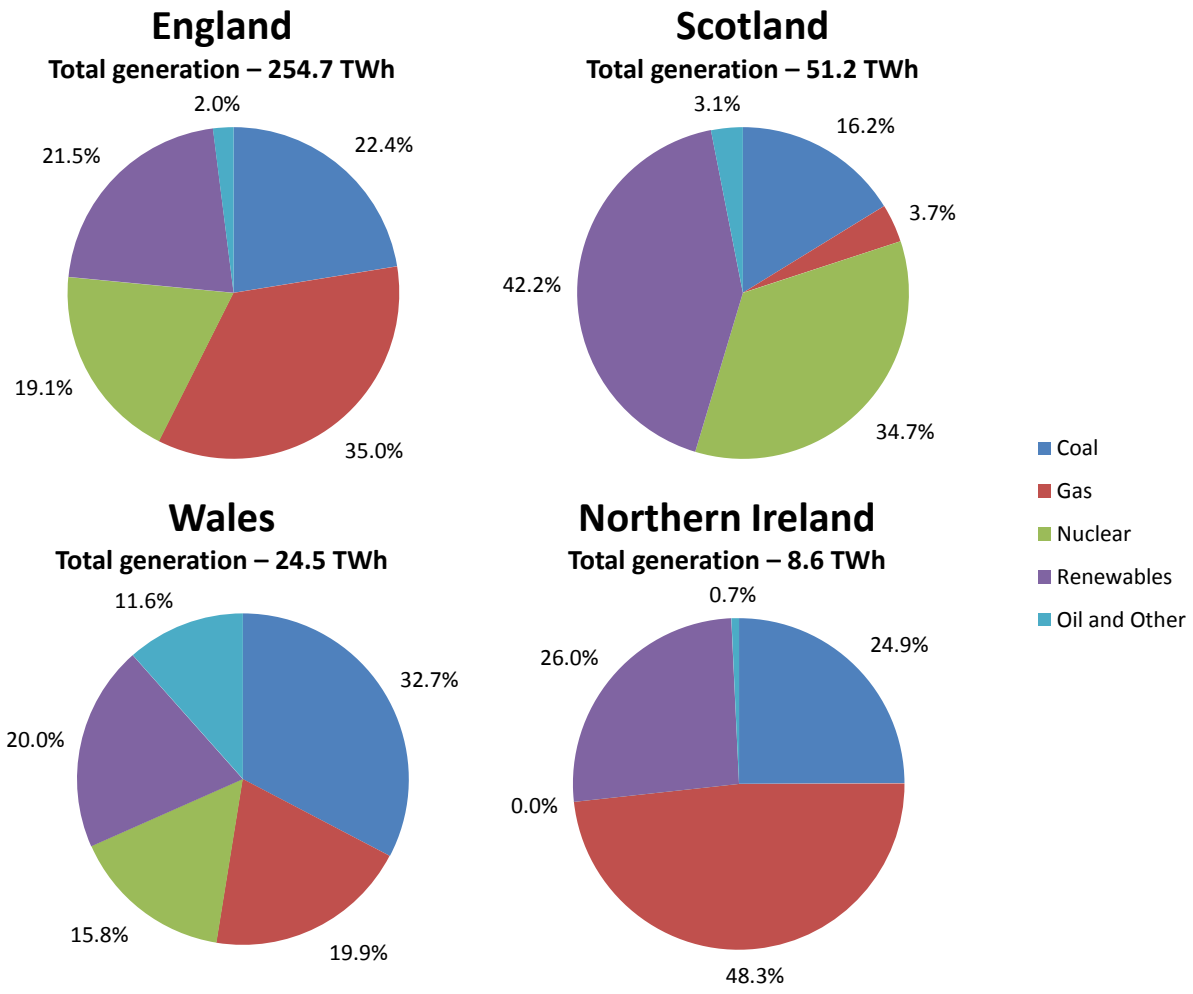
Combined heat and power (CHP) forms the bulk of 'Other generators' generation, although some major power producers (MPPs) also operate generating plants that are partially CHP. CHP statistics for 2015 on a sub-national and regional basis were published in the September 2016 issue of Energy Trends (see references at the end of the article).

The share of generation accounted for by generators other than major power producers varies across the UK. In Scotland, in 2015, other generators had a 15 per cent share (up from 14 per cent in 2014), while in England the share was 12 per cent (up from 10 per cent), in Wales 13 per cent (down from 14 per cent) and in Northern Ireland 20 per cent (up from 16 per cent).

Overall, the UK saw a small increase in total generation (up 0.3 per cent), despite a 1.7 per cent fall in MPP generation. This was due to a 16 per cent increase in autogeneration. The largest reduction in generation share was experienced by coal (down 7.3 percentage points), with conversions of coal units to biomass units at Drax and adverse market conditions. The Drax conversions also led to thermal renewables having the largest increase in generation share (up 5.4 percentage points).

Chart 2 shows the generation by fuel type for each country in 2015.

Chart 2: Generation by fuel type for each country in the UK in 2015 (all generating companies)



Renewables

The share of renewables in electricity generation or sales is measured in two different ways in the UK[3]. First, there is the "headline" overall measure that shows the percentage of electricity generation accounted for by all renewables. Secondly, there is the measure that is based on the Renewables Obligation (RO) (and the analogous Renewables Obligation (Scotland) - ROS) which shows the percentage of electricity sales accounted for by renewables eligible under these obligations. The main differences are the exclusion from the RO of large-scale hydro and non-biodegradable wastes[4]. Table B shows the overall measure for 2012 to 2015.

[3] There is also a third method used by the EU – a Renewables Directive basis – see Chapter 6 of the Digest of UK Energy Statistics 2015, table 6.7 and paragraph 6.43.

[4] Specific exclusions from eligibility for the RO are existing hydro plant over 20 MW; all plant using renewable sources built before 1990 (unless re-furbished); and energy from mixed waste combustion unless the waste is first converted to fuel using advanced conversion technology.

Table B: Renewables percentages

		UK	Scotland	Wales	Northern Ireland	England
Overall renewables percentage	2012	11.3	29.1	9.3	15.9	8.2
	2013	14.9	32.0	10.3	19.5	11.8
	2014	19.1	38.0	16.3	21.9	15.6
	2015	24.6	42.2	20.0	26.0	21.5

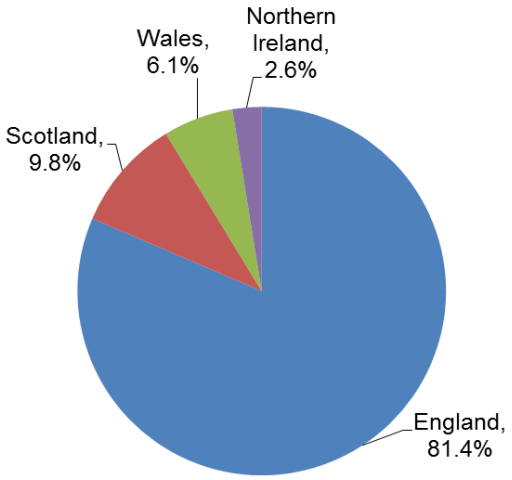
With its high proportion of natural flow hydro, as well as wind generation increasing over the last few years due to increased capacity, renewables' share in Scotland under the headline measure increased by 4.2 percentage points to stand at 42 per cent in 2015. This increase was mainly due to a rise in wind and solar generation as a result of increasing capacity. In 2015, all four regions had a record high percentage of electricity generated by renewables. On a RO basis, the percentage measure for the UK (12 per cent in 2012, 15 per cent in 2013, 18 per cent in 2014 and 23 per cent in 2015) is not meaningful at sub-national level because electricity generated in one part of the UK can be sold in a different part of the UK.

In Scotland, the renewables target to reach 100 per cent by 2020 is expressed as generation as a proportion of gross electricity consumption (defined as generation plus transfers into Scotland less transfers out of Scotland). In 2012, this percentage was 39 per cent, increasing to 44 per cent in 2013. In 2014, this rose by 5.3 percentage points to 50 per cent. It surpassed the interim target, of 50 per cent by 2015, after increasing to reach 59 per cent.

The amount of electricity from renewable sources transferred from Scotland or Wales to England, or from Scotland to Northern Ireland, is not known. What is known from Table 2 is that the amount of ROS eligible electricity generated in Scotland in 2015 was 13 per cent more than in 2014, while the amount of RO eligible electricity generated in Wales in 2015 was 60 per cent higher than in 2014. In England, the increase was 31 per cent. In Northern Ireland RO eligible electricity generated was 31 per cent higher. In the UK as a whole, RO eligible electricity production increased by 28 per cent from 2014 to 2015. Over the four years shown in Table 2, the increases in RO eligible electricity production have been substantial across all countries, namely 74 per cent for Northern Ireland, 43 per cent for Scotland, 86 per cent for Wales and 109 per cent for England.

Renewables statistics for 2015 on a sub-national and regional basis were published in the September 2016 issue of Energy Trends (see references at the end of the article).

Chart 3: Electricity consumption in 2015



Consumption and sales

Transmission and distribution losses are not separately available for Scotland, Wales, Northern Ireland and England so estimates have been made using the UK proportions. Consumption figures have then been calculated by deducting net transfers and losses figures from the electricity supplied figures shown in Table 1. These show (Chart 3) that in 2015, 9.8 per cent of electricity consumption in the UK was in Scotland, 6.1 per cent in Wales, 2.6 per cent in Northern Ireland and 81.4 per cent in England. These are all broadly the same as the average percentage shares for each country for the period 2012 to 2015, namely 82.0 per cent for England, 10.0 per cent for Scotland, 5.5 per cent for Wales and 2.6 per cent for Northern Ireland.

Separate data is collected for sales of electricity from the public supply system in Scotland, England and Wales, and Northern Ireland and published in monthly table ET 5.5 on BEIS' Energy Statistics website (see references at the end of the article), but for this article the breakdown between England and Wales has been estimated. Because of definitional and other differences set out in the technical notes to Chapter 5 of DUKES 2016, there is a statistical difference between the calculated consumption and the sales data in Table 1. The overall statistical difference for the UK equals that shown in Table 5.2 of DUKES for the UK as a whole for the public distribution system.

As part of its commitment to improving the quality of its statistics, BEIS continues to examine this statistical difference and look further at the component series to see where the differences might be arising and thus where improvements to the data might be made.

Chart 4 shows the relationship between generation and consumption of electricity in each of the countries by means of a flow diagram.

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References:

Digest of UK Energy Statistics 2016 (DUKES); available on BEIS's energy statistics website at:
www.gov.uk/government/statistics/electricity-chapter-5-digest-of-united-kingdom-energy-statistics-dukes

Energy Trends monthly table 5.5:
www.gov.uk/government/statistics/electricity-section-5-energy-trends

Large Combustion Plant Directive (LCPD): Running hours during winter 2014/15 and capacity for 2015/16:
www.gov.uk/government/uploads/system/uploads/attachment_data/file/462364/LCPD.pdf

"Combined Heat and Power in Scotland, Wales, Northern Ireland and the regions of England in 2015" – Energy Trends September 2016, page 63:
www.gov.uk/government/statistics/energy-trends-september-2016-special-feature-articles

"Renewable electricity in Scotland, Wales, Northern Ireland and the regions of England in 2015" – Energy Trends September 2016, page 48:
www.gov.uk/government/statistics/energy-trends-september-2016-special-feature-articles

Chart 4: Electricity generation and consumption flow chart, 2015

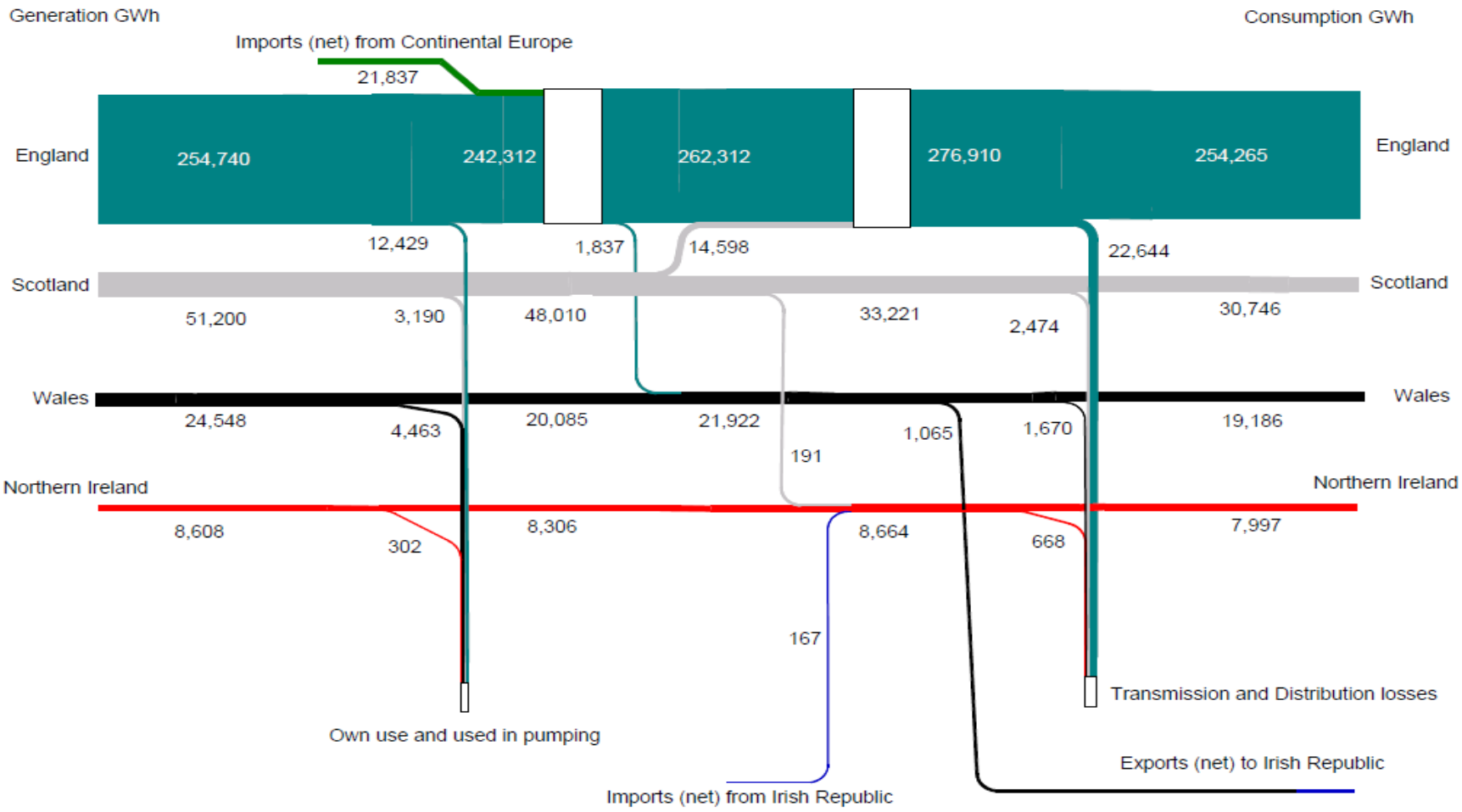


Table 1: Generation and supply of electricity in Scotland, Wales, Northern Ireland and England, 2012 to 2015

GWh

		2012					2013				
		UK total	Scotland	Wales	Northern Ireland	England	UK total	Scotland	Wales	Northern Ireland	England
Generated by	Major power producers	328,270	44,823	23,598	6,573	253,275	324,725	46,778	23,024	6,706	248,217
	Other generators	35,309	5,697	2,529	822	26,260	33,653	6,185	2,706	1,072	23,689
Total generated		363,579	50,520	26,127	7,396	279,535	358,378	52,963	25,730	7,778	271,906
Own use by Other generators		2,108	340	151	49	1,568	2,187	402	176	70	1,539
Electricity supplied (net) by Other generators		33,200	5,357	2,378	773	24,692	31,466	5,783	2,531	1,002	22,150
Used in pumping at pumped storage and other own use by MPPs		19,837	2,995	4,332	196	12,314	19,598	2,995	4,538	199	11,866
Electricity supplied (net) by MPPs		308,433	41,828	19,267	6,377	240,961	305,127	43,783	18,485	6,507	236,352
Electricity transferred to England (net of receipts)		0	10,717	2,157	0	-12,874	0	13,275	1,143	0	-14,418
Electricity transferred to Northern Ireland (net of receipts)		0	2,162	0	-2,162	0	0	1,541	0	-1,541	0
Electricity transferred to Europe (net of receipts)		-11,871	0	104	160	-12,135	-14,426	0	2,161	45	-16,632
Transfers from other generators to public supply		15,882	2,895	901	618	11,468	13,976	3,424	1,165	877	8,510
Transmission losses		6,757	656	370	175	5,556	6,351	629	320	163	5,239
Distribution losses		22,160	1,880	1,104	544	18,632	21,375	1,816	952	501	18,106
Consumption from public supply [A]		307,285	29,311	16,433	8,279	253,262	305,825	29,950	15,076	8,216	252,583
Consumption by autogenerators		17,303	2,460	1,476	155	13,213	17,467	2,356	1,364	124	13,624
Total Electricity consumption		324,588	31,771	17,909	8,434	266,475	323,292	32,306	16,439	8,340	266,207
Electricity sales (public supply) [B]		308,408	28,749	17,109	7,942	254,608	306,747	28,879	17,342	7,791	252,736
Statistical difference between calculated consumption [A] and sales [B]		-1,123	560	-677	318	-1,325	-923	1,072	-2,266	425	-153

Figures in this table do not sum exactly to the UK totals shown because of rounding

Table 1 continued: Generation and supply of electricity in Scotland, Wales, Northern Ireland and England, 2012 to 2015

GWh

		2014					2015				
		UK total	Scotland	Wales	Northern Ireland	England	UK total	Scotland	Wales	Northern Ireland	England
Generated by	Major power producers	300,823	42,876	17,997	6,520	233,430	295,742	43,312	21,451	6,908	224,071
	Other generators	37,352	7,068	2,938	1,219	26,127	43,353	7,888	3,096	1,700	30,669
Total generated		338,175	49,944	20,935	7,739	259,556	339,095	51,200	24,548	8,608	254,740
Own use by Other generators		2,526	478	199	82	1,767	2,867	522	205	112	2,028
Electricity supplied (net) by Other generators		34,825	6,590	2,740	1,136	24,360	40,486	7,366	2,891	1,587	28,641
Used in pumping at pumped storage and other own use by MPPs		17,842	3,090	4,155	184	10,413	17,516	2,668	4,258	190	10,400
Electricity supplied (net) by MPPs		282,981	39,786	13,842	6,335	223,017	278,226	40,644	17,193	6,718	213,671
Electricity transferred to England (net of receipts)		0	10,770	-2,949	0	-7,821	0	14,598	-1,837	0	-12,761
Electricity transferred to Northern Ireland (net of receipts)		0	1,044	0	-1,044	0	0	191	0	-191	0
Electricity transferred to Europe (net of receipts)		-20,520	0	2,408	-121	-22,807	-20,938	0	1,065	-167	-21,837
Transfers from other generators to public supply		16,378	4,059	1,425	989	9,904	18,733	4,059	1,753	1,423	11,497
Transmission losses		6,509	665	329	166	5,349	7,394	723	454	189	6,028
Distribution losses		22,142	1,897	975	508	18,761	20,063	1,751	1,216	479	16,616
Consumption from public supply [A]		291,245	29,473	14,505	7,816	239,451	290,446	27,440	18,048	7,833	237,125
Consumption by autogenerators		18,431	2,527	1,313	146	14,444	21,748	3,306	1,138	164	17,141
Total Electricity consumption		309,676	32,001	15,818	7,962	253,895	312,194	30,746	19,186	7,997	254,265
Electricity sales (public supply) [B]		291,353	26,882	16,791	6,842	240,838	289,337	26,282	19,030	6,485	237,539
Statistical difference between calculated consumption [A] and sales [B]		-108	2,592	-2,286	973	-1,387	1,109	1,158	-982	1,347	-415

Figures in this table do not sum exactly to the UK totals shown because of rounding

Table 2: Generation of electricity by fuel in Scotland, Wales, Northern Ireland and England, 2012 to 2015

GWh

			2012					2013				
			UK total	Scotland	Wales	Northern Ireland	England	UK total	Scotland	Wales	Northern Ireland	England
Major power producers:	Coal		140,164	11,867	10,824	2,367	115,105	130,204	10,802	11,478	2,606	105,319
	Oil		1,132	155	0	44	933	745	161	0	20	563
	Gas		86,229	3,680	4,737	3,609	74,204	82,891	3,497	3,432	3,457	72,505
	Nuclear		70,405	17,050	4,141	0	49,214	70,607	18,498	4,326	0	47,783
	Thermal renewables		6,067	422	104	0	5,542	9,285	360	129	0	8,796
	Other thermal		-	-	-	-	-	522	0	0	0	522
	Hydro natural flow		4,169	3,859	287	0	24	3,609	3,412	175	0	22
	Hydro pumped storage		2,966	610	2,357	0	0	2,904	620	2,283	0	1
	Non thermal renewables		17,137	7,181	1,149	553	8,253	23,958	9,428	1,200	622	12,708
	Total		328,270	44,823	23,598	6,573	253,275	324,725	46,778	23,024	6,706	248,217
Other Generators:	Coal		2,992	25	0	39	2,928	83	19	0	39	24
	Oil		1,439	449	56	36	899	1,321	434	49	38	801
	Gas		13,931	1,959	1,125	124	10,724	12,952	1,943	907	102	10,000
	Thermal renewables		8,581	1,063	466	109	6,943	8,878	999	490	134	7,255
	Other thermal		1,767	27	454	0	1,286	1,390	33	594	0	763
	Hydro natural flow		1,116	980	51	21	64	1,095	951	52	21	71
	Non thermal renewables		4,054	1,181	377	494	2,002	6,452	1,798	615	737	3,302
	Wastes		1,429	14	0	0	1,415	1,481	8	0	0	1,473
	Total		35,309	5,697	2,529	822	26,260	33,653	6,185	2,706	1,072	23,689
Total generation by fuel			363,579	50,520	26,127	7,396	279,535	358,378	52,963	25,730	7,778	271,906
within which:	Renewables	Hydro	5,285	4,838	337	21	88	4,704	4,363	227	21	93
		Wind, wave, solar	21,191	8,362	1,527	1,047	10,255	30,410	11,227	1,815	1,360	16,010
		Other	14,648	1,485	570	109	12,484	18,163	1,359	619	134	16,051
		Total	41,124	14,685	2,434	1,177	22,828	53,278	16,949	2,661	1,515	32,153
Renewables eligible under the renewables obligation			36,647	11,927	2,265	1,177	21,279	44,958	13,979	2,107	1,414	27,458
Percentage shares of generation:	Coal		39.4%	23.5%	41.4%	32.5%	42.2%	36.4%	20.4%	44.6%	34.0%	38.7%
	Oil		0.7%	1.2%	0.2%	1.1%	0.7%	0.6%	1.1%	0.2%	0.7%	0.5%
	Gas		27.5%	11.2%	22.4%	50.5%	30.4%	26.7%	10.3%	16.9%	45.8%	30.3%
	Nuclear		19.4%	33.7%	15.8%	0.0%	17.6%	19.7%	34.9%	16.8%	0.0%	17.6%
	Hydro natural flow		1.5%	9.6%	1.3%	0.3%	0.0%	1.3%	8.2%	0.9%	0.3%	0.0%
	Other renewables		9.9%	19.5%	8.0%	15.6%	8.1%	13.6%	23.8%	9.5%	19.2%	11.8%
	Other		1.7%	1.3%	10.8%	0.0%	1.0%	1.8%	1.2%	11.2%	0.0%	1.0%
	Total		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Figures in this table do not sum exactly to the UK totals shown because of rounding

Table 2 continued: Generation of electricity by fuel in Scotland, Wales, Northern Ireland and England, 2012 to 2015 *GWh*

		2014					2015				
		UK total	Scotland	Wales	Northern Ireland	England	UK total	Scotland	Wales	Northern Ireland	England
Major power producers:	Coal	100,158	10,152	7,478	2,159	80,369	75,563	8,306	8,021	2,110	57,127
	Oil	530	181	0	23	326	683	143	0	22	518
	Gas	88,871	880	4,187	3,679	80,126	88,461	126	4,186	4,042	80,106
	Nuclear	63,748	16,633	1,953	0	45,161	70,345	17,763	3,886	0	48,696
	Thermal renewables	12,707	375	74	0	12,258	17,694	397	83	0	17,214
	Other thermal	528	0	0	0	528	689	0	0	0	689
	Hydro natural flow	4,635	4,391	213	0	30	4,907	4,609	273	0	24
	Hydro pumped storage	2,883	494	2,389	0	0	2,739	523	2,217	0	0
	Non thermal renewables	26,763	9,770	1,702	660	14,632	34,662	11,445	2,785	735	19,697
	Total	300,823	42,876	17,997	6,520	233,430	295,742	43,312	21,451	6,908	224,071
Other Generators:	Coal	72	0	0	39	33	66	0	0	38	28
	Oil	1,366	640	43	39	644	1,450	693	30	42	685
	Gas	12,024	1,844	853	105	9,222	11,574	1,787	692	118	8,977
	Thermal renewables	9,977	1,353	495	166	7,962	11,695	1,464	940	270	9,021
	Other thermal	1,486	135	621	0	730	1,192	207	594	0	390
	Hydro natural flow	1,258	1,045	62	28	123	1,382	1,148	78	29	127
	Non thermal renewables	9,245	2,028	864	840	5,512	13,211	2,564	762	1,203	8,681
	Wastes	1,923	22	0	0	1,901	2,784	25	0	0	2,759
	Total	37,352	7,068	2,938	1,219	26,127	43,353	7,888	3,096	1,700	30,669
Total generation by fuel		338,175	49,944	20,935	7,739	259,556	339,095	51,200	24,548	8,608	254,740
within which: Renewables	Hydro	5,893	5,436	276	28	153	6,289	5,757	352	29	151
	Wind, wave, solar	36,008	11,798	2,566	1,500	20,144	47,872	14,009	3,547	1,938	28,378
	Other	22,684	1,728	569	166	20,220	29,388	1,861	1,023	270	26,235
	Total	64,584	18,962	3,411	1,695	54,727	83,550	21,627	4,921	2,237	54,764
Renewables eligible under the renewables obligation		53,157	15,094	2,628	1,563	33,869	67,813	17,073	4,211	2,047	44,482
Percentage shares of generation:	Coal	29.6%	20.3%	35.7%	28.4%	31.0%	22.3%	16.2%	32.7%	24.9%	22.4%
	Oil	0.6%	1.6%	0.2%	0.8%	0.4%	0.6%	1.6%	0.1%	0.7%	0.5%
	Gas	29.8%	5.5%	24.1%	48.9%	34.4%	29.5%	3.7%	19.9%	48.3%	35.0%
	Nuclear	18.9%	33.3%	9.3%	0.0%	17.4%	20.7%	34.7%	15.8%	0.0%	19.1%
	Hydro natural flow	1.7%	10.9%	1.3%	0.4%	0.1%	1.9%	11.2%	1.4%	0.3%	0.1%
	Other renewables	17.4%	27.1%	15.0%	21.5%	15.6%	22.8%	31.0%	18.6%	25.6%	21.4%
	Other	2.0%	1.3%	14.4%	0.0%	1.2%	2.2%	1.5%	11.5%	0.0%	1.5%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Figures in this table do not sum exactly to the UK totals shown because of rounding

Physical gas flows across Europe and diversity of gas supply in 2015

Background

This article has two purposes. The first is to help illustrate gas flows through Europe using 2015[1] data published by the International Energy Agency (IEA). The second is to compare the resilience of the UK's supply infrastructure with that of other EU Member States using a metric that accounts for the diversity of gas supply.

Key Points

- Natural gas consumption among EU-28 countries rose in 2015 by 5 per cent, from 430 billion cubic metres (bcm) to 445 bcm,
- Indigenous production among the EU-28 countries fell by nearly 10 per cent on 2014, due in part to production caps. Indigenous production is equivalent to around 31 per cent of demand, and is the single biggest source of gas to the EU.
- Aside from indigenous production, the Russian Federation remained the largest single supplier of gas to the EU-28 meeting 28 per cent of EU-28 demand in 2015.
- EU-28 imports of Liquefied Natural Gas (LNG) increased by 9 per cent in 2015 largely driven by falling LNG prices and rising supply.
- The UK has a diverse range of gas sources and would have met 217 and 194 per cent of the estimated peak demand with the loss of the largest and two largest gas supply routes respectively.

European physical gas flows

European gas production

The total EU-28 gas production in 2015 was 138.2 billion cubic metres (bcm), with the Netherlands and the UK accounting for 39 per cent and 30 per cent of this total respectively. This is 9.7 per cent lower than EU-28 production in 2014 which was 152.9 bcm, mainly since Netherlands production nearly decreased by a quarter. The fall in production from the Netherlands can largely be attributed to production caps set by the Dutch Government to reduce output from the Groningen gas field due to the risk of earthquakes in the area being linked to gas extraction. Out of all EU-28 countries, only the Netherlands and Denmark produced more gas than they consumed, demonstrating Europe's reliance on gas imports from outside the EU.

European gas consumption

The largest demand among EU-28 countries came from Germany, the United Kingdom and Italy. Similar to 2014, these countries together accounted for over 50 per cent of EU-28 consumption. Germany remained the largest net importer in Europe in 2015 at 73 bcm, followed by Italy at 61 bcm and then France at 39 bcm[2]. Overall EU-28 net imports increased by 9 per cent compared to 2014 to meet demand following a fall in indigenous production.

Natural gas consumption[3] in the EU-28 increased in 2015 compared to 2014, from 430 bcm to 445 bcm. The majority of EU countries saw a rise in gas demand with Italy, Germany, France, Spain and Belgium contributing most significantly to this increase. This reflected the warmer weather in experienced in 2014 in comparison to 2015, particularly a mild winter in 2014.

1 January 1st 2015 to December 31st 2015 data using the following sources
"IEA (2015), IEA Natural Gas Information (database), www.iea.org/statistics/. (Accessed on [14 December 2016])"
"IEA (2016), Gas Trade Flows in Europe (GTF), www.iea.org/gtf/"

2 These numbers differ slightly from the IEA's annual figures due to the adjustments necessary to balance supply. The supply for some countries may appear unbalanced as stock changes are not shown. Data were calculated primarily from 2015 monthly pipeline gas flows, with 2015 annual imports, exports, production and consumption used for quality assurance amendments.

3 Natural gas consumption has been calculated using 2015 monthly pipeline gas flows and production data from the IEA and may differ from the observed consumption figures quoted in the 2015 annual gas information provided by the IEA. See Annex 3 for statistical differences between these figures.

Sources of gas

There are three sources of gas supply available to EU Member States: indigenous production, imports via Liquefied Natural Gas (LNG) terminal, and imports via pipeline. Countries can also draw on gas stocks from the other three sources that have been put into storage.

The largest single category of gas supply to the EU-28 was indigenous production, supplying 31 per cent of EU-28 consumption in 2015. A total of 18 countries have at least some indigenous gas production with the largest being from the Netherlands and UK which met 12 and 9 per cent of total EU demand respectively.

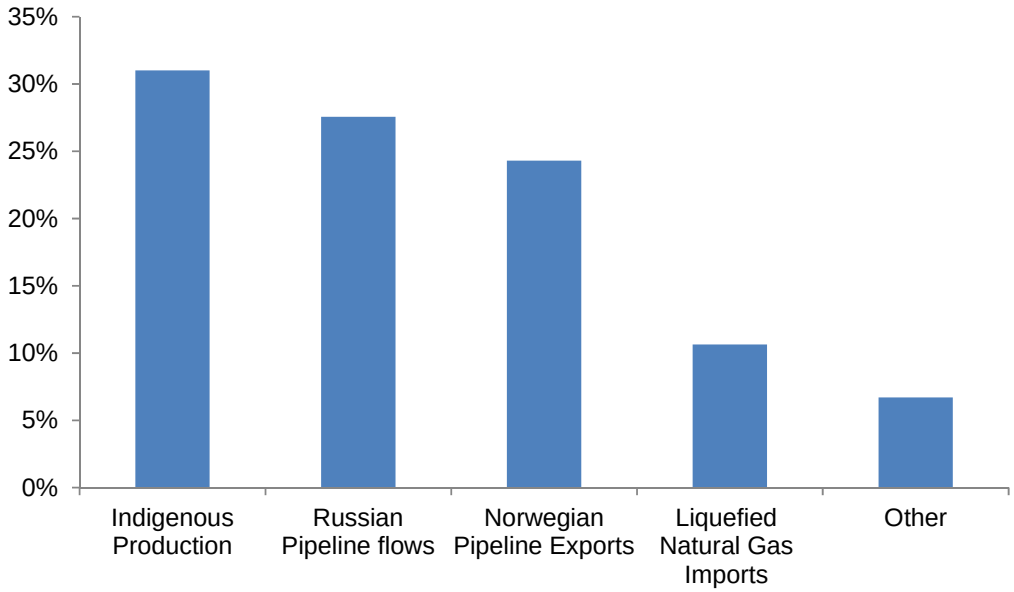
Aside from indigenous production, the Russian Federation remained the largest single supplier of gas to the EU-28, delivering around 123 bcm in 2015 compared to 108 bcm in 2014. This accounted for 28 and 25 per cent of total EU-28 gas demand in 2015 and 2014 respectively. The European pipeline infrastructure means that Central and Eastern European countries receive almost all of their natural gas supply from Russia. It should be noted that the origin of all of this gas is not necessarily Russian, since Russia acts as a transit country for gas from Kazakhstan and Turkmenistan to reach European markets.

Norwegian pipeline exports to the EU-28 increased between 2014 and 2015 but remained steady as a proportion of EU-28 gas consumption. In 2015 pipeline exports were around 108 bcm or 24 per cent of total EU-28 gas consumption compared to 101 bcm or 24 per cent in 2014. This was due to an increase in exports to UK, France and particularly Germany; 26 per cent of Norwegian exports were directed to the UK in 2015. In addition to pipeline exports, Norway exported 3bcm of LNG.

North African pipelines via Spain and Italy provided 30 bcm, or 7 per cent, of EU-28 demand. Algerian gas, coming direct from Algeria as well as via Morocco and Tunisia, accounted for 77 per cent of North African gas delivered to the EU-28, with Libya supplying the remainder.

EU-28 imports of LNG were 47.4 bcm in 2015 versus 43.5 bcm in 2014. This increase could be driven by falling LNG prices along with LNG supply increasing globally. LNG met 10.6 per cent of EU-28 demand. The largest suppliers of LNG to the EU-28 were Qatar, Algeria and Nigeria, who supplied 53, 20 and 13 per cent of total EU-28 LNG imports respectively.

Chart 1: Sources of EU-28 gas, 2015



UK physical gas flows

UK consumption in 2015 was 72.4 bcm, up from 72.2 in 2014. Around 57 per cent of this was met by indigenous production in 2015, slightly up compared to 2013 where 55 per cent was met by indigenous production. The rest were met by LNG imports and pipeline imports from Norway, Netherlands and Belgium.

Norway and Netherlands accounted for 89 per cent and 11 per cent of pipeline imports respectively, whilst the small remainder came from Belgium. UK also exported 14.5 bcm to Belgium (54 per cent), Ireland (31 per cent) and Netherlands (13 per cent).

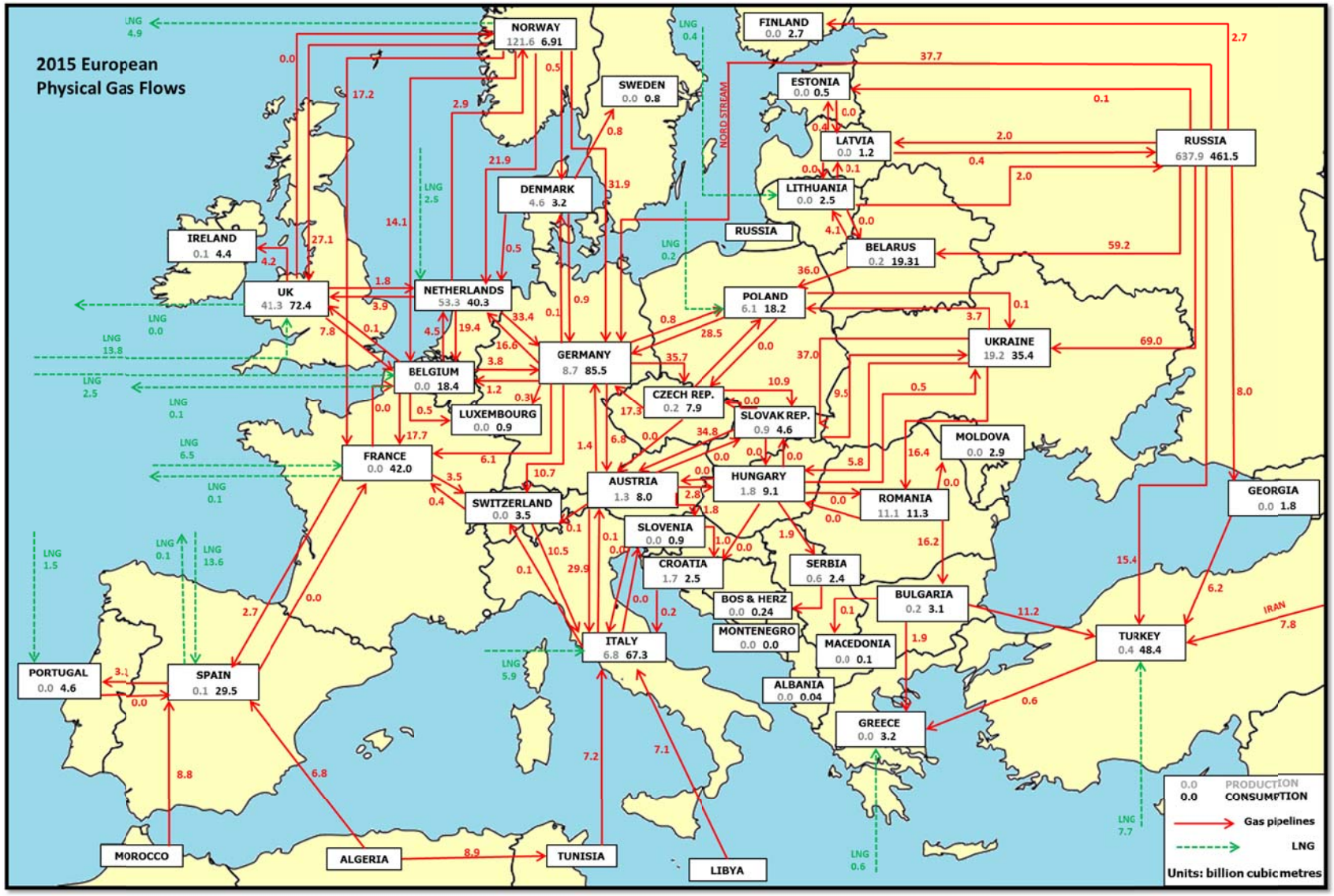
UK imports of LNG increased by 21 per cent, from 11.3 bcm in 2014 to 13.9 bcm in 2015, making the UK as the largest importer of LNG in 2015 within EU-28, ahead of Spain. 92 per cent of UK imports of LNG came from Qatar in 2015, remaining consistent with import levels in 2014 and 2013.

Note

The map uses pipeline data from the IEA to show entry and exit flows between countries and does not necessarily indicate that the gas actually passed through the domestic infrastructure of a country (for instance: Russian gas is transmitted to Turkey through Bulgaria but is separate to the Bulgarian domestic network).

Further data

For readers wanting a greater level of detail, the IEA have made available an interactive gas map, based on entry and exit points throughout Europe. This map is available free of charge at: www.iea.org/gtf/index.asp


2015 European
Physical Gas Flows
NORWAY
121.6 6.91
SWEDEN
0.0 0.8
FINLAND
0.0 2.7
ESTONIA
0.0 0.5
LATVIA
0.0 1.2
LITHUANIA
0.0 2.5
RUSSIA
637.9 461.5
DENMARK
4.6 3.2
IRELAND
0.1 4.4
UK
41.3 72.4
NETHERLANDS
53.3 40.3
BELGIUM
0.0 18.4
LUXEMBOURG
0.0 0.9
FRANCE
0.0 42.0
GERMANY
8.7 85.5
POLAND
6.1 18.2
BELARUS
0.2 19.31
UKRAINE
19.2 35.4
CZECH REP.
0.2 7.9
SLOVAK REP.
0.9 4.6
MOLDOVA
0.0 2.9
AUSTRIA
1.3 8.0
HUNGARY
1.8 9.1
ROMANIA
11.1 11.3
SWITZERLAND
0.0 3.5
SLOVENIA
0.0 0.9
CROATIA
1.7 2.5
SERBIA
0.6 2.4
BOS & HERZ
0.0 0.24
MONTENEGRO
0.0 0.0
MACEDONIA
0.0 0.1
ALBANIA
0.0 0.04
BULGARIA
0.2 3.1
GREECE
0.0 3.2
TURKEY
0.4 48.4
GEORGIA
0.0 1.8
ITALY
6.8 67.3
PORTUGAL
0.0 4.6
SPAIN
0.1 29.5
MOROCCO
ALGERIA
TUNISIA
LIBYA
NORD STREAM
IRAN
LNG
PRODUCTION
CONSUMPTION
Gas pipelines
LNG
Units: billion cubic metres

EU-28 Infrastructure peak daily gas supply in 2015

As noted above, there are four sources of gas supply available to EU Member States: indigenous production, gas storage facilities, imports via LNG terminal and imports via pipeline, with the potential of multiple sources within each of these categories. We have used the peak flow (i.e. the maximum gas deliverable in billion cubic metres per day) as a comparative measure of gas supply for each individual source for each country. For pipeline and LNG terminal, peak flow data were extracted from IEA physical gas flows data[4]. Similarly, peak outputs for storage facilities were extracted from the IEA Natural Gas Information 2016[5]. Storage facilities are assumed to be capable of working at peak capacity during times of peak demand. Although this is susceptible to inaccuracies, as peak capacity from storage facilities may not indeed be achievable by the point of peak demand in EU member states, it does allow a consistent metric across all storage facilities. Data for peak outputs for production was estimated, by taking the maximum monthly production (bcm) in 2015 for each gas-producing member state and dividing this by the number of days in that month.

Chart 2 shows peak gas supply for each individual country as a stacked bar chart, with different colours representing different categories of gas supply. Stacks were arranged with production and storage facilities stacked at the base of the chart and imports via LNG terminals and pipelines stacked above. Further, for these imports and storage sources, data were divided within categories by individual source (represented by horizontal lines within an individual bar colour). Please note these data were collected from a range of sources and we have not confirmed each of the data items with the countries who submit data to the IEA.

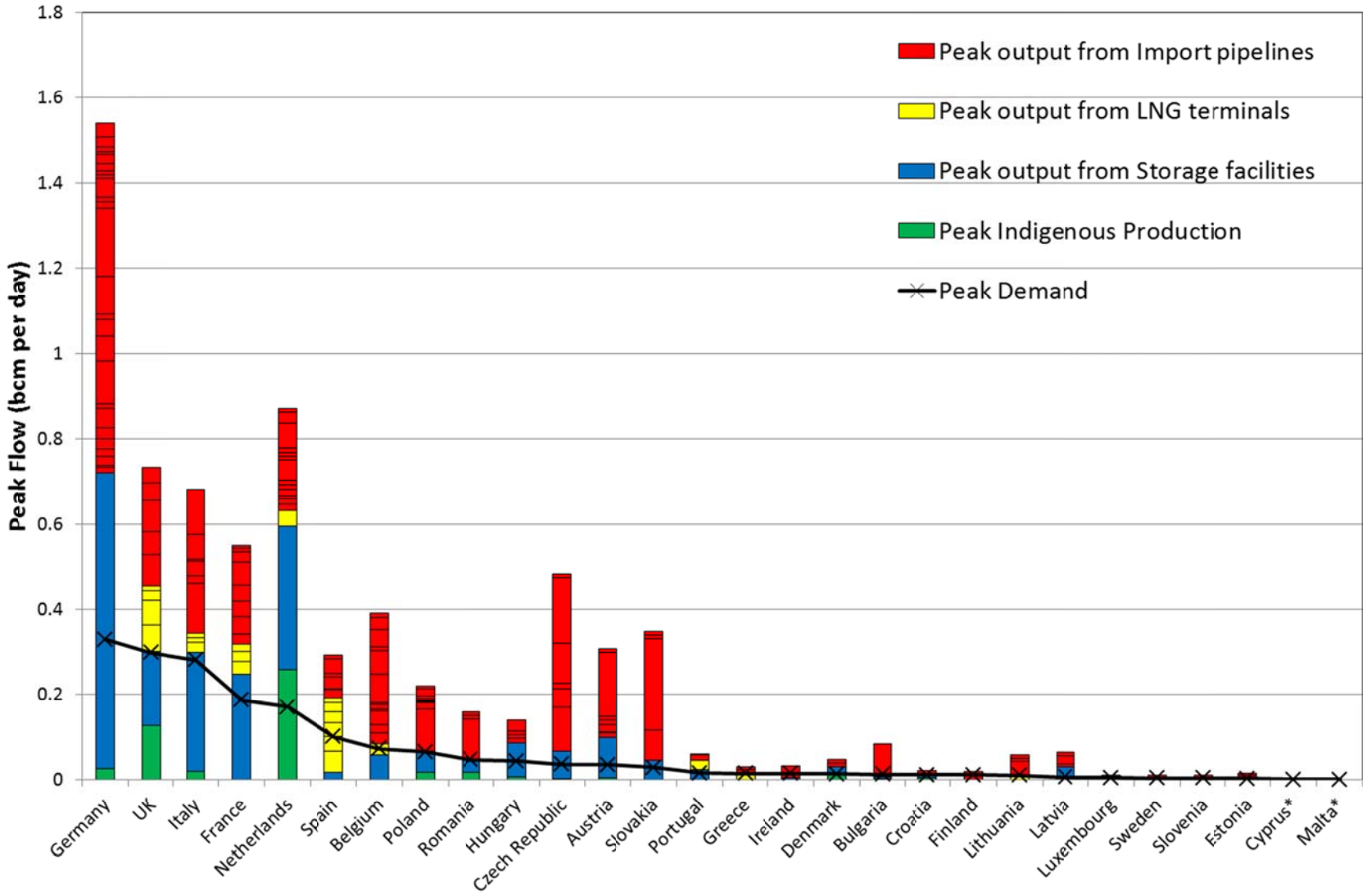
Chart 2 includes all EU-28 member states in order of peak gas demand. The estimated peak gas demand data (bcm per day) are included within Chart 2 as a single line-and-cross plot running across the graph. Peak gas demand acts as a comparator for peak gas supply, and was estimated for each country by taking the maximum monthly demand in 2015 (bcm) divided by the number of days within that month. Whilst this is a conservative estimate, it does allow for a common metric for comparison. Data for peak flows are provided in the table in Annex 1.

Chart 2 illustrates that in all EU countries for which data were available, maximum gas supply exceeded peak demand. According to the data, Germany had the highest peak demand in 2015, but also had the largest potential peak output from both indigenous storage facilities and import pipelines. The data indicated that only the Netherlands and Denmark had sufficient indigenous production capacities to meet or nearly meet peak daily demand. The majority of countries had a peak supply more than double that of peak demand, with the exception of Finland and Croatia.

The UK had the second largest peak demand of the EU member states.

[4] www.iea.org/gtf/index.asp
[5] Natural Gas Information 2016, International Energy Agency, ISBN 978-92-64-25858-7

Chart 2: Estimated peak outputs for gas supply sources versus estimated peak demand for EU-28 Member States



Source: BEIS analysis of IEA data. *Cyprus and Malta have no consumption and are included for completeness only. For import data, stacks are further divided by number/volume of pipelines/terminals. Data are provided in Table in Annex 1.

Looking at the pipeline import data in Chart 2 (red stacks), it is clear that the five member states with the largest peak demand have a diverse range of import pipelines. Germany in particular has a large number of import pipelines, 26 in total. There are substantially fewer import pipelines in EU countries east of Germany. Of particular note, the Slovak Republic appeared to have a peak supply that far exceeded demand, where almost all of this came via a single pipeline from Russia, which has pipelines transiting through to several other member states.

Aside from Spain (six), the UK (four) and Italy and France (three), all other member states had at most a single LNG terminal.

EU-28 Gas infrastructure resilience 2015

In order to given an indication of the resilience of the gas supply infrastructure, we have developed a simple methodology that takes the sum of all gas supplies coming into a country running at maximum capacity (*PF*, peak flow), removes the largest supply route, and looks at the remaining percentage supply relative to peak demand. The equation below indicates PF as

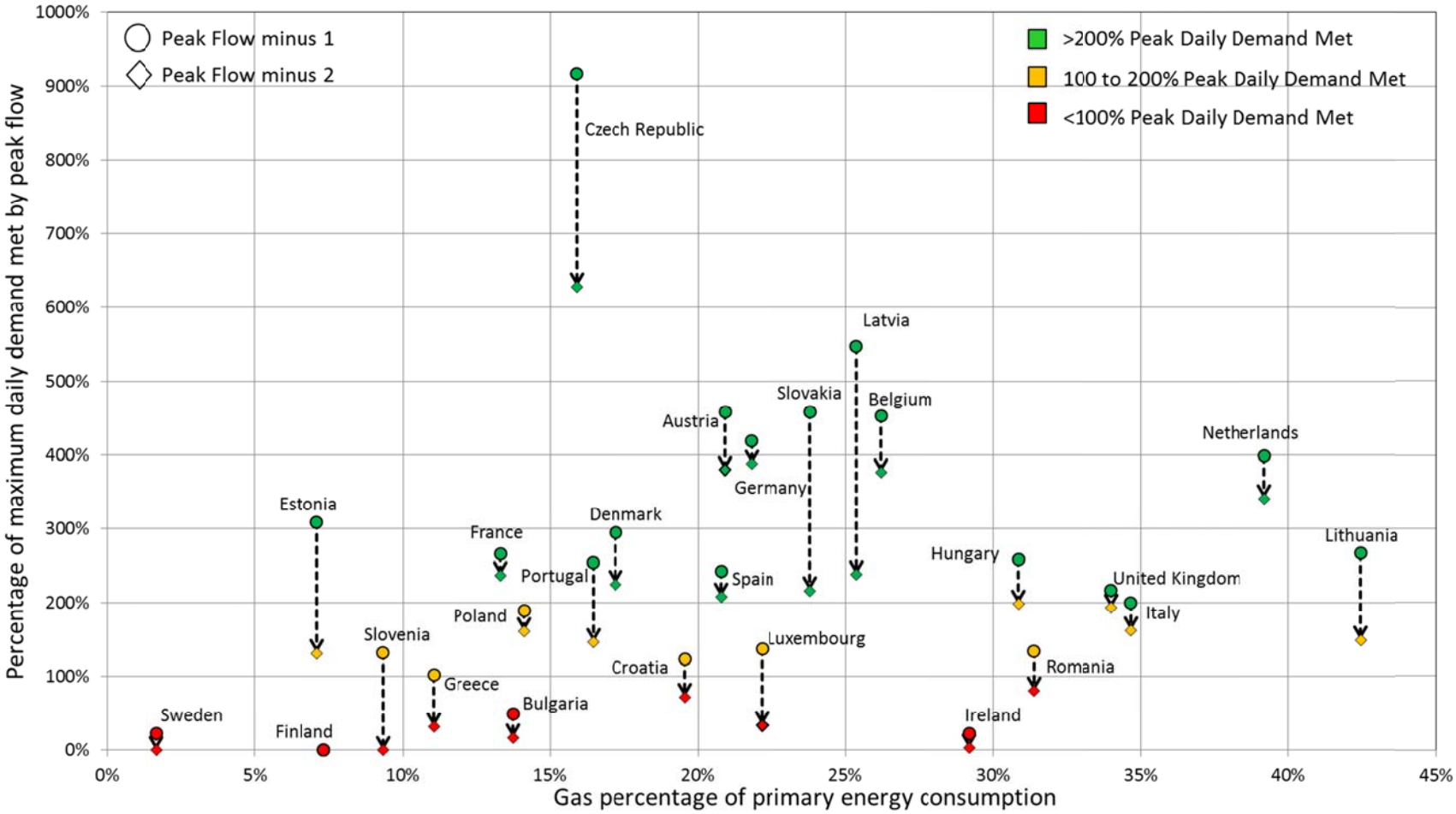
$$PF-1[\%]=\frac{EP_{\max}+P_{\max}+S_{\max}+LNG_{\max}-I_{\max}}{D_{\max}} \qquad \text{Equation 1}$$

Where:
- PF = Peak Flow (bcm/day)
- EP_{max} = Peak capacity of entry points (bcm/day)
- P_{max} = Peak capacity for each indigenous production pipeline (bcm/day)
- S_{max} = Peak output for each storage facility (bcm/day)
- LNG_{max} = Peak output for each LNG terminal (bcm/day)
- D_{max} = Average 2013 peak gas demand (bcm/day)
- I_{max} = Peak daily capacity of single largest supply route (bcm/day)

This formula is similar to a more widely used metric - the 'N-1' measure of supply outlined in the EU Regulation No. 994/2010 - but differs to that due to both the historical nature of the data used here and the definition of demand. In the EU regulation, peak demand (D_{max}) is defined as the total daily gas demand of the country during a day of exceptionally high gas demand occurring with a statistical probability of once in 20 years. In this report, because we are calculating resilience for 2015, we use the estimated peak gas demand in each country for 2015 (January 1st 2015 to December 31st 2015), taking the maximum monthly demand in 2015 (bcm) and dividing this by the number of days within that month. Beyond *PF*-1, *PF*-2 was also calculated using the same methodology but removing the two largest supply routes as a more rigorous test of infrastructure resilience.

As well as considering infrastructure resilience, it is also important to consider the extent to which each EU-28 country relies on gas to meet its primary energy demand. If the *PF*-1 score is less than 100 per cent, it could have considerable consequences for a country that relies on gas for a large proportion of its primary energy demand, compared to a lesser extent for a country that mainly uses other energy sources. We therefore plotted out *PF*-1 and *PF*-2 against the percentage of total primary energy demand met by gas for each EU Member State (Chart 3).

Chart 3: EU-28* Gas infrastructure resilience versus percentage of primary energy consumption met by gas, 2015



*Data for Cyprus and Malta not available. Peak flow minus 1 = total gas supply capacity minus largest gas supply route (*PF*-1). Peak flow minus 2 = total gas supply capacity minus two largest gas supply routes (*PF*-2). For each member state, top circle represents *PF*-1 and bottom diamond represents *PF*-2. Red-amber-green are illustrative, and do not reflect any pre-defined or standard resilience metric.

Chart 3 shows France, Czech Republic, Denmark, Austria, Spain, Germany, Slovakia, Latvia, Belgium and Netherlands to have particularly resilient gas infrastructure. In all nine countries, the gas infrastructure was able to provide more than double the estimated –if conserved peak - gas demand in 2015, even with the loss of their two largest gas supply routes. Finland, Sweden, Ireland and Bulgaria appear particularly vulnerable to infrastructure disruptions, with these four countries unable to meet peak daily demand after the loss of the largest gas supply route. Sweden and Finland use very little gas but it appears that Ireland was particularly vulnerable, given that gas accounts for nearly 30 per cent of primary energy demand.

Including both *PF*-1 and *PF*-2 scores in Chart 2 gives further insight into infrastructure resilience which would not be captured by the *PF*-1 score alone. For example, the data indicate that Romania clearly has two major import routes: although resilient to a single supply disruption (meeting 134 per cent of peak demand), Romania would be vulnerable after the loss of these two main routes. This is also the case for Slovenia, Greece, Croatia and Luxembourg.

UK gas infrastructure resilience 2015

For the UK perspective, there are a diverse range of gas sources, including pipeline and LNG imports, storage and indigenous production, with good resilience to disruption of major supply sources According to these data, in 2015 the UK would have met 217 and 194 per cent of the estimated peak demand with the loss of the largest and two largest gas supply routes respectively. Overall, according to the peak flow metrics and data used in this report, the UK was the eleventh most resilient Member State to gas supply infrastructure disruptions, but it was the fourth most dependent on gas for primary energy demand in 2015.

EU regulations, enforcing that all Member States must have an *N*-1 score of greater than 100 per cent (using the larger value of peak gas demand based on a statistical probability of once in 20 years) came into force from 3rd December 2014. Given the similarity between the EU *N*-1 methodology and the *PF*-1 methodology used here, the UK is well-placed to meet this requirement.

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Annex 1: Table of key data for gas use in the EU-28* countries, 2015

	Peak daily [X] (Billion cubic metres per day)								
EU-28 MS	**Demand ****	**Indigenous production ****	**Import pipelines**	**Storage output**	**LNG out-put**	***PF*-1 score**	***PF*-2 score**	**Natural Gas Consumption (Mtoe)**	**Total Primary Energy Consumption (Mtoe)**
Austria	0.034	0.004	0.209	0.094	0.000	459%	380%	6.9	32.8
Belgium	0.072	0.000	0.309	0.057	0.026	453%	377%	13.9	52.9
Bulgaria	0.012	0.002	0.078	0.004	0.000	49%	16%	2.6	18.9
Croatia	0.011	0.003	0.013	0.006	0.000	124%	72%	2.2	9.1
Cyprus*	0.000	0.000	0.000	0.000	0.000	0%	0%	0.0	2.5
Czech Republic	0.036	0.001	0.416	0.066	0.000	917%	628%	6.5	40.7
Denmark	0.013	0.013	0.018	0.016	0.000	295%	225%	2.8	16.0
Estonia	0.002	0.000	0.014	0.000	0.000	309%	131%	0.4	5.5
Finland	0.011	0.000	0.019	0.000	0.000	0%	0%	2.2	32.5
France	0.187	0.000	0.234	0.248	0.069	266%	237%	35.1	245.7
Germany	0.329	0.026	0.819	0.695	0.000	419%	388%	68.0	311.8
Greece	0.014	0.000	0.015	0.000	0.014	102%	32%	2.7	23.6
Hungary	0.043	0.005	0.054	0.080	0.000	259%	199%	7.5	23.9
Ireland	0.014	0.000	0.030	0.003	0.000	23%	3%	3.8	13.3
Italy	0.281	0.019	0.339	0.280	0.044	200%	162%	55.3	150.7
Latvia	0.006	0.000	0.034	0.030	0.000	547%	238%	0.9	3.6
Lithuania	0.010	0.000	0.046	0.000	0.012	267%	149%	2.1	5.3
Luxembourg	0.004	0.000	0.011	0.000	0.000	138%	33%	0.8	3.7
Malta*	0.000	0.000	0.000	0.000	0.000	0%	0%	0.0	2.3
Netherlands	0.171	0.257	0.238	0.339	0.035	399%	341%	28.1	71.7
Poland	0.065	0.018	0.153	0.049	0.000	189%	161%	13.8	94.6
Portugal	0.015	0.000	0.015	0.023	0.022	254%	147%	4.0	22.1
Romania	0.047	0.017	0.113	0.028	0.000	134%	81%	9.3	33.1
Slovak Republic	0.029	0.000	0.302	0.045	0.000	301%	58%	3.9	16.3
Slovenia	0.003	0.000	0.011	0.000	0.000	132%	0%	0.7	6.6
Spain	0.100	0.000	0.102	0.016	0.173	243%	208%	24.6	119.4
Sweden	0.004	0.000	0.009	0.001	0.000	23%	0%	0.7	50.0
United Kingdom	**0.298**	**0.126**	**0.276**	**0.175**	**0.155**	**217%**	**194%**	**61.2**	**180.0**

Source: BEIS analysis of IEA data. *No data available for Cyprus and Malta **Calculated by peak month divided by number of days in that month.

Annex 2: Table of *PF*-1 and *PF*-2 values for EU-28* countries, 2015

EU-28 MS	PF (bcm/day)	PF-1 (bcm/day)	Nature of the largest supply source	PF-2 (bcm/day)	Nature of the second largest supply source
Austria	0.307	0.157	Import pipeline	0.130	Storage
Belgium	0.392	0.326	Import pipeline	0.271	Import pipeline
Bulgaria	0.084	0.006	Import pipeline	0.002	Storage
Croatia	0.022	0.014	Import pipeline	0.008	Storage
Cyprus*	0.000	0.000	-	0.000	-
Czech Republic	0.483	0.327	Import pipeline	0.224	Import pipeline
Denmark	0.048	0.038	Import pipeline	0.029	Indigenous Production
Estonia	0.014	0.007	Import pipeline	0.003	Import pipeline
Finland	0.019	0.000	Import pipeline	0.000	-
France	0.551	0.496	Storage	0.442	Import pipeline
Germany	1.540	1.380	Import pipeline	1.279	Import pipeline
Greece	0.029	0.015	LNG	0.005	Import pipeline
Hungary	0.139	0.111	Storage	0.086	Import pipeline
Ireland	0.033	0.003	Import pipeline	0.000	Storage
Italy	0.682	0.562	Import pipeline	0.457	Import pipeline
Latvia	0.064	0.034	Storage	0.015	Import pipeline
Lithuania	0.057	0.026	Import pipeline	0.018	Storage
Luxembourg	0.011	0.006	Import pipeline	0.001	Import pipeline
Malta*	0.000	0.000	-	0.000	-
Netherlands	0.869	0.681	Indigenous production	0.581	Indigenous Production
Poland	0.220	0.122	Import pipeline	0.104	Storage
Portugal	0.060	0.038	LNG	0.022	Storage
Romania	0.158	0.062	Import pipeline	0.037	Storage
Slovak Republic	0.302	0.086	Import pipeline	0.016	Import pipeline
Slovenia	0.011	0.004	Import pipeline	0.000	Import pipeline
Spain	0.292	0.243	LNG	0.208	Import pipeline
Sweden	0.010	0.001	Import pipeline	0.000	Storage
United Kingdom	**0.732**	**0.649**	**Import pipeline**	**0.575**	**Import pipeline**

Source: BEIS analysis of IEA data. *PF* = peak flow (defined in Equation 1 in report). *No data available for Cyprus and Malta.

Annex 3: Table of statistical differences between observed and calculated consumption for EU-28* countries, 2015

EU-28 MS	Observed Consumption (bcm)	Calculated Consumption (bcm)	Statistical Difference (bcm)	Statistical Difference (Per cent)
Austria	8.4	8.0	0.3	4.1%
Belgium	17.0	18.4	-1.4	-7.8%
Bulgaria	2.9	3.1	-0.3	-8.1%
Croatia	2.6	2.5	0.1	2.6%
Cyprus*	0.0	0.0	0.0	-
Czech Republic	7.9	7.9	0.0	0.0%
Denmark	3.2	3.2	0.0	0.4%
Estonia	0.5	0.5	0.0	0.0%
Finland	2.7	2.7	0.0	0.4%
France	39.1	42.0	-2.9	-7.0%
Germany	81.4	85.5	-4.2	-4.9%
Greece	3.1	3.2	0.0	-0.9%
Hungary	9.0	9.1	-0.1	-0.9%
Ireland	4.4	4.4	0.0	0.0%
Italy	67.5	67.3	0.2	0.3%
Latvia	1.4	1.2	0.2	14.8%
Lithuania	2.3	2.5	-0.2	-8.7%
Luxembourg	0.9	0.9	0.0	0.5%
Malta*	0.0	0.0	0.0	-
Netherlands	40.3	40.3	0.0	0.1%
Poland	18.3	18.2	0.1	0.7%
Portugal	4.7	4.6	0.1	3.2%
Romania	11.3	11.3	0.0	-0.4%
Slovak Republic	4.6	4.6	0.0	-0.1%
Slovenia	0.8	0.9	0.0	-5.4%
Spain	27.9	29.5	-1.7	-5.6%
Sweden	0.8	0.8	0.0	0.1%
United Kingdom	72.2	72.4	-0.2	-0.3%

Table shows differences between IEA observed consumption and calculated consumption based on pipeline import and export flows without stock change. As this article prioritises pipeline flows the data reported are calculated flows. Source: BEIS analysis of IEA data. *No data available for Cyprus and Malta.

Feed-in Tariff load factor analysis, 2011/12 to 2015/16

Introduction

This article updates the FiT load factor analysis presented in the December 2015 edition of Energy Trends[1]. It presents aggregated load factors for installations registered for the Great Britain Feed in Tariff (FiT) scheme, covering years two to six of the FiT scheme (2011/12 to 2015/16). Included in this are annual load factors, disaggregated by technology, as well as PV commissioning cohort, and quarterly PV load factors. The article also presents annual regional analysis of solar PV for all five years and wind for years five and six. The data in the article are also available in spreadsheet format at: www.gov.uk/government/statistics/quarterly-and-annual-load-factors

Key points

- The median load factor for FiT solar PV sites remained at 10.4 per cent in 2015/16, despite a 0.2 hour decrease in average daily sun hours compared to 2014/15.
- Median solar PV load factor in England & Wales was 10.5 per cent in 2015/16, compared to 9.3 per cent in Scotland.
- Scotland saw the highest median wind load factor, 25.6 per cent compared to 24.4 per cent for Wales and 18.2 per cent for England.

Background

Electrical load factor is the ratio of the actual electrical power generated by a site against its maximum potential generation in the period. Load factors vary by technology and conditions. For example, a solar photovoltaic site requires sunlight to generate electricity so its load factor varies according to the time of year, location and weather. Technological advances may improve a technology's load factor if newer models cope better with imperfect conditions.

The Feed-in Tariff (FiT) scheme was launched in April 2010. It is a financial support scheme for eligible low-carbon electricity technologies in Great Britain, aimed at small-scale installations. The following technologies are supported:

- Solar photovoltaic (PV; Up to 5 MW capacity)
- Anaerobic digestion (AD; Up to 5 MW capacity)
- Hydro (Up to 5 MW capacity)
- Wind (Up to 5 MW capacity)
- Micro combined heat and power (MicroCHP; Up to 2 kW capacity)

Installers receive support through generation and export tariffs, paid directly from electricity suppliers. The generation tariff is based on the number of kilowatt hours (kWh) generated whereas the export tariff is based on electricity that is generated on site, not used and exported to the grid.

Since the start of the scheme, BEIS (formerly DECC) has provided regular updates on the number and capacity of installations installed under the scheme, currently publishing monthly updates on deployment levels, with quarterly reports on geographical distribution, amongst other outputs[2]. From 2013, the department has obtained meter readings for each registered installation from FiT licensees (energy suppliers) and used this to produce quarterly and annual load factors. This started with FiT year 2 (data from year one is not available as the number of installations running for the full year was very small), and has now been updated to FiT year 6.

[1] The article published in December 2015 can be found at: www.gov.uk/government/statistics/energy-trends-december-2015-special-feature-article-feed-in-tariff-load-factor-analysis

[2] The full FiT statistics collection is available at: www.gov.uk/government/collections/feed-in-tariff-statistics

Methodology

The methodology used for the load factor analysis has been described in detail in an Energy Trends article from September 2014[3]. One additional quality assurance (QA) step has been added since 2015: to remove any installations from the analysis where more than one generation meter is attached. This step has only been applied to FiT years 5 and 6 data; previously produced statistics have not been revised.[4]

Table 1 shows how many installations were registered on the Central Feed-in Tariff Register at the start of FiT year 6, and how many installations had meter readings in March 2015 and 2016. Extreme values were excluded (as in previous years' analysis), with just 1.0 per cent of installations (1,549) removed. The column 'Valid load factor' in Table 1 indicates how many installations were included in the final analysis for each technology for the annual generation data. Anaerobic digestion data has been included in the main results, but this data must be treated with caution as the number of installations remains low.

Table 1: Installations included in FiT year 6 - analysis, by technology

Technology	Commissioned by 1st April 2015	Generation Data Reported*	Valid load factor	% remaining in analysis
Anaerobic digestion	235	36	32	14
Hydro	667	157	144	22
Micro CHP	494	59	59	12
Photovoltaic	622,776	148,279	148,158	24
Wind	6,663	2,136	2,120	32

* Meter reading in March 2015 and March 2016.

Results

Table 2 gives the weighted mean and median load factors as well as associated percentiles for each technology. Chart 1 presents this data across all available years (FiT years 2 to 6), highlighting the large range present for hydro compared to other technologies.

Table 2: Load factors in FiT year 6 (2015/2016), by technology

Technology	Count	Mean	Weighted mean	Percentile				
				5th	25th	50th (median)	75th	95th
Anaerobic digestion	32	75.3	81.5	26.5	65.9	86.8	95.7	97.8
Hydro	144	42.4	44.8	15.7	28.9	39.5	54.9	74.7
MicroCHP	59	12.1	12.1	4.4	8.1	11.2	15.2	24.2
Solar PV	148,158	10.2	10.3	7.4	9.4	10.4	11.2	12.2
Wind	2,120	21.7	28.7	7.6	13.6	20.3	28.8	40.4

The median load factor for Solar PV in 2015/16 was the same as in 2014/15 and 2013/14 (10.4%). This was despite a decrease in the average daily sun hours for the period from 4.5 hours to 4.3 hours[5] (see Table 3).

[3] The article published in September 2014 is available at: www.gov.uk/government/statistics/energy-trends-september-2014-special-feature-article-analysis-of-feed-in-tariff-generation-data

[4] Detailed QA of data covering all installations has not been possible due to the large number of installations.

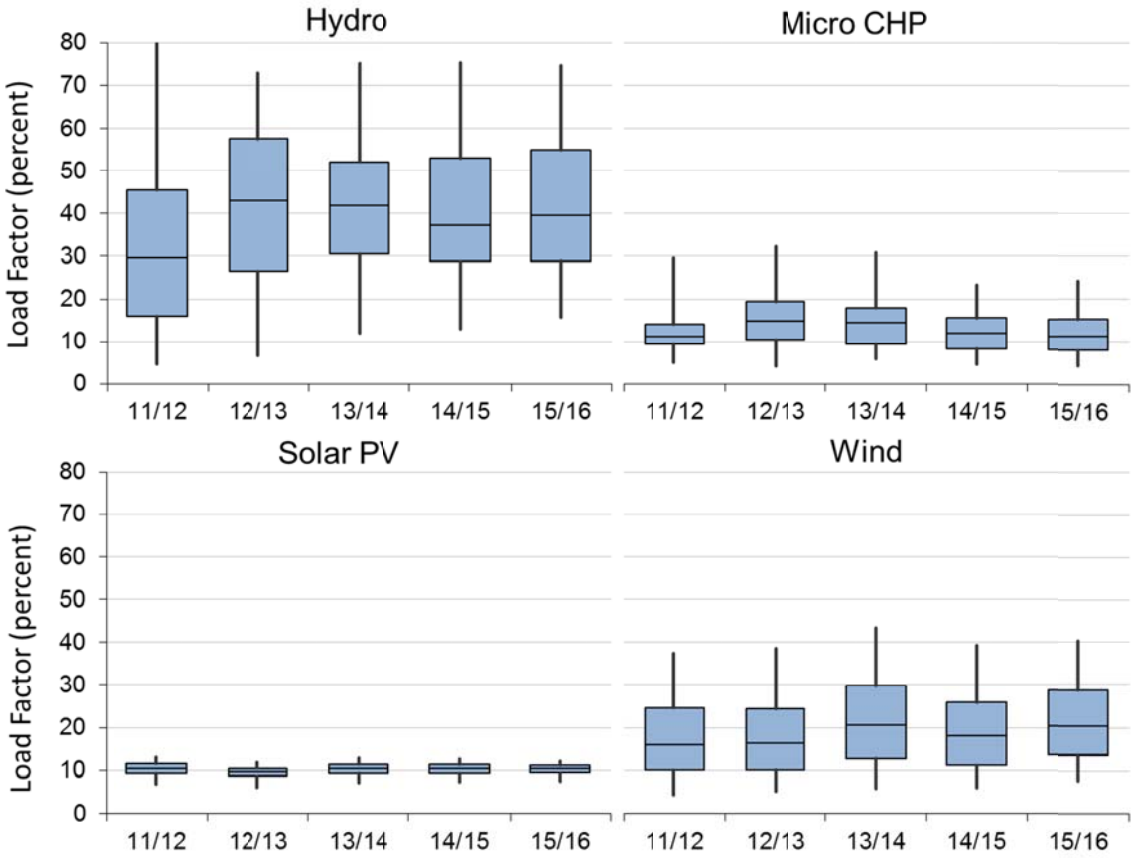
[5] Average daily sun hours taken from Energy Trends section 7: weather, table 7.3 "Average daily sun hours and deviations from the long term mean (ET 7.3)", available at: www.gov.uk/government/statistics/energy-trends-section-7-weather

Table 3: Solar PV load factors and average sun index

Year	Median load factor	Average daily sun hours
2011/12	10.5	4.5
2012/13	9.6	3.7
2013/14	10.4	4.5
2014/15	10.4	4.5
2015/16	10.4	4.3

Chart 1: Load factor range, by technology and FiT year

Lines indicate range from 5th to 95th percentile. Boxes indicate range from lower to upper quartile (25th to 75th percentile), with median indicated.



As in previous years, the weighted mean load factor for wind installations in FiT year 6 is higher than the median, and this difference has increased year on year. This reflects a relative increase in the number of higher capacity wind schemes in the analysis, which have typically performed at higher load factors. The relationship between average daily wind speed[6] and load factor for wind installations is less clear than between sun hours and solar load factors (see Table 4). The data for wind installations is based on a smaller number of installations than the solar PV analysis and therefore it is not clear yet whether the annual variation seen is an artefact of the samples used for each year.

[6] Average wind speed taken from Energy Trends section 7: weather, table 7.2 " Average wind speed and deviations from the long term mean (ET 7.2)", available at: www.gov.uk/government/statistics/energy-trends-section-7-weather.

Table 4: Wind load factors and average wind speed

Year	Median load factor	Average wind speed (knots)
2011/12	15.9	9.2
2012/13	16.3	8.0
2013/14	20.5	9.3
2014/15	18.1	8.6
2015/16	20.3	9.2

Solar PV load factors trends

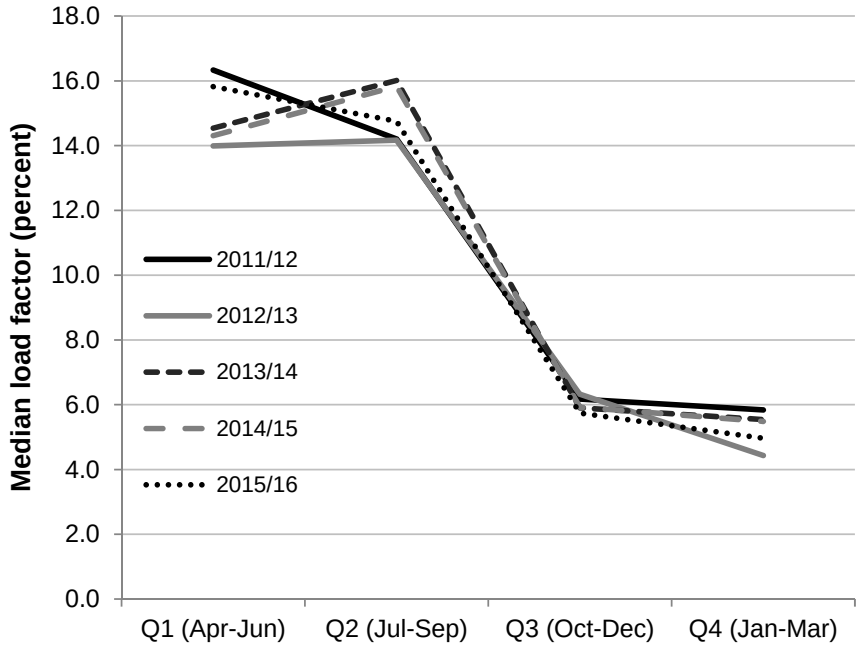
The productivity of solar installations may reduce across time due to degradation of the panels. Also, whilst newly installed schemes can benefit from technological improvements, early solar adopters may have used the most favourable sites, offsetting this. Table 5 gives the data from all the installations in the FiT year 6 analysis, disaggregated by commissioning year. Whilst the number of solar PV installations continues to increase, there is no evidence as yet from this analysis that the load factor of installations decreases over time - the mean load factor does not appear to vary relative to year installed. However, a longer-time series is likely to be needed before firm conclusions can be drawn.

Table 5: Solar PV load factors in FiT Year 6, by year commissioned

Year Commissioned	Count	Mean load factor
2010 and earlier	7,011	10.0
2011	64,475	10.2
2012	46,938	10.2
2013	22,453	10.2
2014	6,836	10.1
2015	445	10.0

Quarterly load factors for Solar PV installations are available in the accompanying spreadsheet and are presented in Chart 2. These show an expected association between load factor and daily hours of sun, where the quarters mainly covering autumn and winter have the lowest load factors. This chart also highlights that the lower annual load factors seen in FiT year 3 (2012/13) for solar PV are driven by lower load factors in all quarters - except quarter three (Q3) – which experienced lower than usual sun levels.

Chart 2: Quarterly solar PV load factors, by FiT year



Regional solar PV load factors

Solar PV load factors for each Government Office Region are given (for FiT years 2 to 6) in Table 6. Chart 3 highlights that the lowest load factors are seen in Scotland, while the highest are seen in the South West of England. Load factors in year three (2012/13) are lower than in other years, which are explained by the average daily sun hours also dropping for that year (see Table 3). London has a lower load factor than the South East which may be due to pollution or particles settling on the panels or because panels are shaded by tall buildings nearby.

Chart 3: Solar PV load factors for FiTs years 2-6, by region

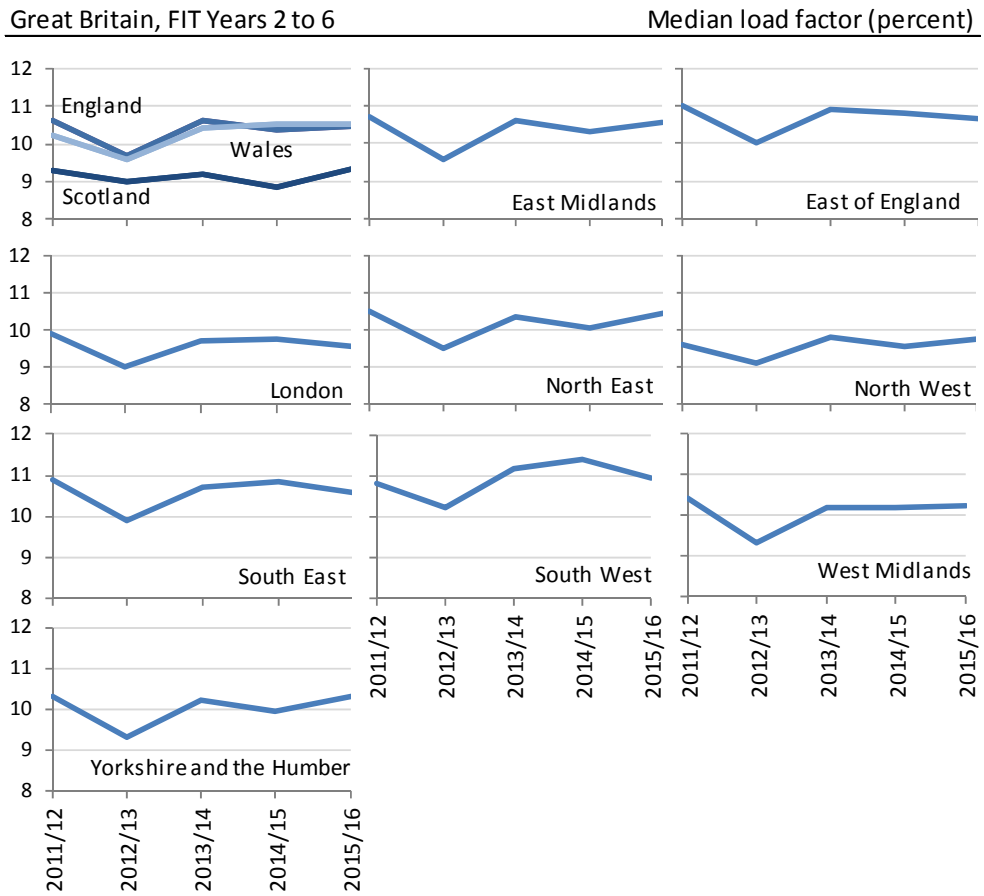


Table 6: Solar PV load factors for FiT years 2-6, by region

Region	FiT Year 2 (2011/12)		FiT Year 3 (2012/13)		FiT Year 4 (2013/14)		FiT Year 5 (2014/15)		FiT Year 6 (2015/16)	
	Count	Median	Count	Median	Count	Median	Count	Median	Count	Median
East Midlands	855	10.7	7,520	9.6	12,936	10.6	18,735	10.3	13,489	10.5
East of England	1,465	11.0	10,521	10.0	16,306	10.9	21,247	10.8	16,917	10.6
London	523	9.9	3,283	9.0	4,117	9.7	4,996	9.8	3,813	9.6
North East	224	10.5	3,460	9.5	5,805	10.3	8,023	10.1	6,444	10.4
North West	718	9.6	8,867	9.1	13,024	9.8	17,360	9.5	13,689	9.7
South East	2,764	10.9	17,378	9.9	23,235	10.7	25,994	10.9	18,955	10.6
South West	2,649	10.8	24,445	10.2	31,965	11.2	36,938	11.4	29,331	11.0
West Midlands	974	10.4	7,139	9.3	11,118	10.2	15,312	10.2	12,013	10.2
Yorkshire and the Humber	798	10.3	7,292	9.3	11,299	10.2	18,507	9.9	15,058	10.3
England	**10,970**	**10.6**	**89,905**	**9.7**	**129,805**	**10.6**	**167,112**	**10.4**	**129,709**	**10.5**
Scotland	**508**	**9.3**	**7,722**	**9.0**	**11,531**	**9.2**	**11,363**	**8.9**	**6,802**	**9.3**
Wales	**645**	**10.2**	**9,882**	**9.6**	**13,643**	**10.4**	**15,100**	**10.5**	**11,614**	**10.5**

Regional wind load factors

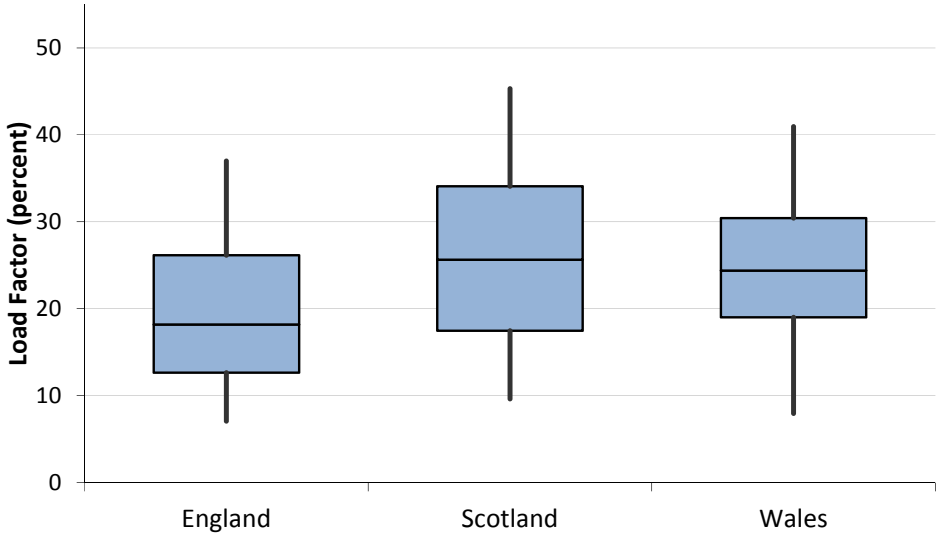
Regional load factors for wind schemes for FiTs years 5 and 6 are presented in Table 7.[7] Chart 4 summarises this data for England, Scotland and Wales, showing that the highest wind load factors are found in Scotland.

Table 7: Wind load factors for FiT years 5 and 6, by region

Region	FiT Year 5 (2014/15)		FiT Year 6 (2015/16)	
	Count	Median	Count	Median
East Midlands	134	14.4	123	17.5
East of England	453	10.0	405	13.0
London and South East	30	14.8	23	12.1
North East	84	16.5	73	17.5
North West	133	19.0	137	23.6
South West	318	19.6	296	25.7
West Midlands	63	13.6	63	17.1
Yorkshire and the Humber	319	18.9	318	20.8
England	**1,534**	**14.8**	**1,438**	**18.2**
Scotland	**743**	**24.8**	**469**	**25.6**
Wales	**190**	**20.0**	**178**	**24.4**

Chart 4: Wind load factors for FiT year 6, by GB country

Lines indicate range from 5th to 95th percentile. Boxes indicate range from lower to upper quartile (25th to 75th percentile) with median indicated.



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[7] Data from London and the South East of England has been aggregated as there was only one installation within the London region with a valid load factor.

Building Energy Efficiency Survey

Introduction

The Building Energy Efficiency Survey (BEES) was published by the Department for Business, Energy & Industrial Strategy on 16th November 2016. The survey was designed to meet the following research objectives:

- To update the Department's understanding of how energy is used, for a snap-shot in time, across the non-domestic building stock in more detail than is available at present;[1]
- To update how energy use can be abated across the non-domestic building stock.
- To understand the barriers and enablers of energy abatement.

The first two objectives are featured in this article. The third objective is only addressed in the BEES overarching report. www.gov.uk/government/publications/building-energy-efficiency-survey-bees

Overview of project method

The BEES study reports on the non-domestic building stock for England and Wales. Within this overall scope the stock is split into 10 sectors. These are in turn made up of 38 sub-sectors, each of which were analysed separately. Industrial buildings are included but the survey did not collect information on energy use in industrial processes.

The study collected data through a large sample of telephone surveys (3,690) across all sectors. Each survey record is a premises which may represent a whole building or a part of a building. This information was obtained from a single organisation in a premises. A smaller subset of site surveys (214) across all sectors were sampled from within the telephone survey sample. The telephone survey respondents were randomly selected from national level datasets for England and Wales.

The telephone surveys were used as the primary input to two models. One model calculated the energy use (the energy use model) and the other calculated the energy saving potential (the abatement model). The energy use model estimated the energy consumption for space heating, hot water, lighting and up to 22 energy uses for each premises record. The abatement model determined the abatement potential of energy efficiency measures which could be applied to that premises, their capital cost and the amount of energy these measures could save.

The detailed findings from site surveys and a database of matched energy and activity data were used to calibrate the two models. The site surveys were also used to validate the telephone survey responses, and collect information on barriers and facilitators from the site contacts.

Overall, the model calibration process has shown that at a sub-sector level the energy consumption is reliable but that at a single record level the accuracy has a higher level of uncertainty.

The overall project method had weaknesses in two areas:

- Data inputs were obtained through telephone surveys, which were highly simplified. The telephone survey was designed to ensure it was easy to understand for non-energy experts. This meant questions could not be particularly technical and this further limited the sophistication of the input data to the model;
- The majority of the inputs were self-reported, which meant it was prone to a range of biases, such as differences in interpretation or understanding of a question by the respondent.

Following analysis of the data on the individual premises, the record results were weighted in order to produce results representative of all non-domestic buildings in England and Wales in each sector.

[1] The current non-domestic stock model (Pout, C (2000) NDEEM: the national non-domestic buildings energy and emissions model) is underpinned by field research conducted by Sheffield Hallam University in the 1990s.

Building stock sector overview

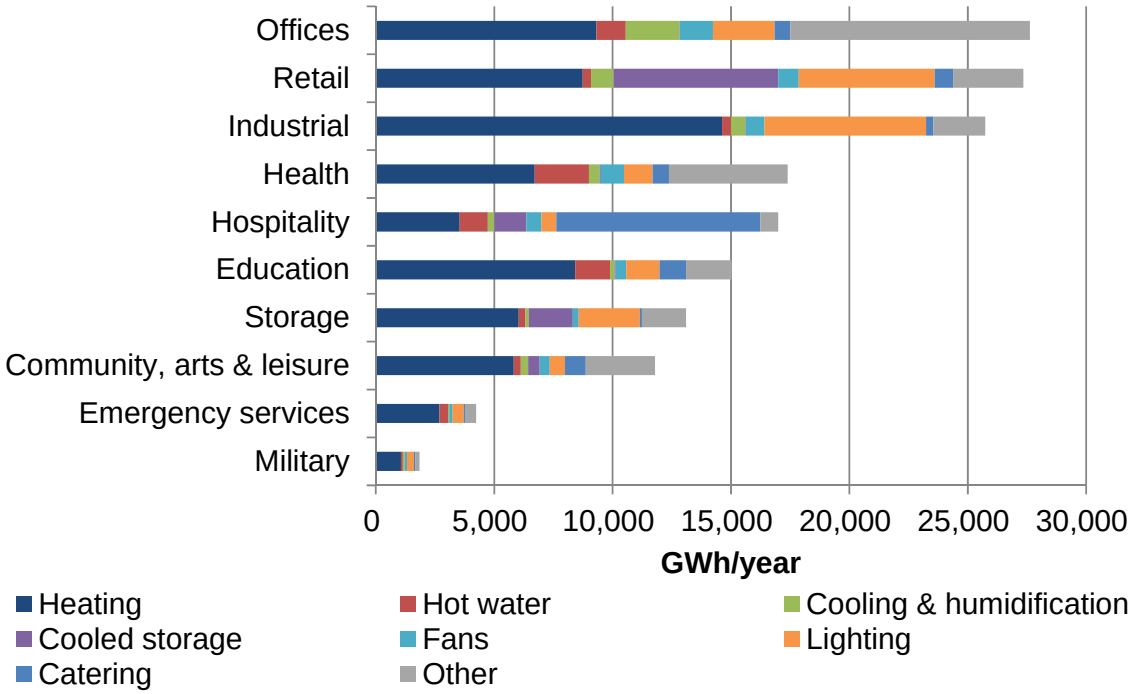
BEES building stock covers a total gross internal area (GIA) of 784million m2, across 1.57 million premises. The total non-domestic stock across England and Wales comprises 1.83 million premises.

Key findings

Energy consumption by sector and energy end use, 2014–15

- According to modelled data based on telephone survey responses, the total stock consumed 161,060 GWh/year of energy, of which electricity was 84,820 GWh/year (53 per cent of total) and non-electrical energy consumption was 76,240 GWh/year (47 per cent of total).
- The five largest sectors in terms of energy consumption were offices (27,620 GWh, 17 per cent), retail (27,340 GWh, 17 per cent), industrial (25,740 GWh, 16 per cent), health (17,380 GWh, 11 per cent) and hospitality (16,980 GWh, 11 per cent). Together these accounted for 71 per cent of total non-domestic energy consumption.
- The four largest energy end uses were space heating, internal lighting, catering and cooled storage (for storage of food and drink), which accounted for 70 per cent of total consumption. The three most common end uses of electrical energy were internal lighting (21,260 GWh), followed by cooled storage (10,790 GWh), and ICT equipment (7,910 GWh). The three most common non-electrical energy end uses were space heating (59,300 GWh), hot water (6,300 GWh) and catering (6,040 GWh).
- The five largest sectors in terms of floor area are the Industrial sector (180 million m2, 22 per cent), Storage (140 million m2, 17 per cent), Offices (120 million m2, 15 per cent), Retail (110 million m2, 14 per cent) and Education (80 million m2, 10 per cent). Together these account for 79 per cent of floor area within the scope of BEES.

Figure 1: Energy consumption by sector and energy end use, 2014–15



Source: Energy use model results for the sector covering England and Wales

Abatement potential in the non-domestic buildings, 2014–15

The energy abatement potential is the amount of energy savings that are technically available for a premises. The abatement model identified appropriate abatement measures based on the responses from the telephone survey, and then calculated the energy saved from the measure compared with the current energy end use consumption calculated in the energy use model. The technical annex sets out a detailed explanation of the abatement model[2].

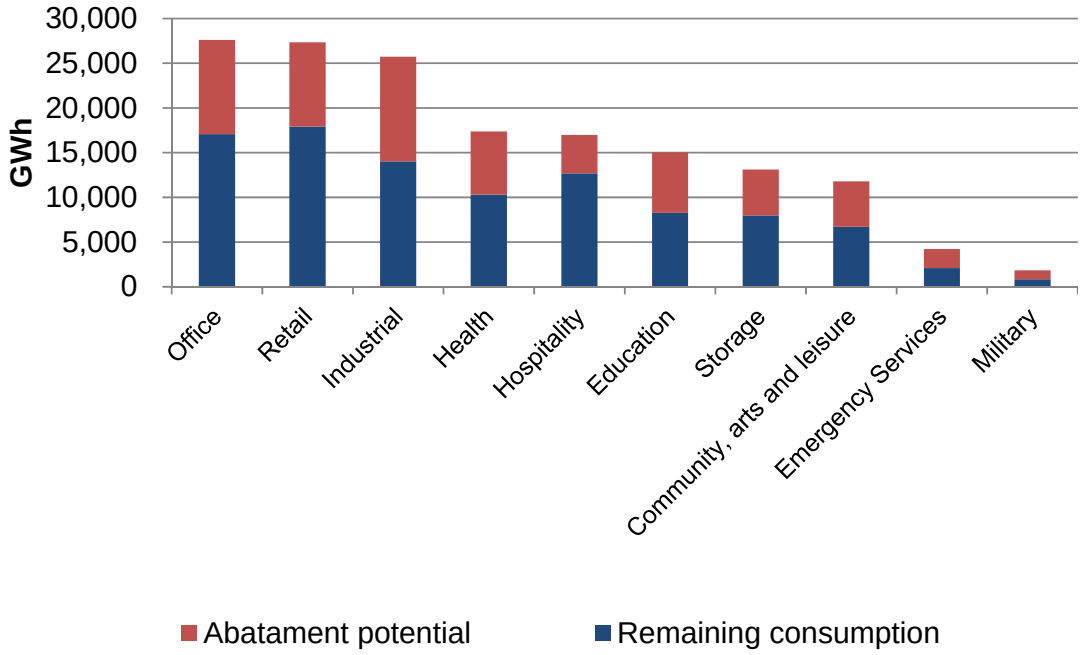
- Figure 2 shows the full technical abatement potential available by sector. This represents the possible reductions in energy consumption following implementation of all applicable measures. The results include measures that are not cost-effective and the model applies a simple assessment of measure suitability.
- The total technical abatement potential in all sectors was 63,160 GWh (39 per cent of total energy). Of this total the electrical abatement potential was 28,870 GWh (34 per cent abatement potential) and the non-electrical abatement potential was 34,290 GWh (45 per cent abatement potential). This could be achieved at a capital cost of £28.4 billion.
- The socially cost effective potential was 27,890 GWh of total energy consumption: 14,140 GWh of electrical energy consumption and 13,740 GWh of non-electrical energy consumption. A measure is socially cost-effective if the total benefits to society outweigh the total costs to society over the lifetime of the measure[3].
- Overall there were 22,080 GWh of total energy savings with a private payback period[4] of 3 years or less (9,850 GWh of electrical energy savings and 12,230 GWh of non-electrical energy savings).
- The sectors with the largest technical abatement potential were Industrial, with 11,710 GWh of energy (46 per cent reduction on consumption), Offices with 10,550 GWh of energy (38 per cent reduction on consumption) and Retail with 9,420 GWh of energy (34 per cent reduction on consumption).

[2] www.gov.uk/government/uploads/system/uploads/attachment_data/file/566038/BEES_Technical_Annex_FINAL.pdf

[3] The Supplementary guidance to the HM Treasury Green Book on Appraisal and Evaluation in Central Government shows how the societal benefits of carbon abatement are measured: www.gov.uk/government/uploads/system/uploads/attachment_data/file/483278/Valuation_of_energy_use_and_greenhouse_gas_emissions_for_appraisal.pdf

[4] Payback is calculated by dividing the capital installation cost associated with a measure by the annual financial savings achieved based on energy cost reductions accounting for any annual operational costs.

Figure 2: Abatement potential by sector, 2014–15



Source: Abatement model results by sub-sector, England and Wales

Table 1 shows the abatement potential by measure type. Definitions of measure type are included in the BEES Technical Annex (Table 4.4). The largest group of savings in terms of reductions in energy consumption related to the implementation of space heating measures, building instrumentation & control measures, and carbon & energy management. The largest group of savings in terms of the potential energy bill savings related to the implementation of lighting upgrades.

Table 1: Abatement potential by measure group, 2014–15 (All sectors)

Measure group	Total annual energy bill saving (£ thousands)	Total annual carbon saving ($ktCO_2$)	Total annual energy savings (GWh/year)	Total capital cost of measure (£ thousands)
Air conditioning and cooling	128,900	370	1,300	1,369,900
Building fabric	294,700	1,480	8,260	6,362,600
Building instrumentation and control	415,600	2,120	11,190	2,447,500
Building services distribution systems	75,200	240	760	1,310,500
Carbon and Energy Management	721,700	3,030	12,580	1,604,200
Hot water	49,600	290	1,520	496,800
Humidification	100	0	1	1,700
Lighting	1,085,400	3,260	10,930	4,401,300
Cooled storage	212,100	650	2,140	1,193,100
Small appliances	127,700	420	1,390	2,077,200
Space heating	294,700	1,690	9,260	3,735,200
Swimming pools	25,000	130	640	275,500
Ventilation	311,100	950	3,210	3,115,300
Total	**3,741,800**	**14,630**	**63,160**	**28,390,800**

Source: Abatement model results for the sector, England and Wales

Energy Consumption in the UK

BEES statistics are now used to produce the estimates of service sector energy by end use published in ECUK (www.gov.uk/government/collections/energy-consumption-in-the-uk). The ECUK tables containing BEES statistics are 5.05, 5.08, the services section of 1.04 and a new table 5.05a.

- Table 5.05a shows the final energy consumption of the services sector by BEES sector, subsector, end use and main fuel.
- Table 5.05 is a summary of these statistics at a BEES sector level, using the ECUK end use and heating fuel definitions. Assumptions were used to represent BEES statistics in the ECUK categories and these are explained in the section below.
- Table 5.08 uses the figures in table 5.05 and converts them to the primary energy consumption equivalents.
- Table 1.04 which shows the overall heat and other end uses by fuel uses BEES figures for the services sector.

The Building Energy Efficiency Survey (BEES) is based on modelled energy use. The model provided an estimated amount of electrical and non-electrical energy for each end use. The survey did collect the main fuel type for space heating. It is not possible to identify the main fuel for non-electrical energy uses for other end uses from BEES directly and assumptions have been made to enable this. All electrical energy is of course allocated to electricity.

Table 2: Allocation of non-electrical energy to fuel type by end use

	Main Heating fuel				
End Use	**Natural gas**	**Oil**	**LPG**	**District heating**	**Other**
Space heating, Water heating, Heating swimming pools.	Natural gas	Oil	Oil	Heat sold	Bioenergy and waste
Catering, Cooling & humidification, Other.	Natural gas	Oil	Oil	Oil	Oil

Some assumptions have been made for converting the BEES end uses to fit the ECUK definitions. It has been assumed that the ECUK ‘cooling and ventilation’ category is equal to the BEES end uses ‘fans, cooling and ventilation’. The BEES ‘cooled storage’ and ‘small power’ have been added to the ‘other’ category to match the ECUK ‘other’ category.

Figures 3 and 4 show the electricity and non-electricity consumption for previous ECUK publications and BEES by end use and show how the proportions of energy used for each end use have changed over time.

For electricity the most noticeable change was the reduction in the 40 per cent proportion of electricity being consumed by lighting in ECUK to only 23 per cent in the BEES figures. Over time there have been improvements in the efficiency of lighting that are not included in the ECUK trend, this increase in efficiency could explain why the BEES estimate for lighting consumption is lower than the historical modelling used in ECUK.

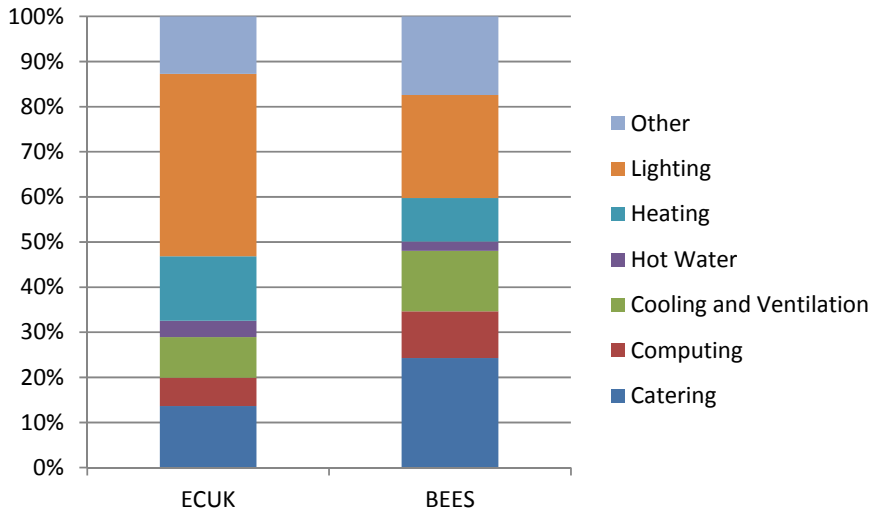
Cooling and ventilation is another end use where there is a difference in the proportion of electricity being consumed, increasing to 13 per cent in BEES compared to 9 per cent. An upward trend is also seen in the computing end use where the proportion of electricity consumed is now 10 per

cent in BEES compared to 6 per cent. The reason for these differences is the increase in these end uses since the previous survey.

The 17 per cent of electricity consumed in the “other” category for BEES is slightly higher than the 13 per cent in ECUK ; this reflects the increased use of electricity for modern small power end uses.

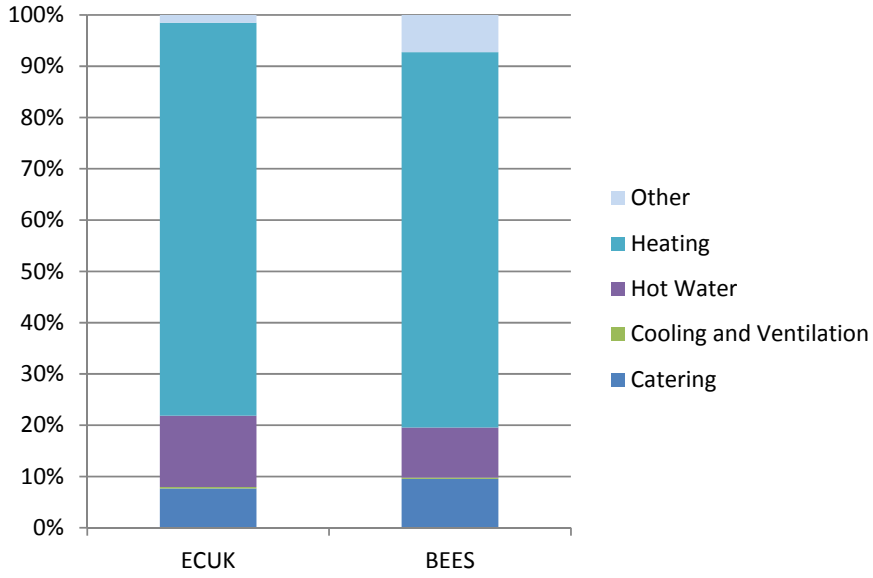
There was a large difference in the proportion of catering between the two data sources, with 14 per cent of electricity consumption in ECUK and 24 per cent of electrical consumption in BEES used for catering. This could reflect the rise in number of meals eaten at restaurants since 1995. It should be noted that the catering end use contains cooled storage for this comparison and any increase in the amount of warehouse style refrigeration and large food retailers may be contributing to this increase.

Figure 3: ECUK End-use electricity comparison



Compared to electricity there are fewer differences between ECUK and BEES for the proportions for each end use of the total energy used. The largest end use is heating in both cases: in ECUK it accounts for 77 per cent of non-electricity energy consumption and for BEES it accounts for 73 per cent. Hot water and catering proportions are similar, but the ‘other’ category is significantly higher in BEES, at 7 per cent compared to 2 per cent in ECUK.

Figure 4: ECUK End-use non-electricity comparison



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Recent and forthcoming publications of interest to users of energy 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 22 December 2016 at:
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 September 2016, was published on 22 December 2016 at:
www.gov.uk/government/collections/smart-meters-statistics

Sub-national electricity consumption, 2015

This factsheet looks at electricity consumption by consuming sector for Great Britain, and Regional/devolved administration areas, together with some commentary relating to local authority trends. The data analysed in this factsheet are based on the aggregation of Meter Point Administration Number (MPAN) readings throughout Great Britain as part of BEIS's annual meter point electricity data exercise. The data cover the electricity year between 26 January 2015 and 25 January 2016. These data follow on from the results produced from similar exercises carried out for 2005 to 2014. The latest release was published on 22 December 2016, at:
www.gov.uk/government/collections/sub-national-electricity-consumption-data.

Sub-national gas consumption, 2015

This factsheet looks at gas consumption by consuming sector for Great Britain, and Regional/devolved administration areas, together with some commentary relating to local authority trends. The data analysed in this factsheet are based on the aggregation of Meter Point Reference Number (MPRN) readings throughout Great Britain as part of BEIS's annual meter point gas data exercise. The data cover the gas year between 1 October 2014 and 30 September 2015 and are subject to a weather correction factor. In the domestic sector, gas consumption is predominately used for heating purposes and as a result usage is driven by external temperatures and weather conditions. The weather correction factor enables comparisons of gas use over time, controlling for weather changes. These data follow on from the results produced from similar exercises carried out for 2005 to 2014. The latest release was published on 22 December 2016, at:
www.gov.uk/government/collections/sub-national-gas-consumption-data.

Sub-national electricity and gas consumption at LSOA, MSOA and IGZ level, 2015

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 2015. The data will be published on 26 January 2017 for electricity at:
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

Greenhouse Gas Emissions final 2015 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 2015 UK greenhouse gas emissions statistics will be published on 7 February 2017 at:
www.gov.uk/government/collections/final-uk-greenhouse-gas-emissions-national-statistics

Greenhouse Gas Emissions provisional 2016 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 will also be included within this publication. Provisional 2016 UK greenhouse gas emissions statistics will be published on 30 March 2017 at:
www.gov.uk/government/collections/provisional-uk-greenhouse-gas-emissions-national-statistics

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.

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

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/

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**
From	**Multiply by**			
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**
From	**Multiply by**			
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

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

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

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